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ICT-POLICY IN A GEOGRAPHICAL CONTEXT A SWEDISH APPROACH

STEN LORENTZON ¹

Résumé - L'introduction des Technologies de l'Information et de la Communication (TIC) en Suède s'est effectuée dans un contexte politico-institutionnel centralisé qui s'est toujours efforcé de maintenir les activités situées dans les îles, ces espaces périphériques peu peuplés. Dans un contexte où l'utilisation des TIC est perçue comme un moyen de corriger les déséquilibres régionaux, il n'en reste pas moins que le développement suédois vers une société de l'information et de la connaissance tend naturellement à renforcer le rôle de Stockholm comme noeud dominant. Cet article traite de la territorialisation des TIC en Suède à un niveau local, régional, national et international. Le rôle des acteurs territoriaux à ces différents niveaux est en particulier souligné pour montrer que les autorités locales, malgré un contexte centralisé, jouent un rôle important dans le soutien à la mise en place de la société de l'information..

Mots clés – TIC, Politiques Publiques – Mise en oeuvre – Compétition régionale - Suède

Abstract - The introduction of ICT in Sweden is performed in the frame of centralistic governing and settlement structure characterized by activities located like islands in sparsely populated areas. Contrasts are evident between sparsely populated areas in the North and densely populated areas in the South. The development towards a more knowledge-intensive society tends to strengthen the role of Stockholm as the dominant Swedish node. In this context the use of ICT is seen as a tool to counteract tendencies towards regional imbalances. This paper focuses on the geographical conditions necessary to the use of ICT in Sweden and the efforts made on local, regional, national and international levels to support the use of ICT. The interplay of actors representing all levels is emphasized. In Sweden the local area authorities play an important role for launching and performing projects.

Key words – ICT-policy – ICT-implementation – Regional competition - Sweden

INTRODUCTION

Sweden is a unicentric country characterized by central governing. This hierarchical structure dates back to the foundation of Sweden by King Gustav Vasa in the 16th century and has extended to a lot of activities. Private companies have been influenced by this type of

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structure (Ahnström 1973). A consequence is concentration of decision-making to Stockholm (the capital). Furthermore, the great regional changes of the Swedish settlement structure after the second World War have been characterised by migration from country to city, from north to south and from periphery to center. These changes are related to the institutionalization of the welfare State especially during the 1960's. The expansion of welfare State services were organized by new and larger municipalities (Petersson 1991).

Otherwise, forest, iron and waterfalls have been decisive factors for location and development of Swedish industries and explain why Sweden has built up competitive manufacturing niches. The forest resources were used at an early stage to provide fuel or in the refining of iron and as a building material. The machinery industry and the transport equipment industry are based on the iron resources and the power of waterfalls enables the processing of iron and timber. Swedish competitiveness is also related to the configuration of the country. The long distance from North to South has been a driving force in the development of transport solutions and systems for the transmission of power and messages enabling the exploitation of raw materials in peripheral isolated areas far away from the markets (Sölvell et al 1991).

This type of resource related manufacturing located to waterfalls shaped the Swedish settlement structure characterized by activities located like islands in sparsely populated areas. This "punctual" distribution of places becomes even more pronounced with regard to the size of the country. Sweden is the third largest country in Western Europe with a North-South distance of nearly 1 600 km and a East-West distance of 500 km. Sweden superficie is 450 000km² including 53% of forests and 8% of cultivated land. The number of inhabitants is 9 million (www.Sweden.se 06-01-16). Thus, many small places are spread over a large area. Sparsely populated forest areas in the northern parts contrast with densely populated agricultural areas in the southern parts of Sweden. In County Norrbotten in the North there are three people per km², while the corresponding figure in County Scania in the South is 105 (Statistics Sweden 2006).

Sweden is also characterized by many large companies. A reason for the development of this large-scale structures is the early internationalisation of Swedish companies (SNA 1993). During the last years mergers have strengthened this dependence on large international companies with headquarters mainly located in Stockholm. The expansion of knowledge-intensive production and the growth of the private service sector during the last decade has strengthened the dominance of Stockholm. The transportation infrastructure has been constructed in accordance with this position. Stockholm is the hub for railways, roads and air connections.

In this context the use of information and communication technology (ICT) offers new opportunities and awakens hope for a potential force counteracting tendencies towards regional imbalances. An official goal of the Swedish IT-policy is to enable communication facilities independent from location². Investments in communications infrastructure are made in all parts of the country. But there is a tendency to favour investments such as the digitization of the telenet and the extension of broadband-nets in urban compared to peripheral areas. This indicates a time-lag hindering the competitive ability of the periphery. In this paper the geographical conditions necessary to the use of ICT in Sweden and the efforts

² ICT (Information and Communication Technology) is used synonymous with IT (Information Technology) in the meaning convergence of communications technologies and computer technologies.

made on local, regional, national and international levels to support the use of ICT in Sweden are at focus.

1. CHANGES OF ORGANISATIONAL AND LOCATIONAL PREREQUISITES

Before Industrialisation the Economy was fragmented. The settlement structure was characterised by self-sufficient units. The mobility and division of labour were limited. The agriculture was the base for economic activity and products such as furniture, clothes and tools were mainly made on the farm. The market economy was slightly used. But the old craft society broke down when foreign trade increased in importance. The export market demanded specialist knowledge that gradually led to a more systematic division and specialisation of work. A consequence was, in many cases, the concentration of certain crafts in one town (SNA 1995).

During Industrialisation the Factory System was introduced. It led to Division of labour and Specialisation. Different forms of production such as "Fordism" and "Taylorism" were developed in Europe and the USA characterised by high division of labour, specialisation and automation. This introduction included long series and large markets that led to mass-production and concentration. These ideas reached their peak in the middle of the 20th century. Large manufacturing belts developed. In this perspective the industrial concentrations in Sweden appear small. The period from about 1800 to the end of the second World War was also characterised by nationalism, mass-education, mass-communication and conscripted armies. To create feelings of solidarity and identity effective communications systems were necessary. Regions were linked by railways. Mass-education and literacy paved the way for newspapers and books (SNA 1995).

The construction of railways during the end of 19th century and the beginning of 20th century stimulated companies to diffuse their production to different factories. This pattern became even more clear when Swedish companies entered foreign production in the late 1800s; a time with high transportation costs and protected markets. Especially since the Second World War companies have been developing international networks interconnecting scattered units enabled by extension of Transportation and communication systems. The demand for rapid transport has stimulated the need to transfer and coordinate information. In this context special attention is paid to flows of information in networks (Castells 1996, Törnqvist 1998).

Presence in networks is important to conquer new fields of knowledge. Accessibility is a central factor for competitiveness of places/regions. This emphasizes the strategic position of the human being as a main actor influencing the locational pattern and the importance of infrastructure for transportation and communications at the development towards a society characterised by information and knowledge processes. Furthermore, the convergence of communications technologies and computer technologies contributes to the economic and social dynamics of the society and introduction of new communication systems is an important explanation for the rise of networks and the location of activities (Hepworth 1989, Roche 1997). From a creative point of view the prevalence of environments with certain characteristics attracting "talents" is underlined (Florida 2002).

In a Swedish context the organisational structure (unicentric) and the locational pattern ("punctual" location of industries in sparsely populated areas) stress the importance of infrastructure for transportation and communications to strengthen competitiveness. Thus, ICT-use is seen as a tool for economic development and for the increase of competitive power of regions all over the country.

2. INFRASTRUCTURE FOR COMMUNICATIONS

The Swedish telephone system construction was very rapid. Only USA and Canada had higher telephone density at the beginning of the 20th century. The absence of entry restrictions, the strong competition between the operators in Stockholm and the existence of a national manufacturing industry – LM Ericsson – are some factors explaining this rapid telephone diffusion in Sweden. During the early 1900s the telecommunications sector developed into a State-governed monopoly that evolved into a strong regime during the following 70 years. But in the 1980s telecommunications policy became a political and public issue. A political process was initiated including reformulation of the game rules (Karlsson 1998).

The Swedish telecommunications policy goal is to offer a high quality infrastructure at low costs throughout the country. Thus, important investments have been made over the years to ensure every household connection to the wired telephone network. Recent examples are investments in the construction of Digital Switching Stations (AXE; started in 1980) and the digitalizing of the telecommunications network in all Sweden. Systems for mobile communications are well developed and were introduced at an early stage. NMT (Nordic Mobile Telephone Network) was introduced in 1982 and GSM (Global System for Mobile Communications) in 1992. GSM-connections are digital, allowing more transmission capacity compared to the analogue NMT-system (Maskell et al 1998). GSM has gradually spread from densely to sparsely populated areas of Sweden. Recent changes of the telemarket concern mainly the increase in the use of mobile teleservices, 3G-telephony and IP-based telephony (Sika 2005).

The shift to electronics and digital technology required more research. This pushed Televerket (monopoly) and LM Ericsson to join their efforts in Research and Development in order to deal with the increased costs associated with new technologies. The cooperation in Ellemtel (company created 1970) was facilitated by the monopoly arrangements with Televerket responsible for the domestic market. LM Ericsson was responsible for the international market. New technologies, facilitated by the monopoly regime, were successfully integrated into the traditional telecommunications systems (Karlsson 1998).

The introduction of new technologies meant extension into new areas. When the first modems were installed in 1962 the first data transmission service started. In the early 1970s the planning for a public data network was initiated and in the early 1980s several data communications services became commercially available (Karlsson 1998). In 1988 Internet was established by the Swedish University Network. Different owners constitute the Internet and are able to govern their own networks and thereby influence the use of Internet. Broadband enabling high-speed transmission of large information flows have been and are constructed. Today about 90% of the population can be connected by broadband (Andersson 2006).

Besides, satellite communication technology was developed during the 1960s. In 1964 INTELSAT, an International Consortium for governing the space segment of a global satellite system was established and in 1965 the first commercial communications satellite was operational. The Scandinavian countries were represented from the beginning and constructed a common earth station (opened 1971) for telecommunications traffic between the Nordic countries and the USA. In 1977 EUTELSAT was created as a regional satellite system in Europe. Sweden signed the convention and in 1983 the first satellite was launched. By new satellite technology the market for new types of services was opened (Karlsson 1998).

3. DEREGULATION AND ACTORS

The Swedish telecommunications sector became a public monopoly in the 1910s. The State-owned agency – Televerket – was responsible for both regulation and operation of telecommunications services. The monopoly included the connection of equipment to the State-owned telephone network and infrastructure construction and operation. But this monopoly regime started to decline during the 1980s (Karlsson 1998). In 1993 Televerket was transformed into a limited company – Telia – and since this time Sweden has been one of the world's most deregulated markets with respect to telecommunications (Maskell et al 1998). Thus, Sweden was quick to conform to the EU directive concerning the liberalisation and harmonisation of the European market (PTS 2002).

At the beginning of the 1990s the Kinnevik Industrial Group (Swedish company) intensified its activities in the telecommunication sector. In 1991 a company – Tele2 - was established and intended to become the second operator of the Swedish telecom market. After Britain, Sweden became the second country in Europe to have an alternative to the traditional telecommunications company. Competition with Televerket would take place in all areas such as basic telephony and data communications (Karlsson 1998). In the mid-1990s four operators dominated the Swedish telephone industry: Telia, Tele 2, Comviq and Europolitän. Of these operators Telia and Tele 2 offered subscriptions on different networks (Nutek 1995). But in the end of 1990s the number of operators had increased to 30 reflecting the changing situation of the telemarket.

Today, Telia Sonera is the market leader concerning landline and mobile telephony as well as Internet services. Tele2, WorldCom, Song, Utfors/Telenor and ANC are the main competitors in the Landline market, while Tele2 and Vodafone are the main competitors to Telia Sonera in the mobile market. Telia Sonera's main competitors on the Internet Services market are Tele2, Bredbandsbolaget, Bostream and UPC. The Communication Technologies market is dominated by Telia Sonera, Utfors/Telenor, WorldCom and Song Networks (www.teliasonera.se 06-03-13).

Along with the deregulation process the authority PTS - Swedish Post and Telecommunications Authority - was established in 1992. In 1993 the Post Office Administration monopoly to distribute letters was abolished and Televerket became the State owned company Telia. In 1994 the Post Office Administration became the Posten company, while the authority responsibility was transferred to the Telecommunications Authority that changed their name to Swedish Post and Telecommunications Authority. PTS looks after electronic communications including telecommunications, IT and radio, and mail. The vision of PTS is to enable access to efficient, praiseworthy and reliable communications services (www.pts.se 06-03-13). Operators wanting to offer telephone services to, for example, a landline or a mobile telephone service must apply to PTS.

The mobile telephone market deviates from the landline market as it is based on the use of radio frequencies. This is a limited resource that restricts the number of operators. But since 2000 the owners of network capacity are obliged to sell excess capacity at market prices to those that request it. Operators that do not have a network can offer services and these "service providers" offer increased competition on the market (SIKA 2000). At the end of 1990s a large expansion of the mobile communication's network took place. Thus, the digital GSM network increased from about 2 million subscribers in 1995 to more than 6 million in 2000 (SIKA 2001). In 2004 this figure had increased to nearly 10 million (SIKA 2005).

By the 3G or UMTS (Universal Mobile Telecommunications System) faster transmission of information is possible. In Sweden permission for 3G was given by PTS in

2000. The decision accepted four out of ten applications: Europolitan, HI3G, Orange and Tele2. All four companies promised to cover at least 8 860 000 persons (nearly 100% of the population) by the end of 2003. These permissions are valid during the period 2000-2015. The decision was controversial and Telia, Telenordia and ReachOut Mobile appealed against the decision. However, the decision was confirmed in 2001 (www.pts.se06-02-20).

4. INSTITUTIONAL PATTERN OF THE COUNTRY

Sweden is organised in a centralistic way and the geographical pattern of decision-making has a unicentric structure. The location of the decisional functions is correlated to the hierarchical structure of society based on a long tradition of central governing. In this system the king was the ruler. Both the church and the authorities were controlled by the king. Today, authorities perform decisions made by the parliament and the government. The parliament makes laws and the government leads the country. The authorities are ruled by the government and are subordinated by the departments. There are 550 authorities in Sweden dealing with public sector activities such as Courts, County Boards or County Police Authorities. The authorities are self-governed and the ministers are not allowed to govern in what way the authority decisions are made or how laws are applied (www.Sverige.se 06-03-10).

Since the 17th century the country was divided into counties led by governors who were appointed by the king until the 1970s. Nowadays the Government appoints them. The State is represented by a County Board. This board controls the government decisions Performance and coordinates different County interests (www.Sverige.se 06-03-10). The Counties administrative borders have changed marginally during 350 years even if some changes in the Western and Southern parts of Sweden were made recently. In the South two counties have merged into County Scania and in the West three counties have merged into County Västra Götaland. This has, together with the former merger of the city and county of Stockholm, meant a reduction from originally 25 to 21 counties.

Along with these mergers have followed a Power Decentralisation from the central to the newly established regional levels. Thus, in Scania and Västra Götaland County councils have been enabled to make decisions in issues formerly governed by the State. But the structural changes are marginal as the Budget main issue and dominating share is the Health sector that since long is governed by County Councils³. There are 20 County councils in Sweden; in general comprising the same territories as the counties. Otherwise, centrally made decisions are mainly implemented by local area authorities (LAAs). There are 290 LAAs/municipalities in Sweden. These LAAs have a formal important power e.g. regarding local Taxes. But their influence is actually limited as the most important decisions are made centrally. The municipalities population varies from 765 000 (Stockholm) to 2 600 inhabitants (Bjurholm)(Statistics Sweden 2006).

Historically the parishes were important functional units related to mainly church activities. But today their importance are limited. There are 2 212 parishes in Sweden (Statistics Sweden 2006).

³ The creation of these counties are still under consideration and final decision will be made after evaluation of these mergers.

5. ORGANISATIONAL STRUCTURE OF ICT-ISSUES

5.1. Background

The process of globalisation has been pushed by the availability of information technologies based on the convergence of communications and computer technologies. During a period of 20-30 years Communications Systems were transformed radically. In a global context the two innovations of satellite communications and optical fibre technologies have been especially significant. Satellite communications have been increasingly challenged by optical fibre technology enabling transmission of information at a very high speed and with a high signal strength in huge capacity systems. In parallel with the transportation technologies development the world has shrunk (Dicken 2003).

A strong tendency of technological developments in transportation is Geographical Concentration. The world's leading national economies are pulled closer together, while e.g. less industrialised countries, smaller towns and rural areas are left behind. Even if this development has taken place parallelly with the introduction of new communication technologies the communications media have become significant in their own right (Dicken 2003). New IT-techniques awaken both hopes and fears and both strong and weak development of regions have been predicted (Toffler 1980, Naisbitt 1982).

In the 1990s there was a growing opinion that IT was about to create a new economy based on new sets of rules. New tele-computer products were introduced and soon found many buyers. Sweden was at the forefront related to Ericsson's successes and the widespread use of mobile telephony and the Internet. The fact that other Scandinavian countries also were early IT-users and the successes of the Finnish company Nokia contributed to the Swedish interest in IT-issues. Furthermore, at discussion of regional issues infrastructure for transportation and communications are at focus as a consequence of the Swedish location in the European periphery and the extension of the country stretching 1 600 km from agricultural areas in the South to Arctic areas in the North.

In this perspective two central dimensions of the Swedish ICT-policy are identified. One regards the use of ICT for economic development in general emphasized by the appointment of the IT Commission. The other dimension regards the use of ICT as a tool in regional policy.

5.2. IT Commission

A special Swedish effort to push the IT-issues was the appointment of the IT Commission in 1994. It was established by the centre-right government in order to become a IT-issues consulting group for the government. The appointment of the IT Commission was initiated and actions performed on the national level. The first chairman was the former prime minister Carl Bildt (www.itkommissionen.se 06-01-11).

In 1995 a new IT Commission was appointed by the social democrat government (elected in 1994) for the same main purpose as its predecessor but with a more clearly defined remit. Jan Nygren, minister of coordination, became chairman. The IT Commission was to advise the Government on strategic questions in the IT-sector, to encourage developments in the public sector and to contribute towards the resolution of legal issues. Besides, the Commission was to highlight the consequences of IT-use on social development and especially on the development of arts and media. The instructions also included proposals for measures promoting the use of information technology with special focus on Business, Working Life, Education and Competence Development. In 1995 the Young People's IT Council was

appointed. This Council was especially dealing with schools and with young people's opportunities to use IT (www.itkommissionen06-02-21).

In 1996 the IT Commission's remit was renewed and extended. Ines Uusman, minister of communications, became chairman. The Commission's goals were to propose measures creating growth and employment thanks to Information Technologies and augmenting access to Information Technologies. Consequences and future scenarios for IT-use were also to be analysed. At the end of 1996 the Commission resolved to set up an IT Law Observatory to observe legal developments within the Commission's priority fields (www.itkommissionen 06-02-21).

In 1998 the fourth IT Commission was appointed. The purpose of the Commission was to analyse the IT impact on Society Development and to point out the problems and possibilities IT development and use may bring. Another purpose was to inform the public on good IT-use such as the transmission of digital information enabled by broadband. In 2003 the Commission was phased out. But it was immediately substituted by the IT Political Strategy Group of the government. The chairman of this group is a former member of the Commission (www.itkommissionen.se 06-01-11).

The IT Political Strategy Group of the Government is a consulting group and a driving force for the establishment of an information society for all. To reach this goal accessibility, trust and competence are at focus. The Strategy Group has organized working groups pushing the use of IT within different fields such as IT and health care, IT in school and learning and IT and culture (www.itkommissionen.se 06-01-11).

5.3. IT-issues in the frame of regional policy

The use of ICT is seen as a tool for regional development from both an European and Swedish perspective and is related to international and national as well as regional and local organisational levels. The international level became especially pronounced when Sweden in 1995 joined the European Union. Former national priorities had to be considered in an European context and adapted to objectives of the EU.

The goals of *EU regional policy* are to develop and pursue its actions leading to the strengthening of its economic and social cohesion. The Community shall particularly aim at reducing disparities between levels of development of the various regions and the backwardness of the least favoured regions. Reduction of regional disparities can be achieved by a movement of people from backward to advanced regions. This process has been slow in the EU. Another alternative is to provide financial assistance to backward regions. This can be made either sectorally (e.g. Common Agricultural Policy) or spatially (e.g. Mezzogiorno). The EU-policy is performed by the Structural Funds that are both regionally and sectorally based (Cole&Cole 1997).

The European regional policy has from the start been challenged by the regional problems of new members. This was also the case in 1995 when Austria, Finland and Sweden became members adding another almost 40% to the surface area of EU. Thereby, a significant part of the EU's territory was within the Arctic Circle. But none of the areas in question had low enough standards to meet the per capita GDP criteria. The negotiations resulted in the solution to make a new area eligible for aid (objective 6). It existed only in Finland and Sweden during the period 1995-1999 and was an Arctic version of objective 1 with a population density below eight persons/km². This meant a geographical extension of the Swedish regional policies. Thus, according to the EU-programme 25% of the Swedish population became citizens in regions eligible for support, while corresponding figure in the national support

zones was 14% (Aalbu 2001). During the period 2000-2006 objective 6 has been redefined as a special area eligible under objective 1.

Swedish regional policy was introduced on a *national* level in the 1960s. The fact that the labour market measures from the 1950s to encourage mobility were unable to solve the unemployment problem was a starting point. Another point was imbalances in the Economy by the rapid expansion of the metropolitan areas in the 1950s and 1960s. A reduction of migration to the metropolitan areas was considered desirable. At an early stage financial aid was directed to an area designated as "the northern development area". The basic concept of this policy from early 1960s was that the considered regions had an obsolete industrial structure. The policy was attributing Aid to restructure this industry. In the 1980s and 1990s the regional policy was still mainly focusing on manufacturing even if more attention was paid to the service sector (SNA 1995).

The regional policy was performed in the Swedish hierarchical system; decisions are made centrally and delegated to *regional* authorities for implementation. But the impact of the policy is limited as the budget for regional development is small in comparison to the Global budget. Most important decisions influencing regional development are made in different sectors such as Education, Defence and Social Care. Besides the traditional functional and administrative borders have hindered cooperation, e.g. interregional efforts to support and stimulate economic development by the use of IT.

The EU-membership in 1995 meant that all the various institutions and actors of Sweden responsible for the development of the regions were brought together. This was a major breakthrough during the period 1995-1999; the Structural Funds programmes have stimulated cooperation in new constellations. The multi-national and multi-sectoral territorial approach is based on programming and partnership. Sweden was involved in cross-border projects including countries both within and outside EU and the fall of the wall enabled transnational cooperation between Sweden and countries in the Baltic area formerly controlled by the Sovietunion. The general picture is that the implementation of the EU-programme was performed satisfactory in Sweden (Aalbu 2001). But the European cohesion policy involving the local and regional authorities, national governments and the Union tends to demand more cooperation to meet future challenges (SOU 2005).

There is a tendency towards the weakening of the NationalState. This development is related to internationalizing by modern technologies that facilitates movements across borders for more people, wider competence by the explosion of education that is weakening established power structures and that regions grow as power centers. Supranational structural policy, the growth of regional consciousness and cross-border networks contribute to this development of a new Regionalism. In Sweden the tendencies towards a stronger position of regions are reflected in the newly shaped counties Scania and Västra Götaland, mergers of respectively two and three counties.

Within the EU regions are important actors for the strengthening of the EU Commission in relation to the national States. Since the State supports laws such as competition regulation politics can no longer be decided by the Swedish Parliament. Laws regulating competition are common within the EU. Another issue affecting the Swedish regional policy is the joint-financing. This in turn is related to the direction, size and geographical area within which support is given. Thus, it is hard to perform a national regional policy that drastically differs from that of the EU (SOU 2000).

But in Sweden *local area authorities/ municipalities* usually are the most important actors for the implementation of politics. Centrally made decisions are delegated to municipalities that are demanded to supply e.g services in Education and Day-Care. When it comes to Business Economy policy making LAAs have not been seen as important partners. But in the late 1970s

and early 1980s the situation changed. The State reduced its responsibility for individual places and businesses. On the other hand, the municipalities took on larger responsibilities for questions on Trade and Industry. A consequence is that the majority of the country's LAAs has created IT-strategies. But the State support is in many cases required to implement these strategies. Within certain areas such as the development of infrastructures the role of the State is becoming clearer. On the other hand LAAs pay more attention to the building of networks, the public and private co-operation and the development of competence. For example, the municipalities try thanks to the help of new tele-computer techniques to increase competitiveness through investments in schools, libraries and co-operation with industry.

6. IMPLEMENTATION OF IT AT DEVELOPMENT OF LAAs - EXAMPLES⁴

6.1. Background

In this section examples are given in what way LAAs/municipalities have used IT as a tool for development and what actors have been involved in these efforts. Furthermore, subsidies are observed. "Active" municipalities were selected: Ronneby in the South, Sotenäs in the West, Åre in the Middle and Arvidsjaur in the North (see fig. 1). Thus, the selection represents LAAs located in different parts of Sweden. But the selection of Sotenäs and Åre also reflects the IT-activity in municipalities fighting against labour market imbalances between the Summer and the Winter seasons. The use of IT is seen as a tool to create jobs and thereby counteract these seasonal variations. Sotenäs has many tourists and a high employment rate during the summer, while Åre has many tourists and a high employment rate during the winter.

The geographical conditions of the LAAs under study vary a great deal. In Arvidsjaur and Åre with 7 000 and 10 000 inhabitants respectively the surface areas of the municipality and the regional labour market are the same. This is a sign of the insular quality of these LAAs. Sotenäs (pop. 9 000) and Ronneby (pop. 28 000) are, on the other hand, parts of wider labour markets. The surface areas also vary a lot between Arvidsjaur and Åre in the northern and middle parts of Sweden in comparison with Sotenäs and Ronneby in the western and southern parts of Sweden. The large area of Åre (7 263 km²) is in sharp contrast to the small area of Sotenäs (139 km²). The differences of the counties (regional State administration) are evident; from 98 249 km² in Norrbotten (incl. Arvidsjaur) in the North to 2 947 km² in Blekinge (incl. Ronneby) in the South (Statistics Sweden 2006).

The LAAs also differ regarding Transportation Infrastructure. Ronneby and Åre have European Roads passing through and are also served by passenger and goods Rail services. The railway to Arvidsjaur is offering goods traffic throughout the year but passenger service is restricted to the summer months. Ronneby and Arvidsjaur are served by regular flights, while inhabitants in Åre and Sotenäs can reach an airport with regular flights within an hour by car.

⁴ This section is mainly based on Lorentzon (2003).

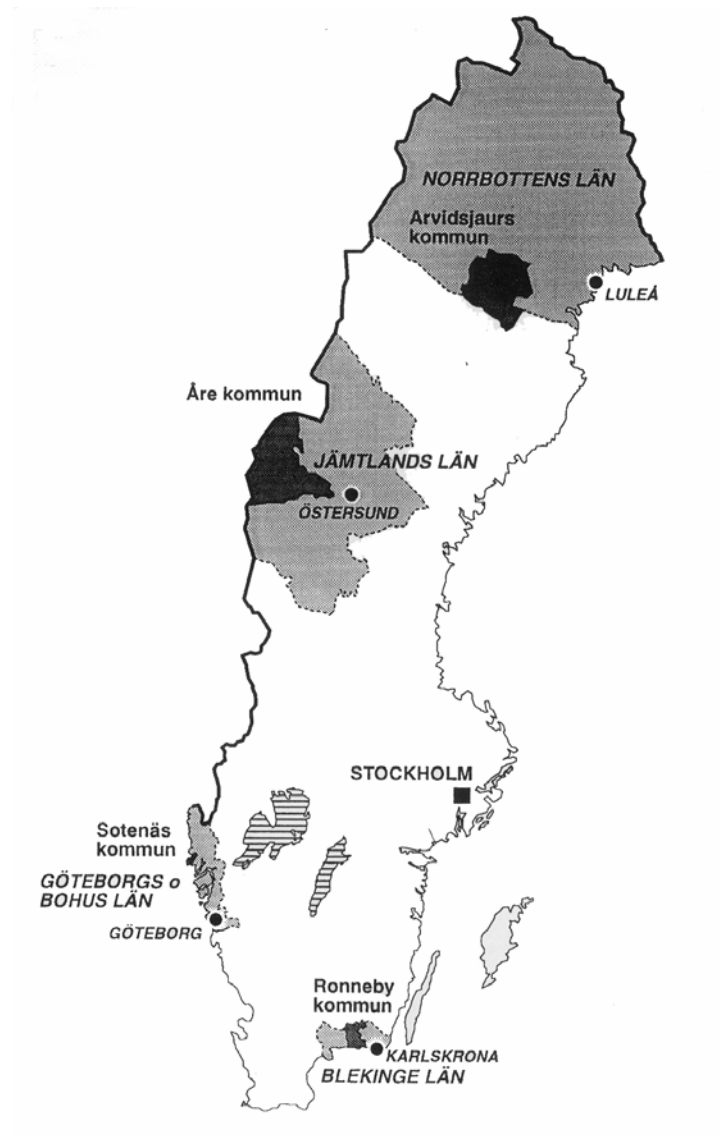


Figure 1 Geographical extension of the LAAs Ronneby, Sotenäs, Åre and Arvidsjaur. Besides the counties and the localization of the main places of each county are shown.

Note: kommun=LAA/municipality; län=county.

6.2. The municipalities

The need for creative thinking in *Ronneby* has been pushed by the closure of heavy industries. In 1993 the municipal council began a project known as "Ronneby 2003". The goal

was to develop a Society making IT-techniques available to everybody in the region. The venture was made by the LAA and the University with the ambition to change Ronneby "from ironworks to brainworks". Libraries, schools and culture were at focus. The exchange of information between representatives of a wide range of activities would create an attractive environment for work, living and Leisure. Efforts made by the municipality also included the development of the Soft Center by investing in buildings with an area of nearly 40 000 m². A number of enthusiasts have been involved in pushing the IT-issues.

In order to increase the use of IT in small business the project has been carried out within the College framework. Job opportunities within the service-sector have been created and counteracted the loss of jobs in the industrial sector. Efforts are also made in County Blekinge and the county administration board has been involved in the development of Blekinge Tekniska Högskola (BTH) with research and education in both Ronneby and Karlskrona. BTH has been important to attract IT-businesses in the region. Besides, the technique and development centre Soft Center started in 1985 in order to stimulate business activities. Cooperation between industry representatives and the municipality, contacts within politics, family relationships and the key role played by the ADP chief in Ronneby are important factors explaining the development of the Soft Center.

The development should also be seen in the frame of the subsidies given by the State and the EU. During the first part of the 1990s Ronneby received State subsidies. But during the later part of the 1990s subsidies have been co-financed by the State and the EU. The aim of the support was to achieve structural changes. At a very early stage representatives of the municipality were conscious that developments within IT could create new possibilities for business. Their willingness to invest in IT was unique. Extra efforts were made within the frame of EU's structural programme to increase the use of IT in smaller businesses (less than 50 employees). Therefore, a number of businesses have received support; first from the State and then from the EU.

In the early 1990s *Sotenäs* aimed at profiling itself as a local area authority of the future by investing in ISDN technologies. A key factor was education that was emphasized as a tool to raise the levels of competence. Interest was aimed at entrepreneurship, risk-taking and lifelong learning. During Spring 1993 the LAA and the Local County Council demonstrated, by the inauguration of the IT-project "Sotenäs towards 2000", the possibilities for small municipalities to make a use of IT. Besides, Trollhättan/Uddevalla College started courses directed to small businesses.

Both the municipal administration and schools were complemented by the IT-investments in the LAA. Investments in interactive communications meant that *Sotenäs* could start local upper secondary school courses. In 1994 a competence center was formed thanks to the aid of local enthusiasts offering training for computer managers and teachers. The competitive power of *Sotenäs* should also be seen in connection to attractive Housing environments.

In the early 1990s *Sotenäs* was not located in an area eligible for assistance. But after the Swedish EU membership in 1995 the EU support has been of great importance for the development of the LAA. The buying power of the community's inhabitants has increased and has strengthened the importance of *Sotenäs* as a centre for retail trade. Other results of the EU-entrance are the improvement of a year-round infrastructure and an increased interest of Norwegian tinned goods businesses to get established in Sweden.

Åre attracts media personnel and industrial leaders with skiing facilities. Thereby, a market for tele-computer products caused an early structure of mobile telephone services based on the need for communications with Stockholm. The LAA started in the early 1990s a number of IT-projects such as the set up of ISDN connections in all schools, investments in

conference systems and the promotion of Åre via the Internet. Enthusiasts representing different interests were involved in the development. The promotion of IT took place through internal education, via libraries and through efforts made in schools. The attraction of business to Åre has been influenced by the image of Åre as a center for down hill skiing. Internet in the region has existed since the mid 1990s and has facilitated for businesses to make use of the State and the EU initiatives.

During the period 1991-1993 a specific IT-project – Apple Village Årefjället -was carried out in Åre. The aims were to study the effects of new technologies within small businesses that were provided with a Macintosh computer, a printer, software and training. A similar successful attempt had been performed in the USA. Apple wished to illustrate, also in Europe, that small businesses could draw advantages from computerising their work routines. Åre fulfilled the criterias of selection such as being a well-known place and having good telecommunications. The project included one-hundred businesses. Many of the members received a better overview of their activities and better control of their economy. By the mid 1990s several development projects had started, such as the IT-project Information Village Årefjäll, aiming at stimulating the use of IT in schools and businesses.

Åre received State Regional support during the early 1990s. Since 1996 the EU has been a large financier of the Region development. The support given by the EU is conditioned by the rule that private and public means shall account for at least half the investments. During 1995-1999 Åre was eligible under objective 6 and was also a part of the Interreg region "Scandinavian Green Belt". Furthermore, the structural funds have been decisive for the performance of the IT-Jämtland initiative, which started in 1998 to promote the use of IT in County Jämtland. As early as 1985 County Jämtland invested in telemedicine; mostly related to skiing accidents during the winter.

In *Arvidsjaur* the computer development started in 1990 by the implementation of a strategy to use the same software (Microsoft) in schools, businesses and the LAA. An important step in the municipality computerization took place in the schools. The LAA also cooperates with the local business association in trade fairs and demonstrations of IT-techniques. Arvidsjaur was developed as an IT Community that led to the localisation of satellite offices of larger businesses. A strategy group promotes the use of IT, e.g. the use of computers within education and training in the use of broadband.

Businesses Representatives in County Norrbotten started the project IT Office in 1995 directed to small and medium-sized businesses and organisations. In peripheral regions efforts were made to improve the technical infrastructure for IT use. Many people engaged in this project later became involved in IT-Norrbotten that made efforts to increase the use of IT during the late 1990s. IT-Norrbotten was created in 1996 by the County Council, 13 LAAs and representatives of businesses. Thus, Arvidsjaur was one of the municipalities that was linked to the electronic network constructed between the main institutions of the LAAs.

The State has invested in communication Infrastructure to attract IT-businesses. But Municipalities have played the main role and have been the driving force behind the development of IT-activities. After the Swedish membership in the EU in 1995 the Community gave considerable support to the IT development in Norrbotten. Thus, the start of IT-Norrbotten was enabled by the EU-support and Arvidsjaur has been eligible for assistance within objectives 1 and 6. However, the IT-businesses location to Arvidsjaur is to a large extent explained by the enthusiasm of one of the employees of the LAA.

CONCLUSION

The efforts made in the selected municipalities reflect a necessity to counteract the negative impact on the labour market of restructuring industries and seasonal variations. Many projects have been performed. Efforts to increase competitiveness are made in many activities such as schools, libraries and private sector activities. The development and implementation of IT are dedicated to all levels authorities ; international, national, regional and local.

The efforts made by LAAs are embedded in assistance by the State and EU. After 1995 the Swedish membership in EU meant strengthening of the international in comparison to the national level. Simultaneously the regional and international contacts became more important enabling support directly from the international to the regional level. The national level was weakened. The position of the regional level is mainly related to two functions. In both the national and the international context the counties function as administrative organisers of regional policies. But the regional level also represents Regional Councils (based on general elections) that are able to initiate and finance projects. By the EU-membership the work performed on the regional level has to be adapted to restrictions and possibilities within the EU regional policy .

Representatives from different organisations interact to create good conditions to attract activities and people. Common local and regional initiatives to create IT-projects are observed. The initiatives are often taken on the local level and implemented in a broader geographical context. In this perspective the EU membership plays a decisive role. Another observation is that enthusiastic individuals at an early stage have spread knowledge on tele-computer's possibilities. Thus, efforts made to increase the use of IT are performed by the interplay between international, national, regional and local actors.

The introduction of IT in Sweden has occurred under specific conditions. One is related to the centralised way of governing. Sweden is a unicentric country with decision-making concentrated in Stockholm (capital). Another condition is related to the natural resources. Forest, iron and waterfalls have been decisive factors for Swedish industries location and development. A result was the shaping of a settlement structure characterized by activities located on islands in sparsely populated areas. Many small places based on resource related industries are spread over a large area. The contrasts are evident between sparsely populated forest areas in the North and densely populated agricultural areas in the South. Furthermore, the early internationalisation of Swedish companies meant a need for communications facilities. Communication was especially oriented towards Stockholm; the node of decision-making nationally and internationally. The expansion of knowledge-intensive production, combined with the centralistic transportation infrastructure, emphasizes the role of Stockholm as the dominant Swedish node. In this perspective, the use of IT is seen as a tool to counteract concentration tendencies.

The settlement structure of Sweden is also related to organisational changes. Before Industrialisation the mobility and division of labour were limited. Self-sufficient units characterised the settlement structure. This was changed by the Industrialisation which brought new organisational ideas such as division of labour and specialisation. Long series and large markets led to mass-production and concentration. But during the end of 19th century and the beginning of 20th century the transport systems enabled the diffusion of production to different factories. Lately, international networks interconnecting scattered units by extension of transportation and communications systems have become more common. Exchange of information is a strategic factor for knowledge-intensive production. Transportation and

communications facilities are of special importance for Sweden as it is located in the European periphery.

Sweden has been in the forefront regarding the development of infrastructure for communications. An ambition is to offer a high quality infrastructure at low costs throughout the country exemplified by the digitalizing of the telecommunications network in all Sweden, a well developed mobile communication system introduced at an early stage and the present construction of broadbands. The need for research at launching new information technology pushed LM Ericsson (early forced by the State to go abroad) and the former wholly State-owned Televerket to joint research. Long experience in international competitive environments by the company LM Ericsson combined with research cooperation with Televerket, responsible for the domestic market, contributed to the development of the Swedish IT-market.

Since the transformation of Televerket into a limited company – Telia - in 1993, Sweden has been one of the world's most deregulated markets with respect to telecommunications. Competitors have entered the market. But the changes of the market have also included the establishment of the new authority, PTS. Operators have to apply to PTS to offer telephone services. The influence of PTS was evident when permissions for the construction of 3G nets were given in year 2000. Four out of ten applications were accepted and the permissions are valid during the period 2000-2015. Thus, PTS has a governing role of the telemarket. In the case of 3G the condition was to enable 3G accessibility to nearly 100% of the population.

The institutional pattern of the country is characterized by the centralistic structure. This organisation dates back to the 16th century based on strong power of the King implemented by counties governors. The organisation is still very much the same. But the power of the king has become marginal and government decisions are mainly delegated and performed in LAAs. By regulations the municipalities have to implement decisions taken on the national level. This central dirigism limits the real influence of the local level. But lately the LAAs have taken on larger responsibilities for trade- and industry-issues. For example, the majority of Sweden's LAAs have created IT-strategies and pay more attention to the building of networks and the developing of competence

A specific organisation of IT-issues in Sweden is the IT Commission appointed in 1994. In different forms it has been an instrument for the government to promote the use of IT. A goal is the establishment of the information society for all. IT is also used as a tool in regional policy. By the EU-membership the conditions for the Swedish regional policy have been formed in accordance with priorities of EU. The geographical framework has become larger and projects include countries both within and outside the EU. Besides, the programmes of the Structural Funds have stimulated cooperation in new constellations. The cooperation and the co-financing arrangements of the EU enable large projects performance such as the construction of electronic networks between and within local area authorities.

Efforts to increase the use of IT are driven by the necessity to compete and attract activities and people but also by the possibilities enabled by IT to counteract the negative impact on the labour market of restructuring industries and seasonal variations. In Sweden LAAS are important actors to initiate projects, to develop strategies and to perform projects. An observation is the prominent role played by enthusiastic individuals to increase the use of IT on the local level. The State has been especially involved as the creator of the IT Commission and the establishment of the national authority PTS. The IT Commission has launched projects to build an information society for all. By PTS the State influences the development of the IT-market and IT-investments. By the Swedish EU membership, investments in IT-projects are made with special attention paid to the development of

peripheral regions. Thus, during the last decade many projects have been performed by efforts made locally, regionally, nationally and internationally. This emphasizes the importance of interplay between actors representing all levels. But still the State dirigism in many cases is crucial to when, where and to what IT-investments are made in Sweden.

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