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## Telecommunications Services in Sweden

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## 0 Introduction

### 0.1 Background and Purpose of the Study

The EC Commission has conducted an extensive study on the impact of the internal market on the services sectors. The EFTA Economic Committee has requested a study similar to that of the EC. The aim of the study is to identify and analyse the impact of European integration<sup>1</sup> on the service sectors of the EFTA countries. The following sectors will be included in the study: banking and insurance, road transports, air transports, telecommunications, construction, management consulting, distribution, and tourism.

This study deals with telecommunications in Sweden, with its regulatory framework (chapter 1), its structural development in the recent past (chapter 2) and the near future (chapter 3), and with an outlook and evaluation of the competitiveness of the Swedish telecommunications sector (chapter 4).

### 0.2 Telecommunications Services

Telecommunication is the exchange of information at a distance with the use of for example electrotechnical devices. Telecommunications services differ from other services because they are provided over *networks* consisting of wires, optical fibres, or by means of radio waves transmitted via terrestrial towers or via satellites. They include voice telephony (including mobile communications), data communications, text services, image communications, videotex and integrated services (ISDN). They also include leased lines — sale of capacity. Telecommunications services, defined as *network services*, does not include the construction of telecommunications networks, the supply of terminal and other equipment, or broadcasting. The latter is an unilateral flow of information, not an exchange.

So called Value Added Network Services (VANS or VAS) are services based on voice telephony, text, data or image communication supplied in the telecommunications network. They are for example Electronic Data Interchange (EDI), electronic mail, Videotex, virtual networks, or message services. They only represent 5% of the world's telecommunications yet but are still the most interesting part. It is with the VAS that companies can render their businesses more effective.

### 0.3 Telecommunications in Sweden

The telecommunications market in Sweden is in the process of being fully liberalised, which implies significant changes in the market at present, as will be described in this report.

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<sup>1</sup> The term "European economic integration" is to be understood to refer to the completion of the EC internal market and the establishment of a European Economic Area (EEA).

Sweden has, according to an OECD-report,<sup>2</sup> the highest level of telephone penetration in the world after Monaco, low domestic tariffs and high levels of quality of service and network. This has been achieved by the national operator Televerket without a legal monopoly, but a *de facto* monopoly. In mobile telephony Sweden has overtaken Norway to become the country with the highest density of subscribers in the world.

Operating revenues of Televerket Group in 1980 made out 1,6% of Swedish GDP and in 1991 2,3%, which shows the increased importance of the sector in Sweden. This is, in spite of low tariffs, fairly high in comparison with other OECD countries. Considering that there in 1991 also were a few new companies in the sector, the importance might have increased even more.

#### *0.4 Internationalisation of Telecommunications Services*

As the exchange of information and the pace of internationalisation move forward, telecommunications is becoming increasingly important for economic growth and the development of industry and commerce.

The *demand* for telecommunications will increase because of the internationalisation of the product markets, especially when Sweden joins the EEA, or the EC. Removal of trade barriers, deregulation, product differentiation, and economies of scale will promote internationalisation of product markets, which will result in higher demand for telecommunications services. The *supply* of telecommunications will grow as an implication of technological progress and economies of scale. Cost reductions are apparent particularly on long distance traffic, where the advantages of optical fibres and of satellites can now be successfully exploited. Therefore, most of the growth of the supply side will occur in long distance markets and, for all, in international telecommunications. A growth will also occur in local mobile communications.

From the above we understand that changing national telecommunications structures have been increasingly influenced by international trends. In recent years a number of bilateral value-added network service arrangements have been agreed between countries, free trade agreements have included telecommunications services, and the Group of Negotiations on Services in the context of the GATT Uruguay Round has included telecommunications as a service to be covered in a general agreement on trade in services (GATS). At the same time initiatives have begun to review existing international recommendations affecting the international provision of telecommunications services. Initiatives to implement the European Commission's Green Paper on Telecommunications may also be extended to cover nearly all the OECD countries.

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<sup>2</sup> OECD Working Party on Telecommunications and Information Services Policies, *Convergence Between Communications Technologies: A policy review* (Paris, drafted May 1991).

# 1 The Regulatory Framework in Sweden since 1980

## 1.1 The Status Quo of Regulation around 1980

Not until in the 1950's did the Swedish state become the owner of the whole production system for telecommunication services; including telephones and other equipment, cables, and switches.

The telecom market in Sweden has never been subject to such regulations as a legal monopoly, requirement of licences for establishing new networks, or offering telecommunication services, which is unique in an international comparison. Instead the national operator Televerket has had a "de facto monopoly" in large parts of the telecommunications market, for example in fixed link telephony and all kinds of connection to the network.

## 1.2 The Process of Reform of the Telecommunications Regulation

During the 1980's there has been a slow process of liberalising equipment markets and the setting of frameworks for competition in other areas, such as VANS and mobile services, where no previous regulations existed. This process is now being completed and all areas will be open to competition.

During the 1980's the connection-monopoly has gradually been abolished. Televerket's exclusive right to supply telephones was abolished in 1985. Connection of private telex terminals and certain computers was allowed, and the monopoly of connecting pay-phones has also been abolished as well as the monopoly on low and high speed modems. In 1990 the market for PBX - Private Branch Exchanges - was opened.

To separate regulatory from operational tasks the National Telecommunications Council (Statens telenämnd) was created in 1989. Until first of July 1992 it was responsible for type approval and standardisation of telecommunications equipment etc. In January 1991 the government decided upon temporary principles for interconnected traffic, above all between mobile telephony operators and the public network operator. In the same government decision the prohibition of third part traffic was repealed, i.e. e to sell capacity on lines leased from Televerket.

In July 1992, the National Telecom Agency (Telestyrelsen) was formed. The Agency has both new tasks as the promotion of "sound competition" as well as existing ones originating from the frequency management section of Televerket (Frekvensförvaltningen) and the National Telecommunications Council. The Agency is now an executive agency with civilian and national-defence functions. From the National Telecommunications Council comes the responsibility of standardisation and registration of telecommunications equipment needed before connection to the network, and from Frekvensförvaltningen the responsibility of allocating radio frequencies, needed for mobile telephony for example.

Televerket's responsibility of research and development (R&D) in the telecommunications sector is proposed to be separated from Televerket, as well as the power to represent Sweden in international telecommunications co-operations and in international agreements. The latter is taken over by the Telecom Agency. The government has also decided to turn Televerket into a public utility company. This will occur at the same time as an act on telecommunications is set in force, probably on July the first 1993, after more than one year delay.

### *1.3 The Swedish Telecommunications Bill*

The telecommunications bill, proposed in the end of March 1993, is supposed to reflect the technological and economic changes that have taken place in recent years. At the same time a bill on radio communication was put forward and a law on telecom terminals was adopted in 1992. The legislation shall be competitively neutral and based on equitable treatment. It also implies a separation of regulation and operation of telecommunications. The most important issues to be covered in the new law are the competition, supervision, and tariffs. The legislation aims at transforming the unregulated Swedish market with one monopolist into a regulated market with competition among several operators.

#### *Licensing*

The licensing requirements shall be kept at a minimum to meet Swedish telecommunications objectives (and to fulfil EC directives). Licences will be needed for anyone who in a public telecommunications network provides telephony services to fixed points of connection, mobile telecommunications services (not only telephony), or leased circuits. Various supplementary services linked to data communication with low speed modems, for example, as well as telefax are covered under telephony services. Licences shall further only be required if an activity is of such a scope that it is significant of the creation of efficient telecommunications and competition. Licences can be given for a certain area or the whole country. The licensing condition/framework will be stated in the law, but determined by the National Telecom Agency. For activities that need to be monitored, but are not required to obtain a licence, there will be a registration procedure.

#### *Tariffs*

In the public telecommunications network tariffs for telephony services and tariffs for leased circuits shall be oriented at cost. (This is in line with the EC ONP - Open Network Provision - directives.) Moreover the government shall be able to impose a price-cap regulation of tariffs for telephony services to fixed points of connection.

#### *Interconnected traffic*

Licensees shall conduct telephony-service activities in public telecommunications networks in a manner that permits interconnected traffic with other licensees or registered operators, at fair and reasonable tariffs in relation to costs

(and in accordance with the direction of ONP regulations). The object with this sector is to create room for and to uphold efficient competition.

### *Numbering plans*

The National Telecom Agency should be given overall responsibility for the co-ordination of number planning, which is now performed within Televerket.

### *Financing*

The cost of exercising authoritative powers shall be financed through fees paid by licensees and parties who are obliged to register. These fees shall be determined by the government, or by the National Telecom Agency.

### *Supervision*

The independent supervisory authority, i.e. the National Telecom Agency, shall, among other things, issue the instructions needed to ensure compliance with the telecommunications legislation as well as the terms and regulations issued by virtue of the law. Failure to comply with an instruction may result in a fine. Conditions for interconnected traffic should be considered from the point of view of private law. The bill recommends that the National Telecom Agency shall be given the role of mediator in disputes. The Agency shall also be able to revoke a licence.

### *Miscellaneous issues*

The new legislation also contains regulation concerning an obligation of secrecy, secret surveillance of telecommunications messages, and the right to establish transmission lines.

In addition to the telecom legislation the new Competition law is likely to have considerable impact on Televerket.

## **1.4 Summary and Conclusions**

State owned Televerket in its role as the dominant supplier of telecommunications services is now being challenged. Unlike in many other countries there has never been any legal monopoly for Televerket, just a de facto monopoly originating in Televerkets task to operate the state network and in the former monopoly of connections to the network. The liberalisation of the market which has taken place during the 1980's has given room for new telecommunications services suppliers - a degree of liberalisation that in an international perspective is very high. New legislation is being worked out to promote the competition, that is needed both in a national and an international aspect. Additionally regulatory and operatory roles are separated since 1992.

The Swedish telecommunications bill is the result of the EC regulations and the necessity to open the market for telecommunications. New technological solutions have made it impossible to prevent new entrants into the market. The big



international telephone and data companies are entering the Swedish market. The only way to prevent a situation where the revenues from the most profitable traffic disappear abroad, is to open the market to competition, where all actors play on the same premises.

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## 2 Structural Development of the Telecommunications Sector

### 2.1 Market Structure

The Swedish telecom services market today amounts to about SEK 27 billion (ECU 2,9 billion) a year, of which slightly more than SEK 3,1 billion (ECU 337 million) is international traffic.

Because of the special structure of the telecommunications services sector, with one dominant company, it has been hard to collect relevant statistics. It can partly be collected from Televerket, but the fourteen other companies (see 2.1.1 below) are not included in this material. Official statistics available on telecommunications either include a large part of telecommunications equipment production and sales, or they include postal services, which makes contemporary information of less interest to this study. This chapter will thus be of a more qualitative than quantitative character.

#### 2.1.1 Degree of Competition and Concentration

The number of suppliers of telecom services in Sweden has risen from one in 1980 to at least 15 in 1993. Of these fifteen companies seven are Swedish: Televerket, Tele2, Fonetel, Comvik, Nordic Tel, Sydkraft Telecom and Dotcom, two origin in an EC country: British Telecom (BT) and France Telecom, and the last five are from the USA: AT&T, IBM, GEIS, MCI, EDS and DEC. The foreign representation in Sweden is characterised by strong large multinational corporations. Televerket is in Sweden, by a operating revenue of SEK 34 billion (ECU 4.6 billion) and 46 000 employees in 1991, much larger than the newcomers on the market. In the overall telecommunications services market the concentration is still very high. Approximately 95% of the employees in the branch work at the Televerket Group and about 90-95% of the market value belongs to the group as well.

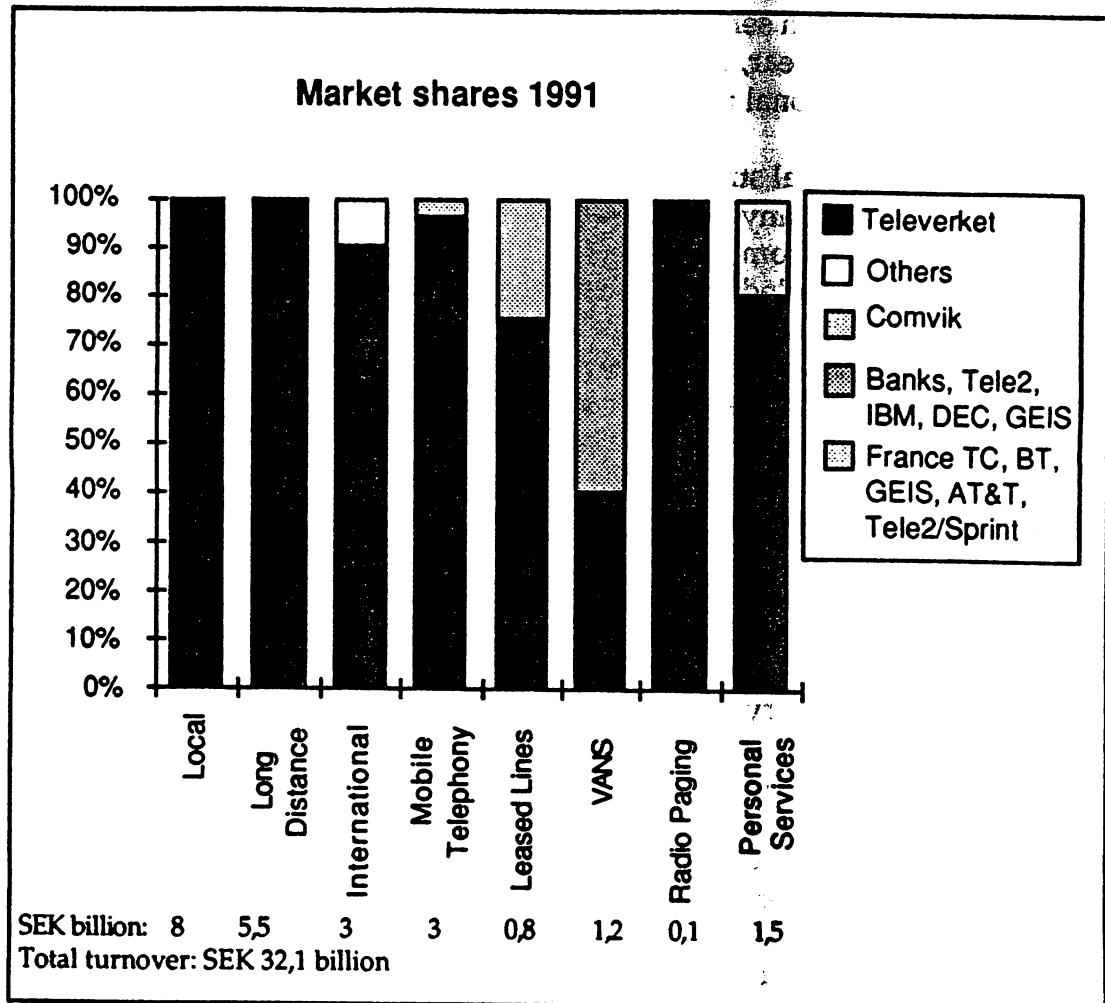
The number of main lines per 100 inhabitants have increased by 19% during the eighties to 69, according to Televerket's statistics. The penetration rate for mobile telephones is about 7 per 100 inhabitants. These penetration rates are amongst the world's highest.

The Swedish government has granted concessions to three GSM mobile telephony operators: Televerket Radio Division, Comvik and Nordic Tel (European).

Some domestic acquisitions have taken place. During the eighties Televerket bought several data hardware companies. Many of these companies have later on been resold.

The new entrants on the Swedish market first concentrated on the profitable data communications services. As the connection monopoly disappeared and later on as simple voice resale was liberalised more companies entered the market and began to supply voice telephony and VANS in their networks,

above all international and long distance traffic, where margins were high due to Televerket's unbalanced tariff structure. Following figure shows market shares of providers in different telecom services in 1991.



Source: Swedish Ministry of Communications and Transport

In telecom services the means of competition are service level - especially availability, number of products, prices, and geographical coverage (in mobile communications). Charges and tariffs in the switched network have decreased and Televerket has lost several important business customers to the new operators. Much of their success is not only a result of low tariffs, but also the ability to provide customer orientation, new network solutions, high quality services, and global networks at the same time as they are locally present. The development of the mobile communications market is fast. Competition is tightening and the operators' customer orientation is obvious. Fax, data and written messages are already new products available and substantial discounts are given on both subscription and tariffs. The geographical coverage will soon be 80-90% of the population for the GSM systems.

### 2.1.2 Televerket Group

Operating revenue: SEK 34 billion (ECU 4.6 billion) 1991.

Employees: 46 213 (1991), of which Televerket 39 003.

Televerket, in operation since 1853, is the publicly owned telecom service provider in Sweden. It has been part of the ministry of communications, but is soon to be incorporated under the name of "Telia AB".

Televerket Group consists of a) Televerket which functions as a public-service corporation and b) Teleinvest AB (a holding company) together with its subsidiaries.

Within Televerket, almost all operations are carried out in independent Telecom Areas/Regions, each of which is responsible for financial results within its geographical boundaries. The Telecom- and the Network- Services Divisions have central responsibility for operations carried out within their respective business sectors. The Cable TV and the Radio Divisions are part of Televerket.

The Teleinvest AB provides support for telecommunication operations in heavily competitive fields where a state-owned public utility would be at a disadvantage. Amongst others Swedish Telecom International and the research company Telia Research are subsidiaries to Teleinvest AB.

Network services are the core of Televerket Group operations. Televerket offers a full range of data- and telecommunication services, both national and international, including cable TV. In addition to the network services Televerket sells PBX and other equipment. Technical/marketing expertise is being gathered in a subsidiary named Swedish Telecom International AB (ST International). For a more complete description, see section 2.2.

Traffic in the switched public telephone network (voice, telefax, and dial-up data connections) increased by 6,2%, while the international traffic increased by 8,4% in 1991.

During the eighties Televerket's return on capital employed has differed between 8% and 12%, while the equity/assets ratio has decreased from 70% in 1983 to 27% in 1991.

The financial performance of Televerket Group in 1991 reflected a difficult year, in spite of increasing sales. Income after financial items came to SEK 1.3 billion compared with SEK 2.6 billion the previous year. This drop was due to the effects of VAT introduced on telecommunications services, increased depreciation rates, restructuring charges, and new accounting principles. The underlying drop in income was SEK 700 million. Investments remained almost constant at SEK 10 billion. Profit margin dropped from 19% to 14%. Televerket Group's strategies for improving profitability are to cut costs through rationalisation, reduction of staff, and stimulation of traffic growth to boost income, partly through low tariffs.

The part of the traffic income that business customers accounted for was 40% in 1991 and the household part was 60%. Since 1992, when Tele2 started its operation, about 80% of Televerket's traffic income was, at least in theory, exposed to competition. The hardest competition is taking place on international traffic,

which is rapidly rising and accounts for a significant part of Televerket's traffic income, 27% in 1991.

### 2.1.3 Other Swedish Telecommunications Services Providers

#### **Tele2**

Turnover: SEK 8 million (ECU 0,11 million) in 1991, approximately SEK 100 million (ECU 11 million) in 1993

Swedish employees: 120 (1993)

Tele2 was acknowledged by the Swedish government as the first private network operator in 1991. It is owned jointly by the Swedish company Kinnevik (60%) and the British telephone company Cable & Wireless (40%). Tele2 is constructing a fiberoptic telecommunications network and has access to the network that lies along the railway tracks in Sweden and is operated by Banverket. Co-operation agreements also exist with a large Swedish power supplier, a radio communications supplier, satellite communication companies, and local companies in Stockholm, Gothenburg and Malmö. Tele2 will be structured similarly to Televerket. Voice telephony and international traffic are important, but several additional services are also offered:

- access to the two international data communications services Flex25 (X.25 in co-operation with US Sprint) and SWIPnet (TCP/IP)
- virtual private networks (VPN)
- leased lines

In the future more services will be provided:

- specialised invoicing
- national telephony
- Calling Card for national and international calls
- VPN-services
- Centrex (software that makes a public telephone switch work like a PBX)
- ISDN services

Tele2's customers are both private and business, above all large Swedish companies and the Ministry for Foreign Affairs. An agreement with Televerket gives Tele2 access to 3.3 million AXE connected customers, which can be extended to 5 million in 1995. Tele2 aims at 5-10 % of the total data- and telecommunications market by the turn of the century, 15-20 % of packet-transmitted data by 1996, and 10% of international calls by 1995.

#### **Fonetel Global Communications AB**

Swedish employees: 3 in March and around 30 by the end of 1993

Fonetel is the third Swedish telecom operator and will start its operation in the summer of 1993. Its shareholders are still not official, but they are spread in several countries and represent large companies and a "large interest group".

Considering the legal ownership, more than 50% of the company will be in the hands of foreign interests and Fonetel is hence to be seen as a foreign company. Fonetel's base is in Malmö where a national exchange for voice and data communication and a satellite station are under construction. Additional local network capacity will be leased from already existing networks. Initially the company will offer Swedish business and private customers international data- and telecommunications. Fonetel will be a company similar to Tele2, but more international and with other technical solutions.

### **Dotcom Data & Tele Communications AB**

Turnover: SEK 174 million (ECU 23 million) in 1991

Employees: 268 (1991)

Ericsson was about to sell one of its subsidiaries to Televerket, but the employees never accepted the thought and formed the independent data- and telecommunications company Dotcom instead. State owned Celcius (which is to be privatised) owns a majority of the shares. The company core business is installation and service of LAN and MAN (local/regional data networks) and PBX.

### **Sydskraft Telecom**

Turnover: SEK 33 million (ECU 4.4 million) in 1991

Employees: 33 in 1991

Sydskraft Telecom is the telecom subsidiary of a Swedish power supplier. Its operation as telecom services provider is still very modest.

## **2.1.4 Foreign Telecommunications Services Providers**

### **AT&T Nordics AB**

Turnover: World-wide 63 billion USD (1991). No sales are being invoiced in Sweden, yet.

Swedish employees: 24 (1991)

AT&T Nordics AB is a subsidiary to AT&T International Inc., USA. The subsidiary was established in Sweden in 1987 and is responsible for marketing and customer support in the five Nordic countries. In Sweden AT&T mainly offers international telephone services, which are all transmitted via the US. Other services offered in Sweden are:

- Calling Card, and USA Direct
- international leased lines
- data network in Switched Digital International
- data and voice networking in VPNs, X.25 and InterSpan frame relay data network

## **BT Worldwide Sweden AB**

Turnover: world-wide SEK 134 billion, in the Nordic countries about SEK 600 million (1992), but invoicing all over the world  
Swedish employees: 40 (1993)

BT has been present in Sweden since 1991 when it bought the Mc Donnell Douglas Tymnet division, which in turn was present in Sweden since 1989. BT offers services in the global data network Tymnet. The services supplied in Sweden are:

- global data- and telecommunication network services (GNS)
- outsourcing networks where BT has total responsibility for companies' networks (Syncordia)
- fixed leased lines
- VPN

They are aggressively competing for new customers among the largest Swedish companies. Several multinational companies represented in Sweden already has an international customer agreement with BT.

### **Others**

France Telecom is represented in Sweden since 1991, mostly for market research functions. Jointly with the Swedish state-owned company DAFA Data, it established a company in 1992 called Transpac Scandinavia AB (FT 60% and DAFA 40%). It provides different data com and network services.

There are at least five other foreign companies present in Sweden, GEIS - General Electric Information Services, IBM Svenska AB, MCI, Electronic Data Systems, and DEC - Digital. They mostly provide access to global data communication networks, VANS, leased lines, and access to data bases.

### *2.1.5 Mobile Services Providers*

#### **Televerket Radio Division**

Sales: SEK 4,7 billion (1991)  
Swedish employees: 2 920

The Radio Division of Televerket develops and markets radio-based telecommunication solutions for the Swedish market. It operates two analogue mobile telephone systems, NMT 450 and NMT 900, and a digital GSM network. The division is also responsible for the minicall services of Televerket as well as Mobitex, a mobile radio system for transmission of images and text.

#### **Comvik**

Turnover 1991: Comvik AB + Comvik GSM AB = SEK 116 million .  
Swedish employees 1991: 190

Comvik AB, operator of an analogue national mobile network since 1981, and Comvik GSM, operator of a digital GSM network since 1992, merged in 1992. At the same time a separate technology company was established. Comvik is owned by the Swedish Kinnevik Group, Millicom International Cellular SA (MIC), New York, Swedish Invik & Co and by employees. Comvik's pure operational network services will probably be supplemented by new services, made possible with the GSM technology. Comvik co-operates with Banverket, Tele2 and MIC.

## **Nordic Tel**

Swedish employees: 170 (1993).

Nordic Tel is, as the third mobile telephony provider in Sweden, building an own digital network, Europolitan, which was set in operation in the end of 1992. Owners of the company are Swedish Volvo, Spectra-Physics, Trelleborg, and the British mobile operator Vodaphone.

### *2.1.6 Cable TV network*

Cable TV network as a means of telecommunications services network is of no significant importance in Sweden. The market share of Televerket is 60% on the cable TV market. The network needs to get technically upgraded to be appropriate for telecommunication services. Cable TV services only make out 2% of Televerket's turnover . There are two other main operators in the branch.

### *2.1.7 Limited Market Access*

The hardships faced by new entrants to the market in the beginning of the eighties were above all:

- the connection monopoly
- Televerket's dominant position
- the unfair allocation of frequencies,
- lack of information, and
- the prohibition of leased lines and third party traffic

There are still a couple of factors, originating in Televerket's economies of scale and scope as owner of the access network, that limits access to the market. Examples are briefly given below.

First of all Televerket's strong position on the market gives it possibility to influence market development, thereby limiting other operator's entrance into the market.

Televerket today owns the network that is inside of all houses, except of houses being built at present. It has been stated that customers who want to change distributor of telecom services have to buy their network inside the house at a "market price".



Televerket's tariffs on interconnected traffic are considered to be too high. Another problem is that there is only one distributor to negotiate with.

## 2.2 *The Main Telecommunications Services*

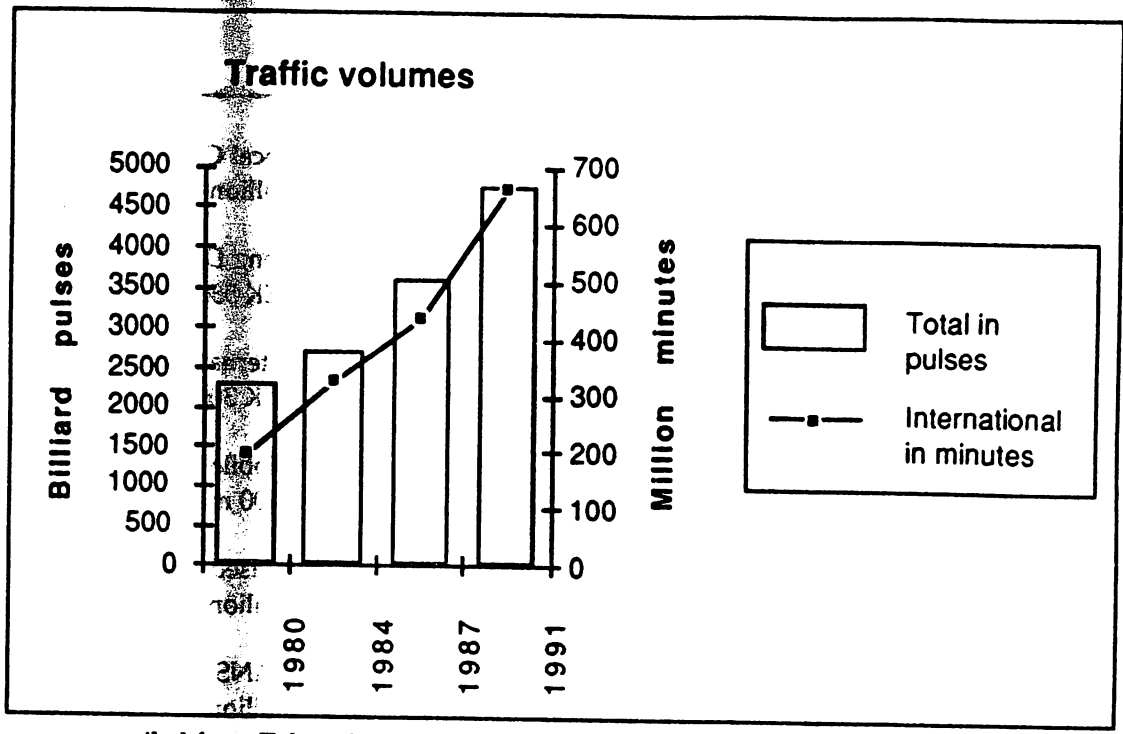
By the side of Televerket's network, there has been additional networks for telecommunications in Sweden during the eighties. They are for example Banverket's network along the railway tracks, Vattenfall's network along power lines and the city network of Stockholm Energi. These three networks have been used for commercial traffic. They now make out alternative transmission routes for Televerket's competitors, who are also constructing their own new digital networks. In the networks the number of different services have increased steadily during the last ten years.

### 2.2.1 *Services in the 1980's*

In 1980 following groups of services were offered by Televerket, or were just to be introduced:

1. telephone services: voice telephony, video conferences
2. data services: datex, teledata, telepak
3. text services: telegram, telex, teletex, telefax
4. radio/mobile services: NMT 450 (analogue mobile telephony), MBS (radio paging).

During the 1980's several services were introduced; PLUS services (made available through the AXE technology) and call-up data connections in the first group; Datapak (X.25), leased lines and Tipnet (Internet) in the second group; NMT 900, Minicall (radio paging) and Mobitex in the fourth group; and finally Videotex, Tele-x satellite services, LAN construction, and cable-TV in new groups.

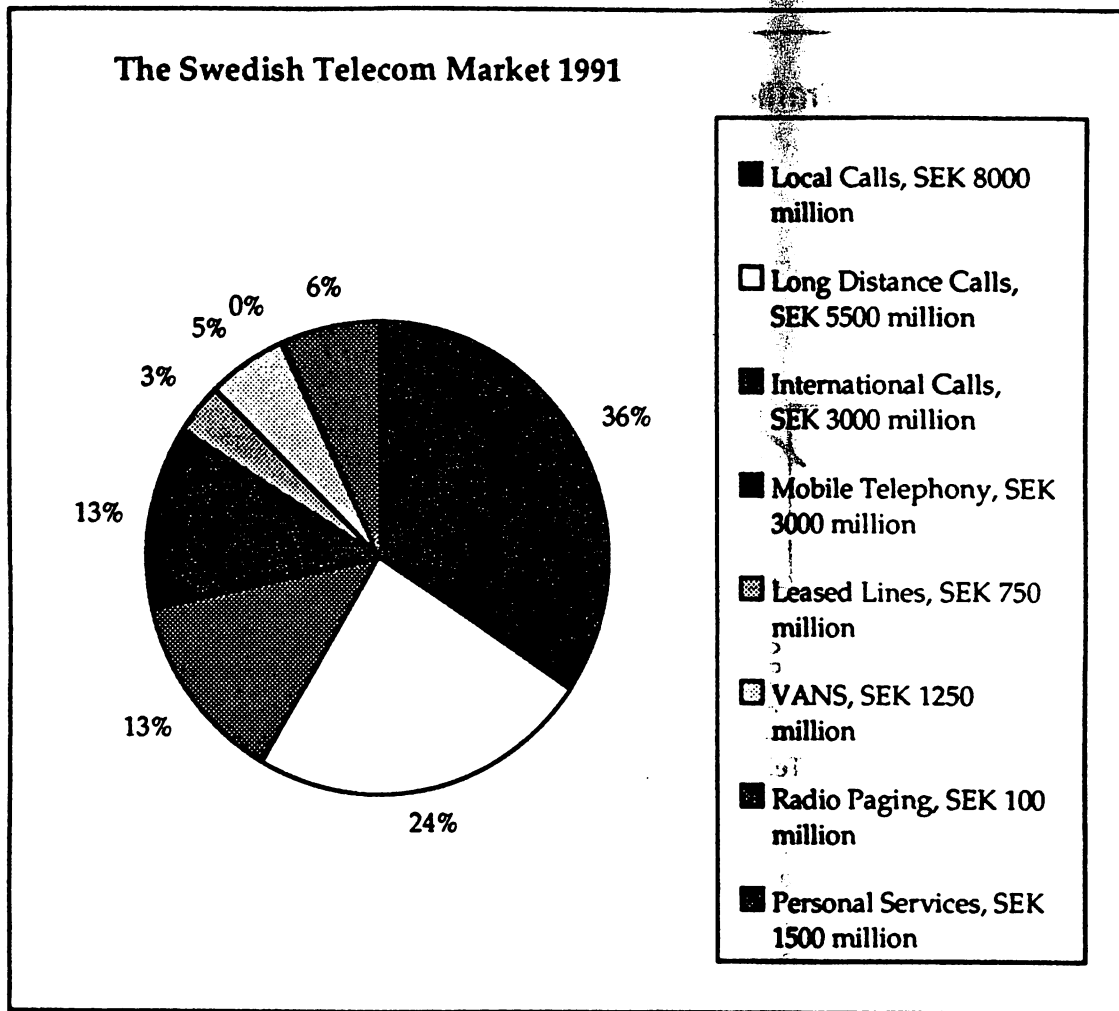


Source: compiled from Televerket Annual Reports

Total traffic volume, measured in number of pulses, constantly increases. International traffic only accounts for 2-3% of total traffic volume, but for at least 13% of market value. From the figure above we can see that the increase of international traffic has been faster than the one in total traffic volume.

2.2.2 Services past 1990

After 1990 for example 020- and 071-numbers have been introduced into the first group mentioned above, GSM mobile system into the fourth. Plans for introduction of ISDN have been presented. Its introduction has been postponed a couple of times. The VANS (value added services) like E-mail, EDI and X.400 have increased in importance and the new operators on the market are offering services similar to those of Televerket. The figure below shows the distribution of the main services in 1991. Total market value was SEK 22 billion.



Source: Swedish Ministry of Communications and Transport

### 2.2.3 Diversification of Economic Activity

As already stated, the number of products in the Swedish telecom sector has increased substantially. A rough check to see if the diversification of economic activity in the sector really has increased can be made using the groups of services for Televerket described in the above two sections. Both years these three groups accounted for a good 90% of Televerket's total sales.

	1980	1991
1. telephone services:	94%	60%
2. data services:	3%	27%
4. radio/mobile services:	<u>3%</u>	<u>13%</u>
	100%	100%

The percentages below show each group's part of the sum of sales for the three groups. The conclusion is that there has been an increase in the diversification of economic activity.

## 2.3 *Determinants of the Market Structure*

### 2.3.1 *Technological Progress*

It seems like the rapid technological progress is the most important determinant of the development of market structure in the telecommunication. Powerful microelectronics components have played a major role in this connection. Optical-fibre and new transmission technologies substantially increase transmission capacity. In addition, satellites and radio-link systems, as well as optical fibres, have made it possible to establish new, competitive networks quickly and relatively inexpensively.

In Sweden, there were further possibilities to construct these alternative solutions for telecommunications as prohibition of third part traffic was repealed. With modern centrally performed data monitoring, less switching stations are needed and less "field personnel". The newcomers on the market build modern systems from the beginning and thus save important amounts of labour costs, while the old telephone companies have to update their switching stations.

In 1991 75% of the trunk lines in Sweden were digital and the digitisation rate (subscribers connected to digital exchanges) in the national network was 56% in 1992. Televerket's trunk network will be 100% digital by 1995.

The standardisation process is not to be forgotten as very important to encourage the technological improvements.

### 2.3.2 *Scale and Scope Economies*

When the value added on telecommunications services is low, economies of scale can be exploited since the unspecialized mass services can be bundled in big transmission capacities. This is particularly the case in long distance networks. For owners of network, for example in an GSM-network with significant basic investments and unspecialized services, or in the use of optical fibres, economies of scale are high. High value added telecommunications services on the other hand are characterised by specialisation, which limits the exploration of economies of scale.

The Swedish market structure has partly been determined by economies of scale. Comvik, for example, merged its two mobile telephony subsidiaries of that reason. The big operators can, thanks to economies of scale, allow themselves to set low prices. Economies of scale also made it possible for Televerket to use the profits from long distance and international traffic to subsidise private customers.

In one sense economies of scale are likely to increase. Development costs are high and internationalisation continues on most markets. This benefits multinational telecom providers like BT, co-operations and alliances. Televerket only has 3% of the market in Europe and is therefore eagerly trying to find co-operation partners to increase traffic volume and geographical coverage. In fact economies of scale do not only exist on the supply side for network providers,

it also exist for them as buyers of equipment and network capacity. In another sense, economies of scale in long-distance communications is getting less important because of new "inexpensive" technological solutions, brought about by the development of satellite and microwave technologies.

The possibility to use one infrastructure for several different services, for example different VANS, indicates the existence of economies of scope in the telecommunication sector, for larger companies. So does new technologies like digitalisation and the possibility to produce telephony and data services in the same network.

The scope economies have increased in the eighties and they will speed up internationalisation of telecommunications in the future thanks to the ONP agreement.

### 2.3.3 *Types of Government Intervention*

Since there were no regulations on telecommunications in Sweden, until today, the Swedish government has not directly discriminated any possible entrants to the Swedish telecom market. Indirectly though this has been the case since the Government is the owner of Televerket and Televerket has set several rules to prevent newcomers into the market. See section 2.1.7. It could also be argued that the price level of the temporary interconnect decision is too high.

There is a political proposal to aid the eastern European countries by helping them construct new telecommunication networks. This would undoubtedly benefit Televerket that is already active in eastern Europe.

Today there is no direct or indirect discriminating government intervention regarding regulation on access to the telecommunications and data services market or to the factor market, product introduction and innovation, or taxes.

## 2.4 *Internationalisation of the Sector*

### 2.4.1 *Exports and Imports*

International calls have for long been one of the most profitable parts of the business of public telecommunications operators and they are growing in importance as international trade and travel grow.

In Sweden international traffic accounted for 14 % of total traffic in 1991. The telecommunications traffic out of Sweden reaches higher volumes than the incoming traffic. The question of if this means a net export or a net import is a question of telephone tariffs and trade policy. Our service export is an incoming call in the Swedish part of the cable, and our import of an outgoing call is in the foreign part of the cable. As long as there are more calls out of (higher import volume) than in to Sweden and as long as tariffs abroad are not cheaper than in Sweden, we will be a net importer of telecommunications services. The most effective way that tariffs are lowered seems to be through the introduction of competition into the markets in all countries, again a question of deregula-

tion. It is also easy to see why this is a question of trade policy since it is a way of decreasing a trade deficit! (After the opening of the American telecommunications market USA put strong pressure on UK to follow their example.) The problem of trade imbalances in basic telecommunications services is likely to grow worse unless some more equitable system for accounting and revenue sharing can be devised.

The foreign telecommunications companies present on the Swedish market are there for at least three reasons. First of all it is a market where they, thanks to liberalisation, can be present, not just in the data communications sector, secondly because customer orientation implies local presence and thirdly because they are big actors with tough globalisation strategies. Their market shares are still small, but increase in international traffic, VANS, and leased lines. AT&T's traffic goes mostly via USA and BT's via the UK.

It will get harder to measure the value of imports and exports of telecommunications services because of reversing of calls, invoicing all over the world, and the global company networks. It is accordingly hard to tell the exact market shares and value of foreign companies present on the Swedish market.

#### 2.4.2 *International Mergers, Acquisitions and Co-operations*

In the telecommunications services sector it seems like the networks of mergers, alliances and co-operations is getting just as complex as the telecommunications networks.

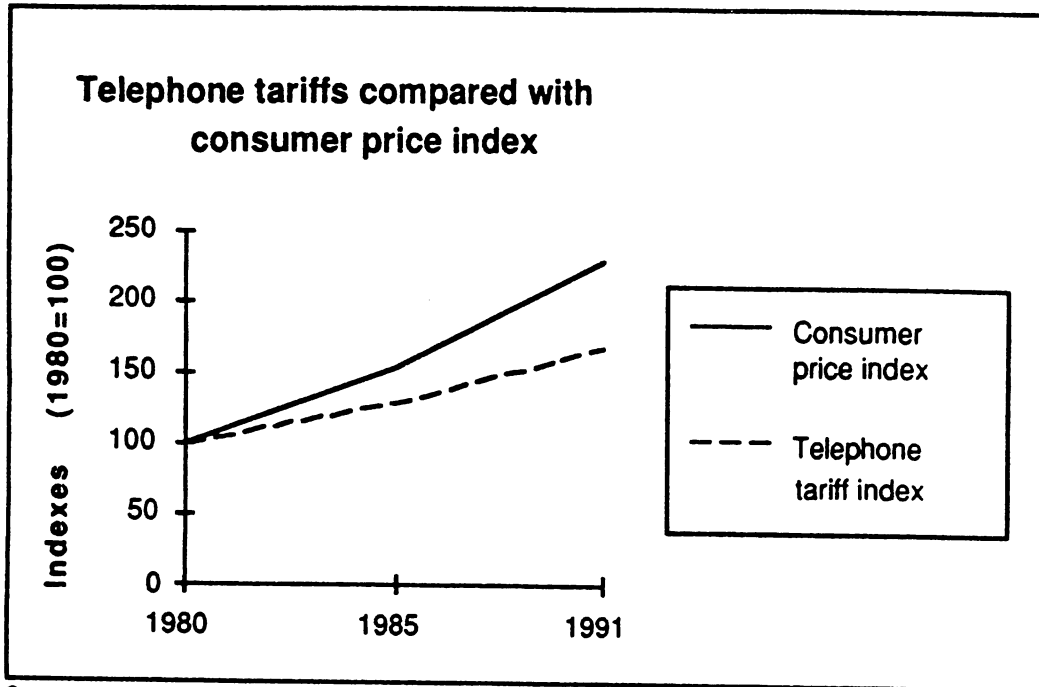
The public telecom providers in the Scandinavian countries have been allied for long. Televerket has a company for consultancy services abroad and a company for international traffic. Televerket has also formed a jointly owned company Unisource, together with PTT Netherlands and the Swiss PTT, for international data, satellite and mobile traffic. Televerket also builds new mobile networks in Estonia, Latvia and St Petersburg. A new telecom company is also established together with Estonian and Finish public telephone companies to reconstruct and modernise the Estonian telephone network.

Finally Televerket has applied for licence to operate on the British market. Since the price to use existing network, in the opinion of Televerket, yet is too high to allow real competition, Televerket is considering construction of an own network. The reason for Televerket's investments of hundreds of million Swedish crowns is an ambition to internationalise to compensate for the forecasted losses of traffic on the opened Swedish market.

For the other Swedish providers of telecom services, co-operations and cross-ownership is still more appropriate than direct investments abroad. Many holy and less holy co-operations are seen. Most companies co-operate in one way or another with Televerket and with international network providers. Several companies have tight ownership or co-operation ties to hardware producing companies as well.

### 2.4.3 Tariff Structure in the European Community

The figure below shows that the increase in telephone tariffs in Sweden has lagged considerably behind the rise in the retail price index for many years. This is a trend that has also been observed in the EC member states and most OECD countries. See appendix IV.



Telephone tariffs in Sweden, both national and international, are among the world's lowest, for households as well as for business customers. The figures in appendix V (calculated by Logica Consultancy) show monthly costs for an average number of telephone calls, plus subscription fees and part of connection fees for national and international calls in different countries, the so called baskets of charges.

Local calls have had too low tariffs because long-distance and international traffic have been allowed to subsidise local traffic increasingly, as new technologies have reduced progressively the influence of geographical distance on cost. According to calculations made by Televerket 1989, only 50% of the costs of household traffic were covered with the revenues generated. International traffic accounted for 80% of total revenues, but only for 25-30% of traffic volume.

Today, in accordance with a decision made by the Swedish Parliament, telephone tariffs are being revised to be adapted to the actual costs incurred and to the prevailing market situation. The new Swedish bill on telecommunications will probably, in addition to the cost orientation, empowers the Government to set price caps on telephone tariffs. (It is yet to see how strong the pressure will be for preserved low tariffs.) Moreover, to provide a sounder basis for competition, the subsidising of household customers by business customers will be reduced. This is a step in line with the ONP directives. Rate rebalancing may not

guarantee lower tariffs, especially not in Sweden, but it should serve to close the gap between the level of tariffs in different countries.

The tariff structure in Sweden is thus changing for most customers. Televerket has proposed to the Government that the subscriber fees for basic telephony shall follow the consumer price index. Whereas, on the other hand, Televerket due to competition from foreign companies, above all BT, is forced to lower the tariff on international traffic for business 25-30%. In mobile telephony both tariffs and subscriber fees have decreased as a result of competition.

Another interesting tariff is the one charged for interconnected traffic and leased lines. It is, by a government decision in 1991, set at SEK 0,65 per minute. Based on Televerket calculations it's supposed to reflect average costs for all telephone traffic, including regional and social commitments. The tariff is considered fairly reasonable for long distances, but maybe too high to promote competition in local traffic.

#### *2.4.4 The International Competition*

Large multinational telecom carriers, like AT&T, Deutsche Telecom, France Telecom, BT, Cable & Wireless, and Swiss PTT, are dominant on the international scene. Televerket is a midget in comparison. These carriers have had fairly high profits, but the profit structure is more and more attacked through increasing competition.

Worth to mention is also that there now are spot markets where "dealers" buy and resell available network capacity from all over the world. Another way to put everything upside down is when the big telecommunications companies offers call-up services, where the direction of a call switched to benefit from own networks possibilities to make international calls more like a local call.

### *2.5 Determinants of Internationalisation*

#### *2.5.1 Tradability of Telecommunication Services*

The tradability in the telecom services sector is high. The existence of reverse calls and other services among countries, the internationalisation of companies and their data- and telecommunication networks, increased trade and travel, and above all, the deregulation, standardisation and technological innovations contribute to continued increase in tradability.

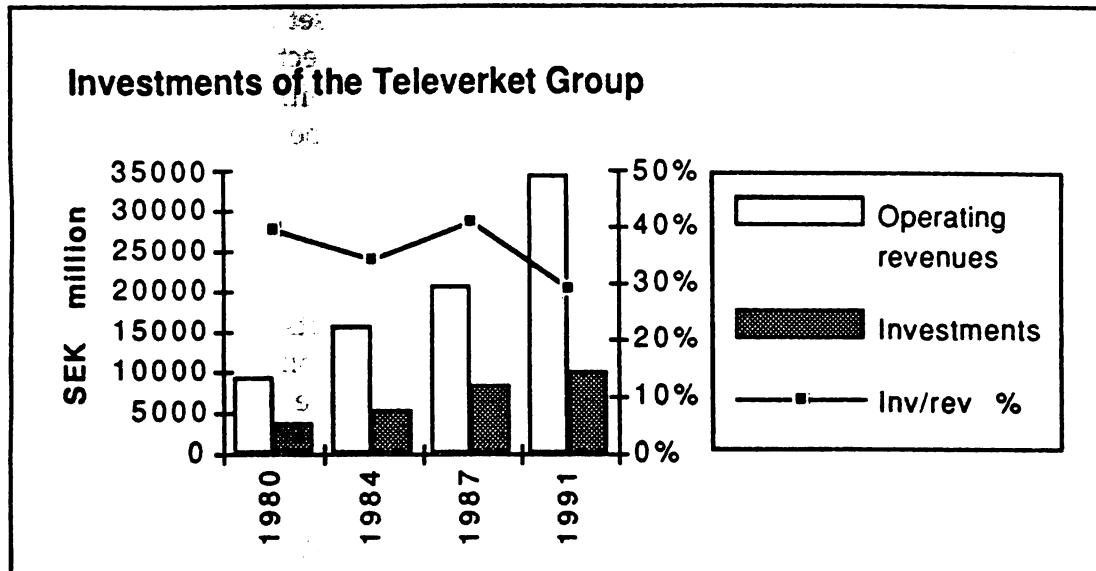
#### *2.5.2 Degree of R&D, Labour, and Capital Intensity*

Televerket increased the R&D expenditures in relation to operating revenues in the eighties from 1-2% to 4%, but is not likely to increase further. R&D no longer is profitable to be carried out by all telephone companies. This has already entailed structural changes in Sweden. Televerket can buy high quality equipment from abroad at descent prices, without having to support domestic industry or its own equipment production and development capacities, maybe except for functioning as a "starting engine".



What is likely to occur onwards, is a specialisation of R&D areas and, at the same time, increased domestic and cross-border R&D co-operations. For instance, Sweden takes part in the EC telecommunications research project RACE.

The telecommunications services sector is, highly capital intensive, because of the technology progress discussed above, which promotes economies scale and in turn internationalisation that brings about increased volumes. The figure below shows high investments of the Televerket Group.



Source: compiled from Official Statistics on Telecommunications in Sweden.

These investments have resulted in an increasing capital intensity, measured as material fixed assets per employee. Between 1980 and 1991 it increased by 280% to a good SEK 1 million per employee in the Televerket Group.

### 2.5.3 Proximity Requirement

At the same time as the tradability of telecommunications services increases, it becomes more important for telecommunications services providers to be close to the customers and thus to be able to provide their large customers well functioning communications abroad as well. This is essential for Televerket for instance, since Sweden relative to its size has a large portion of the world's multi-national corporations.

### 3 Future Changes Induced by Participation in the European Economic Integration

#### A REQUIRED REGULATORY ADJUSTMENTS

##### A1 *Telecommunications Policy of the European Commission*

The objectives and directives concerning telecommunications are based on an Green Paper of June 1987, which is complemented by a more detailed plan of action, the council's resolution of the development in the field of telecommunications up to 1992<sup>3</sup>. The objective is to supply European users with more varied telecommunications services at a higher quality and at a lower cost.

##### A2 *Current European Regulatory Adjustment*

#### 2.1 The EEA-Agreement

The EC rules enacted before July 31st 1991 will be included in the EEA-agreement. Since it is to be a dynamic agreement, new EC rules will be incorporated into the EEA-agreement. The two most important directives in the telecommunication area today are a commission directive on services<sup>4</sup> and a council directive on open network provision<sup>5</sup> (the ONP-directive).

##### 2.1.1 *Introduction of Competition into the Service Market*

The Commission Directive on Competition in the Markets for Telecommunications Services aims at introducing competition in the telecommunication services market, excluding voice telephony which is still allowed to be regulated through a monopoly situation. The directive especially affects the value added network services (VANS or VAS), which are mainly the data communication services. The directive doesn't apply to telex, mobile communications, or satellite services.

The directive allows exclusive or special rights to be given to the supply and operation of the public access network, under the condition that the rules on access (connection, licence and tariff conditions) to the public accessible infrastructure are objective and non-discriminatory. The operators shall, if they require, get access to leased lines, within a reasonable period of time.

##### 2.1.2 *Separation of Regulatory and Operational Activities*

According to the services directive above, regulatory functions (granting of operators' licences, type approval, allocation of frequencies etc) shall be executed

<sup>3</sup> Council Resolution of June 30 1988, 88/C257/01.

<sup>4</sup> Commission Directive 90/388/EEC of 28 June 1990 on competition in the markets for telecommunications services.

<sup>5</sup> Council Directive 90/387/EEC of 28 June 1990 on the establishment of the internal market for telecommunications services through the implementation of open network provision.

by an independent body, i.e. there will be a *separation of regulatory and operational activities*.

### 2.1.3 Definition of Open Network Provision

The ONP-directive, which is a frame directive, is based on a monopoly situation for the establishment of telecommunications network and the supply of voice telephony, according to the services directive described above. The main objective of the ONP directive is to make public (national) teleoperators' networks accessible to everybody, through harmonisation of principles and conditions. The access to the network should not be hampered, except out of consideration for public interests. In this way there will be competition between the public telecom operators and other services operators.

Within this frame directive, there is a working programme on how to work out more detailed conditions, primarily referring to leased lines, packet- and network data communications services, ISDN, telephony services, telex services, and mobile communications services.

The ONP-directive thus facilitates the supply of services by corporations, companies, or physical persons in the public networks, not only within and between the different member states. It also facilitates for a supplier to compete in a country that is not the home site.

### 2.1.4 Other Directives of Importance

The *Terminal Directive I and II*<sup>6</sup> aim at a complete liberalisation of the market for terminal equipment. Equipment that fulfils the requirements in the directive, and that is approved for marketing and access to the network by the independent supervisory body in one of the member states, shall automatically be approved in all other member states.

There is a council directive on *standardisation* within information technology and telecommunications<sup>7</sup>.

Three council directives grant the *reservation of frequency bands* for the co-ordinated introduction of following services into the Community: the pan-European land-based public radio paging<sup>8</sup> (ERMES), public pan-European cellular digital land-based mobile communications<sup>9</sup> (GSM), and digital European cordless telecommunications<sup>10</sup> (DECT).

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<sup>6</sup> Council Directives 86/361/EEC, replaced by 91/263/EEC (both based on Kommission Directive 88/301/EEC).

<sup>7</sup> Council Directive 87/95/EEG.

<sup>8</sup> Council Directive 90/388/EEC.

<sup>9</sup> Council Directive 87/372/EEC.

<sup>10</sup> Council Directive 91/287/EEC.

### A3 *Difference between the Swedish Telecom Bill and Current European Regulatory Framework*

#### 3.1 Comparison with the EC Regulatory Framework

According to Swedish law the telecommunications services market already fulfils the requirements in the Services Directive. The operational and regulatory functions are separated through the forming of the National Telecom Agency in July 1992.

The Swedish telecommunications services market meets the directions of the ONP Directive at large. Some regulations, corresponding to the general principles in the directive, might be incorporated in new legislation.

To fulfil the Terminal Directive new legislative and new authority regulations already exist.

The Swedish regulatory framework is well adapted to the requirements on standardisation.

The council directives concerning the *reservation of frequency bands* have been discussed during the autumn of 1992, in connection to a new law on radio communications, to meet up to the directives.

#### 3.2 Comparison with the EEA-Agreement

Contemporary EC rules concerning the telecommunications area, above all the Services, the ONP (Open Network Provision), and the Terminal directives, will be included in the EEA agreement and new rules will be incorporated in the agreement. The access to Swedish telecom market is at large more open than the EC market.

#### 3.3 Practical Consequences of the EEA-Agreement

The EEA-agreement will, in spite of the above, entail some important practical consequences:

- the long-standing 50/50 R&D joint venture between Televerket and the Swedish telecommunications company Ericsson (the so called Ellementel-agreements) will probably be limited due to the new EC rules on competition, partly since it includes a division of markets
- The chances to compete have been improved through new conditions for connection to the public network.
- Regulatory and operational functions have, as mentioned, been separated.
- A larger market for foreign and national companies through harmonisation of technical standards.

- There are also proposals to encourage competition at public procurement, for example, within the telecommunication sector due to rules on open tenders.

#### **A4 Proposals for More Competition**

##### **4.1 Green Paper on Satellite Communications**

In 1990 a second Green Paper, more specifically on satellite communications was worked out. Satellite communications are not included in the Services Directive, but can be seen as an integrated part of the telecommunications network and accordingly need some extra attention. In the Green Paper, it is stated that the same regulations on open market access that applies to land-based telecommunications network also shall apply on satellite communications<sup>11</sup>. These directives, which have not yet been thoroughly implemented by the EC member states, can imply some complications to, amongst others, the Eutelsat- and Intelsat organisations. They will have to be changed, which could be problematic since they are constituted of several states outside of the EC.

##### **4.2 Further Integratory Actions in the European Telecom Services Sector**

The Service- and ONP Directives, based on the Green Paper of 1987, both include formulations stating that integrating actions should be studied further and developed during 1992. To this aim the Commission adopted in October 1992 a report identifying the problems in the telecommunications sector and four possible options for remedying them;

- i) maintaining the status quo by freezing the liberalisation process which was started by the Green Paper and the 1990 directives;
- ii) introducing extensive regulation of both tariffs and investment at Community level, in order to remove the bottlenecks and in particular the surcharge on intra-Community tariffs;
- iii) the liberalisation of all voice telephony, i.e. international (inside and outside the Community) and national calls;
- iv) an intermediate option of opening up voice telephony between Member States to competition.

The Commission advocated the fourth option. Since this report was adopted the Commission has conducted various consultations with the different member states. A recent general discussion within the Commission resulted in a common view that liberalisation must continue. An important controversial decision still remains, however, concerning the time frame. In May 1993, the EC Council of Ministers will decide on the commission's proposal.

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<sup>11</sup> Utrikesdepartementets Handelsavdelning, *Sverige och den västeuropeiska integrationen - Konsekvenser av ett svenskt EG-medlemskap* (Stockholm Maj 1991).

### 4.3 Consequences for the Swedish Regulatory Framework

It is hard to foresee the pace of further liberalisation within the European telecommunications market, as mentioned above. Germany, for example, wishes to delay the opening up of its national voice telephony market to competition until right before the year 2000. BT, on the other hand, is convinced that the Commission will open up for competition on international voice telephony in 1993 and that the national European markets will deregulate totally in 1995.

As Sweden in its new telecommunications bill already allows for competition in voice telephony, further EC-liberalization will probably not cause any major changes in the Swedish regulations.

#### A5 *GATT Aspects*

Within the GATT Uruguay-round, there are negotiations for a General Agreement on Trade in Services (GATS), which aims at a global liberalisation of trade in services. Since the GATS-agreement will cover more than 100 countries any liberalisation of the telecommunication sector will have great international consequence.

It is, however, at this stage not clear to what extent telecommunications will be covered by the GATS. At the moment the agreement basically only covers VANS, but plans to include basic telecommunications (mainly voice telephony) also exist, possibly through prolonged negotiations.

## B INDUCED STRUCTURAL ADJUSTMENTS IN TELECOMMUNICATIONS SECTOR

### B1 *The Future Market Structure, Revenues and Growth Rates*

Network competition has two primary effects: it will stimulate efficiency and customer-orientation, and it will expose cross-subsidy and drive prices towards costs. Competition will be slower to develop in market segments where Televerket's tariffs are below costs, such as the local network.

It is yet to see if the new legislation and the liberalisation of the market is enough to weaken Swedish Televerket's dominance and to promote fair competition. The two most important issues will be just cost orientation and tariffs for leased lines and interconnected traffic. The competition will, at first, take place in international traffic and in the more prosperous business oriented sector, where the demand for VAS is high.

Onwards Televerket will have to find new ways of earning profits when the margins in Sweden are decreasing, mainly through investments and co-operations abroad. It is hard to imagine that the number of main telecom operators will increase in Sweden.

The growth rates of the Swedish telecom market are strongly influenced by the prevailing business recession. The telephony traffic growth is estimated to only 2-3% yearly up to 1995. Telecommunications are not only voice telephony. Telefax, VANS and data traffic will grow in importance. Mobile telephony is expected to continue at a high growth rate.

### B2 *Suppliers' Market Shares*

In international comparisons it is, for several reasons, believed that the competition on the Swedish telecom market will develop faster than liberalised markets in other countries, for example the UK or the USA. One reason is the high degree of liberalisation and another is that new entrants on the Swedish market already have the experience of competition.

Televerket will probably experience lost market shares and reduced profits the next couple of years, before necessary organisational adjustments are made. A market share outlook made by Televerket for 1995 is; in international traffic:

60%	Televerket
16%	large international operators
10%	Tele2 (and to a certain degree Fonetel and Dotcom)
8%	VPNs with international distribution, extended to telephone traffic
6%	telephone cards and calls via Nordic Tel's and Comvik's GSM networks;

and long distance calls:

- 80% Televerket
- 10% Tele2 (and to a certain degree Fonetel and Dotcom)
- 7% VPN, extended to telephone traffic via connection of PBXs
- 3% Comvik's and Nordic Tel's GSM networks

This outlook may be too pessimistic from the view of Televerket. Sweden is a small country, with low profit margins for the operators. The two new mobile operators will most likely aim at one third of the market each in the next couple of years.

### **B3     *Network Evolution***

The new networks being built in Sweden and the modernisation of Televerket's network will accelerate the pace of digitalisation. According to Televerket 80-90% of all customers will be connected to AXE in 1995. Televerket aims at 100% digitalisation of both switching stations and the network, except the local line network, by the turn of the century. Furthermore fiberoptical transmission systems will be extended in the larger cities and AXE switches will be replaced by ATM switches. (See B4 below.)

There will probably be an increase in co-operations concerning network investments. Nordic Tel and Comvik, for example, are likely to seek this kind of co-operation.

To be able to grant all regions the same high level of service, radio link and satellite technology will be more common.

Since the charges for leased lines in Sweden are relatively low, it is most likely that more private networks will be constructed. Televerket will render income from leased lines' fees, but due to third party traffic lose some of the most profitable traffic.

Most of this report has been concerned with public telecommunications services, but private networks are now carrying an increasing share of both national and international traffic, especially data communications. Private networks are generally built around dedicated circuits, leased from the public telecom operator or other telecom operators. Total by-pass of Televerket's network will become common.

### **B4     *Service Evolution***

Competition will encourage greater customer-orientation and a new focus on customer service. The evolution of differentiated high quality services will also be very important for future competition. An example is personal calling cards. Another one is the ability to provide multinational corporations global data- and telecom services in co-operation with foreign operators.



The process of standardisation and development of the ISDN technology has, partly because of high costs, been at a much lower speed than anticipated. ISDN will be introduced in Sweden during the spring of 1993. It is now believed that the more advanced broad-band ISDN, implemented by ATM technology, will become the success story of the nineties. ATM is an efficient method to deal with all kinds of traffic: voice- and data lines as well as video-images, and switching between local area networks. Multimedia and video-conferencing are service areas where growth is awaited.

#### *B5 National and International Tariffs*

While competition can be expected to reduce some tariffs, price reductions may be limited by factors such as duopoly behaviour and innovative price packages, typically focused on business and high-volume residential customers. Household customers will presumably experience higher monthly telephone costs. In Sweden it is hard to tell the pace of the rebalancing of tariffs. It depends upon the size and extent of a price-cap regulation.

**Table 1: Indicators of Market Structure (static analysis)****A. Assessment of the market structure**

	1980	1984	1990	1991
1) Number of firms	1	2	5	9
- Swedish	1	2	3	4
- EEC+EFTA			1	2
- RoW			1	3
Total turnover (MECU)	1289	2158	4178	5392
Total employment	43416	43178	47983	46693
4) Importance of foreign controlled firms; see section 2.1.1 and 2.1.4				
5) Diversification of economic activity:				
Local calls				49%
Long distance calls				33%
International calls	15%			18%
Ordinary calls	94%			71%
Mobile telephony	3%			13%
Leased lines	3%			3%
VANS				5%
Radio paging				<1%
Personal services				7%
Tot market value (BECU)				32.1

**B. Determinants of the market structure**

See qualitative judgements in the text sections :

- 6) Degree of scale and scope economies; section 2.3.2
- 7) Degree of product differentiation; section 2.2.1, 2.2.2,
- 8) Degree of proximity requirement; 2.5.3
- 9) Types of government intervention; 2.3.3
- 10) Degree of government intervention; chapter one and 2.3.3
- 11) Market share of state-owned enterprise; 2.1.1

## 4 Outlook

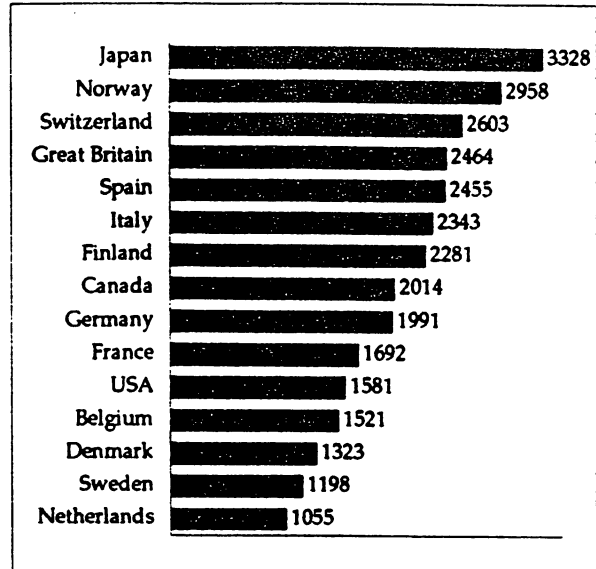
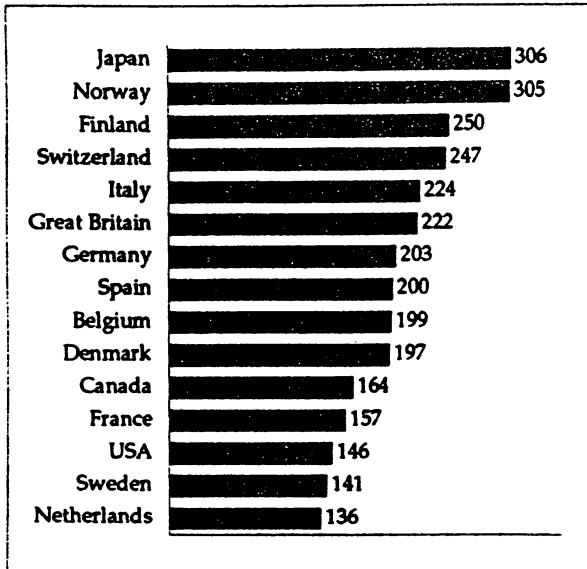
### A. THE FUTURE IMPACT OF THE EEA ON THE SWEDISH TELECOMMUNICATIONS SECTOR

As Sweden in its new telecommunications bill already allows for competition in voice telephony, further EC-liberalisation will probably not cause any major changes in the Swedish regulations, but rather openings for Swedish operators. Also considering that Televerket is currently applying for a licence with the British Department of Trade and Industry (DTI) to compete in the British market for international calls, Sweden will probably be well prepared for and able to profit from a deregulated European market.

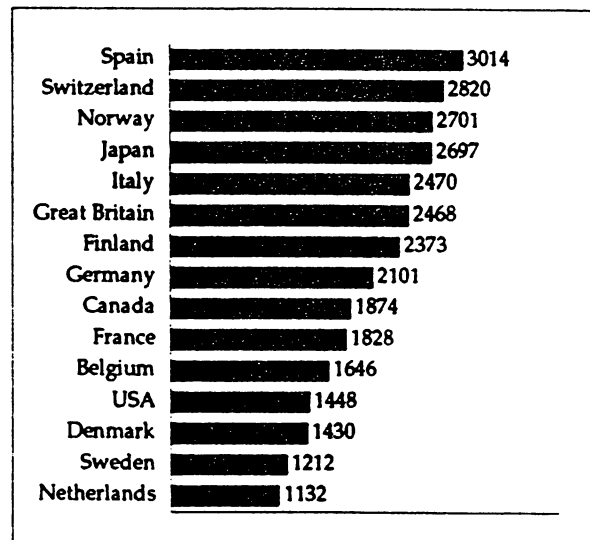
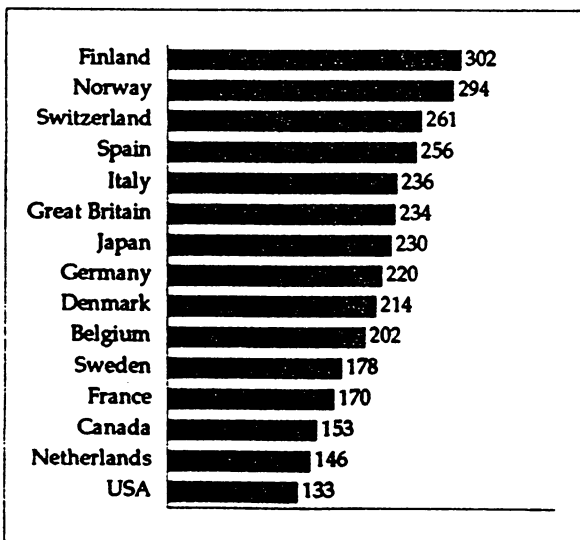
Looking at the size of the market that will be liberalised, now dominated by the state owned monopolies, gives an idea of the major changes that will take place. The total telecommunications market in the 18 EEA-countries is assessed to account for about SEK 1000 billion yearly. A new market structure will emerge with great opportunities for companies who are ready to participate. The already liberal Swedish market gives Swedish companies a good basis for such a participation.

Appendix II

1990  
1 SEK = 0,133 ECU



1991  
1 SEK = 0,134 ECU



Source: Logica

# Monthly Telephone Costs in Different Countries

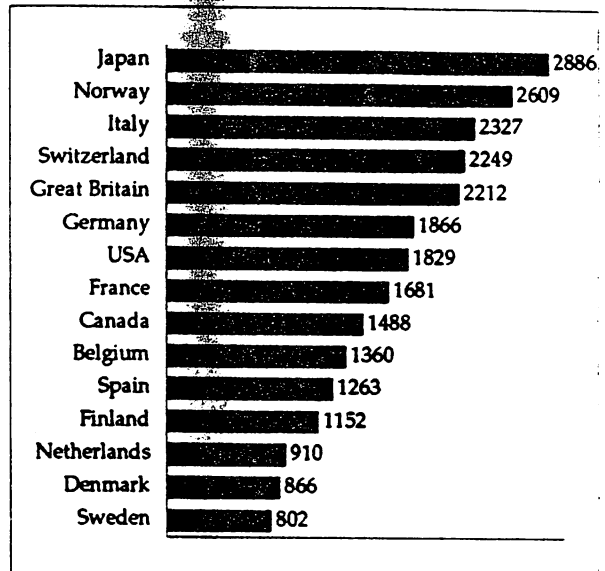
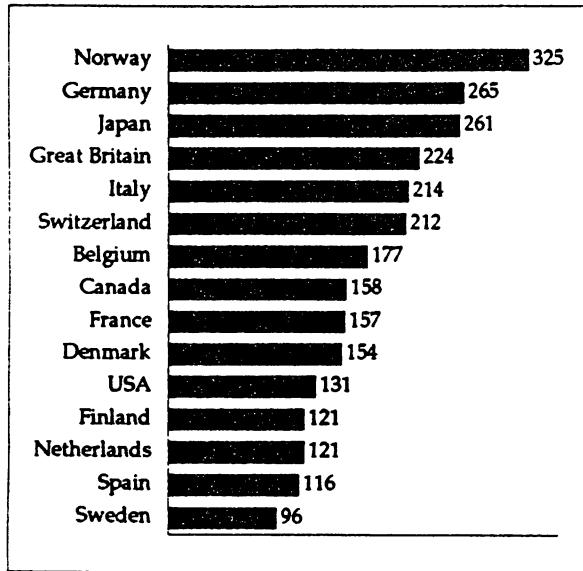
(in Swedish Crowns)

for Households

for Business

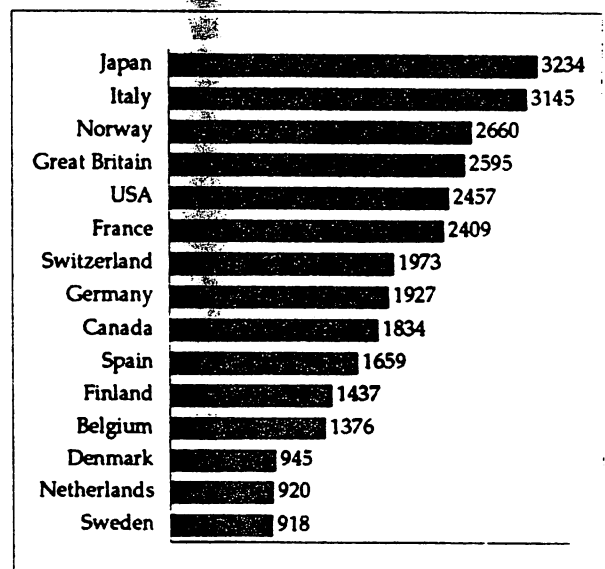
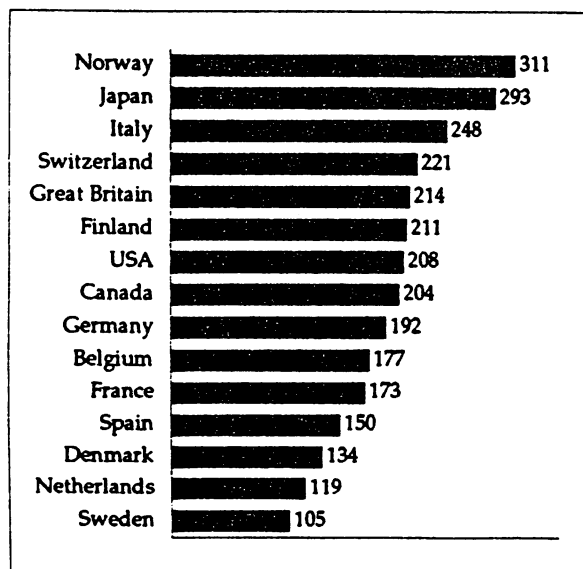
1983

1 SEK = 0,147 ECU



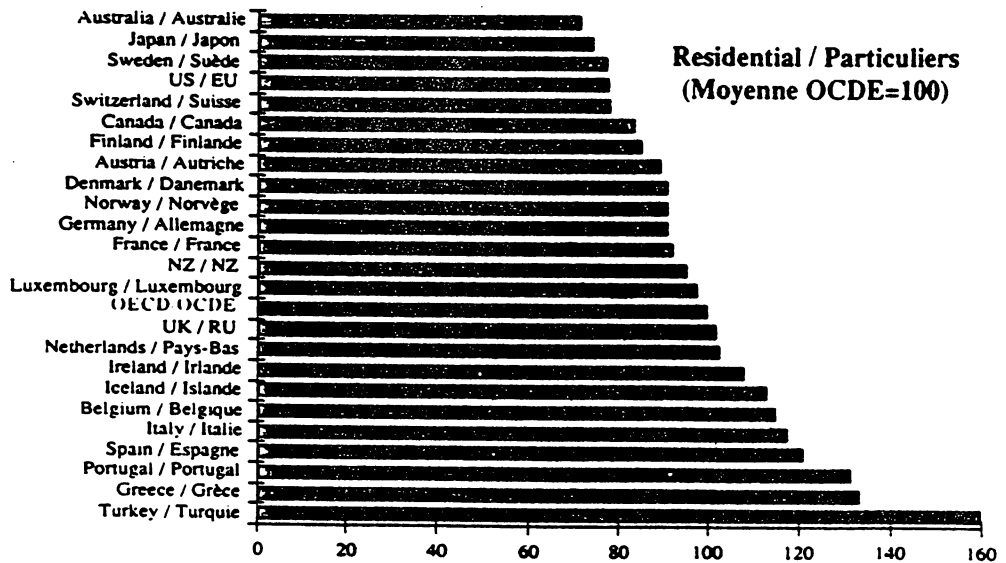
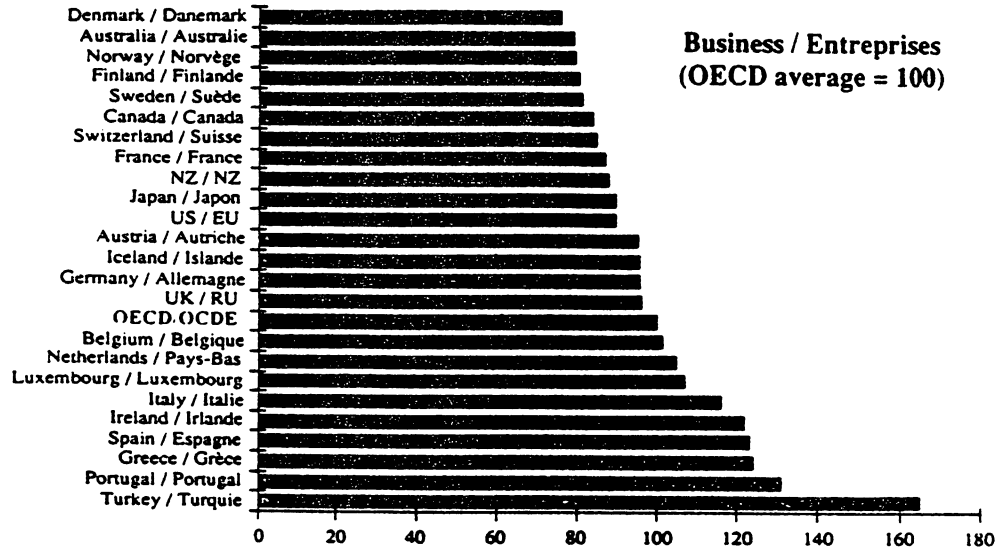
1985

1 SEK = 0,153 ECU



**INTERNATIONAL TARIFFS**

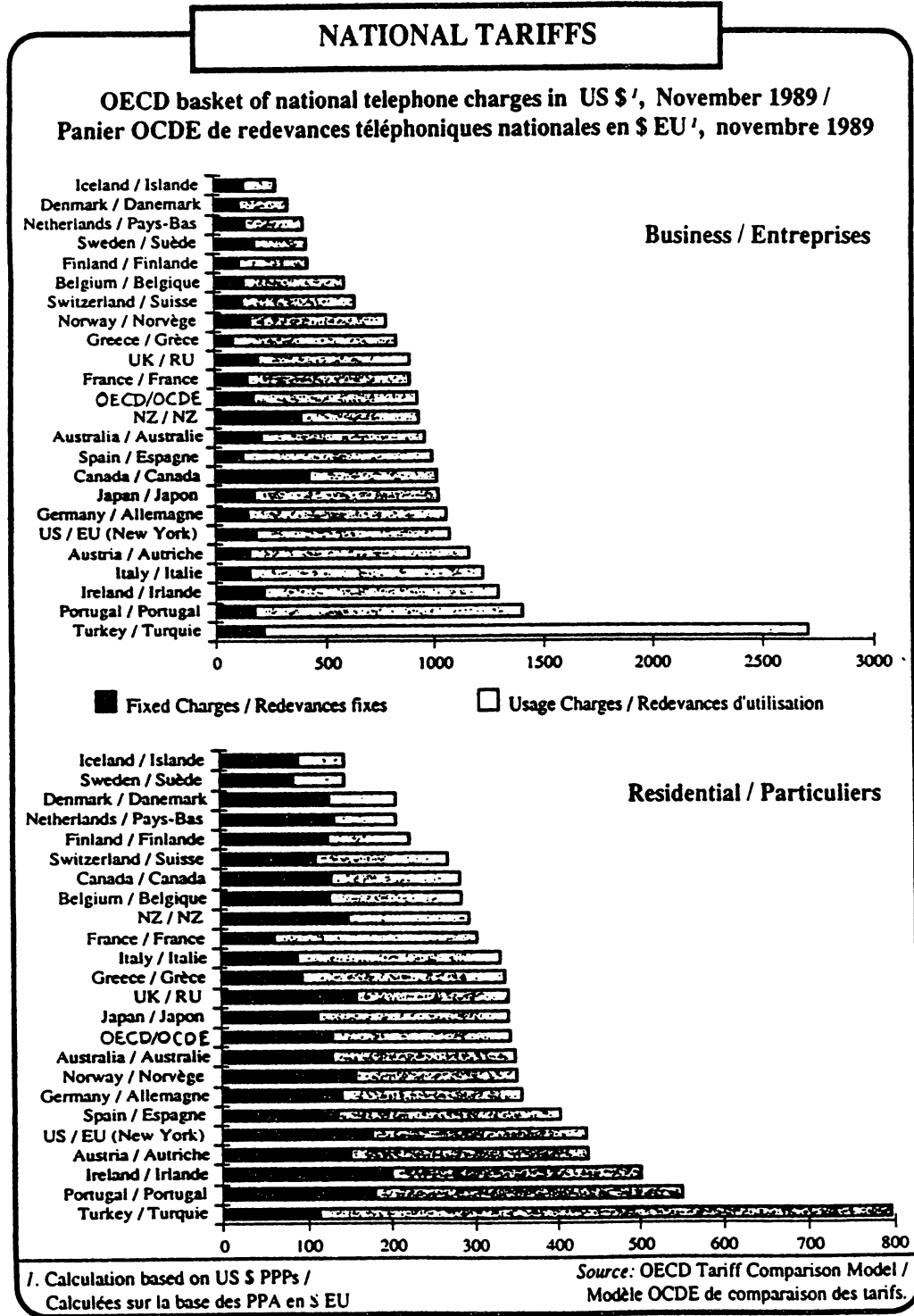
OECD basket of international telephone charges <sup>1</sup>, in indices, November 1989 /  
Panier OCDE des appels internationaux <sup>1</sup>, en indices, novembre 1989



<sup>1</sup>. Calculation based on US \$ PPPs /  
Calculé sur la base des PPA en \$ EU

Source : OECD Tariff Comparison Model /  
Modèle OCDE de comparaison des tarifs.

The OECD Baskets for National and International Charges



# 1 The Regulatory Framework in Sweden since 1980

## 1.1 *The Status Quo of Regulation around 1980*

Not until in the 1950's did the Swedish state become the owner of the whole production system for telecommunication services; including telephones and other equipment, cables, and switches.

The telecom market in Sweden has never been subject to such regulations as a legal monopoly, requirement of licences for establishing new networks, or offering telecommunication services, which is unique in an international comparison. Instead the national operator Televerket has had a "de facto monopoly" in large parts of the telecommunications market, for example in fixed link telephony and all kinds of connection to the network.

## 1.2 *The Process of Reform of the Telecommunications Regulation*

During the 1980's there has been a slow process of liberalising equipment markets and the setting of frameworks for competition in other areas, such as VANS and mobile services, where no previous regulations existed. This process is now being completed and all areas will be open to competition.

During the 1980's the connection-monopoly has gradually been abolished. Televerket's exclusive right to supply telephones was abolished in 1985. Connection of private telex terminals and certain computers was allowed, and the monopoly of connecting pay-phones has also been abolished as well as the monopoly on low and high speed modems. In 1990 the market for PBX - Private Branch Exchanges - was opened.

To separate regulatory from operational tasks the National Telecommunications Council (Statens telenämnd) was created in 1989. Until first of July 1992 it was responsible for type approval and standardisation of telecommunications equipment etc. In January 1991 the government decided upon temporary principles for interconnected traffic, above all between mobile telephony operators and the public network operator. In the same government decision the prohibition of third part traffic was repealed, i.e. to sell capacity on lines leased from Televerket.

In July 1992, the National Telecom Agency (Telestyrelsen) was formed. The Agency has both new tasks as the promotion of "sound competition" as well as existing ones originating from the frequency management section of Televerket (Frekvensförvaltningen) and the National Telecommunications Council. The Agency is now an executive agency with civilian and national-defence functions. From the National Telecommunications Council comes the responsibility of standardisation and registration of telecommunications equipment needed before connection to the network, and from Frekvensförvaltningen the responsibility of allocating radio frequencies, needed for mobile telephony for example.



Televerket's responsibility of research and development (R&D) in the telecommunications sector is proposed to be separated from Televerket, as well as the power to represent Sweden in international telecommunications co-operations and in international agreements. The latter is taken over by the Telecom Agency. The government has also decided to turn Televerket into a public utility company. This will occur at the same time as an act on telecommunications is set in force, probably on July the first 1993, after more than one year delay.

### *1.3 The Swedish Telecommunications Bill*

The telecommunications bill, proposed in the end of March 1993, is supposed to reflect the technological and economic changes that have taken place in recent years. At the same time a bill on radio communication was put forward and a law on telecom terminals was adopted in 1992. The legislation shall be competitively neutral and based on equitable treatment. It also implies a separation of regulation and operation of telecommunications. The most important issues to be covered in the new law are the competition, supervision, and tariffs. The legislation aims at transforming the unregulated Swedish market with one monopolist into a regulated market with competition among several operators.

#### *Licensing*

The licensing requirements shall be kept at a minimum to meet Swedish telecommunications objectives (and to fulfil EC directives). Licences will be needed for anyone who in a public telecommunications network provides telephony services to fixed points of connection, mobile telecommunications services (not only telephony), or leased circuits. Various supplementary services linked to data communication with low speed modems, for example, as well as telefax are covered under telephony services. Licences shall further only be required if an activity is of such a scope that it is significant of the creation of efficient telecommunications and competition. Licences can be given for a certain area or the whole country. The licensing condition/framework will be stated in the law, but determined by the National Telecom Agency. For activities that need to be monitored, but are not required to obtain a licence, there will be a registration procedure.

#### *Tariffs*

In the public telecommunications network tariffs for telephony services and tariffs for leased circuits shall be oriented at cost. (This is in line with the EC ONP - Open Network Provision - directives.) Moreover the government shall be able to impose a price-cap regulation of tariffs for telephony services to fixed points of connection.

#### *Interconnected traffic*

Licensees shall conduct telephony-service activities in public telecommunications networks in a manner that permits interconnected traffic with other licensees or registered operators, at fair and reasonable tariffs in relation to costs

(and in accordance with the direction of ONP regulations). The object with this sector is to create room for and to uphold efficient competition.

### *Numbering plans*

The National Telecom Agency should be given overall responsibility for the coordination of number planning, which is now performed within Televerket.

### *Financing*

The cost of exercising authoritative powers shall be financed through fees paid by licensees and parties who are obliged to register. These fees shall be determined by the government, or by the National Telecom Agency.

### *Supervision*

The independent supervisory authority, i.e. the National Telecom Agency, shall, among other things, issue the instructions needed to ensure compliance with the telecommunications legislation as well as the terms and regulations issued by virtue of the law. Failure to comply with an instruction may result in a fine. Conditions for interconnected traffic should be considered from the point of view of private law. The bill recommends that the National Telecom Agency shall be given the role of mediator in disputes. The Agency shall also be able to revoke a licence.

### *Miscellaneous issues*

The new legislation also contains regulation concerning an obligation of secrecy, secret surveillance of telecommunications messages, and the right to establish transmission lines.

In addition to the telecom legislation the new Competition law is likely to have considerable impact on Televerket.

## **1.4 Summary and Conclusions**

State owned Televerket in its role as the dominant supplier of telecommunications services is now being challenged. Unlike in many other countries there has never been any legal monopoly for Televerket, just a de facto monopoly originating in Televerkets task to operate the state network and in the former monopoly of connections to the network. The liberalisation of the market which has taken place during the 1980's has given room for new telecommunications services suppliers - a degree of liberalisation that in an international perspective is very high. New legislation is being worked out to promote the competition, that is needed both in a national and an international aspect. Additionally regulatory and operatory roles are separated since 1992.

The Swedish telecommunications bill is the result of the EC regulations and the necessity to open the market for telecommunications. New technological solutions have made it impossible to prevent new entrants into the market. The big

international telephone and data companies are entering the Swedish market. The only way to prevent a situation where the revenues from the most profitable traffic disappear abroad, is to open the market to competition, where all actors play on the same premises.

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## 2 Structural Development of the Telecommunications Sector

### 2.1 Market Structure

The Swedish telecom services market today amounts to about SEK 27 billion (ECU 2,9 billion) a year, of which slightly more than SEK 3,1 billion (ECU 337 million) is international traffic.

Because of the special structure of the telecommunications services sector, with one dominant company, it has been hard to collect relevant statistics. It can partly be collected from Televerket, but the fourteen other companies (see 2.1.1 below) are not included in this material. Official statistics available on telecommunications either include a large part of telecommunications equipment production and sales, or they include postal services, which makes contemporary information of less interest to this study. This chapter will thus be of a more qualitative than quantitative character.

#### 2.1.1 Degree of Competition and Concentration

The number of suppliers of telecom services in Sweden has risen from one in 1980 to at least 15 in 1993. Of these fifteen companies seven are Swedish: Televerket, Tele2, Fonetel, Comvik, Nordic Tel, Sydkraft Telecom and Dotcom, two origin in an EC country: British Telecom (BT) and France Telecom, and the last five are from the USA: AT&T, IBM, GEIS, MCI, EDS and DEC. The foreign representation in Sweden is characterised by strong large multinational corporations. Televerket is in Sweden, by a operating revenue of SEK 34 billion (ECU 4.6 billion) and 46 000 employees in 1991, much larger than the newcomers on the market. In the overall telecommunications services market the concentration is still very high. Approximately 95% of the employees in the branch work at the Televerket Group and about 90-95% of the market value belongs to the group as well.

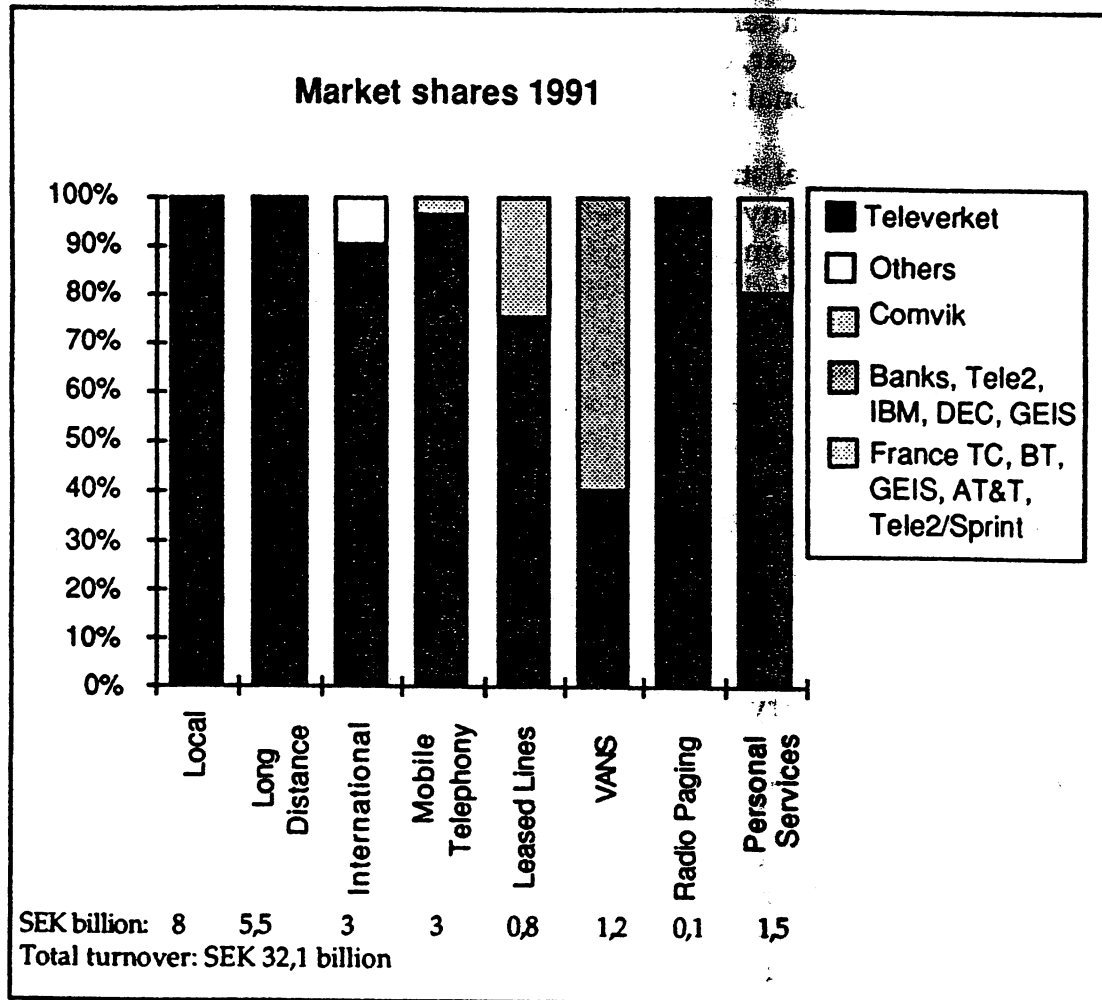
The number of main lines per 100 inhabitants have increased by 19% during the eighties to 69, according to Televerket's statistics. The penetration rate for mobile telephones is about 7 per 100 inhabitants. These penetration rates are amongst the world's highest.

The Swedish government has granted concessions to three GSM mobile telephony operators: Televerket Radio Division, Comvik and Nordic Tel (European).

Some domestic acquisitions have taken place. During the eighties Televerket bought several data hardware companies. Many of these companies have later on been resold.

The new entrants on the Swedish market first concentrated on the profitable data communications services. As the connection monopoly disappeared and later on as simple voice resale was liberalised more companies entered the market and began to supply voice telephony and VANS in their networks,

above all international and long distance traffic, where margins were high due to Televerket's unbalanced tariff structure. Following figure shows market shares of providers in different telecom services in 1991.



Source: Swedish Ministry of Communications and Transport

In telecom services the means of competition are service level - especially availability, number of products, prices, and geographical coverage (in mobile communications). Charges and tariffs in the switched network have decreased and Televerket has lost several important business customers to the new operators. Much of their success is not only a result of low tariffs, but also the ability to provide customer orientation, new network solutions, high quality services, and global networks at the same time as they are locally present. The development of the mobile communications market is fast. Competition is tightening and the operators' customer orientation is obvious. Fax, data and written messages are already new products available and substantial discounts are given on both subscription and tariffs. The geographical coverage will soon be 80-90% of the population for the GSM systems.

### 2.1.2 Televerket Group

Operating revenue: SEK 34 billion (ECU 4.6 billion) 1991.

Employees: 46 213 (1991), of which Televerket 39 003.

Televerket, in operation since 1853, is the publicly owned telecom service provider in Sweden. It has been part of the ministry of communications, but is soon to be incorporated under the name of "Telia AB".

Televerket Group consists of a) Televerket which functions as a public-service corporation and b) Teleinvest AB (a holding company) together with its subsidiaries.

Within Televerket, almost all operations are carried out in independent Telecom Areas/Regions, each of which is responsible for financial results within its geographical boundaries. The Telecom- and the Network- Services Divisions have central responsibility for operations carried out within their respective business sectors. The Cable TV and the Radio Divisions are part of Televerket.

The Teleinvest AB provides support for telecommunication operations in heavily competitive fields where a state-owned public utility would be at a disadvantage. Amongst others Swedish Telecom International and the research company Telia Research are subsidiaries to Teleinvest AB.

Network services are the core of Televerket Group operations. Televerket offers a full range of data- and telecommunication services, both national and international, including cable TV. In addition to the network services Televerket sells PBX and other equipment. Technical/marketing expertise is being gathered in a subsidiary named Swedish Telecom International AB (ST International). For a more complete description, see section 2.2.

Traffic in the switched public telephone network (voice, telefax, and dial-up data connections) increased by 6,2%, while the international traffic increased by 8,4% in 1991.

During the eighties Televerket's return on capital employed has differed between 8% and 12%, while the equity/assets ratio has decreased from 70% in 1983 to 27% in 1991.

The financial performance of Televerket Group in 1991 reflected a difficult year, in spite of increasing sales. Income after financial items came to SEK 1.3 billion compared with SEK 2.6 billion the previous year. This drop was due to the effects of VAT introduced on telecommunications services, increased depreciation rates, restructuring charges, and new accounting principles. The underlying drop in income was SEK 700 million. Investments remained almost constant at SEK 10 billion. Profit margin dropped from 19% to 14%. Televerket Group's strategies for improving profitability are to cut costs through rationalisation, reduction of staff, and stimulation of traffic growth to boost income, partly through low tariffs.

The part of the traffic income that business customers accounted for was 40% in 1991 and the household part was 60%. Since 1992, when Tele2 started its operation, about 80% of Televerket's traffic income was, at least in theory, exposed to competition. The hardest competition is taking place on international traffic,

which is rapidly rising and accounts for a significant part of Televerket's traffic income, 27% in 1991.

### 2.1.3 Other Swedish Telecommunications Services Providers

#### **Tele2**

Turnover: SEK 8 million (ECU 0,11 million) in 1991, approximately SEK 100 million (ECU 11 million) in 1993  
 Swedish employees: 120 (1993)

Tele2 was acknowledged by the Swedish government as the first private network operator in 1991. It is owned jointly by the Swedish company Kinnevik (60%) and the British telephone company Cable & Wireless (40%). Tele2 is constructing a fiberoptic telecommunications network and has access to the network that lies along the railway tracks in Sweden and is operated by Banverket. Co-operation agreements also exist with a large Swedish power supplier, a radio communications supplier, satellite communication companies, and local companies in Stockholm, Gothenburg and Malmö. Tele2 will be structured similarly to Televerket. Voice telephony and international traffic are important, but several additional services are also offered:

- access to the two international data communications services Flex25 (X.25 in co-operation with US Sprint) and SWIPnet (TCP/IP)
- virtual private networks (VPN)
- leased lines

In the future more services will be provided:

- specialised invoicing
- national telephony
- Calling Card for national and international calls
- VPN-services
- Centrex (software that makes a public telephone switch work like a PBX)
- ISDN services

Tele2's customers are both private and business, above all large Swedish companies and the Ministry for Foreign Affairs. An agreement with Televerket gives Tele2 access to 3.3 million AXE connected customers, which can be extended to 5 million in 1995. Tele2 aims at 5-10 % of the total data- and telecommunications market by the turn of the century, 15-20 % of packet-transmitted data by 1996, and 10% of international calls by 1995.

#### **Fonetel Global Communications AB**

Swedish employees: 3 in March and around 30 by the end of 1993

Fonetel is the third Swedish telecom operator and will start its operation in the summer of 1993. Its shareholders are still not official, but they are spread in several countries and represent large companies and a "large interest group".

Considering the legal ownership, more than 50% of the company will be in the hands of foreign interests and Fonetel is hence to be seen as a foreign company. Fonetel's base is in Malmö where a national exchange for voice and data communication and a satellite station are under construction. Additional local network capacity will be leased from already existing networks. Initially the company will offer Swedish business and private customers international data- and telecommunications. Fonetel will be a company similar to Tele2, but more international and with other technical solutions.

#### **Dotcom Data & Tele Communications AB**

Turnover: SEK 174 million (ECU 23 million) in 1991  
Employees: 268 (1991)

Ericsson was about to sell one of its subsidiaries to Televerket, but the employees never accepted the thought and formed the independent data- and telecommunications company Dotcom instead. State owned Celcius (which is to be privatised) owns a majority of the shares. The company core business is installation and service of LAN and MAN (local/regional data networks) and PBX.

#### **Sydskraft Telecom**

Turnover: SEK 33 million (ECU 4.4 million) in 1991  
Employees: 33 in 1991

Sydskraft Telecom is the telecom subsidiary of a Swedish power supplier. Its operation as telecom services provider is still very modest.

### **2.1.4 Foreign Telecommunications Services Providers**

#### **AT&T Nordics AB**

Turnover: World-wide 63 billion USD (1991). No sales are being invoiced in Sweden, yet.  
Swedish employees: 24 (1991)

AT&T Nordics AB is a subsidiary to AT&T International Inc., USA. The subsidiary was established in Sweden in 1987 and is responsible for marketing and customer support in the five Nordic countries. In Sweden AT&T mainly offers international telephone services, which are all transmitted via the US. Other services offered in Sweden are:

- Calling Card, and USA Direct
- international leased lines
- data network in Switched Digital International
- data and voice networking in VPNs, X.25 and InterSpan frame relay data network



## **BT Worldwide Sweden AB**

Turnover: world-wide SEK 134 billion, in the Nordic countries about SEK 600 million (1992), but invoicing all over the world  
 Swedish employees: 40 (1993)

BT has been present in Sweden since 1991 when it bought the Mc Donnell Douglas Tymnet division, which in turn was present in Sweden since 1989. BT offers services in the global data network Tymnet. The services supplied in Sweden are:

- global data- and telecommunication network services (GNS)
- outsourcing networks where BT has total responsibility for companies' networks (Syncordia)
- fixed leased lines
- VPN

They are aggressively competing for new customers among the largest Swedish companies. Several multinational companies represented in Sweden already has an international customer agreement with BT.

### **Others**

France Telecom is represented in Sweden since 1991, mostly for market research functions. Jointly with the Swedish state-owned company DAFA Data, it established a company in 1992 called Transpac Scandinavia AB (FT 60% and DAFA 40%). It provides different data com and network services.

There are at least five other foreign companies present in Sweden, GEIS - General Electric Information Services, IBM Svenska AB, MCI, Electronic Data Systems, and DEC - Digital. They mostly provide access to global data communication networks, VANS, leased lines, and access to data bases.

### *2.1.5 Mobile Services Providers*

#### **Televerket Radio Division**

Sales: SEK 4,7 billion (1991)  
 Swedish employees: 2 920

The Radio Division of Televerket develops and markets radio-based telecommunication solutions for the Swedish market. It operates two analogue mobile telephone systems, NMT 450 and NMT 900, and a digital GSM network. The division is also responsible for the minicall services of Televerket as well as Mobitex, a mobile radio system for transmission of images and text.

#### **Comvik**

Turnover 1991: Comvik AB + Comvik GSM AB = SEK 116 million .  
 Swedish employees 1991: 190

Comvik AB, operator of an analogue national mobile network since 1981, and Comvik GSM, operator of a digital GSM network since 1992, merged in 1992. At the same time a separate technology company was established. Comvik is owned by the Swedish Kinnevik Group, Millicom International Cellular SA (MIC), New York, Swedish Invik & Co and by employees. Comvik's pure operational network services will probably be supplemented by new services, made possible with the GSM technology. Comvik co-operates with Banverket, Tele2 and MIC.

## **Nordic Tel**

Swedish employees: 170 (1993).

Nordic Tel is, as the third mobile telephony provider in Sweden, building an own digital network, Europolitan, which was set in operation in the end of 1992. Owners of the company are Swedish Volvo, Spectra-Physics, Trelleborg, and the British mobile operator Vodaphone.

### *2.1.6 Cable TV network*

Cable TV network as a means of telecommunications services network is of no significant importance in Sweden. The market share of Televerket is 60% on the cable TV market. The network needs to get technically upgraded to be appropriate for telecommunication services. Cable TV services only make out 2% of Televerket's turnover. There are two other main operators in the branch.

### *2.1.7 Limited Market Access*

The hardships faced by new entrants to the market in the beginning of the eighties were above all:

- the connection monopoly
- Televerket's dominant position
- the unfair allocation of frequencies,
- lack of information, and
- the prohibition of leased lines and third party traffic

There are still a couple of factors, originating in Televerket's economies of scale and scope as owner of the access network, that limits access to the market. Examples are briefly given below.

First of all Televerket's strong position on the market gives it possibility to influence market development, thereby limiting other operator's entrance into the market.

Televerket today owns the network that is inside of all houses, except of houses being built at present. It has been stated that customers who want to change distributor of telecom services have to buy their network inside the house at a "market price".

Televerket's tariffs on interconnected traffic are considered to be too high. Another problem is that there is only one distributor to negotiate with.

## **2.2 The Main Telecommunications Services**

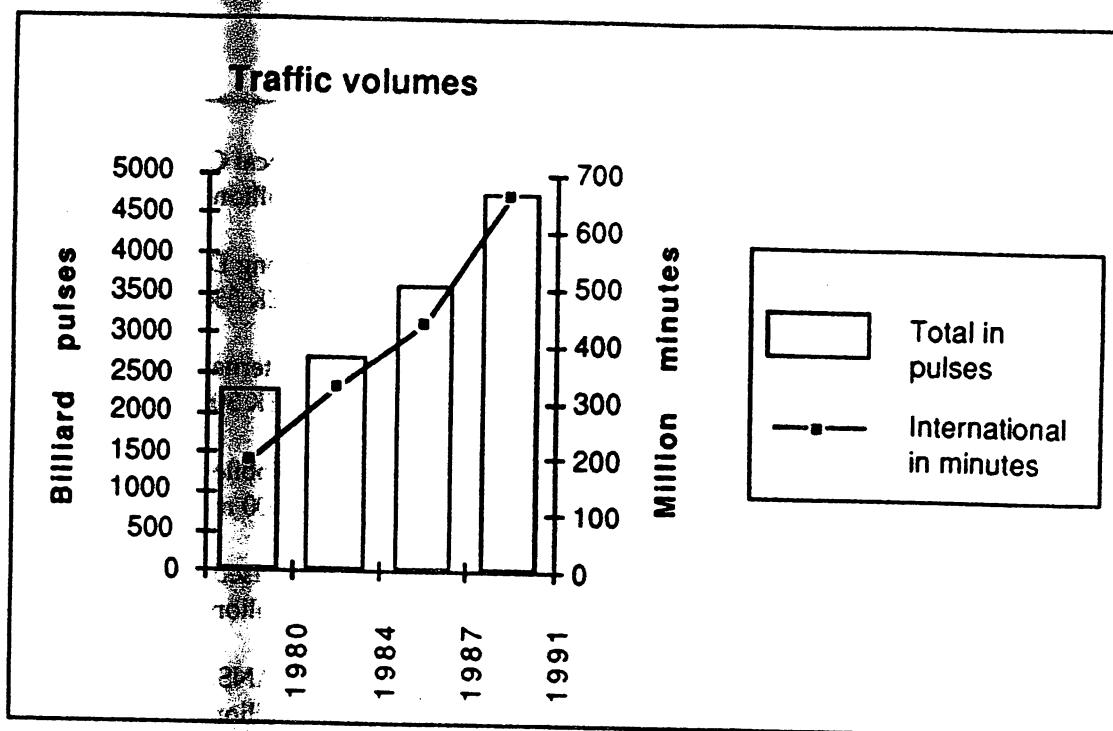
By the side of Televerket's network, there has been additional networks for telecommunications in Sweden during the eighties. They are for example Banverket's network along the railway tracks, Vattenfall's network along power lines and the city network of Stockholm Energi. These three networks have been used for commercial traffic. They now make out alternative transmission routes for Televerket's competitors, who are also constructing their own new digital networks. In the networks the number of different services have increased steadily during the last ten years.

### **2.2.1 Services in the 1980's**

In 1980 following groups of services were offered by Televerket, or were just to be introduced:

1. telephone services: voice telephony, video conferences
2. data services: datex, teledata, telepak
3. text services: telegram, telex, teletex, telefax
4. radio/mobile services: NMT 450 (analogue mobile telephony), MBS (radio paging).

During the 1980's several services were introduced; PLUS services (made available through the AXE technology) and call-up data connections in the first group; Datapak (X.25), leased lines and Tipnet (Internet) in the second group; NMT 900, Minicall (radio paging) and Mobitex in the fourth group; and finally Videotex, Tele-x satellite services, LAN construction, and cable-TV in new groups.

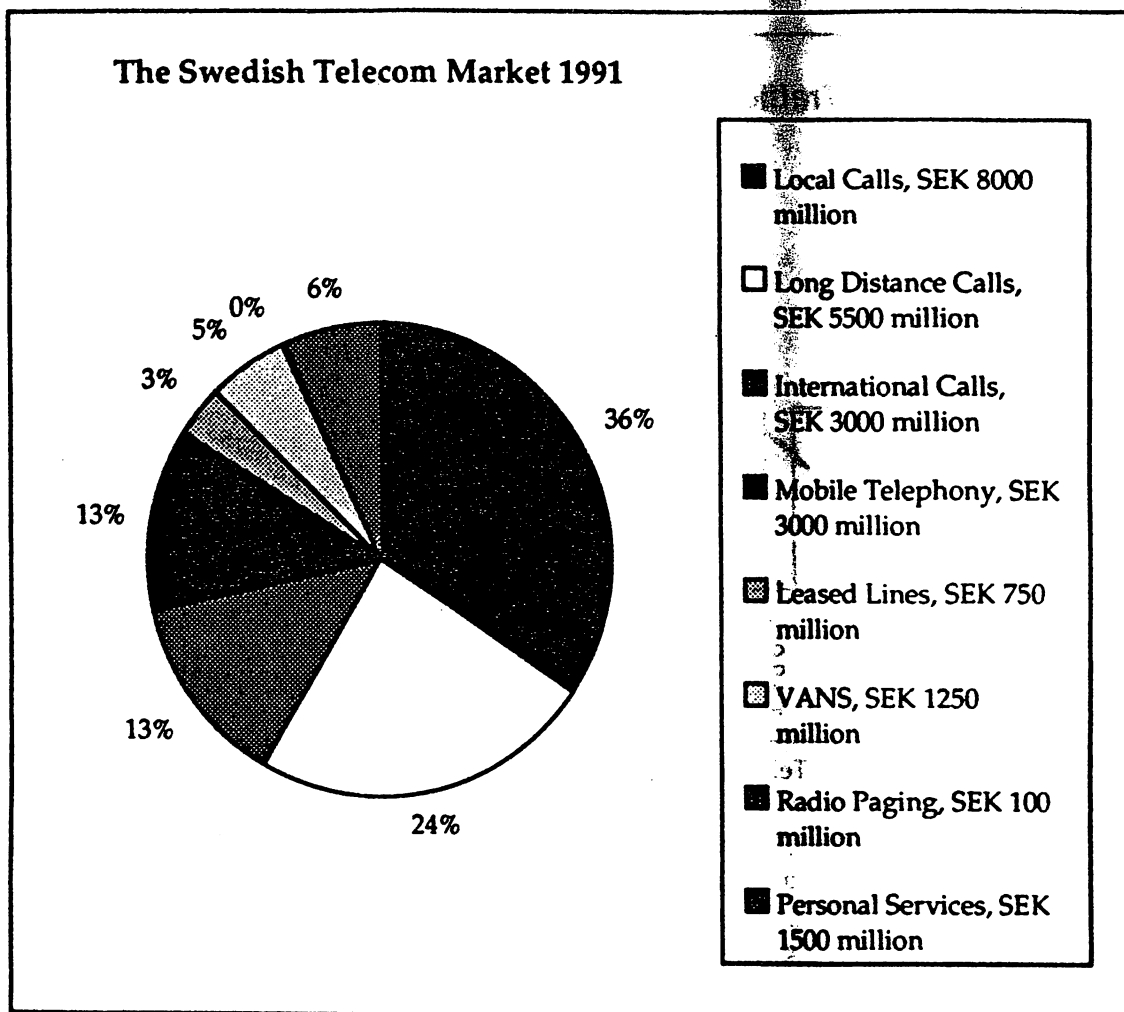


Source: compiled from Televerket Annual Reports

Total traffic volume, measured in number of pulses, constantly increases. International traffic only accounts for 2-3% of total traffic volume, but for at least 13% of market value. From the figure above we can see that the increase of international traffic has been faster than the one in total traffic volume.

### 2.2.2 Services past 1990

After 1990 for example 020- and 071-numbers have been introduced into the first group mentioned above, GSM mobile system into the fourth. Plans for introduction of ISDN have been presented. Its introduction has been postponed a couple of times. The VANS (value added services) like E-mail, EDI and X.400 have increased in importance and the new operators on the market are offering services similar to those of Televerket. The figure below shows the distribution of the main services in 1991. Total market value was SEK 22 billion.



Source: Swedish Ministry of Communications and Transport

### 2.2.3 Diversification of Economic Activity

As already stated, the number of products in the Swedish telecom sector has increased substantially. A rough check to see if the diversification of economic activity in the sector really has increased can be made using the groups of services for Televerket described in the above two sections. Both years these three groups accounted for a good 90% of Televerket's total sales.

	1980	1991
1. telephone services:	94%	60%
2. data services:	3%	27%
4. radio/mobile services:	<u>3%</u>	<u>13%</u>
	100%	100%

The percentages below show each group's part of the sum of sales for the three groups. The conclusion is that there has been an increase in the diversification of economic activity.

## 2.3 *Determinants of the Market Structure*

### 2.3.1 *Technological Progress*

It seems like the rapid technological progress is the most important determinant of the development of market structure in the telecommunication. Powerful microelectronics components have played a major role in this connection. Optical-fibre and new transmission technologies substantially increase transmission capacity. In addition, satellites and radio-link systems, as well as optical fibres, have made it possible to establish new, competitive networks quickly and relatively inexpensively.

In Sweden, there were further possibilities to construct these alternative solutions for telecommunications as prohibition of third part traffic was repealed. With modern centrally performed data monitoring, less switching stations are needed and less "field personnel". The newcomers on the market build modern systems from the beginning and thus save important amounts of labour costs, while the old telephone companies have to update their switching stations.

In 1991 75% of the trunk lines in Sweden were digital and the digitisation rate (subscribers connected to digital exchanges) in the national network was 56% in 1992. Televerket's trunk network will be 100% digital by 1995.

The standardisation process is not to be forgotten as very important to encourage the technological improvements.

### 2.3.2 *Scale and Scope Economies*

When the value added on telecommunications services is low, economies of scale can be exploited since the unspecialized mass services can be bundled in big transmission capacities. This is particularly the case in long distance networks. For owners of network, for example in an GSM-network with significant basic investments and unspecialized services, or in the use of optical fibres, economies of scale are high. High value added telecommunications services on the other hand are characterised by specialisation, which limits the exploration of economies of scale.

The Swedish market structure has partly been determined by economies of scale. Comvik, for example, merged its two mobile telephony subsidiaries of that reason. The big operators can, thanks to economies of scale, allow themselves to set low prices. Economies of scale also made it possible for Televerket to use the profits from long distance and international traffic to subsidise private customers.

In one sense economies of scale are likely to increase. Development costs are high and internationalisation continues on most markets. This benefits multinational telecom providers like BT, co-operations and alliances. Televerket only has 3% of the market in Europe and is therefore eagerly trying to find co-operation partners to increase traffic volume and geographical coverage. In fact economies of scale do not only exist on the supply side for network providers,

it also exist for them as buyers of equipment and network capacity. In another sense, economies of scale in long-distance communications is getting less important because of new "inexpensive" technological solutions, brought about by the development of satellite and microwave technologies.

The possibility to use one infrastructure for several different services, for example different VANS, indicates the existence of economies of scope in the telecommunication sector, for larger companies. So does new technologies like digitalisation and the possibility to produce telephony and data services in the same network.

The scope economies have increased in the eighties and they will speed up internationalisation of telecommunications in the future thanks to the ONP agreement.

### 2.3.3 *Types of Government Intervention*

Since there were no regulations on telecommunications in Sweden, until today, the Swedish government has not directly discriminated any possible entrants to the Swedish telecom market. Indirectly though this has been the case since the Government is the owner of Televerket and Televerket has set several rules to prevent newcomers into the market. See section 2.1.7. It could also be argued that the price level of the temporary interconnect decision is too high.

There is a political proposal to aid the eastern European countries by helping them construct new telecommunication networks. This would undoubtedly benefit Televerket that is already active in eastern Europe.

Today there is no direct or indirect discriminating government intervention regarding regulation on access to the telecommunications and data services market or to the factor market, product introduction and innovation, or taxes.

## 2.4 *Internationalisation of the Sector*

### 2.4.1 *Exports and Imports*

International calls have for long been one of the most profitable parts of the business of public telecommunications operators and they are growing in importance as international trade and travel grow.

In Sweden international traffic accounted for 14 % of total traffic in 1991. The telecommunications traffic out of Sweden reaches higher volumes than the incoming traffic. The question of if this means a net export or a net import is a question of telephone tariffs and trade policy. Our service export is an incoming call in the Swedish part of the cable, and our import of an outgoing call is in the foreign part of the cable. As long as there are more calls out of (higher import volume) than in to Sweden and as long as tariffs abroad are not cheaper than in Sweden, we will be a net importer of telecommunications services. The most effective way that tariffs are lowered seems to be through the introduction of competition into the markets in all countries, again a question of deregula-

tion. It is also easy to see why this is a question of trade policy since it is a way of decreasing a trade deficit! (After the opening of the American telecommunications market USA put strong pressure on UK to follow their example.) The problem of trade imbalances in basic telecommunications services is likely to grow worse unless some more equitable system for accounting and revenue sharing can be devised.

The foreign telecommunications companies present on the Swedish market are there for at least three reasons. First of all it is a market where they, thanks to liberalisation, can be present, not just in the data communications sector, secondly because customer orientation implies local presence and thirdly because they are big actors with tough globalisation strategies. Their market shares are still small, but increase in international traffic, VANS, and leased lines. AT&T's traffic goes mostly via USA and BT's via the UK.

It will get harder to measure the value of imports and exports of telecommunications services because of reversing of calls, invoicing all over the world, and the global company networks. It is accordingly hard to tell the exact market shares and value of foreign companies present on the Swedish market.

#### 2.4.2 *International Mergers, Acquisitions and Co-operations*

In the telecommunications services sector it seems like the networks of mergers, alliances and co-operations is getting just as complex as the telecommunications networks.

The public telecom providers in the Scandinavian countries have been allied for long. Televerket has a company for consultancy services abroad and a company for international traffic. Televerket has also formed a jointly owned company Unisource, together with PTT Netherlands and the Swiss PTT, for international data, satellite and mobile traffic. Televerket also builds new mobile networks in Estonia, Latvia and St Petersburg. A new telecom company is also established together with Estonian and Finish public telephone companies to reconstruct and modernise the Estonian telephone network.

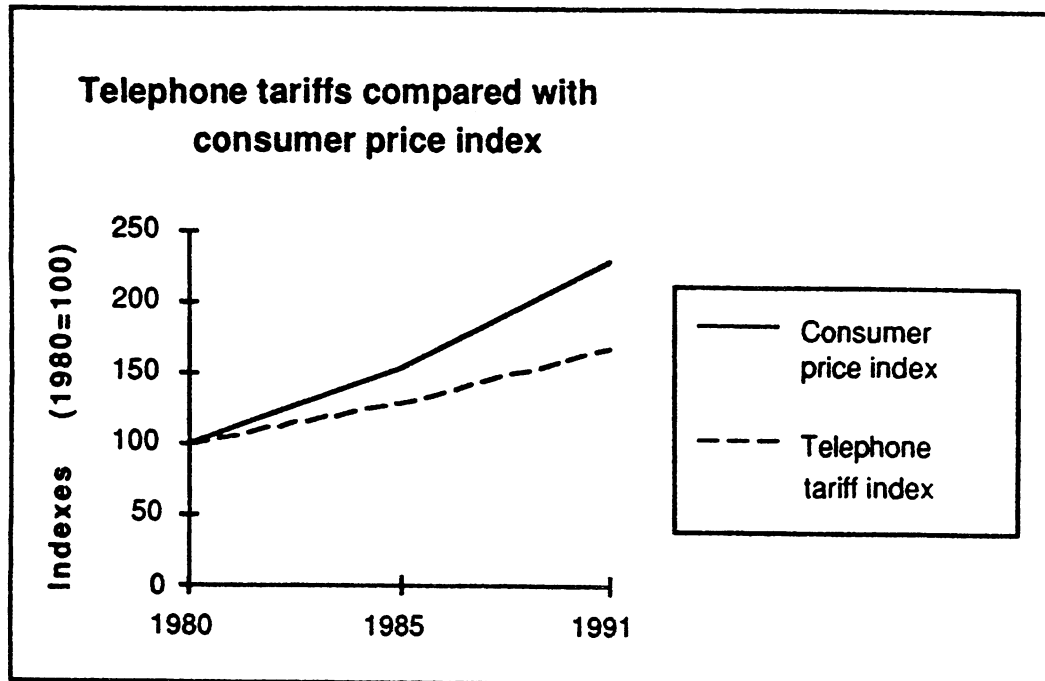
Finally Televerket has applied for licence to operate on the British market. Since the price to use existing network, in the opinion of Televerket, yet is too high to allow real competition, Televerket is considering construction of an own network. The reason for Televerket's investments of hundreds of million Swedish crowns is an ambition to internationalise to compensate for the forecasted losses of traffic on the opened Swedish market.

For the other Swedish providers of telecom services, co-operations and cross-ownership is still more appropriate than direct investments abroad. Many holy and less holy co-operations are seen. Most companies co-operate in one way or another with Televerket and with international network providers. Several companies have tight ownership or co-operation ties to hardware producing companies as well.



### 2.4.3 Tariff Structure in the European Community

The figure below shows that the increase in telephone tariffs in Sweden has lagged considerably behind the rise in the retail price index for many years. This is a trend that has also been observed in the EC member states and most OECD countries. See appendix IV.



Source: Televerket Annual Report 1991

Telephone tariffs in Sweden, both national and international, are among the world's lowest, for households as well as for business customers. The figures in appendix V (calculated by Logica Consultancy) show monthly costs for an average number of telephone calls, plus subscription fees and part of connection fees for national and international calls in different countries, the so called baskets of charges.

Local calls have had too low tariffs because long-distance and international traffic have been allowed to subsidise local traffic increasingly, as new technologies have reduced progressively the influence of geographical distance on cost. According to calculations made by Televerket 1989, only 50% of the costs of household traffic were covered with the revenues generated. International traffic accounted for 80% of total revenues, but only for 25-30% of traffic volume.

Today, in accordance with a decision made by the Swedish Parliament, telephone tariffs are being revised to be adapted to the actual costs incurred and to the prevailing market situation. The new Swedish bill on telecommunications will probably, in addition to the cost orientation, empowers the Government to set price caps on telephone tariffs. (It is yet to see how strong the pressure will be for preserved low tariffs.) Moreover, to provide a sounder basis for competition, the subsidising of household customers by business customers will be reduced. This is a step in line with the ONP directives. Rate rebalancing may not

guarantee lower tariffs, especially not in Sweden, but it should serve to close the gap between the level of tariffs in different countries.

The tariff structure in Sweden is thus changing for most customers. Televerket has proposed to the Government that the subscriber fees for basic telephony shall follow the consumer price index. Whereas, on the other hand, Televerket due to competition from foreign companies, above all BT, is forced to lower the tariff on international traffic for business 25-30%. In mobile telephony both tariffs and subscriber fees have decreased as a result of competition.

Another interesting tariff is the one charged for interconnected traffic and leased lines. It is, by a government decision in 1991, set at SEK 0,65 per minute. Based on Televerket calculations it's supposed to reflect average costs for all telephone traffic, including regional and social commitments. The tariff is considered fairly reasonable for long distances, but maybe too high to promote competition in local traffic.

#### *2.4.4 The International Competition*

Large multinational telecom carriers, like AT&T, Deutsche Telecom, France Telecom, BT, Cable & Wireless, and Swiss PTT, are dominant on the international scene. Televerket is a midget in comparison. These carriers have had fairly high profits, but the profit structure is more and more attacked through increasing competition.

Worth to mention is also that there now are spot markets where "dealers" buy and resell available network capacity from all over the world. Another way to put everything upside down is when the big telecommunications companies offers call-up services, where the direction of a call switched to benefit from own networks possibilities to make international calls more like a local call.

### *2.5 Determinants of Internationalisation*

#### *2.5.1 Tradability of Telecommunication Services*

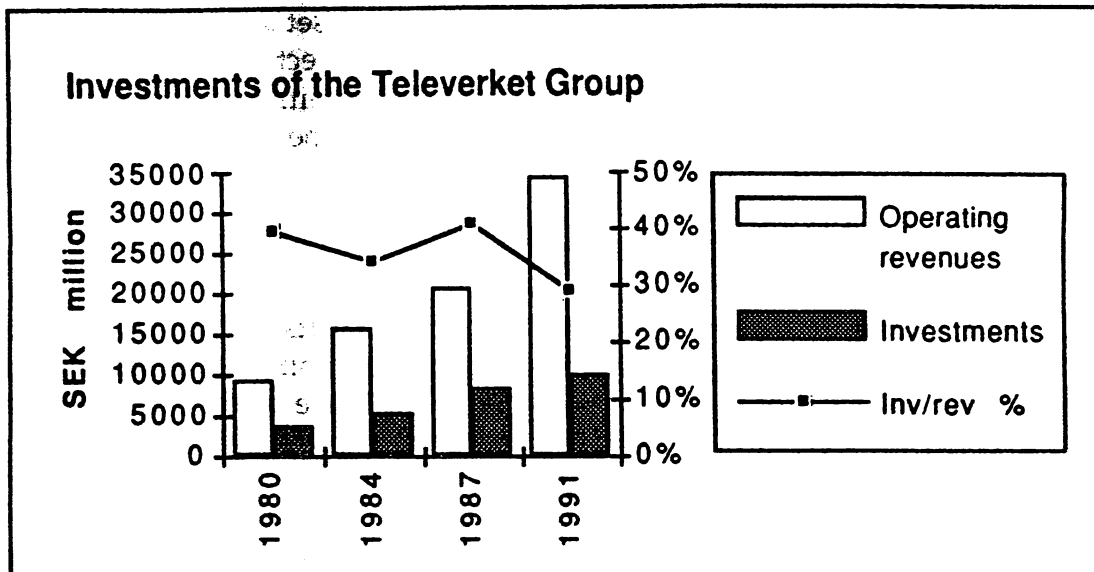
The tradability in the telecom services sector is high. The existence of reverse calls and other services among countries, the internationalisation of companies and their data- and telecommunication networks, increased trade and travel, and above all, the deregulation, standardisation and technological innovations contribute to continued increase in tradability.

#### *2.5.2 Degree of R&D, Labour, and Capital Intensity*

Televerket increased the R&D expenditures in relation to operating revenues in the eighties from 1-2% to 4%, but is not likely to increase further. R&D no longer is profitable to be carried out by all telephone companies. This has already entailed structural changes in Sweden. Televerket can buy high quality equipment from abroad at descent prices, without having to support domestic industry or its own equipment production and development capacities, maybe except for functioning as a "starting engine".

What is likely to occur onwards, is a specialisation of R&D areas and, at the same time, increased domestic and cross-border R&D co-operations. For instance, Sweden takes part in the EC telecommunications research project RACE.

The telecommunications services sector is, highly capital intensive, because of the technology progress discussed above, which promotes economies scale and in turn internationalisation that brings about increased volumes. The figure below shows high investments of the Televerket Group.



Source: compiled from Official Statistics on Telecommunications in Sweden.

These investments have resulted in an increasing capital intensity, measured as material fixed assets per employee. Between 1980 and 1991 it increased by 280% to a good SEK 1 million per employee in the Televerket Group.

### 2.5.3 Proximity Requirement

At the same time as the tradability of telecommunications services increases, it becomes more important for telecommunications services providers to be close to the customers and thus to be able to provide their large customers well functioning communications abroad as well. This is essential for Televerket for instance, since Sweden relative to its size has a large portion of the world's multi-national corporations.

### 3 Future Changes Induced by Participation in the European Economic Integration

#### A REQUIRED REGULATORY ADJUSTMENTS

##### A1 *Telecommunications Policy of the European Commission*

The objectives and directives concerning telecommunications are based on an Green Paper of June 1987, which is complemented by a more detailed plan of action, the council's resolution of the development in the field of telecommunications up to 1992.<sup>3</sup> The objective is to supply European users with more varied telecommunications services at a higher quality and a to lower cost.

##### A2 *Current European Regulatory Adjustment*

#### 2.1 The EEA-Agreement

The EC rules enacted before July 31st 1991 will be included in the EEA-agreement. Since it is to be a dynamic agreement, new EC rules will be incorporated into the EEA-agreement. The two most important directives in the telecommunication area today are a commission directive on services<sup>4</sup> and a council directive on open network provision<sup>5</sup> (the ONP-directive).

##### 2.1.1 *Introduction of Competition into the Service Market*

The Commission Directive on Competition in the Markets for Telecommunications Services aims at introducing competition in the telecommunication services market, excluding voice telephony which is still allowed to be regulated through a monopoly situation. The directive especially affect the value added network services (VANS or VAS), which are mainly the data communication services. The directive doesn't apply to telex, mobile communications, or satellite services.

The directive allows exclusive or special rights to be given to the supply and operation of the public access network, under the condition that the rules on access (connection, licence and tariff conditions) to the public accessible infrastructure are objective and non-discriminatory. The operators shall, if they require, get access to leased lines, within a reasonable period of time.

##### 2.1.2 *Separation of Regulatory and Operational Activities*

According to the services directive above, regulatory functions (granting of operators' licences, type approval, allocation of frequencies e t c) shall be executed

<sup>3</sup> Council Resolution of June 30 1988, 88/C257/01.

<sup>4</sup> Commission Directive 90/388/EEC of 28 June 1990 on competition in the markets for telecommunications services.

<sup>5</sup> Council Directive 90/387/EEC of 28 June 1990 on the establishment of the internal market for telecommunicatins services through the implementation of open network provision.

by an independent body, i.e. there will be a *separation of regulatory and operational activities*.

### 2.1.3 Definition of Open Network Provision

The ONP-directive, which is a frame directive, is based on a monopoly situation for the establishment of telecommunications network and the supply of voice telephony, according to the services directive described above. The main objective of the ONP directive is to make public (national) teleoperators' networks accessible to everybody, through harmonisation of principles and conditions. The access to the network should not be hampered, except out of consideration for public interests. In this way there will be competition between the public telecom operators and other services operators.

Within this frame directive, there is a working programme on how to work out more detailed conditions, primarily referring to leased lines, packet- and network data communications services, ISDN, telephony services, telex services, and mobile communications services.

The ONP directive thus facilitates the supply of services by corporations, companies, or physical persons in the public networks, not only within and between the different member states. It also facilitates for a supplier to compete in a country that is not the home site.

### 2.1.4 Other Directives of Importance

The *Terminal Directive I and II*<sup>6</sup> aim at a complete liberalisation of the market for terminal equipment. Equipment that fulfils the requirements in the directive, and that is approved for marketing and access to the network by the independent supervisory body in one of the member states, shall automatically be approved in all other member states.

There is a council directive on *standardisation* within information technology and telecommunications<sup>7</sup>.

Three council directives grant the *reservation of frequency bands* for the co-ordinated introduction of following services into the Community: the pan-European land-based public radio paging<sup>8</sup> (ERMES), public pan-European cellular digital land-based mobile communications<sup>9</sup> (GSM), and digital European cordless telecommunications<sup>10</sup> (DECT).

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<sup>6</sup> Council Directives 86/361/EEC, replaced by 91/263/EEC (both based on Kommission Directive 88/301/EEC).

<sup>7</sup> Council Directive 87/95/EEG.

<sup>8</sup> Council Directive 90/388/EEC.

<sup>9</sup> Council Directive 87/372/EEC.

<sup>10</sup> Council Directive 91/287/EEC.

### A3 *Difference between the Swedish Telecom Bill and Current European Regulatory Framework*

#### 3.1 Comparison with the EC Regulatory Framework

According to Swedish law the telecommunications services market already fulfils the requirements in the Services Directive. The operational and regulatory functions are separated through the forming of the National Telecom Agency in July 1992.

The Swedish telecommunications services market meets the directions of the ONP Directive at large. Some regulations, corresponding to the general principles in the directive, might be incorporated in new legislation.

To fulfil the Terminal Directive new legislative and new authority regulations already exist.

The Swedish regulatory framework is well adapted to the requirements on standardisation.

The council directives concerning the *reservation of frequency bands* have been discussed during the autumn of 1992, in connection to a new law on radio communications, to meet up to the directives.

#### 3.2 Comparison with the EEA-Agreement

Contemporary EC rules concerning the telecommunications area, above all the Services, the ONP (Open Network Provision), and the Terminal directives, will be included in the EEA agreement and new rules will be incorporated in the agreement. The access to Swedish telecom market is at large more open than the EC market.

#### 3.3 Practical Consequences of the EEA-Agreement

The EEA-agreement will, in spite of the above, entail some important practical consequences:

- the long-standing 50/50 R&D joint venture between Televerket and the Swedish telecommunications company Ericsson (the so called Ellemtel-agreements) will probably be limited due to the new EC rules on competition, partly since it includes a division of markets
- The chances to compete have been improved through new conditions for connection to the public network.
- Regulatory and operational functions have, as mentioned, been separated.
- A larger market for foreign and national companies through harmonisation of technical standards.

- There are also proposals to encourage competition at public procurement, for example, within the telecommunication sector due to rules on open tenders.

#### *A4 Proposals for More Competition*

##### 4.1 Green Paper on Satellite Communications

In 1990 a second Green Paper, more specifically on satellite communications was worked out. Satellite communications are not included in the Services Directive, but can be seen as an integrated part of the telecommunications network and accordingly need some extra attention. In the Green Paper, it is stated that the same regulations on open market access that applies to land-based telecommunications network also shall apply on satellite communications<sup>11</sup>. These directives, which have not yet been thoroughly implemented by the EC member states, can imply some complications to, amongst others, the Eutelsat and Intelsat organisations. They will have to be changed, which could be problematic since they are constituted of several states outside of the EC.

##### 4.2 Further Integratory Actions in the European Telecom Services Sector

The Service- and ONP Directives, based on the Green Paper of 1987, both include formulations stating that integrating actions should be studied further and developed during 1992. To this aim the Commission adopted in October 1992 a report identifying the problems in the telecommunications sector and four possible options for remedying them;

- i) maintaining the status quo by freezing the liberalisation process which was started by the Green Paper and the 1990 directives;
- ii) introducing extensive regulation of both tariffs and investment at Community level, in order to remove the bottlenecks and in particular the surcharge on intra-Community tariffs;
- iii) the liberalisation of all voice telephony, i.e. international (inside and outside the Community) and national calls;
- iv) an intermediate option of opening up voice telephony between Member States to competition.

The Commission advocated the fourth option. Since this report was adopted the Commission has conducted various consultations with the different member states. A recent general discussion within the Commission resulted in a common view that liberalisation must continue. An important controversial decision still remains, however, concerning the time frame. In May 1993, the EC Council of Ministers will decide on the commission's proposal.

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<sup>11</sup> Utrikesdepartementets Handelsavdelning, *Sverige och den västeuropeiska integrationen - Konsekvenser av ett svenskt EG-medlemskap* (Stockholm Maj 1991).

### 4.3 Consequences for the Swedish Regulatory Framework

It is hard to foresee the pace of further liberalisation within the European telecommunications market, as mentioned above. Germany, for example, wishes to delay the opening up of its national voice telephony market to competition until right before the year 2000. BT, on the other hand, is convinced that the Commission will open up for competition on international voice telephony in 1993 and that the national European markets will deregulate totally in 1995.

As Sweden in its new telecommunications bill already allows for competition in voice telephony, further EC-liberalization will probably not cause any major changes in the Swedish regulations.

#### *A5 GATT Aspects*

Within the GATT Uruguay-round, there are negotiations for a General Agreement on Trade in Services (GATS), which aims at a global liberalisation of trade in services. Since the GATS-agreement will cover more than 100 countries any liberalisation of the telecommunication sector will have great international consequence.

It is, however, at this stage not clear to what extent telecommunications will be covered by the GATS. At the moment the agreement basically only covers VANS, but plans to include basic telecommunications (mainly voice telephony) also exist, possibly through prolonged negotiations.



## B INDUCED STRUCTURAL ADJUSTMENTS IN TELECOMMUNICATIONS SECTOR

### B1 *The Future Market Structure, Revenues and Growth Rates*

Network competition has two primary effects: it will stimulate efficiency and customer-orientation, and it will expose cross-subsidy and drive prices towards costs. Competition will be slower to develop in market segments where Televerket's tariffs are below costs, such as the local network.

It is yet to see if the new legislation and the liberalisation of the market is enough to weaken Swedish Televerket's dominance and to promote fair competition. The two most important issues will be just cost orientation and tariffs for leased lines and interconnected traffic. The competition will, at first, take place in international traffic and in the more prosperous business oriented sector, where the demand for VAS is high.

Onwards Televerket will have to find new ways of earning profits when the margins in Sweden are decreasing, mainly through investments and co-operations abroad. It is hard to imagine that the number of main telecom operators will increase in Sweden.

The growth rates of the Swedish telecom market are strongly influenced by the prevailing business recession. The telephony traffic growth is estimated to only 2-3% yearly up to 1995. Telecommunications are not only voice telephony. Telefax, VANS and data traffic will grow in importance. Mobile telephony is expected to continue at a high growth rate.

### B2 *Suppliers' Market Shares*

In international comparisons it is, for several reasons, believed that the competition on the Swedish telecom market will develop faster than liberalised markets in other countries, for example the UK or the USA. One reason is the high degree of liberalisation and another is that new entrants on the Swedish market already have the experience of competition.

Televerket will probably experience lost market shares and reduced profits the next couple of years, before necessary organisational adjustments are made. A market share outlook made by Televerket for 1995 is; in international traffic:

60%	Televerket
16%	large international operators
10%	Tele2 (and to a certain degree Fonetel and Dotcom)
8%	VPNs with international distribution, extended to telephone traffic
6%	telephone cards and calls via Nordic Tel's and Comvik's GSM networks;

and long distance calls:

- 80% Televerket
- 10% Tele2 (and to a certain degree Fonetel and Dotcom)
- 7% VPN, extended to telephone traffic via connection of PBXs
- 3% Comvik's and Nordic Tel's GSM networks

This outlook may be too pessimistic from the view of Televerket. Sweden is a small country, with low profit margins for the operators. The two new mobile operators will most likely aim at one third of the market each in the next couple of years.

### **B3 Network Evolution**

The new networks being built in Sweden and the modernisation of Televerket's network will accelerate the pace of digitalisation. According to Televerket 80-90% of all customers will be connected to AXE in 1995. Televerket aims at 100% digitalisation of both switching stations and the network, except the local line network, by the turn of the century. Furthermore fiberoptical transmission systems will be extended in the larger cities and AXE switches will be replaced by ATM switches. (See B4 below.)

There will probably be an increase in co-operations concerning network investments. Nordic Tel and Comvik, for example, are likely to seek this kind of co-operation.

To be able to grant all regions the same high level of service, radio link and satellite technology will be more common.

Since the charges for leased lines in Sweden are relatively low, it is most likely that more private networks will be constructed. Televerket will render income from leased lines' fees, but due to third party traffic lose some of the most profitable traffic.

Most of this report has been concerned with public telecommunications services, but private networks are now carrying an increasing share of both national and international traffic, especially data communications. Private networks are generally built around dedicated circuits, leased from the public telecom operator or other telecom operators. Total by-pass of Televerket's network will become common.

### **B4 Service Evolution**

Competition will encourage greater customer-orientation and a new focus on customer service. The evolution of differentiated high quality services will also be very important for future competition. An example is personal calling cards. Another one is the ability to provide multinational corporations global data- and telecom services in co-operation with foreign operators.

The process of standardisation and development of the ISDN technology has, partly because of high costs, been at a much lower speed than anticipated. ISDN will be introduced in Sweden during the spring of 1993. It is now believed that the more advanced broad-band ISDN, implemented by ATM technology, will become the success story of the nineties. ATM is an efficient method to deal with all kinds of traffic: voice- and data lines as well as video-images, and switching between local area networks. Multimedia and video-conferencing are service areas where growth is awaited.

#### **B5      *National and International Tariffs***

While competition can be expected to reduce some tariffs, price reductions may be limited by factors such as duopoly behaviour and innovative price packages, typically focused on business and high-volume residential customers. Household customers will presumably experience higher monthly telephone costs. In Sweden it is hard to tell the pace of the rebalancing of tariffs. It depends upon the size and extent of a price-cap regulation.

**Table 1: Indicators of Market Structure (static analysis)****A. Assessment of the market structure**

	1980	1984	1990	1991
1) Number of firms	1	2	5	9
- Swedish	1	2	3	4
- EEC+EFTA			1	2
- RoW			1	3
Total turnover (MECU)	1289	2158	4178	5392
Total employment	43416	43178	47983	46693
4) Importance of foreign controlled firms; see section 2.1.1 and 2.1.4				
5) Diversification of economic activity:				
Local calls				49%
Long distance calls				33%
International calls	15%			18%
Ordinary calls	94%			71%
Mobile telephony	3%			13%
Leased lines	3%			3%
VANS				5%
Radio paging				<1%
Personal services				7%
Tot market value (BECU)				32.1

**B. Determinants of the market structure**

See qualitative judgements in the text sections :

- 6) Degree of scale and scope economies; section 2.3.2
- 7) Degree of product differentiation; section 2.2.1, 2.2.2,
- 8) Degree of proximity requirement; 2.5.3
- 9) Types of government intervention; 2.3.3
- 10) Degree of government intervention; chapter one and 2.3.3
- 11) Market share of state-owned enterprise; 2.1.1

## 4 Outlook

### A. THE FUTURE IMPACT OF THE EEA ON THE SWEDISH TELECOMMUNICATIONS SECTOR

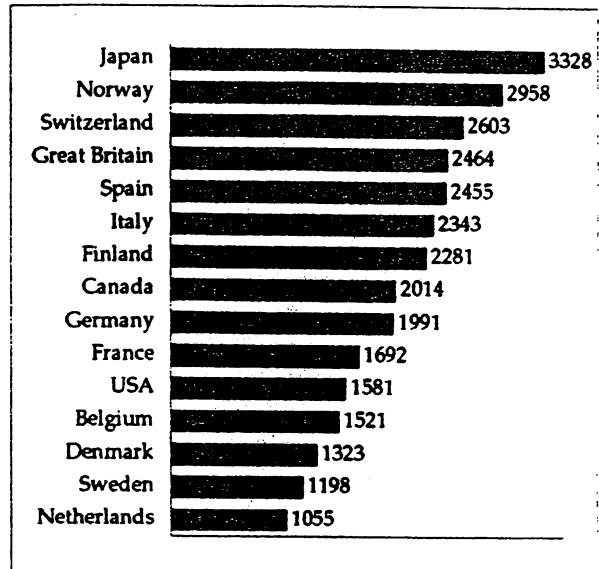
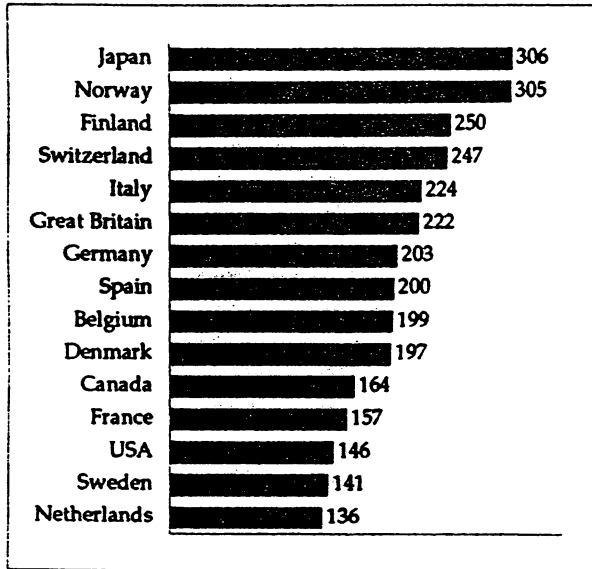
As Sweden in its new telecommunications bill already allows for competition in voice telephony, further EC-liberalisation will probably not cause any major changes in the Swedish regulations, but rather openings for Swedish operators. Also considering that Televerket is currently applying for a licence with the British Department of Trade and Industry (DTI) to compete in the British market for international calls, Sweden will probably be well prepared for and able to profit from a deregulated European market.

Looking at the size of the market that will be liberalised, now dominated by the state owned monopolies, gives an idea of the major changes that will take place. The total telecommunications market in the 18 EEA-countries is assessed to account for about SEK 1000 billion yearly. A new market structure will emerge with great opportunities for companies who are ready to participate. The already liberal Swedish market gives Swedish companies a good basis for such a participation.

Appendix II

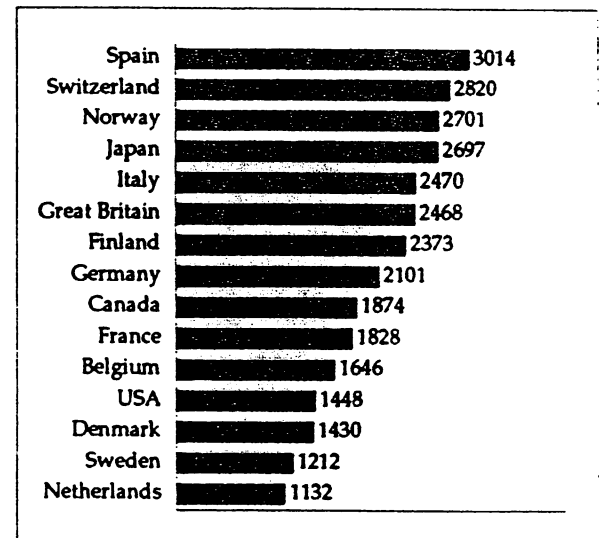
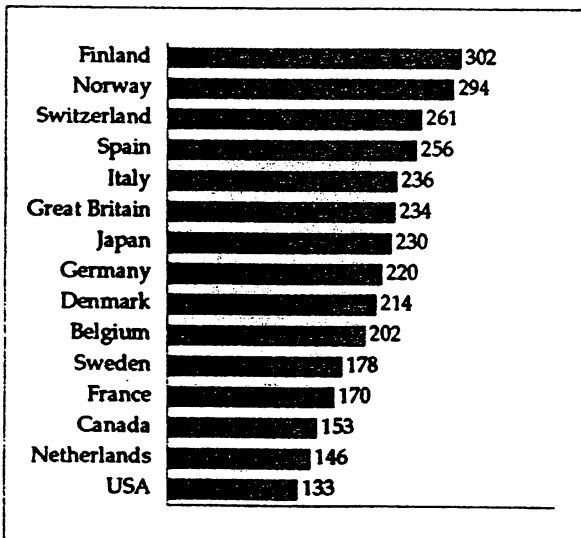
1990

1 SEK = 0,133 ECU



1991

1 SEK = 0,134 ECU



Source: Logica

# Monthly Telephone Costs in Different Countries

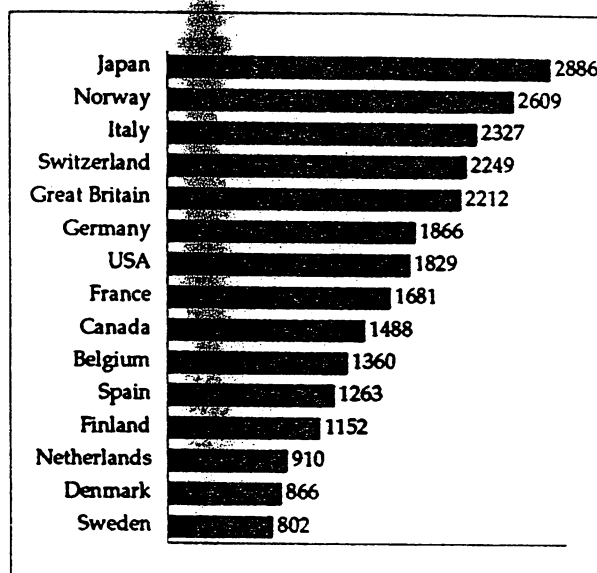
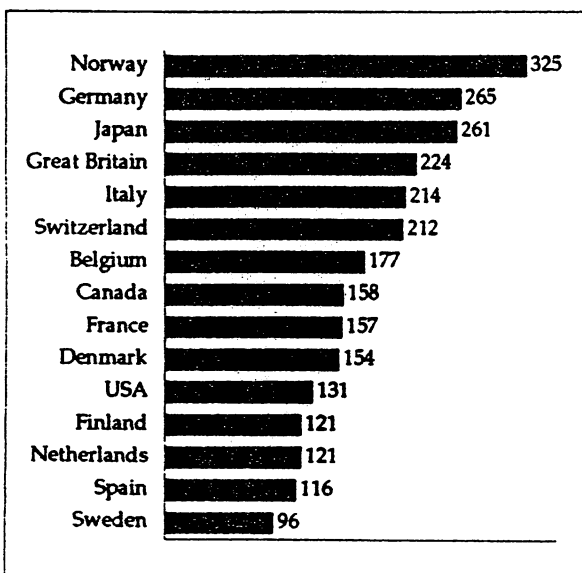
(in Swedish Crowns)

for Households

for Business

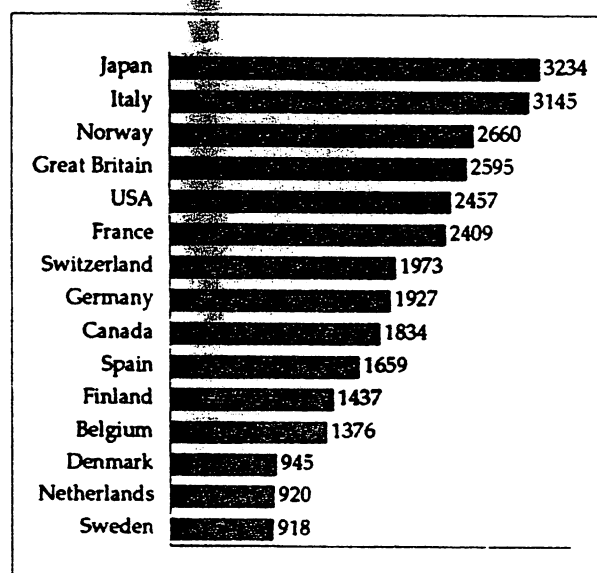
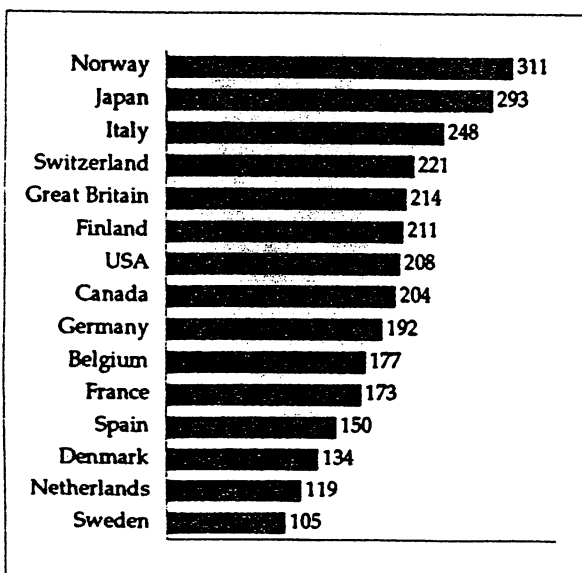
1983

1 SEK = 0,147 ECU



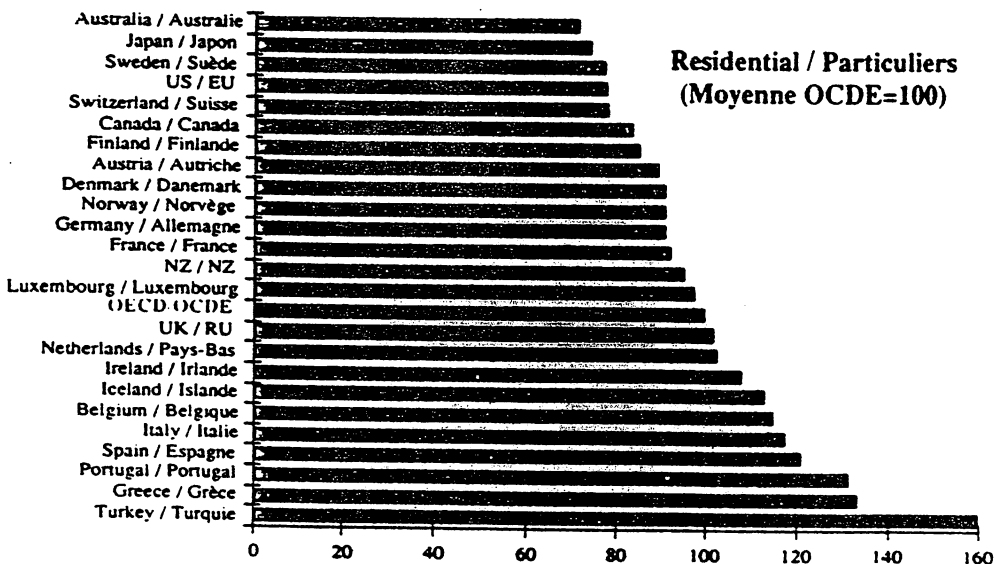
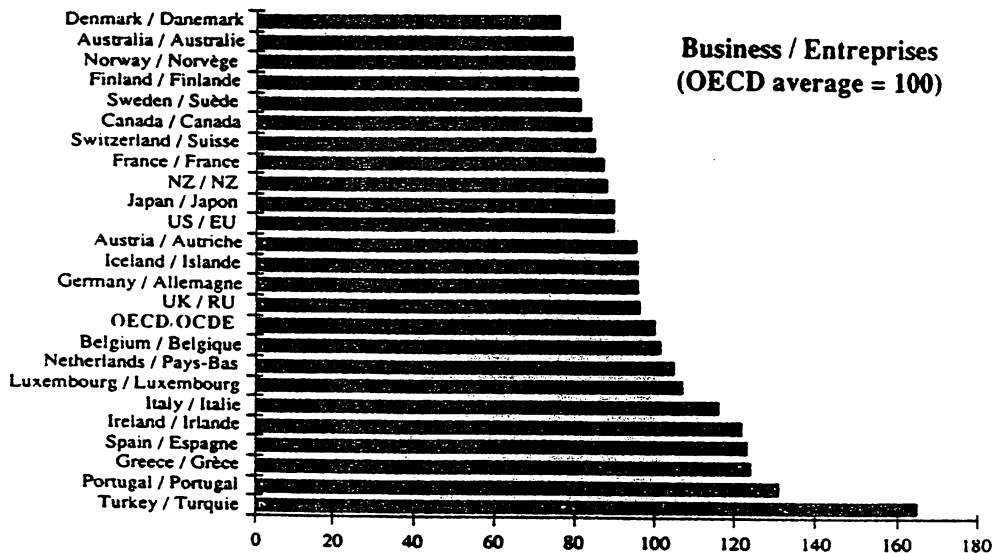
1985

1 SEK = 0,153 ECU



**INTERNATIONAL TARIFFS**

**OECD basket of international telephone charges<sup>1</sup>, in indices, November 1989 /  
Panier OCDE des appels internationaux<sup>1</sup>, en indices, novembre 1989**



<sup>1</sup>. Calculation based on US \$ PPPs /  
Calculé sur la base des PPA en \$ EU

Source : OECD Tariff Comparison Model /  
Modèle OCDE de comparaison des tarifs.



# The OECD Baskets for National and International Charges

