

The history of Telia

Compiled for TeliaSonera AB

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Preface

TeliaSonera AB was formed on 9th December 2002, when Swedish Telia AB merged with Finnish Sonera Oyj, two companies with long histories. Telia came into existence when the Swedish incumbent Televerket was corporatized in 1993. In Finland the Post and Telecommunications was corporatized in 1994 and Telecom Finland became a subsidiary company. It changed name to Sonera in 1998 when the company was launched on the stock exchange. Telia was launched on the stock exchange in 2000.

Televerket's official history comprises seven sections (eight volumes) which were published (only in Swedish) between 1931 and 1997, plus several other books.

Telecom Finland's (and its predecessor's) official history comprises two volumes published in 1996 to commemorate the Finnish telegraph's second centenary. A condensed English version also exists.

In Telia's case, from 1993 onwards there exists no written historical record of the company other than annual reports. This document attempts to correct that situation, primarily between 1993 and 2002. Its purpose is to describe and explain the immense changes and extensive expansions which have taken place within Telia, both in Sweden and abroad. The target audience for this work is the Group's own past and present personnel and those who are curious about the company's direction and development. This history can hopefully also contribute to further academic research on the telecom development and be a basis for analysis of Telia's role in this development

1 Source material

A central source for this work has been the company's annual reports, which from 1999 are available on TeliaSonera's web site. In addition more than 40 interviews have been conducted with key employees, past and present, to collect supplementary information. Additional material has also been included from previous historical literature and even from sources via the Internet. Telia's extensive archives have so far not been utilised due to lack of resources.

2 The assignment

Telia's history is the result of a decision taken by TeliaSonera's Communications Director in 2006 and the efforts of a project group comprising:

- John Geary, TeliaSonera, project manager, co-author and translator
- Johan Martin-Löf, Televerket/Telia 1986-2002, research and author
- Claes-Göran Sundelius, TeliaSonera, co-author
- Bertil Thorngren, Televerket/Telia 1976-1997, co-author

Many present and previous employees of the company and its predecessors have generously contributed views and information from their professional experience.

3 The result

The assignment has resulted in a number of documents in both Swedish and English, primarily in Word and Excel formats, listed below.

3.1 Sweden and Finland

The merger of Telia and Sonera signified the union of a Swedish and a Finnish company. In spite of Sweden's and Finland's close history, geographical proximity and cultural ties, the conditions for telecommunications development in both countries differed in several important aspects. The most important was that from 1918 everything to do with telecom services in Sweden was concentrated under a State umbrella. Finland is one of the few countries which has retained its structure with many entities.

For this reason, a brief introduction has been included outlining historical developments in Sweden and Finland

3.2 Main outlines, (Short history)

As this history is quite a long and complicated affair, one short document attempts to give the reader a condensed overview of the main aspects in five sections, each representing an important development process. It is intended to give the broad picture without too many details

3.3 The History, (Main history)

Telia's history is presented in five parallel chapters:

- Strategies and organisation
- Domestic activities
- Foreign multi-national activities
- Foreign national activities
- Consultancy

The first chapter describes strategies and organisational aspects at different stages. Business activities take up the other four chapters describing a variety of subjects. In principle the narrative ends in December 2002 but in some cases important facts from a later date have been included.

The main emphasis in this history is on the development of **Telia** between 1993 and 2002. Many courses of events are closely connected to earlier periods, so to give the reader a comprehensible picture, some information from the **Televerket** period between 1980 and 1993 has been included. In a few cases even information from earlier periods has been mentioned, indicating not least the longevity of Swedish telecommunication's proud history. This has been done to give the reader a complete picture without having to search for information from older sources.

It is inevitable that this history touches upon subjects from different perspectives resulting in some repetition in different chapters and sections.

Financial data has not been included in this narrative as financials are well covered in annual reports.

3.4 Chronology

One stand-alone document (only in Swedish) presents an overview of the company's entire history from 1853 to the 21st century in the form of a chronology on a single A3 sized sheet. This page is a grid with 16 rows and 13 columns. Each row represents a decade and columns depict activities. Any activity mentioned in a box has a corresponding date.

3.5 Appendices

Some facts have been assembled as appendices to reduce the narrative. (With the exception of the **Telefos Group**, the **Orbiant Group** and **Televerket's restructuring** all the following appendices are only available in the Swedish language)

These appendices cover information relating to:

Ministers with responsibility for telecommunications, 1993 – 2002.

Telia **Board members**, 1993 - 2002.

Telia **CEO's**, 1993- 2002.

Telia's organisation. Lists Telia's executive management, 1993-2002. The company had five different structures during the period. Diagrams and lists.

The **Telefos Group.** Gives an account of the Telefos Group comprising eight former Telia companies. 51% of Telefos was sold to Industri Kapital on 1st June 2001. The group companies were disposed of in steps up to 2007, at which point Telefos was liquidated.

The **Orbiant Group.** Gives an account of the Orbiant Group with six former Telia entities within network construction and maintenance of which 91% was sold to Flextronics at the end of 2001 and the remainder in mid-2002.

Televerket's restructuring, indicating the many organisational changes made by Televerket between 1980 and 1993. They were preparatory actions prior to the corporatization of Televerket in 1993.

Services. Indicates customer numbers for a variety of services in Sweden according to annual reports from 1985 to 2007. Diagrams.

Employees in the parent company plus subsidiaries in Sweden and abroad according to annual reports from 1988 to 2007. Diagrams.

Source materials, a list of background documentation used in this history project.

References, a selected list of material for extended reading.

3.6 Background material

Interviews. Comments from 43 interviews with employees, past and present, comprise complementary background information for the history.

Telecom history in Sweden and Finland

TeliaSonera was created in December 2002 by the merger of Swedish Telia and Finnish Sonera, uniting two companies which were an excellent complement to each other, both from a market and financial perspective. For the first time anywhere, two former telecom incumbents joined forces to form a new and stronger company. Telia's and Sonera's underlying histories have much in common but also some important differences, in spite of the fact that the two home countries are neighbours which for many years had been united as one kingdom.

Telia's home country, Sweden, has enjoyed a long period of peace and stability since the national crisis of 1809 divided the Kingdom and Finland became part of Russia. Sonera's home country, Finland, has had a much more turbulent history. Firstly Finland was a Russian Grand Duchy from 1809 until 1917 and thereafter a sovereign republic whose existence was threatened several times during World War II.

These differences are reflected in the way telecoms developed in both countries.

1 Sweden

Telia's predecessor in Sweden, the State-owned Televerket, was created in 1853 to run the electrical telegraph. When the telephone arrived in the 1880's local private entrepreneurs were the first to seize this new opportunity. It was only when the Government decided that Televerket should build a united national telephony network in the 1890's, called "Rikstelefon", that Televerket bought the majority of the local network companies. By purchasing the largest competitor, Stockholms-telefon, in 1918 Televerket became the totally dominant operator on the Swedish telecom market, a situation which remained until competition arrived in the 1980's. In this way telecommunications in Sweden came under State control (as in most other countries) and quite early in its history in 1918, even though a legal monopoly was never created.

Televerket extended and automated the national network and introduced a uniform national pricing structure. Subscription rates and local calls were cheap, whilst international and long-distance national calls were expensive. Consequently, in an international perspective, telephony in Sweden had a great impact due to low pricing. Excessive profits on long-distance traffic cross-subsidised local calls and subscriptions. However, this meant that the business was vulnerable and around 1990 attracted competitors who started "cherry picking" on the over-priced segments and threatened Televerket's profits. Powerful countermeasures such as price rebalancing and special initiatives towards major business customers became necessary in the early 1990's.

2 Finland

During the era that Finland was a Russian Grand Duchy, from 1855 the Finnish telegraph system was a part of the Imperial Telegraph. However, when the telephone arrived it was developed by private Finnish interests who wanted to protect their independence. When the Republic was born in 1917 telephony was essentially in the private domain. In addition to telegraphy, the Finnish Telegraph Administration, which was created at that time, only had responsibility for some parts of fixed

telephony. These were international and long distance national traffic, plus subscriptions in rural areas. The local telecom business in Finland was mainly in the hands of at most some 850 local private monopoly companies. From 1921 they collaborated in the Telephone Operators Association, renamed Finnet in 1996. Early on even long-distance traffic in Southern Finland was managed by a private company until it became State owned in 1935. The Finnish market was divided into two blocks of roughly equal size, one state-owned and one private. Finnish telecommunications was therefore never the responsibility of a single entity.

As all competing parties must be profitable, fixed telephony pricing was in the main cost orientated and varied nationally according to local conditions, in contrast to the situation in Sweden. For this reason Finland did not have the imbalances and overpricing which attracted competitors to Sweden. However, the two Finnish blocks started to compete with each other at the beginning of the 1990's, primarily for data and mobile services. Mobile telephony opened up new opportunities for the then corporatized Telecom Finland (the telecom part of the ex Post and Telecom Administration) to increase its customer base and become active outside its traditional markets. In 1998 Telecom Finland changed its name to Sonera after being introduced on the Stock Exchange. Having had relatively few fixed telephony customers, Sonera transformed itself into a mobile operator to a larger degree than Telia.

Telia's history, main outlines

The main outlines of Telia's history are a summary of five areas in the company's development from 2002 backwards in time. They relate to both Telia and its predecessor Televerket (Swedish Telecom), both of which have been drastically transformed over the years. The intention of this short narrative is to give the reader a first overview of the subject. The next stage provides a more comprehensive picture, divided into five detailed chapters.

1 1993-2002 – Telia's development and new services

Between 2000 and 2002 Telia underwent a recovery and new start when the attempted merger with Norwegian Telenor failed in December 1999 after political controversy. Telia was floated on the Stock exchange in June 2000 and the State's ownership reduced to 70.6%. Nearly one million Swede's became shareholders in the company but saw their investment sink like a stone in the aftermath of the IT bubble bursting. Telia invested heavily in mobile and Internet expansion in the Nordics and Baltics plus on international carrier services to overseas operators. At the same time Telia focused on radically transforming its national business by hiving off non-core activities such as network construction and maintenance.

In the mid 1990's, Telia had entered the growing Swedish Internet market which had first been exploited by competitor Tele2 a few years earlier. By the end of the 1990's Telia launched ADSL broadband offering services to a wide section of the population. Telia continued to expand the GSM network and attained a 50% share of the Swedish market in tough competition with Comvik and NordicTel (which became Europolitan, Vodafone and finally Telenor after a series of changes in ownership). GSM grew rapidly and was complemented with pre-paid cards, SMS text services and data services. Digitalisation of the fixed telephone network was completed in 1998 at which point fixed customer numbers had culminated at 6 million connections as users started to prefer mobile phones only. Telia was also active in the information-services market, both traditional and new, without achieving any major success.

In the 1990s Telia also invested in (primarily) mobile operations in many countries all over the world, often on a risk-capital basis with partners. The strategy was to exploit competences from the home markets and use them abroad. In many cases Telia could also utilise the international experiences gained by Swedtel, an internal international consultancy created by Televerket in the 1960s.

2 Competition started early in Sweden

Telia AB was created in 1993 when it took over the business from Televerket, a state-owned public service corporation. This action was in principle a very important telecom reform. As a limited company Telia now had an organisation which had both the flexibility and adaptability necessary for international collaboration in an increasingly competitive telecom market.

Even if the Swedish State continued to own 100% of Telia, corporatization and competition demanded telecom legislation. In 1993, Sweden's first ever telecom law came into being which defined the conditions for all players on the market. These

regulations were aimed at promoting competition as an instrument to attain efficiency and good service. In addition they defined the conditions to ensure that Telia's infrastructure would be available to competing operators. Prior to 1993 the Swedish telecom market was virtually unregulated, contrary to most other countries where formal monopoly legislation was the norm. This meant that in practice Sweden arguably had one of the most liberal telecom legislations in the world. When other operators and entrepreneurs realised that there were no legal barriers, competition began very early in Sweden, not least in the mobile area where competition had existed from the early 1980s. Competition for business customer's telecom traffic started when international telcos established themselves in Sweden around 1990, followed by companies from the Nordic countries and a number of national entities. The Swedish State became a driving force when several government bodies purchased telecom services from foreign suppliers. The fact that these operators were mostly monopolists from countries which did not allow reciprocal access to their own markets was a hot topic in the national political debate. This situation evened out when EU policies opened up the European telecom markets in 1998.

Telia responded to these international challenges by founding subsidiaries abroad as soon as circumstances allowed, starting with Telia UK in the United Kingdom in 1993. During 1995-96 several other subsidiaries were created in the Nordic countries in response to their telecom company's establishment in Sweden.

Another challenge was to provide Swedish multi-national companies with increasingly more comprehensive services. The larger international operators threatened this market and thereby substantial portions of the most lucrative traffic. To create a firm presence, primarily in Europe, Televerket and PTT Telecom Netherlands (later renamed KPN) created the Unisource Alliance in 1991. Swiss PTT Telecom (later renamed Swisscom) joined in 1993. Spanish Telefónica became a fourth member in 1996 but under different economic terms than the original three. USA's AT&T was affiliated via the joint venture in AUCS (AT&T – Unisource Communications Services). The Alliance was created to fulfil complex market demands, such as the needs of the EVUA (European Voice Users Association) an international purchasing alliance. By 1998, when the excessive profit-level in international tariffs disappeared as a consequence of competition, Unisource had played out its role and the Alliance was disbanded in 1999. AUCS was taken over by Infonet, a US international data-services company in which the Unisource partners were shareholders. The other major telecom alliances which had been created by other operators were also disbanded at around this time.

3 Televerket's transformation into Telia AB

The corporatization of Televerket and the formation of Telia AB in 1993 was the culmination of a long process of building subsidiaries within the framework of Televerket. This started already in 1981 with the creation of Teleinvest AB which served as a holding company for a subsidiary sector within what became known as the Televerket Group. A Parliamentary decision to approve the formation of Teleinvest was the result proposals from Televerket to the Government, which also included the need for greater financial freedom. As a result, Televerket was separated from the State budget in 1984 and thereafter allowed to borrow funds on the

The history of Telia original

international capital markets itself. This was necessary in order to act in a business-like manner as competition evolved. Televerket organised existing activities in separate divisions to have a better control of each business and later converted them into subsidiaries. New businesses were mostly started as limited companies, sometimes in partnership with others. When Telia was created in 1993, Teleinvest's activities were responsible for 30% of the revenues and 20% of the employees within Televerket. In an international perspective, Televerket was a very early starter in the process of gradually adapting to growing competition in the telecom market.

Televerket established itself outside Sweden already in 1990. After the fall of the Iron Curtain the Baltic countries sought co-operation to create telecom connections westwards and to modernise their neglected national systems. Televerket and Telecom Finland (later Sonera) worked together to broaden the base and spread the risks in co-owned associated companies in Estonia, Latvia, Russia and Lithuania.

4 New services in the 1980's

The beginning of the 1980's was a milestone in Swedish telecom development when a whole host of new services were launched, most of which came to play a crucial role in Televerket/Telia's competitive ability. Computerisation and digitalisation of the telephone network started around 1980 with the introduction of AXE exchanges developed during the 1970s in collaboration with LM Ericsson via the jointly owned development company ELLEMTEL. The telex, data and mobile networks also utilised AXE. Telefax was a major success, plus both fixed and mobile data-networks were launched. The fact that Televerket was responsible for radio broadcasting was exploited to introduce a nation-wide paging service over the FM-radio network. In particular, NMT (Nordic Mobile Telephone) was a spectacular success and a good example of cross-border co-operation. NMT was also the starting point for development at a European level of the GSM digital mobile system, which in turn was the basis for the ensuing massive global success of mobile telecommunications for voice, data and broadband. Televerket's service portfolio, which was previously predominantly based on the fixed national telephony network, was extended with many new services in the 1980s. However, the State transferred radio broadcasting to a new entity, Teracom, in 1992.

5 Building a telephone network in a de-facto monopoly

Between 1924 and 1972 Televerket completed the mammoth task of building and automating the national telephony network. This was done using Swedish advanced exchange technology developed together with LM Ericsson. Exchanges were also manufactured in Televerket's own factories, which dated back to 1891. The Swedish network was built entirely from income generated by the business and was in no way financed by the taxpayers after the 1890s. Televerket's de-facto monopoly was established in 1918 when the major competitor Stockholms Telefon was taken over. For this reason Televerket had an early virtual monopoly in Sweden, half a century before her Nordic neighbours. Sweden differs in another way because the post and telecom services have never been amalgamated, as was the case in Denmark and Finland in 1927 and in Iceland in 1935. Sweden rejected the idea in 1936.

In the 1960s Televerket established Swedtel as a consultancy to help telecommunications in developing countries as a component of Sweden's aid programmes to the Third World. It was a far-sighted idea and the business gave Televerket an early and broad proficiency in international conditions plus an excellent reputation in many parts of the globe.

Telia's history

Telia's history deals primarily with the bare ten years prior to the formation of TeliaSonera in December 2002 and after the creation of Telia on 1st July 1993. This period has not previously been comprehensively recorded. However, Telia's history is closely linked to earlier periods which have been well documented but are difficult to access. For this reason, some facts from the history of Swedish Telecom (Televerket) have been included, in some cases all the way back to the creation of the company in 1853.

This narrative follows the development of both the domestic and international markets. It shows how Telia developed a broad portfolio of services and businesses in many countries during the 1990s from a starting point of a limited set of simple services, mainly in Sweden, as late as in 1980.

The document follows five main themes: Strategies and organisation, domestic activities, foreign multinational activities, foreign national activities and consultancy.

1 Strategies and organisation deals with the conditions necessary to conduct the business, strategies, marketing issues, organisation, business control, personnel issues and environmental work. Since the early 1990s Government telecommunication policy has been focused on shaping regulations that promote competition. Telia's strategy has been to face competition on the home market by streamlining and improving the central activities in Sweden and broadening the supply of new services. In addition, Telia established activities on markets outside Sweden from 1990 onwards. These transformations meant extensive organisational changes and put a great deal of emphasis on raising competence levels and customer orientation. Telia also tested alliances with foreign operators. After a failed attempt to merge with Norwegian Telenor in 1999, a successful merger with Finnish Sonera was completed in 2002. Since the early 1990s, employee numbers (in Sweden) have reduced by about 75%. A focus on environmental activities has created new business opportunities.

2 Domestic activities are related to customers in Sweden. Network services for data, voice and text dominate revenues and they have increasingly been delivered over both fixed and mobile networks. Broadband and mobility have increased dramatically. In 2003 the EU compelled Telia to sell its own CATV activities as a condition for the merger with Sonera. Telia has developed network-based complementary services and at the same time concentrated activities by hiving-off a number of sideline and support activities by selling or corporatizing them.

3 Foreign multinational activities are primarily directed towards international corporations, plus telecom companies and operators world-wide. Telecom transport services at a global wholesale level were created by Telia International Carrier. In the 1990s the Unisource alliance, in which Telia was a founder, was created with European operators member as a response to the increasing international telecom needs of multi-national companies. The traditional multinational cooperation from the monopoly era at a global, European and Nordic level has gradually reduced in importance.

4 Foreign national activities refer to local telecommunications companies in many countries around the globe which Telia either started, mostly as a member of a consortium, or acquired by purchasing shares in existing entities. After 2000 these activities mostly comprised the Nordic and Baltic countries and the wider Baltic area. During the 1990s some ten European and more than a dozen markets on other continents were addressed. After the turn of the century most activities outside the close neighbourhood were disposed of.

5 Consultancy in the telecommunications area was conducted internationally through Telia's subsidiary Swedtel until 2001, when the company was sold. During the 1990s Swedtel increasingly supported the foreign national activities that Telia started in many countries. Before 1990 the main focus was consultancy in developing countries intended to promote their telecom development.

1 Strategies and organisation

Strategies and organisation summarizes Telia's development after its start in 1993 but includes some historical reference to its predecessor Televerket, born in 1853.

This description comprises nine sections.

- Business environment
- Business strategies for the company
- Technology and marketing investments
- Re-structuring
- International alliances
- Mergers
- Business management
- Personnel issues
- Environmental activities

Business environment refers to technology development in general, competition in the telecom market, plus politics and regulation, primarily in Sweden. Technology today is dominated by broadband and mobility and in particular Telia has played an important role in the global development of mobile telecoms. Around 1990 intense competition emerged in Sweden, after an early start in the 1980s, causing the end of the de-facto monopoly Televerket had enjoyed since 1918. Telecom regulation in Sweden is today based on EU rules, but prior to 1993 it was relatively insignificant.

Business strategies have experienced a number of transformations. In the early 2000s Telia focussed on broadband and mobility in the Nordic and Baltic countries, plus the international carrier business. During the second half of the 1990s major risk-capital investments were made in a large number of countries world-wide. In Sweden, mobility and Internet services were rapidly rolled out and in addition content-services expanded at the same time as older businesses were sold off. The early 1990s saw the first investments abroad, in the Baltics and in a number of European countries. In Sweden, digital mobile telephony was launched and digitalisation of the fixed network was completed which included a new range of services. During the 1980s the number of mobile and fixed services expanded due to new technology complementing the previously dominant fixed telephony.

Technology and marketing investments in the beginning of the 2000s were dominated by the introduction of mobile broadband, first in the GSM-network (2G) and later in the UMTS-network (3G). ADSL fixed-broadband was launched in a big way in 1999 and Homerun, which allowed high-speed wireless broadband via "hot spots" was introduced in 1998. Mobile text-transfer was given a big push when SMS started in 1997. The second generation mobile phone system was introduced in 1992. It became a massive success and over time it replaced the earlier NMT system. NMT, launched in 1981, had been a major achievement for the Nordic telecom administrations, where Televerket played a leading role. NMT was a pioneering exploit of such dimension that it is true to say that it paved the way for the ensuing global success of mobile telephony. Digitalisation of the fixed-telephony network

was completed in 1998, 18 years after its start. The number of fixed- telephony customers began to decline in 1996.

Restructuring of Telia took place repeatedly as the business areas and marketing companies re-organised to support current marketing strategy. After Telia was launched on the stock-exchange in 2000, most network construction and maintenance activities were disposed of, radically reducing personnel. These activities had always been an integral part of the telecom business but at the end of the 1990s they were hived off as independent companies prior to being sold. Telia continued however to be an important customer to these companies. In 1999 Telia re-organised its wholesale activities. At the same time the majority of Telia's risk-capital investments throughout the world were sold-off and the resulting capital-gains were employed in Telia's Nordic and Baltic focus. Many peripheral activities, which for many years had been a natural complement to core business, were also sold in the firm conviction that they would be better managed as smaller entities.

International alliances between major national telecom companies were formed during the 1990s primarily to provide international services for conglomerates and also for customers on the move. As of 1991 Televerket created Unisource with telcos in the Netherlands, Switzerland and Spain. This alliance had fulfilled its roll by the end of the 1990s and was dissolved in 1999. In addition, the Unisource partners became shareholders in Infonet, an American data-network provider with global reach which offered services to International companies. Infonet took over a major part of the business when Unisource was dissolved. Infonet was created in 1988. Prior to this period, Televerket and the Nordic telecom administrations had created a number of specific alliances to implement common regional projects in the era prior to competition.

Mergers have as an objective to create larger and more competitive companies. In December 2002 Telia acquired a share-majority in Sonera and thereby completed a merger with one of the two major telecom operators on the Finnish market. The two companies complemented each other and in addition had for many years been partners in a number of companies in the Baltic States and Russia. Sonera was in financial difficulties after several expensive purchases of European 3G licences, which would also have required massive additional investments to exploit them. Telia had been more cautious and had the financial muscle to acquire Sonera. A few years previously, between 1997 and 1999, Telia had tried twice to merge with Norwegian Telenor. Telia and Telenor were similar, having both been incumbent operators on their respective home markets. A merger between incumbents meant strong government intervention and the deal became very politically infected. Finally the whole affair turned into a very public fiasco. The deal was abandoned in December 1999.

Business management within Telia has lead to many changes over the years to adapt the company to changing conditions. The attempted merger with Telenor was also a turbulent time and meant a lot of wasted energy from all involved. Until June 2000 Telia was a 100% state-owned entity and the members of the Board of Directors were mostly politically nominated members.

Personnel issues have always been important for Telia involving two recurring themes. The first was to handle the necessary personnel reductions when older activities or operations were rationalised or closed down. The second was the need

to recruit new employees who had the necessary competence for new business areas. Telia made major efforts to ensure that redundant personnel were given the chance of finding a new job through educational programmes and other activities. At the same time employees were given the opportunity to broaden (not least) their language and cultural competence skills.

Environmental activities became a part of Telia's business idea in 1994 when services were promoted as an aid to solving customer's environmental issues.

1.1 Business environment

This section looks at three types of external pre-conditions for the business; Technology, Competition, plus Politics and regulation. These conditions were not entirely limitations from the outside but were influenced to a high degree by Telia.

From the early 1900s Televerket was an active player in the **development of new technology** and was one of the few telecom companies that invented, designed and manufactured equipment itself, primarily for its own use. Televerket was an important contributor in the development of both electro-mechanical and computer- controlled exchanges in collaboration with LM Ericsson. In the 1970s Televerket's radio division was responsible for pioneering achievements in the development of mobile telephony, which later also led to major successes for Ericsson. Over time technology development became more globalised and as Telia was a small player, the company decided to phase out the manufacturing side of the business in the 1990s and generally reduce the level of R&D. The consequence was, purchase what you need and leave development to someone else.

When the telephone came to Sweden in the 1880s **competition** was extensive but reduced to virtually zero by 1918. Thereafter Televerket had a de-facto monopoly until the 1980s when competition started again. This was comparatively early in a global perspective and was possible because Sweden was one of few countries without a legal monopoly. Sweden (along with the UK) became a pioneering country for competition in Europe, long before de-regulation occurred elsewhere.

Telecom regulation in Sweden had always been negligible. Around 1980 Televerket concluded that competition in an open market would be more positive for long-term development than a regulated monopoly. However, as it was clear that the business needed to be conducted in an updated and more liberal manner, Televerket itself proposed a number of regulatory reforms which were introduced from 1980 onwards, complemented with Sweden's first ever telecom law in 1993, the year Televerket became Telia. Thereafter, the EU's telecom agenda played an all important role after Sweden became a part of the homogenous European community in 1995.

1.1.1 Technology development

Telecommunication involves the transmission of messages over long distances utilising electrical and electro-magnetic means, first between humans and thereafter between humans and machines and from machine to machine.

Telecom development covers more than 150 years from the middle of the 1800s. It was very much an international activity where discoveries and inventions found their way to all corners of the world. Even so, its effects in reality varied greatly

between countries as a result of national idiosyncrasies which had nothing to do with technology. Sweden was and is one of those countries which have always embraced new telecom technology early.

International development can be described in a few broad strokes.

Messages were first in the form of **text** from the mid 1800s, then **speech** from the 1880s and later images and video from the 1930s. **Data** came in the 1960s, a technology which was capable of transferring all types of messages using suitable coding.

Transmission originally utilised **fixed wire** technology. From the early 1900s **wireless** radio communication was possible and during the last quarter of the century, with the advent of mobile phones, combination systems used radio at both ends and a fixed wire connection for the rest of the transfer. This idea was ingenious because it combined radio's mobility with fixed wire capacity. Swedish and Nordic technicians made very valuable contributions in important areas in the development of **mobile systems**, which by the end of the 20th century had exploded into a global phenomenon. It has now become possible to transfer any type of information over broadband to virtually anywhere on earth at any time.

This rough picture needs some clarification. Information was initially transferred using **analogue technology**, which mirrored the message as electrical signals. Each type of service, (telegram, telephone, radio, television etc.) needed its own special infrastructure. From 1975 onwards, **digital technology** was gradually introduced allowing messages to be sent as strings of impulses which are packaged together for transportation. When the packages arrive they are disassembled and converted to the original message. The consequence of this technology leap is that all individual transport infrastructures will gradually be replaced by one common infrastructure carrying all services with total flexibility.

Telecom infrastructure comprises networks which connect end-equipment using links (transmission) and nodes (exchanges or routers).

Fixed-line analogue **transmission employed small-band technology** and used copper wires, until the 1920s without amplification. Only then, when electronic amplifiers arrived, was long-distance communication possible. The next stage was coaxial cable using broadband analogue multi-channel technology in the 1940s and later digital broadband in the 1980s. A leap towards virtually unlimited capacity-transmission was made in the same decade when digital optical transmission over fibre-optic cables was invented.

Exchanges were initially manual and labour intensive, employing mostly women. To increase capacity and reduce costs, automatic electro-magnetic exchanges were developed in the first few decades of the 20th century. In the 1970s computer-controlled exchanges were introduced, equipped with digital signal transmission which greatly increased quality and flexibility. Exchanges utilised circuit-switched technology, for both analogue and digital transmission. This continued until the breakthrough of the Internet in the 1990s when a changeover to packet-switched technology resulted in the transition towards one integrated homogeneous infrastructure.

Radio technology was originally developed to connect places which were difficult to reach by other means, such as ships at sea and in the air. Long-wave radio was

used and coverage was quite modest. In the 1920s broadcast radio was invented which became a both a medium for the masses and a telecom activity in its own right. When short-wave radio was introduced in the 1920s, global radio-communication was possible thanks to the fact that the ionosphere allows radio waves to bounce around the earth. After the Second World War much shorter wave-lengths were deployed which only reached the horizon, paving the way both for television and a large number of channels. By transmitting signals up to tele-satellites, from the 1960s it became possible to broadcast over oceans and entire continents at high capacity.

For mobile systems, radio frequencies are used only for communication over short distances, allowing service to many users per unit-area with a small-cell system and seamless hand-over between cells over a large area. Using data-bases in the network it became possible to offer customers a service wherever they might be (roaming).

Finally, radio is also used for close-range communication over only a few metres, primarily where a cordless environment is needed (Internet routers, Bluetooth). Swedish engineers use all these and contributed in important areas to their success.

1.1.2 Competition

Many local telecom companies were created during the 1880s in Sweden. They reduced in number during the next decade when Telegrafverket, under the Rikstelefon trademark, built a national network and simultaneously purchased many of the local networks. However, competition existed for nearly three decades, especially in Stockholm. This continued until 1918 when Televerket purchased Stockholmstelefon with a city network which was twice the size of Televerket's. The owner, Stockholms Allmänna Telefon AB (SAT), merged its activities with LME in the aftermath of the Russian revolution which hit both companies hard. SAT lost its telephone network in Moscow and Warsaw, whilst LME lost its large factory in St Petersburg. All their assets were confiscated by the State.

Televerket was responsible for operating the national telecom network and after 1918, by default, had a de-facto monopoly in Sweden. Customer premises telecom equipment in Sweden was an integral part of the network and Televerket was therefore responsible end-to-end for all services. Sweden never had a legal monopoly or concession requirements as in virtually all other countries, but nobody challenged Televerket's de-facto monopoly until around 1980. Televerket also possessed the technical competence itself to build and automate the country's telephone network. This automation took nearly 50 years, starting 1924 in Stockholm and ending in Arjeplog in Lapland in 1972. Sweden escaped the devastation of two World Wars which also meant that Televerket was well prepared for new challenges when a new era arrived in the 1970s. Telephone density was high and tariffs were low.

Competition came initially in the **terminal market**. The development of electronics made it possible to construct many new or improved terminals, including phones, faxes, answering devices, telexes, PBXs etc. Suppliers of office equipment organised themselves in an association called LKD and Trade and Industry users in a separate association called NTK. These organisations were responsible for effective opinion-building activities against Televerket's terminal monopoly.

Televerket Radio acted in a progressive manner already in 1971 when it decided to break with existing practice and allowed MTD mobile system terminals to be sold in free competition on the open market (rather than be supplied by Televerket). On the fixed network side, the liberalisation of terminals was slower, starting in the 1980s, but it became evident that Televerket could not supply everything to everyone in the more complex world that was developing. This was complicated further by the fact that Televerket manufactured its own phones, PBXs etc and meant that competition also threatened employment in the factories, a real headache for the Unions.

In 1980 the Government presented the first in a series of telecom bills to be approved by Parliament. Terminals were defined in different groups. Those that would no longer be a part of the monopoly and those which would still have monopoly status but which would be released later when technical specifications for them had been decided. The monopoly on telephones was removed formally in 1985, but it had already been undermined for a few years by the import of foreign phones. This was not legally forbidden as international free trade agreements existed but connecting them to the telecom network was in principle forbidden. PBXs were more complicated to specify and were only released in 1987-89. However, it was still up to Televerket to ensure that telecom terminals sold on the open market complied with technical demands, which caused new conflicts around Televerket's double role of both controller and competitor.

The terminal market quickly became very competitive but Televerket was able to hold its own in some segments. However the Swedish manufacturing of telephones was too expensive and was shut down in 1989 but Televerket continued to design phones which were manufactured under licence in the Far-East and became profitable products. In 1993 the decision was taken to cease production of telephone exchanges and PBXs.

Competition for services began already in 1981 when Kinnevik's Jan Stenbeck purchased a group of companies, which had for some time operated a mobile radio business, and started Comvik expressly to challenge Televerket. Comvik launched an analogue mobile network just before Televerket started NMT. The company had succeeded in receiving the necessary permits by persuading the Government to remove three important Televerket-enforced obstructions. These were; frequency allocation, connection of own PBXs and the transport of third-party traffic over leased lines. In contrast to Televerket, Comvik sold only their own terminals to customers. Their strategy proved less successful and customer numbers rose slowly, whilst NMT gained a substantial share of this new market. In 1992, when it was time for the second generation of mobile systems (GSM), the State issued three licences to Televerket, Comvik and Nordic Tel which ensured tough competition. Initially the manufacturers of 2G phones had huge delivery problems which meant that there was a shortage of terminals (phones) and it took nearly two years before the market took off.

Competition in the fixed network arena was entirely different. Televerket controlled the whole market, however with a tariff system which had an inherent imbalance between costs and prices. International and long-distance national traffic were over-priced but local traffic and fixed subscriptions were both under-priced. There was a considerable imbalance between prices for business and residential customers,

between rural and urban areas plus between long and short distance traffic. In spite of this, the necessary rebalancing ran into political resistance. A major portion of Televerket's profits came from international traffic and in particular from large business customers. Competition for their business was fierce.

The first competitors to establish a Swedish presence were major international operators like BT, France Telecom and Cable & Wireless (with Tele2). They were allowed to begin activities on the un-regulated Swedish market, whilst Televerket/Telia was not allowed to establish itself on their home (monopoly) markets. There was no Swedish demand for market entry reciprocity from other countries causing a lively political debate.

To add fuel to the fire, in 1994 Telecom Denmark, Telenor and Telecom Finland joined forces with BT in Sweden and formed Telenordia. In this way Sweden became a test market for competition prior to the planned de-regulation in the rest of Europe.

In the role of consumer, the Swedish State did not bestow any favours on Telia. Quite the opposite occurred when international traffic for the Foreign Office was purchased from BT and a network for the National Police Authority from France Telecom. The State also arranged a co-ordinated purchase for state-owned entities via the STATTEL-delegation. In addition, as the owner of other infrastructures, the State sold long-distance capacity to the new competitors in the telecom networks which the both Swedish Rail Administration and the National Grid had established.

Eventually prices were forced downwards, closer to costs, and the major foreign operators left Sweden. What remained were the Nordic operators, a large number of smaller national operators and service providers. In 1999, number-portability and pre-selection were introduced in the Swedish fixed networks making it much easier for customers to change operator.

When Telia and Sonera merged in 2002 Telia's market share of international telephony had dropped to 44% and for national telephony to 60%. At the same time Telia's share of mobile services was 50% and revenues from end-user internet access was 43%. Lively competition now existed in all areas.

1.1.3 Politics and regulation

Swedish telecom politics have always had some peculiarities. As mentioned before, the telecom business was never a legal monopoly. Televerket had a de-facto monopoly from 1918, after which the question of monopoly regulation was no longer an issue. The telecom business was never combined with the postal service, in spite of three attempts at the end of the 1800s and one at the end of the 1920s, which was rejected in 1936

Televerket became a state-owned public service corporation in 1912 together with a number of other state activities and was therefore not a civil service department. The public service corporation format gave Televerket a fairly high degree of autonomy and freedom of movement. Parliament made a number of important telecom decisions. In 1920 they addressed the national cable network, automation of the telephone network and the Trans-Atlantic radio-telegraph station in Grimeton. In 1924 the distribution of broadcast radio was entrusted to Televerket.

Between the 1920s and 1980s Televerket concentrated on building networks and associated infrastructure etc until competition arrived and the need to reform appeared. To a large extent Televerket led these reforms, recognising that it was necessary to achieve similar conditions with the new competitors and escape from the shackles of a state-run institution. Notably Televerket already had four subsidiary companies.

As the result of a telecom proposition in 1980, Televerket was authorised to create Teleinvest as a holding company for subsidiaries. This allowed Televerket to create new companies by corporatizing important parts of the business which were susceptible to competition. In addition, the creation of Telefinans made it possible to offer business customers equipment-leasing contracts, which also complied with the intentions of a Parliamentary decision to gradually liberalise terminal equipment between 1980 and 89. Televerket was separated from the State budget in 1984 and could now borrow money on the open market. In 1988, Parliament agreed on the principles to re-balance telephone tariffs and on comprehensive political goals for telecom in Sweden, not least that regulatory and operative activities must be separated.

The first regulatory body, Statens Telenämd (STN), was created in July 1989 and took over from Televerket the responsibility for the regulation and registration of equipment which could be connected to the telecom network. STN replaced an older committee which had previously handled appeals when Televerket had refused approval to connect telecom equipment to the network.

Liberalisation of the telecom world came up on the OECD's international agenda around 1980. Telecom policy moved onto the EU's agenda via a green book in 1987 with a plan to liberalise the EU's telecom market within 10 years. The Swedish market evolved much faster. Already in 1990 it was completely liberalised and far more open than the EU's telecom market expected to be by the end of the 1990s.

In view of the way the market in Sweden was developing, in the autumn of 1990 Televerket proposed to the Government that the whole of Televerket should become a limited company. This triggered a legal and organisational chain-reaction requiring both a new telecom law and a revised radio communication law.

In 1991 the Government decided to make it easier to establish competitive business by permitting third-party traffic over lines leased from Televerket and by allowing interconnect-traffic according to regulated terms between Televerket's fixed network and the different mobile networks.

In early 1991, the government proposed that Televerket's status should be changed but still owned 100% by the State. In addition, Televerket should deliver 5 billion SEK of its own capital to the State and redeem a number of state-loans, all of which reduced Televerket's solidity to around 30%. The proposition also defined how the State's tele-political goals should be formulated based mainly on recommendations from a Post and Telecom commission of enquiry.

Televerket's regulatory responsibilities for frequency allocation and numbering plans, plus STN's terminal approval activities were transferred in July 1992 to a newly created regulatory authority, Telestyrelsen, under the directorship of Jan Freese. At the same time the radio broadcasting business was moved from Televerket's Radio Division to a newly formed state-owned enterprise, Teracom

Svensk Rundradio AB. The State wanted to maintain radio broadcasting as a component in media politics and divorced from competitive telecoms.

The reform activities were somewhat delayed but were completed at the last minute, so on 1 July 1993, Telia AB was formally established and Sweden's first ever telecom law came into force. This was complemented with an agreement between the State and Telia on specific commitments which would be applicable until the end of 1996 and which were later extended until 1 July 1997. The agreement covered six areas: a Price-ceiling for telephony, Subscription rates for low users, Phone-boxes in rural areas, Nation-wide telephony coverage with no compensation for universal service, Transfer of internal building networks to their owners and the acceptance of third party maintenance of PBXs. These commitments were later replaced with licensing conditions in accordance with the new law when Telia's licence was under consideration. Telestyrelsen assumed responsibility for Televerket's remaining public authority duties and on 1 March 1994 became Sweden's national Post & Telecom Regulator (PTS) when even postal-issues were assigned to this authority.

In 1993/94 the EU decided that voice telephony, the physical telephony infrastructure and CATV networks would be liberalised by 1998 and a green-book on the mobile market demanded that more competitors should be allowed in member countries. In February 1997, when 69 WTO member-states signed a global agreement to gradually liberalise basic telecom services, this also opened up opportunities for Telia outside of Europe.

On 1 July 1997, a revised Swedish telecom law came into force which was adapted to EU regulations. Telia's specific commitments agreement with the State from 1993 expired in July 1997 and was replaced by licence provisions. The new law created the conditions for an explicit distinction between telecom policy and the State's ownership of Telia, which from 1 September 1997 was transferred to the Department of Trade and Industry.

Operator pre-selection in Telia's fixed network came into effect in September 1999 allowing customers to choose operator for an international or long-distance call. Number portability, i.e. to change fixed network operator but retain the telephone number, was gradually introduced during late 1999. An alteration of the law to sell capacity in mobile networks to 3rd party operators was being prepared but Telia decided to open its GSM network anyway and three operators exploited the opportunity.

In April 2000 an EU directive resulted in a new Swedish law for radio and telecom terminal equipment and the responsibility to fulfil technical specifications became the responsibility of individual market players.

In addition, from 1st May, mobile operators in Sweden were obligated to sell network capacity to others at commercial terms if capacity was available but this had little significance in practice. On 1st July a limited obligation was imposed on the three existing mobile operators to make national roaming available to new operators. The objective was to promote competition by making it easier for new operators when UMTS licences were allocated.

Telia applied for an UMTS licence to build a 3G network in Sweden but on 16 December 2000 the Regulator (PTS) decided that Telia would not receive a licence

on the grounds that the company had submitted a technically inferior application. This created shock-waves throughout the company but the problem was quickly solved when Telia and (competitor) Tele2 announced their intention to create a joint network company, Swedish UMTS Network Company, to utilise the 3G licence which Tele2 had been awarded. This co-operation was finally approved by the Competition Authority in the spring of 2002.

The special price-regulation of a Telia telephone subscription came to an end in early 2001. An EU decree giving other operators the right to use a former incumbent's access network (known as local-loop unbundling) came into force on 2 January 2001. Telia had already opened its network in March the year before so this regulation had little effect.

In 2001 Telia also received a licence in Sweden to build a broadband access network based on fixed radio technology but in practice this was never built.

In December 2001 the EU decided on a new telecom policy document on electronic communication to be introduced in all member states. The Swedish Government's report on the realization of a new EU directive for electronic communication was published in mid 2002. This report formed the basis for a new law on electronic communication (LEC) which came into force on 1 July 2003 and which replaced the existing Telecom Law.

Cost-based pricing calculation-models were a major issue for all telecom operators.

In the years around the turn of the century disputes between Telia and other operators regarding inter-connect pricing conditions increased, which had major financial consequences for all parties.

The licence-condition which stipulated demands on Telia to provide a phone-box service in rural areas was moderated to include only areas without mobile coverage.

The EU agreed in 2002 to the merger between Telia and Sonera on certain conditions, amongst others that Telia should dispose of its Swedish CATV business Com Hem and its own telecom business in Finland.

1.2 Business strategies for the company

Knowledge and flexibility have always been consistent characteristics of the long-term business development in Televerket and Telia. Technical knowledge and how it could be used was paramount and at the same time the company had to be flexible and adapt to constantly changing conditions. For many years, the mixture of co-operation and competition with LM Ericsson played an important role in the company's development as did the contacts and commitments in the international telecom co-operation arena.

Televerket's strategy during the 1900s was primarily to build the Swedish fixed telephone network and ensure that it reached nearly every permanent household in the country. In the 1980s the service portfolio was increased to include data-services and mobile telephony. In the 1990s Televerket started both mobile and fixed operations abroad where alliances with other operators was an important component and this intensified after Televerket became Telia in 1993. Mobile services and the Internet became very important areas from the mid 1990s. After the failed attempt to merge with Telenor in 2000, Telia decided to concentrate all its efforts on the Nordic and Baltic Sea area and abandoned many of its international

commitments and activities. One exception was the international carrier market where Telia wanted to be a major wholesale player offering international network services to other telecom operators but was forced to reduce its ambitions after the IT-bubble exploded.

Telia did not seriously participate in the adventure to buy very expensive 3G licences in Europe. Unfortunately Sonera did enter the game and paid massive sums for licences in Germany and Italy. As a result the company found itself in serious financial difficulties and became an acquisition candidate for Telia. An offer in 2002 was consummated by the merger in December 2002.

1.2.1 Televerket from the 1970s

Televerket had already understood by the end of the 1970s that the convergence of telecom and data would pave the way for new markets and competition. Televerket was virtually the only European operator which did not have a legal monopoly defence for its network business. The management realised that any attempt to protect the business with monopoly rules would be counter-productive. The company would be fenced into a receding closed market and be prevented from participating in new business. The existing terminal monopoly had to be removed and at the same time new competence was needed to meet all the new challenges. Televerket's ideas and insights were early in relation to its European peers.

So instead of proposing monopoly legislation, Televerket accepted the situation and searched for ways to remove the business disadvantages that were associated with the Public Service Corporate format. In 1979 Televerket proposed the creation of subsidiaries for business elements that were exposed to competition, less restricted financing possibilities and that the terminal market should be liberalised. In addition, around 1980 Televerket started to introduce new technology and a series of new services. At the same time the company was eager that the newly launched NMT system would be a successful mobile telephony venture and in its regulatory role passed a few regulatory resolutions which were negative for Comvik.

An important customer group were major international companies. They were (and still are) an essential part of the Swedish economy, with increasing demands for national and international telecom services. Their businesses were becoming more and more computerised and many of them started to construct private company networks using leased lines from the telecom administrations in the countries they operated in. In the monopoly world which existed abroad this took time and was very expensive, so in the middle of the 1980s Televerket started a number of activities to make life easier for these customers and the term "one stop shopping" became fashionable.

In 1987, Scandinavian Telecommunication Services (STS) was created as a subsidiary selling services to multinational customers. To strengthen this business, Televerket invited the other Nordic administrations to participate in an alliance, following the tradition of several decades of co-operation. STS became a Nordic venture after a great deal of agonizing discussions, especially in Norway. However, STS was a disappointment and it became clear that at a working level STS was seen as unwanted competitor by the other Nordic operators. In 1990 STS was disbanded amicably marking the beginning of the end of (most) Nordic telecom collaborative ventures.

The history of Telia original

In 1988 Televerket became a partner in Infonet, an international data-networking services company based in the United States which was created by a spinoff from a US data service company. Infonet supplied global services.

In the autumn of 1989 Televerket decided to assemble most of its international activities into a new subsidiary, Swedish Telecom International (STI) under the umbrella of Teleinvest. STI became responsible for the fixed, mobile and satellite businesses outside of Sweden and was the instigator of many successful mobile company start-ups abroad, sometimes in collaboration with one more of the other Nordic operators. At this time Scandinavia, and very much so Televerket, had an unrivalled competence in the field of mobility, a quality much sought after by potential partners.

In Televerket's view competition came from three sources. A few large international data-companies offered global services. Major international network operators established themselves in Sweden offering network capacity and services and thirdly, Swedish national companies and local authorities which built parallel infrastructures alongside Televerket's.

Competition was intense to provide services to major Swedish multinationals, in particular for their international traffic, and this would have serious consequences for Televerket. At that time international telephony accounted for 25% of Televerket's revenues and the resulting profits were used to invest in the necessary infrastructure to provide services to rural areas and households at low prices. These developments demanded major changes to Televerket's business and adaptation to a new reality.

With the fall of the Berlin Wall in 1989, Europe was faced with a liberation process which would put a whole new perspective on the future. This was true not least in the Baltic countries where, first Estonia followed by Latvia, sought co-operation with Televerket to create telecom connections westwards and to rebuild their neglected national networks. Televerket started a consultation process in 1989/90 which led to collaborative agreements in both countries.

In 1990 Televerket's strategic direction emphasized following customers abroad, competing on the international market for the profitable major businesses and to become an attractive partner for strategic co-operation with others. This demanded a different terms-of-association format and was one of the reasons why at the end of 1990 Televerket proposed that the entire business be converted from a Public Service Corporation into a limited company.

National changes were also necessary. In 1990 Televerket started a massive residential customer program to reduce delivery and repair times combined with an attempt to comply better with customer's wishes. In addition, digitalisation of the telephone network was also accelerated. In late 1991, an attempt by Televerket to radically change the entire Swedish telephony tariff system to better mirror the cost structure was met by a storm of protest and this reform was delayed for six months by Parliament which at that time was responsible for telecom pricing issues.

On the international scene, Televerket formed an alliance with PTT Telecom Netherlands which had a company vision of the future and market conditions matching Televerket's. Co-operation began with satellite communication via

Televerket's subsidiary Vesatel. The Unisource alliance was announced in October 1991.

Televerket also signed agreements with the Governments of Estonia and Latvia to create two separate mobile companies. At the end of 1992 a contract was also signed regarding the long-term development of the Estonian fixed network. As a precaution this contract was co-signed by Telecom Finland (which became Sonera in 1998) and who thereby participated in the financial, legal and political risks which were rife in the newly liberated and fragile Baltics.

In 1992 Televerket's strategy was to position itself as a Swedish customer's provider of choice anywhere in the world. In addition the intention was to form alliances with companies in smaller countries with a similar market structures, plus to broaden the customer base and transit traffic from Eastern Europe via Sweden.

1.2.2 Telia from 1993

Like many others in the business, Telia believed that 1993 would see the start of rapid and revolutionary changes in the telecom sector where a few large players would take care of major customer's international telecommunications. Specialised niche players would appear offering outsourcing, supplementary services, capacity resale and automatic call-back services.

This proved correct and a turbulent period of intensive activity commenced with a whole host of new business initiatives. Telia's reduced market shares in Sweden would be compensated by an extended customer base in Europe. An alliance between foreign small telcos could provide economies of scale. In 1993 the Unisource alliance was therefore extended to include Swiss PTT Telecom and the three owners pooled all their datacom business into Unisource. The major event of 1993 was the transformation of Televerket into Telia AB on 1st July and at the same time Sweden's first ever telecom law came into force. In the autumn, TELI AB was sold to LM Ericsson and thus at year-end 1993 Telia ended more than 100 years of inventing, designing and manufacturing telecom equipment.

In 1994 an important visionary activity began. The emphasis was the long-term "Vision 2001", which in concentrated form was expressed in Telia's business idea:

"Telia develops quality of life, the environment and the ability to compete for people and organisations by uniting them with easy-to-use telecom-based information services. We are the market leader in the Nordic/Baltic region and offer global services from a European base. By supplying first-class service and advanced services at the leading edge of technology we will ensure that we are our customers' provider of choice."

An internal regeneration process, entitled "2001 NOW", was launched based on the Telia Group's three values: Development – Cooperation – Commitment. Telia focussed on four main business activities: Internationalisation, Integration of fixed and mobile networks, Expansion upwards in the value-chain plus more Efficient marketing and sales activities.

Four areas were determined as crucial for success: Multimedia (which was believed would account for nearly half of Telia's revenues in the beginning of the 2000s), Mobility, Major companies and by being the Nation's telecom-company of choice.

The history of Telia original

In 1995 it was believed that alliances between content providers, software houses and telecom operators would play an important role in the electronic marketplace. New players would join forces with alternative infrastructure operators such as local authorities, energy companies, railway companies or CATV operators. The privatisation of telecom companies in Europe had started.

Telia's loss of market-share and profitability in Sweden was compensated by new and expanded market activities. This meant raising levels of enhancement, rationalising the core business and investing in information services. In addition, this also meant extending the business outside Sweden. Activities concentrated on the telephony business, expansion in countries close by, establishing Unisource in the European market plus interactive services with commercial content.

In 1996, a strong increase in the demand for information services was expected but without any corresponding decrease in the use of traditional telecom services. The Nordic countries slowly started to become one homogeneous market and the countries around the Baltic were in a period of strong economic development. Their trade exchange and contacts with the rest of the world increased dramatically. Within Europe, internationalisation and intensified EU co-operation necessitated an increase in cross-border communication solutions.

Telia focussed on three main areas in 1996: further Development of the network – not least to provide increased bandwidth via ADSL technology in the local loop, Enhancing the service portfolio and Geographic expansion. Services development concentrated on information-seeking, education, electronic commerce, marketing and entertainment. In the pure telecom area, Telia invested in comprehensive solutions, the integration of fixed and mobile services and in the other Nordic countries to offer pan-Nordic services as the second operator. Unisource sold pan-European services to enterprise customers and sought partnership with other operators in the four largest markets of Germany, France, the UK and Italy.

By 1997, competition had squeezed prices and led to a rapid development of new services and technology. Reduced margins meant increasing the customer-base and product-offering to retain profitability. IT provided the possibilities to become more efficient, to reduce the transport of goods and to replace material products with telecom services. Reducing pressure on the environment became a telecom business opportunity.

This business direction meant a major Nordic investment to increase customer-base and activities to create new telecom-based information services for new revenues. At the same time expansion to parts of European Russia was explored. Profitability and value-creation were to be guaranteed via rationalisation, market segmentation, prioritising major customers, investing in future technology, increasing network bandwidth, developing the mobile business and personal telephony, development of the information business and raising the service level.

In 1998 it became clear that telecom operators must segment the market and concentrate efforts where they could best develop their competitive edge and strengths. Structural business-deals and alliances were seen as important to create economies of scale and to secure financial strength and competence. It was also seen as vital to convert to IP-technology in both networks and platforms.

It was important for Telia to create a strong regional position in Northern Europe and even to expand outside this geographical area. Telia should retain market leadership in Sweden and become a leading alternative operator in the rest of the Nordics. Investments were made in all three of the existing Baltic incumbents. In Poland, Netia was established as the second operator for fixed telephony whilst in European Russia the mobile business continued to develop. Telia also expanded operations outside the extended home-market within mobility, Internet and the carrier business.

However, by 1998 Unisource had not achieved an acceptable profitability and Telia reduced its shareholding. On the global scene, investments in licences were made in the name of Telia Overseas and on the consulting market via Telia Swedtel. Non-core businesses were phased out or hived off. National business was rationalised and made more efficient and at the same time the ability to package and integrate products was further developed. Broadband coverage in the network expanded.

For Sweden to retain its position as a leading Internet nation Telia decided in 1999 to take a strategic stride into the new IP/Internet world. Sweden and the Nordics were sophisticated but limited markets and therefore Telia must expand abroad. Three development trends dominated: Convergence of telecom/IT/media, Open value chains and Increased mobility. Convergence meant that existing infrastructure gradually transferred to IP technology. Open value chains created new business structures and new markets at both wholesale and retail levels. Increased human mobility meant that more and more speech communication moved from fixed to mobile networks, where the majority of interactive services were also developed.

By 1999, broadband had been extended to all major centres of population and ADSL connections to households accelerated. In parallel, major investments were made in the carrier and mobile businesses. On the carrier side the objective was to establish a fibre network throughout Europe and the USA and become the largest transporter of traffic over the Atlantic.

The “Homerun” wireless broadband service plus portals for access to the mobile Internet were launched in 1999. For the first time, Telia sold mobile network capacity to three independent Swedish service providers. In the countries around Sweden the ambition was to be the leading mobile operator in both revenue and offerings. Strengths from the Swedish market in areas where Telia had leading-edge competence were the basis for international expansion in, primarily, the five largest countries in Europe: France, Italy, Spain, the UK and Germany. In the mobile area the ambition was to gain a foothold even in the United States.

Between 1997/99, Telia attempted twice to merge with Telenor. The second looked successful in the autumn of 1999 but collapsed a few months later on 16 December.

In 2000, after the failed Telenor merger, it was clear that Telia was a leading player in the mobile field, had a strong position in the Nordic countries and was a strong owner of mobile operators in the Baltics and North-West Russia, in addition to financial investments in growth regions all over the globe. A large customer-base was clearly a strategic advantage. Sector convergence opened up the market for new players and mobile data-traffic was expected to start growing.

In 2000 a radical change in direction led to the disposal of virtually all business activities which lacked industrial synergy and were therefore outside the strategic

business core. Telia now had three core businesses: Fixed services, Mobile services and Portals. In addition there was a fourth peripheral business area for financial investments, Telia Equity. Telia acted increasingly both as a wholesaler and retailer in Sweden which meant that reduced revenues from the retail market could be compensated (in part) by increased wholesale earnings.

The main technical emphasis was now to move from circuit-switched networks to packet-switched IP-networks. A fixed multi-portal for the consumer market, based on a concept from Com Hem, (still owned by Telia at the time) was prepared for launch in early 2001.

Telia aimed to develop a wide offering of mobile services, both in the mobile network but also for wireless broadband access (Homerun), plus in wireless local networks(LANs). Mobile Internet became a collective name for mobile portals, where Telia wanted to be the Nordic market leader. In some other parts of Europe, Telia aspired to be a virtual mobile network operator and leased capacity in other's networks. Telia believed that, via portals, customers would be able to search for and find new services which they would be prepared to pay for. A mobile operator-independent portal, such as Telia's Speedy Tomato, could be used to become a player on the European mobile Internet market without owning a network.

When the IT-bubble burst in 2001, Telia once again refined the business to concentrate on four core areas: Mobility, Broadband with Internet, Fixed networks and the International carrier business. On the mobile side, Telia and Tele2 started building a joint 3G network and new services were developed. Customer service improved as a result of streamlining processes and customer care efforts.

During 2002 it was primarily the demand for mobile services, Internet, broadband and data-network solutions which drove growth. The integration of fixed and mobile plus voice and data services was prioritised. Customers should be able to use any type of service without having to invest in costly infrastructure. Telia concentrated on the international mobile businesses and restructured the loss-making International Carrier, including writing down most of the assets. The carrier business was restructured to concentrate on the profitable parts of the wholly-owned European network. The Asian business was terminated as were sales of national network services in the USA and the UK. Offerings were limited to pure wholesale network-capacity services.

1.3 Technology and marketing efforts

Televerket was established in 1853 with the task of transferring messages, to start with over wires. Text was transmitted as telegrams from the 1850s and speech via the telephone from the late 1880s. Televerket developed the first automatic exchanges during the 1910s together with LM Ericsson (LME) to handle increasing traffic volumes. Thereafter, automation of the telephone network took nearly half a century between 1924 and 1972. During the 1970s Televerket and LME jointly invented a radical new generation computer-controlled digital exchange, the AXE. Its installation between 1980 and 1998 thereby digitalised the entire Swedish network. In the 1980s fixed data networks were introduced followed by the Internet in the 1990s.

Wireless communication began in the beginning of the 1900s and Televerket's first coastal radio station for telegraphy was inaugurated in 1911. Originally radio was used only for long-distance communication. In 1925 Televerket was given the responsibility for broadcast-radio and in the mid 1950s for TV distribution. In 1969, at Televerket's initiative, the Nordic telecom administrations agreed on a co-operative venture to develop a cross-border mobile telephone system (NMT) which was opened in the early 1980s. This co-operation was extended to include the telecom manufacturing sector, an international first. This successful combination of operators and vendors conferred the Nordics with a leading role when digital mobile telephony was developed during the 1980s and introduced in the 1990s, first in Europe and later world-wide.

From the middle of the 1990s Telia introduced Internet, initially as fixed dial-up, later as fixed broadband and finally in the early 2000s as mobile broadband.

1.3.1 Televerket

Over the years, Televerket had built up a significant national fixed infrastructure for the transmission of text and speech, plus a wireless radio business which included broadcast radio. These two branches were organised in two separate parts of Televerket.

The business was dominated by the fixed telephone network. Automation started in Stockholm in 1924 took half a century to complete. The build-out used two different exchange types, both of which were developed in Sweden and manufactured by both Televerket and LME. Automation was completed in 1972 which was early in a global comparison. The network had world-class penetration and low pricing throughout the entire 1900s.

Around 1970, new technology arrived in the form of digitalization, semi-conductors and miniaturization creating the basis for convergence. Computers were introduced, revolutionising information flows in industry and business. Both Televerket and LME understood that computers could control telecom network-traffic but that enormous resources would be needed to develop the technology. For this reason, in 1970 at the initiative of LME's Chairman, Marcus Wallenberg, development of the AXE exchange began in the jointly owned company ELLEMTEL. The result was a gigantic success both in Sweden and world-wide. (LME have since sold the AXE to most countries on earth). Televerket was also instrumental in ensuring that the technology for speech-transfer in the network changed from analogue to digital, a vital component in the success of AXE.

From 1980, Televerket introduced a whole host of new technical solutions to both broaden and improve the service portfolio and to satisfy new customer demands.

The primary innovation was that computer-controlled AXE exchanges were introduced in the **fixed telephone network**, in parallel with two other new features. The exchanges were connected via a separate digital signalling network and in addition the actual transport of traffic between and through the exchanges was converted to digital transmission. This meant faster functionality, better quality and many new services. AXE exchanges were also installed in the telex network, the Datex data-network and also in the Nordic Mobile Telephone system (NMT). Televerket also wanted to offer enterprise customers a digital PBX to complete the

digitalisation of the whole network. When LME decided not to prioritise this issue, Televerket initiated a co-operative venture with the Canadian manufacturer Northern Telecom to convert their SL-1 PBX to Swedish conditions and for TELI to manufacture it under licence as the A-345. This dramatically accelerated the digitalisation process.

Another internationally early innovation was Televerket's introduction of **telex** as an easy-to-use service which transmitted any type of text, symbol or picture via the telephone network. Televerket was an active supporter in the work to standardise the service, a pre-requisite to ensure that different terminals worked together. This work was a stimulus for Japanese manufacturers and led to lively competition on the Swedish terminal market.

The third innovation was that two separate **fixed data-networks**, Datex and Datapak were introduced to improve communication with computers. The two networks were designed for different uses. Datex, which was circuit-switched, was for fast and secure transfer over short distances, such as cash via an ATM. Datapak, which was packet-switched, was for longer interactive sessions over long distances where communication was infrequent. The services were narrow-band and for business users. They complemented older data-services in the telephone network from the 1960s, "Datel dial-up" and "Datel fixed" over leased lines. The former was too slow, the latter inflexible.

The fourth innovation was the introduction of **mobile services** which were of three types: MBS text paging services in 1978, mobile voice via NMT 450 in 1981 and data services over the Mobitex mobile packet-switched data-network in 1986. In 1986 NMT 900 was introduced to cope with a huge customer demand. All three services were important pioneering efforts. MBS achieved instant national coverage by utilising the existing FM broadcast-network. NMT is the foundation stone for the global development of mobile telephony which surpassed all expectations. The small-cell network construction made it possible to make many simultaneous calls despite a limited number of radio channels covering both rural and densely populated urban areas. The AXE exchange's enormous capacity was of crucial importance for the NMT system's ability to offer national and international roaming, e.g. freedom of movement for users. Every single service was the result of an early pioneering exploit, placing Televerket in the global limelight and whose importance for subsequent mobile developments cannot be exaggerated.

A fifth advance was the introduction of **fibre-optic cables** in the early 1980s allowing the digital transfer of light impulses in the fixed backbone network which dramatically increased capacity and flexibility whilst significantly reducing costs

A sixth innovation, in the middle of the 1980s, was when Televerket launched **CATV** with coaxial-cable based analogue broadband distribution of some 40 TV programs in urban areas where normal antenna reception was often poor.

All these innovations during the 1980s increased the portfolio diversity and allowed the telecom business to enter new markets and meet new competitors. However, one business which moved in the other direction was broadcast radio which for reasons of competition policy was separated from Televerket in July 1992 prior to the formation of Telia. It was transferred to a newly formed state-owned company called Teracom Svensk Rundradio AB.

1.3.2 Telia

The transformation of Televerket into Telia in 1993 did not halt technical development. On the contrary, it continued, became more global and in the long term Telia turned to purchasing on the open market instead of developing things itself.

The **fixed telephone network** was converted to digital AXE technology at an increased pace and was completed in 1998, two decades earlier than originally planned. This was necessary as it became more difficult to maintain the older electro-mechanical technology when experienced personnel retired. The conversion meant a drastic reduction in the number of exchanges from 6000 to 250. Sweden has a low-density population but the original 6000 exchanges were the result of Televerket's early automation when transmission was expensive in relation to switching technology. The number of fixed telephony subscriptions culminated at around 6 million in 1996 and since then has slowly reduced as customers become more mobile. ISDN (introduced in 1993) subscriptions in the telephony network, increased until 2001 but decreased over the next few years as ISDN services were replaced by alternative Internet solutions.

The second generation of **mobile telephony**, GSM 900, started in 1992 but due to a chronic lack of handsets it took two years before sales took off. NMT continued to grow until 1995 and in customer numbers was only overtaken by GSM in 1997. To cope with demand, it was necessary to complement GSM 900 with a second network, at a higher frequency. In November 1997 Telia was first in the world to run a combined GSM 900/1800 network utilising dual-band phones. Re-chargeable pre-paid mobile phone-cards were introduced in 1998 and were an immediate success, especially amongst young people. Licences for Swedish third generation mobile networks, UMTS, were issued in 2000 and, as explained elsewhere, Telia did not receive one of the four licences but built a 3G network with Tele2 instead. TeliaSonera launched 3G services using this network in 2004.

The older **fixed text-services, telegram and telex**, disappeared gradually during the 1990s. However, the telegram service survived until 2002, nearly 150 years after the start. The State wanted to wait until other countries disbanded their service, even though this was both expensive and unprofitable. During its last few years some of the costs for the service were state-subsidised. Telex also dwindled sharply and Telia sold the small remaining business to Telemar Scandinavia in 2003. The use of Telefax became more sporadic, though older terminals were retained or the service was integrated into advanced photo-copiers or PCs. New text services in the form of e-mail transported over data-networks became the norm.

Mobile text-services, in the form of paging, remained fairly insignificant and the Minicall service was sold to Generic Mobile in 2002. Paging was replaced by SMS, an integral component in the GSM system, which gathered momentum from 1997. SMS also became a bearer for other mobile data services after 2000.

Data services in the Datapak and Datex **fixed data networks** were developed from the early 1980s but by the 1990s were surpassed by the Internet and other IP-based networks. ISDN, which was an enhancement to the digital phone network, was introduced after much deliberation in 1993 but was never a success in Sweden, in contrast to Germany and Norway. Swedish ISDN reached a maximum of 922,000 channels in 2001 and decreased thereafter. ISDN served primarily for local Internet

access. Televerket started offering Internet services via TIPnet from 1991. After Tele2's success as a dial-up Internet-access provider from 1991, Telia also started to offer a phone dial-up Internet service in 1995 achieving maximum customer numbers in 2003. Traffic via a modem has a highest transfer speed of 56 kbit/s, whereas ISDN can offer 128 kbit/s. An enormous break-through came in 1999 when broadband over the local copper telephone network (ADSL) was introduced at a speed of 500 kbit/s which soon increased to 2 Mbit/s, with even higher speeds for customers situated closer to an exchange. Fixed-broadband was now available to large portion of the population even though total geographic coverage was not available. A major advantage was also that ADSL was always connected.

Telia also introduced fixed broadband in a new way via the CATV network. Starting in 1997 transmission was converted from analogue to digital signals so that TV capacity increased fivefold. Thereafter a return channel, broadband data-transfer and finally IP-telephony were introduced so that by the beginning of the 2000s the CATV network was a complete alternative to ADSL-based broadband (triple play.) However, Telia was forced to dispose of the CATV business (Com Hem) for competitive reasons as an EU demand prior to the merger with Sonera in 2002.

Mobile data-services started in 1986 with the introduction of Mobitex, the world's first mobile packet-switched data network, created by Televerket in Göteborg. It was marketed together with Ericsson via co-owned Eritel founded in 1988. However, it had a limited take-up and the Mobitex network was sold to Multicom Security in 2002. At that time, customers were waiting for GSM as a data-carrier which initially only offered 9.6 kbit/s but was upgraded to higher speeds in 2001/2. The third upgrade to EDGE (384 kbit/s) came in 2004, the same year as the 3G UMTS network was inaugurated.

Homerun, a wireless broadband data-network service, was launched in 1998. It was based on a series of independent communication zones (hot-spots) using spectrum in the free-frequency bands. The service allowed travellers to connect their laptop from hotels, waiting rooms etc. at speeds up to 11 Mbit/s (later 54). Telia developed Homerun under the auspices of its internal research programme Demotel.

1.4 Restructuring

Until the middle of the 1970s, Televerket's administration was dominated by a regional organisation for a fixed-wire business incorporating 20 telecom areas. These were complemented with radio activities and also with manufacturing - which was unusual internationally. Technology and business activities varied somewhat between the telecom areas and in 1975, a matrix organisation was created to co-ordinate the business at a national level. Subsidiary companies had been established for the first time in the 1960s. In 1981, Teleinvest was created as a holding company for an entire subsidiary sector and many new activities started. They were assembled as divisions and later transformed into subsidiaries. 1990 saw the start of a restructuring of the whole business in preparation for corporatization. In 1992 the twenty regions were reduced to eight.

On 1st July 1993 the whole group became a limited company, Telia AB. The regions which had been inherited from Televerket finally disappeared in 1996. A failed attempt to merge with Norwegian Telenor in 1999 meant preparing for major changes which were never implemented and during the following two years

activities were refocused to concentrate on core-business. New merger discussions were initiated, this time with Finnish Sonera, whose business was an excellent complement to Telia's. During 2002 Telia made an offer for Sonera which was accepted and the two companies merged to become TeliaSonera in December 2002.

1.4.1 The Group organisation, an overview

By agreement with the Swedish State, the entire business of Televerket including all assets and liabilities (with a few small exceptions) was transferred on 1st July 1993 to Teleinvest AB, Telia Mobitel AB and Fastighets AB Telaris. Teleinvest AB changed name at the same time to Telia AB, 100% owned by the State. The central financial unit became the Telia Treasury Division within Telia AB. Teleinvest's subsidiaries became Telia subsidiaries but the business structure remained virtually intact.

The parent company Telia AB inherited the previous 8 geographical regions which worked as a matrix with two business areas, network services and telecom services. They comprised two national divisions. Divisions and subsidiaries were divided into three main activities: Core business, specialised companies and business development companies. This organisation remained basically unchanged for two years.

During 1994 four national operative special units were created, Telia Network Support, Telia Integration, Telia Systems Support and Telia Billing.

In October 1994 responsibilities for the international activities were re-distributed. Businesses within Telia International AB (ex STI), returned to the parent company, which in December 1994 also took over Telia International's subsidiary companies and other shareholdings. International network planning and settlements moved back into the Network Services Division whilst development and marketing of international telecom-services was transferred to the Telecom Services Division. The established activities in Estonia and Latvia, plus new activities in the Nordic countries moved to the Telecom Services Division. Some others had already been taken over by Unisource. The remainders were transferred to a new International Division responsible for fixed and mobile investments outside the home market.

At the end of 1994 the Multi-Media division was created to stimulate development of new services.

A special personnel support division was created at the end of 1995 to supervise and manage the employee consequences of re-structuring.

The first major structural change after corporatization occurred in early 1996 as part of the reforms initiated by the new CEO. The old regional structure, telecom-areas and the matrix organisation disappeared and were replaced by a purely functional organisation. The Group now had six business areas and six marketing companies. The business areas were Telecom Services, Network Services, International, Infomedia Services, Financial Services and Business Systems. Changes occurred primarily in the International and Infomedia divisions. The marketing companies were specialised to fulfil the needs of each respective customer group.

The six marketing companies were Telia Nära (residential), Telia Företag (SMEs)

Telia Publicom (public service entities), Telia Megacom (large businesses), Telia Handel (dealer sales channel) and Telia Info Reklam (information services).

A distinctive difference between wholesale and retail sales of network and end-user services respectively was created with this new structure.

A personnel support division was created to help employees who did not immediately fit into the new organisation. A group-wide project was started to cope with the “millennium bug” where older computer systems could expect problems when clocks entered the new millennium.

Internationally, investments outside the Nordic region became more risk-capital based. The business idea was to invest capital and knowledge, and together with others create companies, primarily in the mobile sector, which could be sold at a profit some years later. Closer to Sweden however the ambition was to establish businesses of a more permanent character with a broad portfolio of services.

The Infomedia Services Division assembled all existing content business such as directories, CATV and personal telecom services and in addition, new content services from the Multi-Media division where the intention was to climb up the value-chain.

One important change was in Network Services where fixed and mobile networks were combined in early 1997. This was similar to the integrated organisation from 1968 but it did not survive for long this time either because it was not sufficiently flexible.

Telia's businesses continued to expand through a whole host of initiatives and acquisitions in the Nordic and Baltic region, Europe and globally.

In April 1998 the Group organisation changed yet again to comprise eight business areas (each with integrated marketing and sales functions), three Nordic country-based markets (DK, NO and FI) plus a retail dealership distribution channel (Telia Handel). The business areas were: Network Services, Public Communications, Business Communications, Mobile Communications, Systems and Service, Infomedia, Financial Services and International.

This increase from six to eight business areas was mainly the result of Telecom Services being divided into three business areas: Residential, Business and Mobile. At the same time, responsibility for the mobile network was transferred back to Mobile from the Network business area. All business-systems services were congregated within one division in the parent company. In addition there were also a number of support functions such as Telia Assist, Telia Research and Telia ProSoft. The Group Head-Office had eight staff units.

This new organisation was designed to better fulfil customer needs in an increasingly competitive market.

The personnel support division was disbanded at the end of 1998.

Telia International Carrier was created in March 1999 as a separate unit within Networks to produce and sell international network services to operators and service providers anywhere on the globe. This was motivated by an assessment that the imminent explosion of both Internet and (3G) data services would mean a massive increase in traffic and transport capacity, which corresponded well with the new ability for fibre-optic cables to deliver enormous volumes of data at low cost.

During 1999 a great deal of organisational effort took place in preparation for a merger with Telenor. The (expected) new company was never christened but was

called Newtel or Telianor. A Swedish/Norwegian Board of Directors was appointed on 19th October.

In the beginning of 2000 it was time for the next re-organisation after the failed merger with Telenor and the focus was on core business. The Group reduced from eight to five business areas: Mobile, Carrier & Networks, Business, Residential and Enterprises. This meant that four of the existing businesses were slimmed down and assembled in Enterprises. Sales of customer-premises equipment, content services, financial services and international investments were reduced significantly. However, a separate business area for Internet and IP-based services was not created as each business area developed their own. The entire Swedish and international mobile business was assembled within the Mobile business area.

Skanova was formed in October 2000 as a national wholesale trademark so that Telia could deliver services to competing operators.

April 2001 saw, yet again, a new Group structure. The aim was to increase business orientation and facilitate internationalisation, plus to create the right conditions for Telia to participate in the structural changes that were imminent. Each core business became a separate business area with P&L responsibility for development, sales, operation and maintenance of applicable services on all geographical markets. The five business areas were: Mobile, Internet Services, International Carrier, Networks plus Equity. This structure reflected the Internet's status as a platform for future business. Networks took over responsibility for all other fixed services. Equity, responsible for refining Group businesses and the management of components which were on the for-sale list, was gradually wound up as a business area. Minority shareholdings were later managed by Telia Holding. Telia Sverige became the common outlet for sales and customer service towards all categories of Swedish end users. Telia Research became the unit responsible, at Group level, for R&D reporting directly to the CEO.

2002 was dominated by activities related to the purchase and merger with Sonera. The Board decision to the merger was made on 26th March and was completed on 9th December 2002. The Swedish business was re-organised again, this time from product-orientated to customer-orientated, divided into four segments: Large companies, SMEs, Residential and Operator customers.

(Organisational details are included as appendices in the Swedish language version).

1.4.2 Subsidiaries

This section only includes major subsidiary companies. Others are mentioned elsewhere in connection with national or international activities.

On its inception in July 1993 the Telia Group comprised a parent company and 13 wholly-owned business driven subsidiaries. The parent company's division for data-services was transferred to Unisource Business Networks Svenska AB, which in turn was transferred to Unisource NV in Amsterdam (one-third owned by Telia). Thereby the responsibility for all Telia's data traffic was handed over to Unisource.

At year-end 1993 the Megacom division (management of large business-customers) and the Personal Telecom Services division were moved to the newly created Telia Megacom AB and Telia Telerespons AB respectively.

In January 1996 a number of new marketing companies were created via transfer from the parent. They were: Telia Nära AB (residential), Telia Företag AB (SMEs), Telia Publicom AB (public sector), Telia Telecom AB (developed fixed and mobile services), Telia Systems AB (developed customer premises equipment) plus Telia Handel AB (management of retail dealerships).

Telia Overseas AB was created together with Ratos, Skandia and Orkla in 1996 to invest in fast-growing economies outside Europe. Telia's share was 65% and at most the company managed shareholdings in eight companies, mainly in Asia. Telia Overseas became Overseas Telecom in 2002.

Telia Mobitel became a pure mobile network company, Telia Mobile AB, at year-end 1996, at which point some parts of the business were transferred to other units.

In January 1999 business services and contracting were transferred to the Telia System and Service AB subsidiary.

The international carrier business plus installation and construction personnel were transferred to subsidiaries in January 2000. Telia Network Services became a separate company called Neterna AB and specialised in the operation and maintenance of fibre-optic cables. Even Telia Installation and Telia Företagsservice (later Eviga AB and Relacom AB respectively) became separate companies.

Telia and Tele2 established Svenska UMTS-nät AB in early 2001 on a 50-50 basis to build and operate a UMTS network utilising Tele2's licence. In this way Telia was able to become a 3G operator without having its own licence.

Telia Sverige AB was formed when Telia re-organised in April 2001 at which point the company took over responsibility for all customer categories in Sweden.

1.4.3 Sales of subsidiary companies

The majority of subsidiary sales were accounted for within each respective business.

In early 2001, in preparation for the disposal of several units within Telia which were no longer regarded as core business, Telia decided to form the **Telefos Group** comprising nine former internal businesses with 5,600 employees. These were: Multicom Security, Ki Consulting and Solutions (ex Prosoft), Respons, Swedia Networks, Comcarta (ex Telia Dokumentation), Telia Swedtel, TA Teleadress and Validation. The average number of Telia employees was thereby reduced by 17%. In June 2001 a Swedish venture capital company; Industrikapital, purchased 51% of the Telefos Group. Over the next few years all the individual Telefos companies were sold, the last one in 2007 (see appendix).

Again in 2001, and for the same reason as above, Telia formed the **Orbiant Group** with 5,400 employees comprising six companies involved in the installation and service of customer equipment plus network maintenance activities. They were: Neterna (ex Telia Network Services), Relacom (ex Telia Business Services), Eviga (ex Telia Installation), Orbiant service (ex Telia Service), Orbiant systems (ex Telia Systems) plus Wireless Network Management (from Telia Mobile). On 28th December 2001 Flextronics purchased 91% of the shares in the Orbiant Group, and the remaining 9% in July 2002 (see appendix).

1.5 International alliances

Over the years Televerket/Telia has participated in 3 alliance groups.

The history of Telia original

The first group comprised the **Nordic telecom administrations** which started to co-operate in 1917. Commercial collaborations were made after the Second World War. Co-operation reduced in the early 1990s when international competition started and stopped nearly entirely in the mid 1990s when the Nordic countries entered each other's markets. One exception was a close co-operation with Telecom Finland (later on Sonera) in the Baltic countries, where a number of common investments were made, where the investments and risks were equally divided. .

The second Alliance involved some ten telcos which in 1988 purchased shares in USA-based **Infonet** Services Corporation which had a world-wide data network for enterprise customers. Services in this network were sold mainly to Swedish multi-nationals. In 1993 Infonet Svenska AB was created to simplify sales in Sweden. Telia and the Unisource partners were dominant owners in Infonet by the mid 1990s. All the owners left Infonet in 2005 when the company was purchased in its entirety by BT.

The third alliance was built up in stages, starting in October 1991 when Televerket and PTT Telecom Netherlands (later KPN) formed **Unisource**. The primary objective was to offer Swedish and Dutch companies European-wide services and hinder the large telcos from taking this lucrative international traffic. Swiss PTT Telecom (later Swisscom) joined the alliance in 1993.

Unisource and American AT&T formed the Uniworld joint venture in 1994 which was later converted into AT&T Unisource Communications Services (AUCS). (Spanish) Telefónica joined Unisource in 1996 but major upheavals in Spain lead to leadership changes and Telefónica left the alliance in 1998. Similar to other alliances of the day, Unisource no longer had a role to play. The decision to liquidate Unisource was taken in 1998 and the business was disposed of in an orderly fashion over the next few years. In 1999, AUCS was transferred to Infonet which played an important role in the dissolution of Unisource. Other components were taken care of by the newly created Telia International Carrier Services.

1.5.1 The Nordic countries and Scandinavian Telecom Services (STS)

The Nordic telecom administrations have an age-old tradition of mutual co-operation and for many years Televerket/Telia acted in alliance with their Nordic colleagues on the international scene, even though there were national differences between the countries. The Nordic administrations gained influence and saved costs by acting in unison in relation to both international co-operation and business. One important area was establishing international cable and satellite connections with different parts of the world. Around 1980 both data and mobile networks (Datex & NMT) were launched at the same time in the Nordics and this mobile co-operation gave all the operators a unique competence which was very much sought after by other countries wanting to start new mobile companies. When fixed network services competition escalated at the end of the 1980s Televerket formed Scandinavian Telecom Services to supply business services in Europe and invited the other Nordic administrations to become shareholders. However, STS was never fully accepted by the other Nordic parents who tended to see this new company as an unwelcome competitor and STS was formally disbanded in 1990. Nordic mobile co-operation in most other countries fizzled out, even though Telia managed to partner with both the Nordics and PTT Telecom Netherlands to start the

Hungarian mobile operator Pannon. In the mid 1990s the former Nordic allies entered each other's home-markets as competitors. However, Telia and Sonera continued to co-operate in several common new enterprises in Estonia, Latvia, Lithuania and Russia in the 1990s.

1.5.2 Infonet Services Corporation

Infonet was a global data network with origins in the USA-based Computer Science Corporation (CSC) which built a data network for its own needs in 1970. Infonet expanded, offering services to enterprises all over the world and by the mid 1980s they were represented in Sweden by Datema. Televerket started selling Infonet services via **Interpak** which was co-owned with Datema. In 1988 Televerket and some 10 other operators bought stock in Infonet. Televerket's share was 5% and as Infonet had many small owners, the management could run the company with little interference. Infonet's CEO, has the distinction of holding the job for 34 years when he retires in 2009. Interpak and Infonet services were incorporated within STI when it was formed in 1989. Later, when the activities of STI were integrated back into Telia, Infonet Svenska AB was created as a Swedish subsidiary. The ownership in Infonet continued to change and in 1995 the Unisource parent-companies had a share-majority. In 1999, as a consequence of the decision to liquidate Unisource, an agreement was signed with Infonet to take over the management of the central business of AUCS. In this way the Infonet alliance played an important role in dissolution of the Unisource alliance.

1.5.3 Unisource

Televerket made contact with its Dutch counterpart, PTT Telecom Netherlands, at the time when the Nordic co-operation in STS was being disbanded. Televerket believed that the significant telecom revenues and profits which major Swedish export companies generated were under threat from competition. These were important fixed network services customers and losing their international traffic to competitors would mean substantial losses to Televerket. The Dutch market had similar characteristics and the two telcos found that they had similar issues. The first co-operative venture was to transfer Swedish Vesatel, which supplied satellite-based services, into a common company. This was followed in October 1991 when the Unisource alliance was made public at the ITU Telecom 91 exhibition in Geneva. The Parent company was established in the Netherlands during 1992 and in 1993 Swiss PTT Telecom, with a similar customer structure, joined the alliance. One driving force for Unisource was to get the European Voice Users Association (EVUA) as a customer. The EVUA was a purchasing alliance formed by some 70 major European companies in 1992 to challenge telecom operators' pricing structures. Unisource could offer competitive pricing and the ability to deliver. Unisource expanded its business with new subsidiaries and signed a co-operative agreement with AT&T in the USA.

In 1996 the Spanish incumbent Telefónica joined Unisource but major upheavals in Spain lead to leadership changes and Telefónica left the alliance in 1998. By now Unisource had become both unprofitable and an organisation riddled with issues. Tough competition had put so much pressure on prices that both Unisource and the other alliances lost their position in the market.

The history of Telia original

A number of major restructuring efforts did not have the desired effect and in 1998 the owners decided to liquidate Unisource in an orderly fashion. The majority of the individual businesses were taken over by other entities with positive results for those involved, amongst others Infonet and Telia's recently created International Carrier Services, which via its foreign subsidiaries increased Telia's delivery capability for customers abroad.

In parallel, and for roughly the same reasons, the other alliances also disbanded. Alliances of this type no longer had a role to play.

1.6 Mergers

One way of achieving a position of strength in a competitive market is to merge the company with another suitable entity. Telia made two attempts with Telenor which failed in 1999. Telia was floated on the stock exchange in 2000 and thereafter a successful merger with Sonera was completed in December 2002.

1.6.1 Telenor

Telia and Telenor had some common reasons for trying to merge. They were both in roughly the same situation at the same time and both understood that it would be expensive to compete in each other's home market. In addition, both companies had difficulty in persuading their (State) owners to accept privatisation, which could have been achieved via a merger process.

In the autumn of 1997, Telia's CEO Lars Berg and Telenor's CEO Tormod Hermansen started very confidential discussions regarding a potential merger of the two companies. Telia's issues with the Unisource cooperation were a major reason behind the approach to Telenor. Discussions gathered momentum when Telenor's partner TeleDanmark was bought by US Ameritech in October 1997.

The Swedish Ministry of Industry and its Norwegian counterpart were drawn into these discussions, which became public knowledge in January 1998, but which were curtailed by the Norwegian Minister for Communications Odd Einar Dörum. The Centre party in the coalition government was determined to safeguard Telenor's independence and the Minister for Culture, Anne Enger Lahnstein, was her party's most critical advocate. Via leaks to the press, it emerged that Hermansen had contacted the government's opposition who demanded that discussions continue. These started-up again and Hermansen received a public reprimand for disobedience towards his owners – the government. At the end of February 1998 discussions were terminated yet again because of political conflict. It was possible to agree on some things but the main bone of contention was that the Swedes felt that the Norwegians placed too little weight on the business aspects, and the Norwegians felt that the Swedes did not understand their demand for equality of rights and balance, stated the Swedish Minister for Industry, Anders Sundström. Telia's chairman, Bengt Westerberg, was replaced in the spring of 1998 by Jan Stenberg, at that time CEO of SAS and a person well accustomed to the Nordic business climate.

At a company level Lars Berg was still optimistic and he re-established contact with Tormod Hermansen. Discussions were restricted to a small circle with only Telia's Chairman and one other person involved. The Minister for Industry, Anders Sundström, was informed but otherwise Telia's Group Management was kept in the dark. In October 1998 Telia's Chairman informed the new Minister for Industry,

Björn Rosengren, of the on-going discussions. Rosengren was infuriated. Lars Berg resigned and accepted an offer from Mannesmann in Germany, where he became CEO in March 1999

In spite of everything, negotiations continued at the political level and somewhat surprisingly a Letter of Intent was signed by Ministers Rosengren and Dörum during a public ceremony at Gardermoen's airport in Oslo on 20 January 1999. A number of principles were outlined and this was followed on 30 March by a definitive agreement between the Swedish and Norwegian States to merge Telia and Telenor. This document was signed by Rosengren and the new Norwegian Minister, Dag Jostein Fjærvoll. A large number of working groups began the job of creating the new joint company and in June the Parliaments of both countries gave their seal of approval, notwithstanding that the Swedish Parliament energetically debated the 60-40 percent share-split between Sweden and Norway. In mid 1999 the EU Commission approved the merger on condition that certain businesses were disposed of. On 18 October, in accordance with a share issue decision, the Swedish State deposited its entire shareholding in Telia AB as its contribution to the newly formed company, provisionally called Newtel AB, co-owned by the two states.

Much of the organisational work was agreed but many relationship issues caused friction. Dividing corporate functions equally rather than taking into account the business needs was vital to the Norwegians where politicians had always been much more involved in running the telecom sector than had been the case in Sweden. In addition, Televerket concentrated more on the fixed network whilst Telenor was more involved in mobility services. Telenor's CEO, who was popular in Norway, was elected to head the new company but did not receive much Swedish support for his personality and leadership style. He was known for his decision-making ability and abhorred the Swedish consensus culture. Rosengren, the Swedish Minister for Industry, did not make things any better when he whispered in front of TV cameras that Norway was the last Soviet State.

After many ups and downs the merger was called off on 16 Dec. 1999. The last straw was a conflict about where the mobile business head-office should be placed.

Telia was no longer bound by the EU Commission's demand to sell overlapping businesses but completed anyway the planned sale of fixed telephony in Norway to Enitel ASA on 1st January 2000, leaving Telia with virtually no business in Norway. However Telia succeeded in returning as a competitor to Telenor in Norway by purchasing the majority share of the main mobile competitor NetCom in June 2000.

Telia and Telenor's merger activities were wound up without problem during 2000, mainly because integration of the respective business areas had not yet been accomplished. The failed merger affected Telia's annual result with a 226 MSEK right-down, excluding own labour costs.

1.6.2 Sonera

Sonera's situation in Finland had always been different to Telia's situation in Sweden. Historically the Finnish telecom market had been divided in two roughly equally sized groups. Finnet was an association of local operators which controlled virtually the whole Finnish market for fixed telephony. Sonera's predecessor only had some rural plus long-distance and international traffic. Sonera was therefore

mainly a mobile operator already from the early 1990s. Competition between the two groups started around 1990 and both were involved in competing mobile and data businesses. Both Sonera and Telia were exposed early on to competition.

During the whole of the 1990s Telia and Sonera were co-owners in a number of fixed and mobile companies in Estonia, Latvia, Lithuania and Russia. Telia and Sonera knew each other well, even though they were not always in full agreement.

As the year 2000 approached, the IT world was euphoric and both Telia and Sonera invested heavily in different areas. Telia created International Carrier but contrary to Sonera, refrained from the hunt for 3G licences which were auctioned off for enormous sums. Sonera also invested in mobile networks and information services in line with contemporary business logic. In addition, Sonera's cautious CEO Aulis Salin was about to retire and he was replaced by the more visionary and verbose Kaj-Erik Relander. The latter was responsible for purchasing a number of expensive 3G licences during 2000, not least in Germany for 3.6 billion EUR. This dramatically increased Sonera's debt level even if no reservations were made for the necessary investments in 3G network infrastructure. When the IT bubble burst in 2001, Sonera found itself in a serious financial crisis, forcing the company to sell off assets and the Finnish state to make a substantial capital injection. Telia was financially strong and saw the opportunity to acquire Sonera, not least because the two companies complemented each other well. A merged entity would be both a powerful mobile and fixed network operator, the geographical footprint would extend eastwards and positions in the Baltics would be strengthened.

On 26th March 2002 Telia AB and Sonera Oyj announced the planned merger. On 30th September Telia presented a merger prospectus to Sonera shareholders and on 9th December 2002 it was announced that the merger had been completed. The Swedish State now owned 46% in the new company, TeliaSonera AB, and the Finnish State 19.4%. Anders Igel was nominated CEO and Harri Koponen his deputy.

1.7 Management and control of the business

This section describes how the business was managed and controlled at three different levels: Government/Ministry, Board and CEO.

Until 1993 Televerket was a Public Service Corporation (a part of the State). Control mechanisms had been refined from the 1980s towards less detailed management and became better adapted to an increasingly competitive situation. From 1993 Telia was a State owned limited company which at the same time was governed by the new Telecom Act. Both owner and regulatory functions were the responsibility of the Ministry of Communications but between 1997 and 1999 both functions were transferred to the Ministry of Enterprise, Energy and Communications under two separate Ministers. After the Telenor merger-debacle Telia was privatised and nearly 30% of the shares introduced on the stock exchange. Telia had five different Chairmen of the Board, first two senior politicians, followed by three business leaders.

Telia had six different CEOs starting with Tony Hagström who left the company in 1994 after 17 years as Head of Televerket and Telia. The last was Anders Igel who also became the first TeliaSonera CEO.

The history of Telia original

1.7.1 At Ministry level

Until 1993 Televerket was a part of the State having been a Public Service Corporation since 1912. It belonged to the Ministry of Communications, which was responsible for the rules and control of the business. The rules were Televerket's formal instructions and ordinances, and control was based on annual State budget decisions which related to Televerket's business plus any applicable regulations.

On 1st July 1993 Televerket was transformed into a limited company, Telia AB, in which the State retained 100% of the shares. (Sweden had a right-wing government from 1991-94) At the same time, the State entered into a new relationship with Telia (and with all other telecom companies as well) as a consequence of the combination of a Telecom Act and a new Regulator, Telestyrelsen (which from 1994 became Post & Telestyrelsen).

The Ministry of Communications, via different internal departments, was responsible for both the State's ownership of Telia and telecommunications regulation until 1st September 1997. On this date, ownership responsibility for Telia moved to the revamped Ministry of Trade and Industry to achieve a clear separation between these two roles of the State. However, this situation prevailed for only 15 months. On 31st December 1998 the Ministry of Communications ceased to exist and was incorporated in a substantially expanded Ministry of Enterprise, Energy and Communications. The roles of owner and regulator were once again in the same Ministry, but this time under two separate Ministers. The Minister for Enterprise and Energy was responsible for ownership and the Minister for Communications was responsible for regulatory issues.

(A list of relevant Ministers is shown in a Swedish language appendix).

The question of Telia's partial privatisation was a political issue directly after corporatization but the social democratic government which came into power in 1994 decided not to act. In 1999, during negotiations with Telenor in Norway (also State owned), it became evident that without a realistic market evaluation of both companies the merger would be very complicated. The failed merger in December 1999 spurred both governments into privatising their respective telcos. Telia was launched on the stock exchange six months later on 13th June 2000 and at the same time 150 million new shares were issued. The share-price was 85 SEK and nearly one million Swedes became shareholders, only to be disappointed shortly afterwards when the share-price dropped like a stone as a consequence of the IT-bubble bursting. The State's ownership was reduced to 70.6%.

(Telenor was launched on the stock exchange in December 2000 and the Norwegian State's ownership reduced to 79%)

When a merger with Sonera was on the cards in 2002, the procedure was entirely different. Telia made an offer for Sonera shares (already noted on the stock exchange in 1998) which was accepted by a majority of the shareholders, the remainder were compulsory purchased and the two companies merged on 9th December 2002. Prior to the merger, the Swedish State owned 70.6% in Telia and the Finnish State 52.8% in Sonera. After the merger, the Swedish State owned 46% and the Finnish State 19.4% of the shares in TeliaSonera. The remaining shares were purchased by a multitude of institutions and private investors.

The history of Telia original

1.7.2 The Board of Directors (The Board)

The Swedish term “Telestyrelsen” (Telecom Board) has been used in different ways throughout the years, including Televerket’s executive management in Stockholm until 1968. The latter is called Televerket’s central administration, until 1980 when the role was renamed the Head Office. (The name “Telestyrelsen” was re-used in 1992 to denote the new regulatory authority. It was retained again when the name of the regulatory authority changed to “Post & Telestyrelsen” in 1994).

In the mean time the word “Telestyrelsen” was used to denote Televerket’s governing body which since 1963 took the form of a Board with Televerket’s Director General as Chairman plus five external members appointed by the Government. Two union representatives were included from 1971/72. **Tony Hagström** was elected Chairman in 1977. In 1988 the Board was reorganised to closely replicate a limited company’s Board, with former Prime Minister **Thorbjörn Fälldin** as Chairman and the Director General remaining as a member. Until Telia was created in 1993, the Board comprised a Chairman plus nine members and two union representatives.

From 1993 Telia AB was a wholly State-owned limited company with a Board appointed by the Government whose members differed little from the preceding Board for Televerket. There were 10 external members composed of politicians and representatives from trade and industry. The first Chairman was former Prime Minister, **Thorbjörn Fälldin**, who remained in the role from the Televerket era. He was replaced in 1995 by a former Deputy Prime Minister, **Bengt Westerberg**, who retained the position until 1998. As discussions regarding a potential merger with Telenor had already begun, the CEO of SAS **Jan Stenberg** was appointed as Telia Chairman to utilise his experiences of Nordic business co-operation. At the same time the Board was rejuvenated with new members.

When the merger with Telenor was announced (Newtel) in October 1999, a Swedish.-Norwegian Board was appointed comprising four ordinary members and two union representatives from each country. **Jan-Åke Kark** was full time Chairman.

After the aborted merger with Telenor in December 1999 the majority of the Board was replaced but with only five ordinary members plus three union representatives. The new Chairman was the more industry-orientated CEO of the Skandia Insurance Company, **Lars-Erik Petersson**. Former Prime Minister **Ingvar Carlsson** was appointed as the sixth Board member (in May 2000) and this constellation remained until the merger with Sonera in 2002.

The composition of relevant Boards of Directors is shown in an appendix.

1.7.3 Telia’s Chief Executive Officers (CEO)

During the ten years of its existence Telia had six CEOs.

The first was **Tony Hagström** (born 1936) who had been appointed Director General for Televerket in 1977. He holds a PhD in Economics and came to Televerket from the role of Under Secretary of State within the Ministry of Industry. During his time with the company he was the initiator and driving force behind the fundamental transition from Public Service Corporation, with no competition, to limited company with a multitude of competitors. He started

international activities in the Baltics and Europe, plus created the Unisource Alliance. Tony Hagström left Telia in June 1994 after nearly 17 years as Head of the company and one year after fulfilling his ambition to corporatize the company. Only two other Televerket Director Generals served for longer periods.

Telia's second CEO was **Lars Berg** (born 1947). He holds a Masters degree in Economics and came to Telia in 1994 after a long career within Ericsson, first 15 years in South America and later heading subsidiaries in Sweden. He continued the task of transforming Telia's structure and culture plus continued to extend the company's international expansion. Berg played a major role in the attempts to merge Telia with Telenor together with Telenor's CEO Tormod Hermansen. He resigned in the middle of these negotiations in November 1998 and moved to the German mobile operator Mannesmann at the end of February 1999.

Telia's third CEO was **Jan-Åke Kark** (born 1946), a lawyer. His career included working at the Swedish Immigration Board, Programator and as MD for Ericsson Microwave Systems. He came to Telia in 1999 in the middle of the process of trying to merge with Telenor, which proved to be a minefield. Kark left his position of CEO for Telia in October 1999 to become Chairman of the merged company, Newtel, with Telenor boss Tormod Hermansen as CEO.

Telia's fourth CEO was **Stig-Arne Larsson** (born 1943) who had spent 36 years in the company, not least as CFO and deputy CEO after Telia was created in 1993. When the Telenor merger fell apart, Jan-Åke Kark was renamed CEO of Telia. Stig-Arne Larsson was abruptly forced to resign and accept an early retirement package.

When **Jan-Åke Kark** returned as CEO of Telia in January 2000 his main tasks were to get Telia back on track and to implement the stock-exchange float which took place in June 2000. Kark began to show signs of previous medical problems and resigned for health reasons in October 2000

Telia's fifth CEO was **Marianne Nivert** (born 1940) who had spent a lifelong career in the company in roles such as Area Director, Personnel Director and Head of Networks. She was responsible for the strategy which forced Telia to concentrate on core business and dispose of peripheral activities. She also started the international carrier business which, together with investments in mobile Internet and portals, proved costly when the IT bubble burst. After a thorough cleansing, Telia still proved to be financially sound and during 2000 began the process to acquire the economically weakened Sonera. Marianne Nivert retired in July 2002.

Telia's sixth CEO was **Anders Igel** (born 1951) who entered Telia via a seat on the Board of Newtel which had been created for the merger with Telenor in 1999. At that time he was CEO for Esselte. He holds degrees in economics and engineering and has a long background in Ericsson. Anders Igel was appointed Marianne Nivert's successor on her retirement in July 2002. He led the work to merge with Sonera at the end of 2002 and to create the necessary organisation for TeliaSonera. He resigned from the company on 31st July 2007 after disagreement with the Board of Directors. CFO **Kim Ignatius** replaced Anders Igel on a temporary basis until **Lars Nyberg** (born 1951) was appointed CEO in September 2007

(An overview of the various CEOs terms of office is shown in a Swedish language appendix).

1.8 Personnel issues

In the 1980s Televerket's personnel reached a maximum of nearly 50,000 and had for many years been dominated by network installation plus maintenance and repair staff. As new technology made in-roads, personnel requirements reduced. Major reductions were made in the years prior to the formation of Telia and over 9,000 persons left the company between 1991 and 1993. When radio and TV broadcasting plus frequency administration were moved to other entities in 1992, 800 employees accompanied the transfer. In 1994, when Telia sold the manufacturing arm TELI, 1,400 persons moved to the new owner, Ericsson. The paradox was that even though reductions were a necessity, it was equally important to employ new staff with up-to-date economic, technology and sales competences.

Personnel reductions were handled in three ways: early retirement, natural attrition and via specific development projects to prepare an employee for a new carrier within or outside the Group. Ambitious programmes were started to try and correct the competence and age imbalance. Over 3,000 employees took part in a course of lessons to achieve upper secondary school competence. A Telia Telecom MBA programme was arranged for some years together with Uppsala University. Telia also started trainee programmes which attracted a great number of young, well educated candidates and within the Unisource venture, a Joint Management Development Programme was started for top managers in the alliance.

To fulfil the employee reductions process in an efficient and responsible manner, at the end of 1995 a special personnel provisioning division was created where those affected (approximately 2,700) retained their employee status but spent all their time preparing for a new job. This initiative gave Telia good-will and the company was also given an award from one of the major Unions. Personnel reductions moderated by the mid 1990s.

Major efforts were made to raise IT competency and every employee had to take a PC licence exam. 180 IT-pilots were trained in 1996 to work as instructors in Telia shops, sales teams and customer support. International expansion meant the need to employ people with international competences and employees abroad increased as well. For the first time human-capital was measured using Telia's Integrated Method (TIM). These results were compared with market capital and economic efficiency in order to manage competence and organisational development. Specific gender equality activities were also started in 1996 to make it easier for women to achieve leadership and specialist positions. A gender equality prize was awarded to a manager that had been especially successful in this field.

Other activities included educating staff to use mobile communication tools, language and cultural training. In 1998 the Telia Management Institute was created to train internal managers. The EU Commission became aware of the work that Telia was doing to restructure the company whilst retaining employee well-being and flexibility for the business. The personnel provisioning division was disbanded at the end of 1998 and its activities were returned to the normal organisation, by which time roughly 6,500 employees had passed through its doors.

Telia worked actively with measurement methods in order to improve the business and in 1999 started using the Satisfied Customer Index which is an EU standard. Much of 1999 was concerned with the Telenor merger preparations. 2000 saw a

new start after the failed merger and planning for the forthcoming stock-exchange introduction. Things were relatively calm on the personnel front.

In mid 2000 a process to focus on core business was started. This led to an extensive disposal of subsidiary businesses in 2001 and a corresponding dramatic reduction in staff numbers. Over 10,000 persons moved to new employers outside the Telia Group.

A new unit called Telia Re-Adjustment (Omställning) was created to support employees and managers who were affected by these changes and also to coordinate relevant activities with external recruitment. Active measures were also taken to ensure a better gender-balance and to focus on employee health issues.

In December 2002 the merger agreement with Sonera was accomplished. At this time Telia had approximately 12,600 staff, which was roughly one-quarter of the number Televerket had employed in 1990.

The following table indicates the average number of employees in total and in Sweden during the Telia period (+ the two years prior to Telia).

The Total figures include employees in Telia's majority-owned subsidiaries abroad. (They do not show the number of Telia Swedes abroad). The table also indicates the dramatic Swedish personnel reductions in the early 1990s and after the year 2000.

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Total	42399	39540	34312	32807	32825	34031	33930	31320	29546	30307	24979	17277
Sweden	41734	39156	33912	32166	31503	31290	30474	27540	25414	25383	20922	12593

1.9 Environmental activities

Over the years Televerket always had some specific environmental issues of its own but they rarely created a major storm. Stopping poisonous contamination from impregnation of telephone poles, phasing out ozone-harmful freon as cooling agents and removing lead-coated cables were some examples. In 1994 Telia started an ambitious environmental programme which included a declared environmental policy. This happened at a time when Telia expressly extended its business idea with a goal to develop a customer's quality of life, environment and competitive ability. Focus was broadened from not only applying to Telia's own impact on its surroundings to include the use of IT as an aid in reducing pressure on the environment for individuals and society as a whole.

This included the concept that working outside the office can substitute travel or that transport companies can optimise their cargoes or miles driven using an IT solution. A special environmental function at Group level was created in 1995 and the collection of electronic refuse was an agenda item. Telia appointed a Head of environmental issues in 1996, adopted an environmental control system and started reporting environmental issues. Telia participated in European co-operation within EURESCOM and signed an environmental document with 18 other operators. In 1997, a life cycle analysis of video conferences, plus an attempt to reduce the amount of paper used in telephone directories was conducted. Telia's managers received environmental training for the first time.

The history of Telia original

In 1998 Telia's own influence on the environment was analysed and concerns for potential health risks connected with mobile telephony were noted. Life cycle analyses were conducted and Telia started to collect discarded customer products. Solutions utilising few resources were emphasized in Telia's 1999 sales activities. Telia also took the initiative to promote an industry-wide environmental telecom-product-declaration and to support research into the effects of electro-magnetic fields (EMF) on humans.

Telia also initiated the production of an environmental declaration for telecom services and the first product was Centrex (a network-based PBX solution). In 2001 Skanova became the first Swedish company to receive a combined ISO 9001 and ISO 14001 certificate for an integrated quality and environment management system. Telia continued to monitor developments in the mobile telephony EMF issue. During 2002, in an ETNO working group, Telia was responsible for the production of information to concerned interest groups.

2 Domestic activities

Telia's domestic activities comprised five segments:

- Telecom services
- Radio and CATV
- Complementary services
- Sideline activities
- Support activities

Telecom services for voice, text and data have always dominated revenues. The emergence of telecom competition in the 1990s has gradually also turned Telia into a wholesaler, selling services to other operators and resellers in addition to the traditional retail business and consumer markets. Telia's telecom services have rapidly become more mobile, having previously been primarily fixed. Datacom capacity has increased dramatically since fixed and mobile broadband has become more common. Internet and IP technology has a strong foothold in Sweden. GSM has been a major hit, building upon the success of NMT. The fixed network was completely digitalised by 1998 and by then had already passed maximum customer numbers. Text has been re-vitalised with Internet e-mail and SMS via GSM.

Radio and CATV. Program distribution became more cable orientated having originally been totally wireless. Telia's CATV (Com Hem) was disposed of in 2003 as a demand from the EU to allow the Telia Sonera merger. By this time CATV had become a complete competitive infrastructure since the network had been digitalised. Televerket had distributed radio (and later TV) from 1925 until 1992 when the State transferred this responsibility to State-owned Teracom AB.

Complementary services enhanced existing network services and became widely available thanks to the new networks but not all were a hit. Successful peripheral businesses such as alarm services and maritime radio were sold.

Side activities were telecom-related businesses for Telia's customers, often with roots in the old monopoly world. Telia disposed of virtually all of these activities to concentrate on core-business. For example, it was no longer suitable that the dominant operator ran telephone directories in a competitive market. Personal tele-services could also be better handled on a small scale as could many others.

Support activities assisted the company's own business and were initially internal activities. However, by hiving-off, corporatizing or selling most of them, around the year 2000 Telia was able to concentrate on its core business whilst at the same time the activities that were affected could blossom as stand-alone businesses. Examples were equipment manufacturing, office administration, computer support, property management etc. Network construction and maintenance was a major example which was hived-off, corporatized and later sold as two company groups. Telia became a major customer to most of the companies in question which could grow, become more efficient and sell their services to others.

2.1 Telecom services

Telecom services have always dominated revenues and until 1980 were of two types, text and voice services delivered via fixed networks. Televerket was responsible for both the network and terminals from customer to customer, i.e. for all services end-to-end. Just prior to 1980 a third service data-transmission, appeared and market demand for data-services between computers and other machines increased rapidly. After 1980, wireless communication started in earnest with mobile networks for voice, text and data.

Over just one decade the business changed dramatically. The two main revenue streams, fixed voice and text in a **monopoly** market became six revenue streams with voice, text and data over both fixed and mobile networks in a **competitive** arena. This was a central component in transforming Televerket into Telia.

Services have always been sold at a retail level, i.e. to enterprises, public institutions and residential customers. This situation changed at the beginning of the 1990s when a wholesale telecom market evolved. Telia started selling a portfolio of (primarily fixed) network wholesale services to three customer groups: Telia's own marketing divisions, external service-providers and competing network operators. Telia's wholesale brand-name in Sweden was Skanova and the portfolio included services in four areas: telephony, network capacity, Internet access and co-location.

2.1.1 Text communication, fixed networks

Telegraphy is the transmission of text, i.e. alphabetic letters, numbers and various characters. About 50 symbols suffice for most western languages. Transmission is digital, one-way and requires very little capacity. The technology was simple and during the second half of the 1800s was already a global phenomenon.

A **Telegram** was the service which led to the foundation of Telegrafverket in 1853. A telegram is a written message which is transmitted as electrical impulses from one place to another, converted back into written form and delivered by hand to the recipient, who does not even have to be a subscriber. This was Televerket's only service until 1880 when the telephone appeared (and which Televerket used to deliver telegrams). The service continued to grow and peaked in 1950. Thereafter usage declined and became unprofitable. The service was discontinued in 2002

Telegrams were of two types, normal and luxury (greeting telegrams). Many of the normal telegrams were sent on a regular basis, reporting the weather and news etc., and after 1950 were replaced by more modern methods. Just before Telia was formed in 1993 the telegram business was moved to Telia Telerespons. In 1996 luxury telegrams were sold to a private company, RiksTelegram AB and normal telegrams were co-located with Stockholm Radio in 2000. One issue remained. When would Telia be allowed to close down the international telegram service? The Government hesitated because it was still regarded as an important public service but finally decided to subsidise it with a 5 MSEK special appropriation, which as it happened was short-lived. By 2000 many European countries decided to close down the international service and Telia was finally allowed to do the same on 30 April 2002, 149 years after the start in 1853.

Telex was a service for enterprises where tele-typewriters were connected via a separate automatic 50 bit/s circuit-switched network allowing customers to

exchange messages themselves. Telex was a secure service where messages sent and received were accepted as legally binding all over the world. Televerket introduced the system to Sweden in 1946 and the network was modernised around 1980 with the introduction of AXE and traffic continued to grow until 1985 when other services started to take over. In 1987 there were 19,700 customers but by the time Telia was formed in 1993 customer numbers had shrunk to 9,000. In 1994 all traffic was concentrated to one telex station in Stockholm which was finally closed in 2000 and telex became the responsibility of Telia Mobile Satellite Services. The remaining customers were connected to a European telex network managed by Swisscom. The last customers were banks and merchant shipping where deep-routed routines and reliable connections were only gradually being replaced by new technology. Primarily it was the secure electronic name-exchange at the beginning and end of each message that customers' valued. In 2003 TeliaSonera sold the Mobile Satellite unit to Telemar Scandinavia AB. The telex service was included but has gradually faded away and been replaced with an e-mail alternative.

Teletex was a sort of super-telex which was commercially introduced in 1983. Terminals were a form of word-processor which could communicate via the Datex data-network at a higher speed (2400 bit/s) than telex (50 bit/s). However Teletex was never a success coming at about the same time that PCs made their entry and only a few terminals had survived when Telia was created in 1993.

Telefax, (facsimile) is a form of remote copying. The service copies and transmits a document, containing any type of information over the telephone network as a series of lines. Image transmission has a long history but it was primarily the Japanese who developed the modern telefax at the end of the 1970s. Telefax could transmit kanji with thousands of symbols. Televerket introduced Telefax in 1980 and was active in the standardisation process which created the basis for a wide choice of compatible terminals from different manufacturers. They were easy to use and were sold in full competition between Televerket and private suppliers. Over time, e-mail became a serious competitor and by the end of the 1990s Telefax usage had reduced substantially. Unlike earlier services, Telia did not have to decide when to withdraw the service. Existing equipment was used less and less but many are still in use after 2000, primarily to send signed documents. The telefax function is also a component in a variety of data-services.

Electronic mail (e-mail) started life in the 1970s as a service to connect computer terminals and the major computer manufacturers developed different e-mail systems as a component in their main-frames. Televerket launched a public service in 1986 called Telebox which utilised the US Telemail system from GTE. The service could be reached via Datel, Datapak, Datex or Telex and traffic with other countries which used the same system opened in 1987. Many competing systems were now available but they were all stand-alone and not compatible with each other. To solve this issue the ITU developed a common standard called X-400 which Televerket's subsidiary Tele Delta used to launch an interconnected e-mail service called TEDE-400 in 1989. When the Internet had a break-through in 1995 e-mail via the TCP/IP-protocol was soon dominant. Simple internet addresses and domain names made X-400 redundant. Telia started selling Internet subscriptions in 1995 which included both an Internet connection and e-mail accounts. E-mail development was the responsibility of Telia Promoter. The primary customer group

was a new school data-network which attracted a lot of political attention. In 1996 further development of the Internet was taken over by the regular organisation and Internet became a public service. Many Internet Service Providers (ISPs) began activities around that time. When web-mail was introduced at the end of the 1990s anyone could go into an Internet café anywhere in the world and manage their e-mail correspondence. Secure e-mail was launched in 2001 as an encrypted service.

2.1.2 Text communication, wireless networks

Radio telegraphy from ship-to-shore was Televerket's first radio-based service when the first coastal station was opened in 1911. This was important for many years but was gradually replaced by modern alternatives. Morse code telegraphy was still used until 2002 when monitoring of distress frequencies was discontinued. The year after, Telia sold ship-to-shore radio to the Viamare Group.

Radio telegraphy between terrestrial stations started during the First World War. In 1923 radio-telegraph connection with the USA was established in from a major new station at Grimeton on Sweden's west coast, today on UNESCO's world heritage list. Radio telegraphy also played a major role during the Second World War.

Maritex was an automatic short-wave radio system for telex traffic used by ships anywhere on earth. It was developed by Televerket's radio division in Göteborg and started in 1972. Traffic peaked during the 1980s with some 1000 users and good profitability. In 1979 Inmarsat became a competitor for this type of traffic but it took until 2002 for Maritex to be closed down for good as telegraph officers were no longer needed on merchant ships after 2000.

MBS was a country-wide mobile messaging system where messages were broadcast as signals over the public FM radio in the 88 – 108 MHz band and picked-up anywhere by small pocket receivers (called Pagers). MBS was developed by Televerket's radio laboratory and launched in 1978 as the first system in the world with country-wide coverage for a messaging service. MBS reached a maximum of 70 000 customers in 1989 and remained in service until 1996.

Minicall was the second generation of mobile messaging with its own radio network in the 160 MHz band using simple receivers. It was based on the British POCSAG system, (Post Office Code Standardisation Advisory Group), and a simple version was introduced as Minicall Tone in 1985. This was upgraded in 1988 to also send text, (Minicall Text) and in 1989 to include number messages (Minicall Numerical). The service was also used to send tele-commands to remote locations. Minicall had 167,000 users in 1999 and was largely superseded by SMS.

ERMES was a more advanced European mobile messaging service with higher capacity built to a CEPT standard. Telia introduced the service in 1998, marketed as Minicall Broadcast. In 2002 Minicall/ERMES was sold to Generic Mobile Systems AB, a company specialised in business critical communications.

SMS, Short Message Service, is a mobile phone text messaging system which can transport up to 160 symbols. The Service was developed for the GSM standard and was available from the start in 1992. Later it became apparent that there was a market for text-based messages, despite the limitations of a small keypad. From 1997 Telia has offered SMS as a subscription component and traffic has risen dramatically. In 2002 Telia transported 488 million SMS messages, about one third

of the Swedish total. Swedes send an average of 15 SMSs per month, which is low in a Nordic comparison. SMS can also be used to send binary content such as ring-signals or telephone settings.

2.1.3 Voice communication, fixed networks

Fixed telephony started in Sweden in 1880. Signals were analogue and transmission was in principle two-way and telephony needed a whole new infrastructure to be built, in parallel with the telegraph network. Initially, only local networks were constructed and it took until the 1890s for them to be interconnected nationally. Long distance international telephony only became possible when electronic amplifiers were introduced after the First World War.

Telephony had a major impact in Sweden from the beginning, not least due to competition, where more than 200 local and private network associations started all over the country. After a hesitant start, Televerket decided in 1890 to build a national cable network to connect all the local networks. As a consequence, Televerket also bought many of these local networks to ensure a consistent high technical quality end-to-end. No formal monopoly existed but by 1893 more than half of all Swedish telephones were owned by Televerket and in 1894 telephone revenues exceeded telegram revenues. By 1918 virtually all the country's telephones were owned by Televerket when the last major competitor, Stockholmstelefon was bought from Stockholms Allmänna Telefon AB, (which in turn merged with LM Ericsson). Televerket now had a de-facto monopoly which existed until the 1980s. Between 1924 and 1972 the telephone network was automated with electro mechanical exchanges of a pioneering national design (500-selector/crossbar switches).

The next major technical change in the network started in 1980 with the installation of computer-controlled exchanges (AXE), digital speech transmission (PCM) and a separate signalling network (SS7). By 1988 a country-wide digital backbone-network was in place. This massive transformation was planned to take 40 years but was completed in half the time by 1998. The major component was the AXE exchange which was developed by ELLEMTEL, a company jointly owned by Televerket and Ericsson. AXE became a huge export success for Ericsson, whilst Televerket manufactured for its own needs. AXE gave customers a whole range of new additional services, PCM ensured better speech quality even over long distances and the new signalling network meant faster connection. Customers could now ring anywhere on earth with the same quality as talking to their neighbour.

Another effect of the AXE introduction was a dramatic reduction in the number of switches from 6800 in the old electro-mechanical world to around 250 in the new system. The number of levels in the network decreased from five to three and network data-bases put intelligence into the network. As a consequence of all these changes, major personnel reductions were made in the early 1990s. When Telia was formed in 1993, 67% of the country had AXE, increasing to 100% in 1998 when the last station was converted.

SDH (Synchronous Digital Hierarchy) technology was installed from 1995 and formed the basis for a modern remote controlled backbone network. At the same time a commercial ATM network was established which could connect local area networks and transfer large amounts of data.

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In 1999, four important events led to significant technical changes for the Network business area: preparations for the Millennium Change, Carrier Pre-Selection, Number Portability and a new international telephone prefix (00) meant that 106 local AXE exchanges were phased out and the remaining 143 were upgraded.

Competition in Sweden started in earnest at the beginning of the 1990s, especially for international telephony traffic. Several foreign operators were established plus an increasing number of national players and they all concentrated their efforts on International calls which for many years had been over-priced. One response to this competition was for Televerket to re-balance its tariff structure for national and international calls between 1993 and 1995. In addition a call set-up charge was introduced in 1995. At the same time, costs for the production of international calls fell dramatically as the result of new technology and competition, with correspondingly lower consumer prices, until they levelled out in 2002. The existing distance-based national call-tariff structure was gradually re-balanced so that by February 2002 all national calls were regarded as local. However, the cost of a local call, which had always been under-priced, was increased, annoying many people.

Fixed telephony subscriptions peaked at 6.03 million in 1996 and were in constant decline thereafter due to competition from mobiles and other operators. By 2002 subscriptions had fallen to 5.58 million (plus 0.84 million ISDN lines) and Telia's market share had reduced to 44% of international calls and 60% for national.

New telecom regulation was introduced in 1999 relating to **number portability** and **carrier pre-selection** in order to promote competition. In 2000 Telia opens up its networks to competitors who were given the right to lease **copper access** and **co-location** in Telia's exchanges.

The fixed telephone developed in several different directions. Initially customers were mostly business users, so **public telephones** for private individuals were an important innovation. Attractive telephone call-boxes, with payphones connected to manual exchanges, were installed in public places. Later, automatic exchanges and long distance traffic created the need for more advanced payphones and in the 1950s a three-coin unit was introduced. In 1986 payphones reached a peak of 44,000 units declining to 28,000 in 1993, of which 10,000 were in public places and 18,000 in hotels, restaurants etc. Automatic international traffic created the need to pay larger call sums and in 1990 a French smart-card, and later a credit-card, payphone was introduced. Payphones were never a very profitable business for Telia but their importance was high-lighted in the Telecom Law of 1993 which specified how many were needed in rural areas. Increased usage of mobile phones led to a major decline in payphones, down to 15,300 in 1999, of which 1,100 in rural areas. In 2002 the Regulator (PTS) decreed that Telia need only provide payphones in areas without mobile coverage.

Primitive **telephone answering machines**, which could leave a message to the caller, entered service around 1950. Development gained momentum when terminals lost their monopoly status in 1981 and soon it was possible for the caller also to leave a message, greatly increasing its usefulness. Eventually the answering function became a service in the network instead and a separate machine was no longer needed. An answering machine, or service, results in increased revenues for an operator in two ways. The caller is connected and can listen to a recorded

message, which in turn often generates a second call. At the end of 1999 Telia's fixed voice-mailbox had 650,000 subscribers.

Cordless telephones allow the user freedom of movement within a radius of a few hundred metres in and around the home. Simple devices were used illegally during the 1970s, utilising TV frequency bands, which often disturbed the neighbours. A European standard developed during the 1980s led to reliable DECT- telephones with a secure connection between the fixed unit and portable handset. In 1993 there were around 500,000 cordless phones in Telia's network.

IP-telephony. The evolution of IP made it possible to make calls over the Internet. Telia's entry into the IP world started in 1998 when Telia Light launched three IP telephony services on a commercial basis in the Nordic markets. These services integrated voice and data. Telia i-Call was telephony between two Internet-connected computers. With Telia Site-Call, a PC user could visit a company's website and simultaneously make a free call to that company's customer service. The third service, Telia Budget-Call (later called Micro-call) was international telephony at very low cost using a pre-paid telephone-card, primarily for students and immigrants. Calls were made from any telephone via a special 020 number. Competitors were small players working in a specific market niche. Telia was an early entrant, not least to cover the risk of unpleasant surprises from competitors. Telia Light was closed down after a couple of years but succeeded in placing Telia as one of the pioneers on the international IP-telephony scene.

In March 2001, via the Skanova brand, Telia became the first Swedish operator to offer IP-telephony to broadband suppliers who connect their customers via LAN

Telephone meetings. The concept of telephone meetings was launched at the end of the 1970s when it first became popular to reduce travel and streamline meetings. Group-calling was one service which caught on, although it had existed for 20 years. It was also at this time that quality loud-speaker phones were developed.

2.1.4 Voice communication, wireless networks

Radio telephony between Sweden and non-European countries started in 1928 to USA and Canada. Radio telephony with ships started in 1932 and had become a regular service by 1936. In 1960, coastal ship-to-shore telephony moved to VHF bands with substantially better quality. When NMT 450 was launched in 1981, coastal shipping became early users causing a reduction in VHF usage. Global Satellite telephony via Inmarsat was launched in 1979. Shipping radio was concentrated to Stockholm Radio in Nacka Strand in 1994 until all radio based communication for both shipping and aviation was sold to the Viamare group in 2003. Satellite technology was sold at the same time to Telemar Scandinavia.

The world-wide use of **Mobile telephony** has its roots in Sweden and the Nordic countries and its early development in the 1950s was the result of far-sighted energetic telecom administrations and industry. Televerket launched the world's first fully automatic mobile system **MTA** in 1956 followed by **MTB** in 1965 but coverage for these two systems was limited to only a few towns. This changed in 1971 when a manual mobile system **MTD** was launched as a co-Nordic project prior to the introduction of a new automatic system (**NMT**). For the first time ever,

terminals were the object of free competition (a controversial but far-sighted decision), which stimulated growth. MTD remained in operation until 1987.

In 1969, at a Nordtel conference in Norway (Kabelvåg – Lofoten), Televerket took the initiative for a pan-Nordic decision to create a common analogue automatic mobile telephone system (1G). A Nordic working group under Swedish leadership produced the list of specifications for a mobile system in the 450 MHz band. **NMT 450** was launched in the Nordic countries in 1981, which was so successful that in 1986 the **NMT 900** system was opened in the 900 MHz band to alleviate network congestion. A free-of-charge mobile answering service was introduced in the late 1980s. The breakthrough for NMT was so great that after 10 years the Swedish customer-base was half a million, more than 10 times the original calculation. NMT reached a maximum of 975,000 Swedish customers in 1995.

Televerket was instrumental, via CEPT in 1982, in the creation of the GSM (Groupe Spécial Mobile) working group to develop a digital 2G system. The first **GSM 900** networks started in 1992. In Sweden initial growth was slow because NMT was so well developed and it took more than two years before GSM gained momentum and by-passed NMT in 1997. GSM 900 was complemented with **GSM 1800** in 1997 to increase capacity, especially in urban areas. Dual-band mobiles existed so customers were not affected. In 1998 a new re-chargeable payment service started (Mobitel Refill) making it easier to become a customer and triggered a substantial increase in mobile usage, especially amongst young people.

NMT 900 was closed down in 2000 and the frequencies transferred to GSM. NMT 450 had much better coverage and remained until 2007 when TeliaSonera's licence expired and the Regulator (PTS) auctioned the same 450 MHz frequencies to be used in a new digital network, a competition won by Nordisk Mobiltelefon.

In 1993 the company had 780,000 mobile customers in Sweden, virtually all NMT. At the end of 2002 this number had increased to 3.6 million Swedish mobile customers of which 96% used GSM. Penetration was 89% of the population and TeliaSonera had a 45% share of the Swedish mobile market.

Mobile telephony developed in competition from the very start and already a month before NMT 450 was opened in 1981, Kinnevik-owned Comvik started a competing analogue mobile telephone network. In contrast with NMT, Comvik had only one type of phone which proved to be a competitive disadvantage in the long-term and NMT became the clear market leader. When GSM networks started in 1992 Televerket has two competitors, Comvik and NordicTel (later, Europolitan/Vodafone / Telenor) and competition was fierce from day one.

UMTS (Universal Mobile Telecommunications System) was the third generation mobile standard (3G), initially for Europe and Japan. The standard was conceived during the 1990s within the 3GPP (3rd Generation Partnership Project), where ETSI co-operate with other organisations outside Europe. Telia and Ericsson were both very active members. During the autumn of 2000, the Swedish Regulator awarded four 3G licences via the “Beauty Contest” method. Contrary to expectations Telia did not receive a licence (becoming the only former incumbent anywhere in the world finding itself in this position). However, a few months later Telia and (competitor) Tele2 announced the formation of the Swedish UMTS Network Company to build a joint national radio network. Telia and Tele2 would co-operate

at network level but compete fully for customers. TeliaSonera launched 3G services in 2004.

An **MVNO** (Mobile Virtual Network Operator) is a company which does not own its own network but leases capacity from a network owner (i.e. Telia) to carry its own services. Telia had three MVNO customers in 2000 and in the same year contemplated establishing itself as an MVNO in Europe but decided not to.

TFTS (Terrestrial Flight Telephone Service) was a telephony service for aeroplane passengers which started in 1995. Telia Mobitel operated four base-stations which covered most of Sweden. Phones were placed in the seat arm-rests on board 60 SAS planes but the service was not a success and discontinued soon afterwards.

Satellite telephony evolved as a complement to terrestrial mobile telephony. Telia signed an agreement with Satellite operator Iridium and the first service was launched in November 1998, delivering global coverage outdoors via hand-held telephone terminals. This business was sold to Telemar Scandinavia in 2003.

2.1.5 Data services – fixed networks

Data transfer is the transport of digital data either in real-time or with a short delay after intermediate storage along the way. This data can in turn be the bearer of information for all types of applications. The computer age has created a completely new market for data services in parallel with text and voice services.

Primitive data transfer became possible when the **Telex** arrived in the 1940s, as was punch-tape which was a common data-bearer when computers were in their infancy. By the 1960s the need arose to connect computers and terminals over long distances. As the analogue telephone network was the only widely available network it had to suffice initially. Modems (modulate – demodulate), which converted data-bits to and from the telephone networks tone signals, were developed and standardised. This service was called **Datel**. It was introduced by Televerket in 1962 and made it possible to construct closed-user private data networks using modems and lines leased from Televerket. In the 1970s the first real-time bank networks and company networks were built, especially for multinationals.

The concept of **Videotex** evolved from a British trial in the 1970s to create a simple service for the home, called Prestel. A normal TV would be the screen, a push-button telephone was the keyboard, all complemented by a small “black box”. In 1981 France Telecom created Minitel. Customers received a small compact terminal and over the telephone line could search the phone directory, make train reservations and many other services. An updated service still exists in 2009.

Televerket started a videotex project in 1975 and a trial system was bought from AU-System. The service was called **Datavision** and tests started in 1979. This new phenomena created an immense amount of political interest, not least a report from an IT commission of enquiry which painted a picture showing a massive transformation of the entire media landscape. When the worst passions had receded, Televerket officially opened the service in late 1982 aimed at the enterprise market. There was a great amount of interest but network accessibility was poor. Something radical was needed and in 1988 Televerket installed a system, created by IBM for the German Bildschirmtext, which was both ambitious and expensive. The objective was a separate Videotex network and 100,000 customers by 1990 but the

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project was never a success. Using the French Minitel as a model, the telephone directory merged with Videotex and **Teleguide** was created, a new data-based directory. Televerket, Esselte and IBM joined forces to tackle the precarious financial situation. Within Televerket a Tele-Media group was created to combine both paper and data-based directories and a subsidiary, **Svenska Videotex AB** was started. In spite of all the ambitious efforts to enlarge the market and reduce costs it was impossible to save Videotex and the entire project was shut down in 1993, just when Telia was created.

Public switched data networks appeared at the end of the 1970s and were suitable even for smaller customers. Two different principles were developed, Circuit Switched and Packet Switched, both of which were standardised in the ITU.

The first principle, Circuit Switching, is similar to the telephone network where an exclusive channel is opened between two end points. Its advantages are simplicity and security. It is well adapted for small transactions over short distances where security is paramount such as bank cash-point machines, petrol stations etc. In a Nordic project, Televerket introduced **Datex** in 1981 based on AXE technology allowing fast up – and downstream connection. Transfer speeds up to 19.2 kbit/s were possible. Datex culminated in 1991 with 44,000 connection points.

The second principle, Packet Switching, involves dividing a data-stream into standardised packages each with an individual address label. Packets from different sources queue to be sent one after the other over shared or separate connections which route each packet independently. This is efficient for long distances and for activities which take a long time with sparse data activity and where a short time-delay does not matter. A typical application is a data-base search in another country and it was such applications which initiated the following services: **Databas 300** in 1978 and **Telepak** 1980, which were replaced by **Datapak I** in 1984 and **Datapak II** in 1989 when the technology was upgraded. These packet networks offered modest data speeds of a few tens of kbit/s over the normal telephone network.

Packet-switched data networks were even adapted for computer-to-computer communication for file-transfer etc. The need arose from the national and international academic world at the end of the 1970s. When the Swedish Defence Research Establishment (FOA) was relocated outside Stockholm a further need arose for data-communication. Televerket's data-base service supplied network services to the University and FOA networks which were built between 1977 & 78. The University network became the embryo of SUNET. The FOA's network was gradually integrated into Televerket's public data-network services.

The next development stage in traditional international telecom co-operation was **ISDN** (Integrated Services Data Network) designed for new data-services. Telia introduced ISDN in 1993. It was an addition to the AXE telephony network, offering dual channels on each line with a data speed of 2 x 64 kbit/s. ISDN coverage was expanded and converted to a European standard in 1996. ISDN was used primarily for faster access to the Internet than was possible over the PSTN. Growth was fairly substantial and culminated in 2001 with 922,000 channels. Thereafter ISDN declined when customers chose fixed, or later, mobile broadband.

During the 1970s and 1980s the international academic world developed a set of separate data networks for research purposes which became known as the **Internet**.

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Its roots came from military research in the USA where both a civilian and military version was created and in addition commercial services became available for database searches such as Tymnet and Telenet which was used in Sweden. The Internet was built in Sweden within both the university and company sectors using the TCP/IP protocol over modem-based links leased from Televerket.

One of the tasks for Televerket's subsidiary Swedish Telecom International AB (STI) was to create network services for trans-national Nordic companies. In 1989 STI launched an international Internet service with IBM as the first customer. The service was a joint effort with Telecom Finland. A joint physical 256 kbit/s link was connected to the USA's first commercial Internet exchange called CIX. The service was called Nordframe and it was also planned to be connected to the public Internet in Norway and Denmark. Often networks were funded by research grants. In 1991 Televerket was asked by an interest group call SNUS (Swedish Network Users Society) to manage a national Internet for research purposes, but declined. Instead Tele2 started Swipnet according to SNUS's defined needs. Swipnet became a successful provider of dial-up Internet which created a substantial flow of inter-connect traffic from Telia to Tele2. In 1991 Televerket created its own public service called TIPnet. Internet usage gathered momentum and soon became a threat to traditional data-networks. As different Swedish networks had separate routes to the USA, Swedish users were connected with different Internet suppliers via the USA. What was needed was an "Internet Exchange" in the Nordics. This was created under STI's leadership, combining SUNET, Swipnet, Telia's international and national services, TIPnet and Datanet from Telecom Finland.

Since 1987, Televerket had the Nordic Universities network, NORDUNET, as a customer of fixed international connections to the USA and Amsterdam. NORDUNET had been created with support from the Council for Nordic Ministers (NMR). During 1993, NMR analysed the need for a Nordic school data-network and Sweden was represented by Telia Promotor. On behalf of the Swedish Department of Education, Telia Promotor ensured that this data-network was indeed inaugurated in the Swedish Parliament building in March 1994. School children were able to send e-mails in their own language between countries and at least one server per county was created. The inauguration was such a success that it was decided to immediately create the Swedish part of the Nordic School Network. Telia won the contract and, in addition, decided to wholeheartedly invest in the Internet and launch a public service much more comprehensive than TIPnet.

Telia became an ISP (Internet Service Provider) offering customers access to a whole host of services. Initially the only connection method offered was via a dial-up phone link at a speed of 56 kbit/s. A steady growth in customer numbers culminated in 2003 with 823,000.

As services became more abundant and the availability of information exploded, the need for faster Internet access increased in importance. Advances in modulation technique developed **ADSL** (Asymmetric Digital Subscriber Line), a technology to transmit digital signals over the existing copper telephone network within a radius of about 4 km from a tele-station. In 1996 Telia started a substantial ADSL network investment program and by early 1999 could offer customers ADSL connectivity, initially at 0.5 Mbit/s increasing soon afterwards to 2 Mbit/s and higher.

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By 2002 Telia had 317,000 customers, which meant a 45% market share of residential customers and 50% of the enterprise market.

In the traditional data network services area Telia continued to offer a wide selection of national and international services for enterprise customers and had a market share of about 60% in 2002. The main competitors in Sweden were Uffors/Telenor, WorldCom and Song Networks.

At this time the majority of networks services were based on traditional data platforms and developing data network services based on the Internet Protocol (IP) became a major priority

2.1.6 Data services – wireless networks

As data services increased in the fixed networks, a parallel growth occurred in wireless. **Mobitex** was developed by Televerket Radio in Göteborg and launched in Sweden in 1986 as the world's first public mobile data network. It carried packet data with a speed of 8 kbit/s in the 400 MHz band and was intended for the transport sector, emergency services etc, offering secure communication. The market developed much slower than expected, mainly because of the complexity of integrating applications with a customer's internal systems. In 1988 Televerket and Ericsson formed Eritel, a joint development company, to tackle the international market. An important break-through contract was signed in 1990 with RAM Communications in the USA (later a part of Bell South). Televerket was also a co-owner in companies which established Mobitex networks in the UK and France. In Sweden, Mobitex had 9000 customers (2000 internal) when Telia was formed in 1993. Telia sold its share in Eritel to Ericsson in 1994 but continued to provide services to Swedish customers. In 2002 the Mobitex network, with nearly 20,000 customers, was sold to Multicom Security, a company with roots in TeleLarm and its alarm communications network. It was part of the partly owned Telefons group.

The **GSM** (2G) was launched in 1992 and in addition to voice, offered data communication from the start at 9.6 kbit/s, a speed which was soon regarded as too slow. In February 2000 Telia launched a faster data-service **HSCSD** (High Speed Circuit Switched Data), at 38.4 kbit/s which was the same speed as a fixed modem connection at the time. The next stage, **GPRS** (General Packet Radio Service), came the year after. It was a GSM data service at 115 kbit/s which made it possible to surf the Internet and send e-mail. In 2001 Telia also installed GPRS in Norway and Finland and in 2002 in Denmark allowing GPRS roaming throughout the Nordic countries. Mobile Multimedia Services (**MMS**) were launched in 2002 making it possible to send messages as both text and pictures. **EDGE** (Enhanced Data-Rates for Global Evolution), launched in 2004, was the last stage in upgrading the GSM infrastructure at speeds up to 385 kbit/s.

UMTS (3G) was a further development of GSM where it was possible to transfer mobile data at the speed and capacity needed for multimedia services. TeliaSonera launched UMTS in 2004 and the first major service was Internet access for lap-top computers. The initial speed was up to 0.5 Mbit/s, but an upgrade to **HSDPA** (High Speed Downlink Packet Access) in 2007 allowed up to 7.2 Mbit/s.

HomeRun was launched in 1997. It is a WLAN service (Wireless Local Area Network) with transfer speeds of up to 11 Mbit/s. It was designed by Telia's

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development unit Demotel, and initially access nodes were installed in about 80 hotels plus airport lounges, giving business travellers broadband wireless access to their home network or the Internet via a lap-top. In 2002 Telia HomeRun was Europe's largest WLAN operator with more than 500 "hot spots" in the Nordics region and had signed the first roaming agreements with operators in the UK and Italy.

Global Area Network was a new generation of satellite services with transfer speeds equivalent to ISDN (64 kbit/s), which Telia launched as one of the first operators in the world in 2000. The service used Inmarsat's satellite system which covered most of the globe. At the end of 2001 it was decided to close down the Swedish-based satellite business which was sold to Telemar Scandinavia in 2003.

2.1.7 Wholesale services

During the monopoly era Televerket sold only services to end customer users. In 1991 third-party traffic over leased lines was allowed and interconnect traffic was introduced. This created a wholesale market where competitors who ran fixed and mobile networks thrived. They bought services from Televerket, built their own networks and became retail outlets selling services in competition. The EU's ONP (Open Network Provision) regulation stipulated that services offered by a dominant operator must be delivered on equal terms to all.

When Telia re-organised in 1996 the retail and wholesale businesses were structurally separated. Wholesale became the responsibility of Network Services, and retail remained with Telecom Services.

Telia entered the global wholesale market when International Carrier was established in 1999 which became a subsidiary in 2000. At the same time Telia's national wholesale business remained the responsibility of Network Services under a separate brand called Skanova which sold telephony, network capacity, Internet access and co-location services.

By the year 2000 Telia's networks were facing dramatic changes towards an all-IP and broadband world where exchanges would be complemented with routers. Skanova's fibre-optic network now connected 3000 localities all over the country. In addition, 121 towns in Sweden had already invested in their own fibre-optic city rings. Telia's national IP network was established at record speed and reached 41 towns during 2002. By 2002 Skanova has 150 wholesale customers in Sweden.

The wholesale business grew faster than the retail business, which reflected Telia's strength in providing large scale systems.

2.2 Radio and TV-distribution

Contrary to telecom services, radio and TV are distribution services where signals emanate from one source to many customers simultaneously. Initially they were only wireless services but after the Second World War they were also partially wire-based. In Sweden, radio was introduced in the mid-1920s and television in the mid-1950s when broad-band became technically possible. This also had an effect on radio so that several programs could be broadcast simultaneously. Televerket was only responsible for the physical distribution of radio and TV, whereas the production of programs in both media was the responsibility of Sveriges Radio.

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In parallel with an increase in the selection of TV channels during the 1980s, Cable TV (CATV) evolved as an alternative with a capacity to send 30 – 40 channels. The growth of a new cable-based infrastructure with broad-band capacity was both complementary, and later became, a competitor to telecom services. This was one development aspect in addition to the emergence of fixed and mobile competition.

Radio broadcasting was of strategic importance for Televerket and a significant part of the radio side of the business which led to many important innovations from the Radio laboratory. Amongst others, an advanced system for FM stereo transmission in the UKV band was developed, which unfortunately did not win international acclaim (the Berglund system). In addition, a system for data-transmission via the sub-carrier in a radio program broadcast which was developed for the MBS paging service. This in turn led to the invention of the RDS system which is used today in most radio networks throughout the world. An award-winning solution for digital HDTV in Europe was also created in the early 1990s.

Televerket's radio laboratory played a world-leading and crucial role in the development of mobile telephony from its very beginnings (with global consequences), and which was already a core business for Televerket in the 1980s.

2.2.1. Broadcast radio and TV

Radio technology developed significantly during the First World War which led to the creation of Televerket's Radio Bureau in 1918. Televerket played an important role in starting Swedish **radio broadcasting** in 1925. Program *production* was entrusted to a new company, **Radiotjänst AB** (which became **Sveriges Radio AB** in 1957) whilst program *distribution* was Televerket's responsibility. Everything was financed by the owners of radio receivers paying a licence fee. This fee was collected by Televerket until 1989 when Sveriges Radio's subsidiary, Radiotjänst in Kiruna, took over this responsibility. At that time Broadcast radio and TV accounted for 2.5% of Televerket's annual revenues.

Early AM-transmitters were in the long and medium wave bands, with radio coverage normally beyond a country's borders. A lack of frequencies, combined with interference from abroad meant that there was only room for one radio program in Sweden. After the Second World War however, new ultra short wave technology, with coverage only from the transmitter to the horizon, made it possible to re-use the same frequencies in different parts of the country and mostly without foreign interference. More programs were now available in Sweden and FM radio moved into the VHF band when television was introduced in 1956.

Prior to Televerket's conversion into Telia, the Government decided that the broadcast business should be divested from Televerket so as not to complicate the new competitive situation. In July 1992 broadcasting was transferred from the Radio Division to a new state-owned company, Teracom Svensk Rundradio AB. At the same time frequency administration, which is a regulatory function, was moved to the newly created regulatory authority, Telestyrelsen. As a consequence, Telia was never responsible for terrestrial radio distribution.

2.2.2. Wired broadcasting

Radio broadcasts in the long and medium wave-bands had poor reception in many rural areas. After the Second World War, Televerket complemented wireless transmissions with wired long-wave radio broadcasts over the telephone network in some areas. A splitter at the subscriber end separated the telephony and radio signals allowing simultaneous use of both services. This service started in 1947 but not long afterwards FM-radio gathered momentum and with the arrival of television, wired radio lost its attraction. The service was closed down in 1971. Wired radio has its place in history as the first example of transmitting both telephony and broadband simultaneously over a local copper telephone network. This concept appears again in the 1990s with the advent of ADSL.

2.2.3. Cable TV (CATV) (see also 2.3.2)

Radio and television was initially only transmitted as a wireless terrestrial service. As broadband technology evolved during the 1970s, Televerket studied and analysed the alternative of distributing TV over coaxial cables. The advantages of a CATV network, primarily in urban areas, were superior picture quality and the ability to send many more channels than terrestrial TV. Several competing players started building networks and in 1985 Televerket created a separate CATV division. At around this time a number of international TV satellites came into operation and signals from them could be distributed via CATV, some of them free, but many of them encoded which could be charged for. In 1992 this division was converted into a company within the Teleinvest group with the name **Svenska Kabel-TV AB**. When Telia was formed in 1993 the company had a 75% CATV market share, 1.5 billion SEK had been invested and 1.25 million households were connected.

Telia continued in the same manner and in 1996 renamed the company **Telia Infomedia Television AB**, as one component in Telia Infomedia's efforts to launch information services. Pay-TV, marketed as a cinema at home, was launched in 1996. The CATV network was converted to digital transmission in 1997/8, increasing capacity fivefold to over 200 channels and the concept of a return channel was introduced. When digital services were launched, take-up was slower than expected because customers were unsure which technology to choose when it became clear that even terrestrial TV would be digitalised. Competitors who distributed TV over satellites subsidised digital boxes, which Telia did not. The "Com Hem" brand was introduced in 1999 and the network upgraded to deliver broadband with a return channel. Customer numbers increased to 1.35 million and market share reduced to 60%. During 2000 major efforts were made to develop technology platforms for Internet and other interactive services for TVs and PCs. CATV becomes a growing competitor to telecom services.

As a conditional requirement by the EU Commission for the proposed merger between Telia and Telenor, in the autumn of 1999 Telia started the disposal process of its Swedish CATV business and the company **Com Hem AB** was formed in 2000. When the merger was called off, Telia delayed the decision to sell Com Hem. The sale finally took place in 2003 to fulfil the EU demands as a consequence of the merger between Telia and Sonera. The purchaser was EQT investments which in 2006 sold the company to the Carlyle Group and Providence Equity.

The history of Telia original

2.3 Complementary Services

Complementary services are of two types.

Firstly, telecom services which offer new enhanced services in the value chain. These services open up new opportunities for a network operator bringing in new revenues by generating more traffic, or as services which can be invoiced individually, often via the phone-bill, which every customer receives anyway.

Secondly, other complementary telecom services with low financial profile. Most complementary services were disposed of when Telia focussed on core business.

2.3.1. Services over the phone

Televerket offered the first **content services** in the 1930s. The **speaking clock** was introduced in 1934 and charged as a normal call. A **weather service** came in 1936. The Swedish news-flash service (IT) was launched in the early 1960s.

Plus-services arrived when the first AXE digital exchanges were introduced in 1980. Using the new telephone's key buttons, customers could order a whole range of services designed to manage telephone usage, which in 1989 were given the name Plus-Services. Most, but not all, were free of charge and paid for themselves by an increase in traffic. Examples were call-transfer, call-back, wake-up call etc.

The Hot-line came about by accident. In 1982, teenagers discovered that it was possible to set up a free conference call if several persons simultaneously called a vacant number. This use of this anomaly spread like wild-fire and Televerket took the bull by the horns and introduced specific group-numbers in some 60 places around Sweden to avoid network disruption. However, the phenomenon created a political debate regarding the moral aspects of this kind of service, not least after it became clear that contacts were being exploited by criminals. The Hot-line was eventually closed in 1995 even though it brought in sizeable revenues.

Toll-free calls (020 numbers) mean that a company takes the cost of a call when their customers ring a 020 number. This became possible in Sweden when digital exchanges were introduced in 1985 and in 1986 toll-free calls also became an international service. This gave additional flexibility so that a local customer-care centre could answer during the day, a national office in the evening and a foreign office at night. 1400 toll-free numbers existed when Telia was formed in 1993.

Premium-Rate calls (071 numbers) were launched in 1989 for calls to information providers. Several price levels existed and the provider received a portion of the tariff, which was included on the telephone bill. Information services were offered by many providers either for advice by a human being or for pre-recorded messages. In 1992, Televerket was involved in the start of an organisation to suppress misuse, the Ethical Council for Tele-information (ERT) in cooperation with the Swedish Tele Information Association STIF. In 1994 Telia stopped all telecom sex-services. ERT became the Ethical Council for Premium Rate Call Services in 1994 and the Ethical Council for Premium Rate Services in 2002.

Number presentation is a service using a small screen which shows the calling party's telephone number before answering. Customer care centres often use this service to locate data about the calling customer. The service was launched in 1994 and by 1999 was used by 40% of all residential customers, i.e. 1.9 million users.

2.3.2. Infomedia services

In 1994 Telia announced that it intended to expand activities higher up in the value-chain by heavily investing in schools and multi-media services. In 1995 TeleMedia launched a series of electronic search services both in CD-ROM format and online. Svenska Kabel-TV (later Com Hem) started developing new interactive TV services.

At the end of 1996, the Infomedia Services business area was created as the vehicle for an intensive investment in interactive information services. It acted as a broker by structuring and packaging information which could be stored and transmitted using Telia's technology platforms and networks. One prioritised mission was to transfer Telia's own printed number-based information into electronic media.

A number of existing and new services such as directories, personal tele-services, CATV and multi-media were transferred to the business area. (See each respective section).

During 1997 Telia Infomedia Services signed an agreement to lease satellite capacity to offer TV distribution via a satellite-dish as a complement to CATV. The idea was however never fulfilled, with substantial settlement costs as a consequence.

In 1998 Telia and a company called Kunskapshamnen AB formed a joint-venture called **Snille (genius) Publishing AB** which offered multi-media services in the area of education. Telia transferred all its interests in teaching activities to Snille Publishing in which Telia owned 49.9% of the shares.

New business services developed new services with external partners based on new distribution channels and presentation media such as the Internet, mobile phones and Portals. TradeBase, which was Telia's **electronic commerce** brand, was transferred to a separate company, **Telia Trade Base AB** in 1997. During the same year, the first important agreements were signed with a number of municipal and county council authorities. **Information content services** started in 1999 providing Infomedia information data-bases for external customers.

The majority of Infomedia services disappeared from Telia's focus when Eniro was sold in 2000 and Com Hem in 2003. However, the TV business continued via early trials to distribute TV over Telia's broadband connections (IPTV).

2.3.3. Portals via data networks

As use of the Internet expanded, customers were given access to a rapidly growing global world of information services and the problem of being able to find what you were looking for became a major issue. This gave rise to the idea of **Portals**, web-sites which collected links relevant for a particular customer group.

Telia made an early entry and in 1996 launched **Passagen**, an Internet-based on-line service which gave customers access to e-commerce, information, news, games, entertainment and advertising space. Passagen rapidly developed into one of the most used and attractive sites on the Swedish Internet market. New applications were gradually introduced, such as Funbase (entertainment) and Sportbase. In addition a personal communication service was included, which was later called a chat-site. During 1997 Passagen continued to strengthen its position and became one of the most visited sites in the Nordic region. The number of services increased with, amongst others, a news channel in collaboration with CNN and a large

shopping arcade. However, the technology had its limitations, only allowing a few major players, which meant that co-operation and partnerships were expected to increase in importance. In 1998, Passagen was the most visited portal in the Nordics with an average of 1.2 million visitors a month.

In June 1998, Telia's Internet-based PC-services, including Passagen, were incorporated in a new venture, **Scandinavian OnLine AB (SOL)**, which Telia formed with two Norwegian companies, Schibsted and Telenor (40/40/20). In Denmark, Telia was affiliated in a new company, Egmont Online, with the objective of creating a Nordic concentration of portal-type services.

In April 2000, Telia agreed with Nextra AS (a Telenor company) and Schibsted Multimedia AS to create a pan-Nordic network of portals to be owned by SOL, which at the same time purchased portals in Norway, Denmark and Finland. In mid 2000, SOL became listed on both the Oslo and Stockholm stock-exchanges, with Telia owning 24.6% of the shares. In December 2001 Telia sold its entire shareholding in SOL after accepting a public bid from Eniro.

Telia concentrated instead on a portal called **Startsidan** (start page) which became Telia's multi-portal for the Swedish consumer market when it was launched in 2001.

Telia had also launched a home-page called **telia.se** which presented the company's services. By 1999 it had 250,000 users. It had a personal section, **Mina sidor**, where customers could order and manage their own services.

By 2002, Telia Internet Services was strong in the access business but had poor results for content, portals and pay-as-you-use services. The entire Internet Services division was therefore restructured and parts of it were closed down. **Marakanda**, an Internet e-commerce company formed in 2000 together with Förenings sparbanken, incurred a 24 MSEK write-down and Telia sold its shares in the company in 2003.

Mobile portals were also being developed and in 1999 Telia launched **MyDOF (Department of the Future)**, one of the world's first Wireless Access Protocol (WAP) portals via GSM, offering information, transaction and communication services. This was the first generation of a mobile portal, speeds were very low, the presentation of information was crude and everything had to be adapted to the limitations of existing mobile telephones. MyDOF was built on a platform from Oracle. In 2000, Telia and Oracle formed a joint company called Drutt to develop the technology for WAP-portals. Drutt developed the **Halebop** portal.

Speedy Tomato was intended to be an operator-independent portal for mobile terminals where Telia could offer services to users out in Europe. The portal was tested in Denmark and the UK in 2000 prior to a launch in a number of countries. Agreement was also made with Olivetti in Italy to market Speedy Tomato. In 2001 it was decided that Speedy Tomato no longer had a future and the company was completely wound-up in 2002.

In 2000 Telia and Microsoft signed a joint ventures agreement to deliver interactive games to broadband customers, starting in Stockholm. Two commercial positioning services were also launched for a wide audience.

In 2000, portals were expected to be the next major business opportunity with most of the revenue coming from company advertising. However 2000 was the year that

the IT bubble burst and many expectations turned into dust, one of which was revenues from adverts on the Internet. As a result, Telia was forced to make dramatic cut-backs in the portal business. During 2001 ambitions were restricted to the Nordic market where two small acquisitions were made. One was a 14% share in **TicketAnywhere Europe AB**, a mobile booking services company. The other was a 10% share in **NGF NetGame Factory AB** which developed games and competitions for mobiles and the Internet.

Shares in the portal company Scandinavia Online were sold in 2001 and **comhem.se** became Telia's main broadband portal in Sweden. The same year Telia became the sole owner of Halebop which was transformed into a virtual mobile operator for young people in Sweden.

As a consequence of the above, during 2002 all content services, portal services and pay-as-you-go services which could not show an acceptable profit were removed from the portfolio. Instead, all efforts were directed towards the development and sale of Internet access products, an area where Telia's real competence and strong market position could be exploited.

2.3.4. Other data networking services

In February 1998, together with AB Thoreb, Telia started Thoreb ITMobile AB to sell and install **traffic control systems for public transport** in the Nordic countries. Telia owned 51% of the shares, a holding which was disposed of in 2000.

In March 1999 Telia purchased 28% of the shares in Wireless Maingate AB, a company which developed machine-to-machine (**M2M**) wireless communication. The company became an MVNO in Telia's mobile network. Telia's ownership reduced to 16% 2002 and was sold in its entirety in 2004.

In 2001 one of the first **positioning services** called FriendFinder was launched. In addition a whole range of new **SMS services** greatly increased SMS usage. Examples were Premium SMS, InfoBrain, Quickdeal, MobileQuiz and Botfighter.

2.3.5. Services to the business sector

Televerket Megacom was created in January 1992 to combat increased competition in the large company sector. It concentrated on selling packaged solutions to the top 80 major customers who had complex needs in a wide number of locations. Competition loomed from BT, France Telecom and Tele2. Customers were offered IT solutions, financing and traffic contracts with price plans.

In Telia's 1996 re-organisation, Telia Megacom became one of the marketing companies, responsible for all accounts which exceeded 7 MSEK/year. At the same time Telia Företag was created for medium-sized businesses, Telia Publicom for the public sector and Telia Nära for residential plus small companies.

In April 1998 the Telecom Services business area was split in two. One part was fixed services for business communication plus integrated solutions to large and medium customers in the Nordics. The other was fixed services to small companies and the residential market in the Nordics. In 2001 these area were included in Telia Networks.

By 2000, Telia's business customer-base comprised 200 major, 9000 public sector and 55,000 SMEs. Customers were offered individual or adapted packaged solutions of four types: Voice, data, IP and special adaptations.

For voice services, in 1999 the business sector represented 1 million PSTN lines and a number of virtual services took care of exchange and call-centre functions. VPN (Virtual Private Networks) connected major companies and tele-conferencing services started to play an important role. Telia Bright offered the first integration of a company's fixed and mobile telephones

Data services were offered as a variety of tailor-made private data networks or as a standard service. Broadband entered the scene around the turn of the century.

In the IP sphere, Telia started offering a complete business solutions comprising an IP platform, web-host, e-mail, customer equipment and consulting services. IP telephony made it possible to contact a home-page via the Internet and at the same time to speak to that company's customer service (Telia SiteCall). E-commerce services were introduced during 1999 allowing a company to provide a complete electronic market place. Telia offered a web-host service which could host a customer's home pages. Internet security services for verification and validation were introduced which were important tools for company web-sites and e-commerce suppliers to ensure secure communication over IP networks. A new business opportunity was ASP services (Application Software Provider) where a company could rent software as needed.

The medium-sized business area (Företag) invested heavily in combining fixed and mobile services which were integrated on an IP platform. Special solutions included outsourcing, i.e. management of the whole system for a customer, plus consulting services to help customers introduce new technology.

During this period Telia prioritised developing solutions which integrated fixed and mobile communication of both voice and data. Customers should be able to use all services but without the inconvenience of investing in different infrastructures. Telia's sales to the business community included an internal sales organisation complemented by a strong network of dealers and partners.

2.3.6. Alarm Services

As far back as the 1950s Televerket was involved in basic alarm transmission systems for the fire fighting services. **SOS Alarmering AB** was established in 1973 to provide advanced alarm centres for the fire, police and ambulance services at County level. This was a collaborative venture between Televerket, the Association of County Councils and the Association of Municipalities (50/25/25). Televerket kept its ownership in this venture until 1993 when the State took over responsibility.

Televerket's other alarm businesses were re-organised as the **Alarm Division** in 1975 and once again in 1982 when, after parliamentary approval, the alarm activities were transformed into a separate company, **TeleLarm AB**. Services were concentrated into four areas: fire alarm, entry security, alarm transmission and personal alarm systems for the elderly. At the end of the 1980s the company expanded into Denmark, Norway and Finland.

When Telia was created in 1993, TeleLarm had nine subsidiaries in seven countries and a turnover of 740 MSEK. In July 1997 TeleLarm was sold to Securitas as an early example where Telia started to focus on core business. This included everything except alarm transmission which was transferred to **Multicom Security AB**, market leader in Sweden and where Telia owned 55%. However in 1999 Telia bought back Securitas' share and the company became wholly owned again.

Multicom Security becomes a part of the Telefons Group in which Telia sold 51% to investment company Industri Kapital in June 2001. Multicom Security purchased Mobitex from Telia in 2002. In 2005 the company had a new owner in the form of UK investment company GMT Communication Partners LLP.

2.3.7. Picture phone

A 1960s idea of complementing a phone call with a picture became a reality after practical tests in the early 1970s. Until the 1980s the technology was based on analogue transmission demanding 5 MHz of bandwidth. This required special connections and limited the service to only a few installations throughout Sweden. By the mid-1980s, 2 Mbit/s digital connections became available and at the same time digital data-compression reduced capacity needs. However, it took until the end of the 1990s and the arrival of broadband, the Internet and small cameras before the fixed picture phone became available to everyone.

Mobile transmission of pictures became possible with 3G.

2.4 Side activities

Side activities were telecom related business for the benefit of Telia's customers. They were not pure telecom services but were in some way connected to them. To a large extent Telia had disposed of most side activities by 2002 to concentrate on core business.

2.4.1 Telephone directories (see also 2.3.2.)

Televerket's first telephone directory was published in 1889. From the very beginning it was an intrinsic part of the telephone service and was constantly adapted to the needs of the day. Televerket was responsible for content and production and in the 1970s the process became computerised.

The first advertising contract was signed in 1920 but it took until a major re-organisation of Televerket in 1975 before directories became a commercial entity. To modernise advertising sales, in 1978 Televerket joined forces with the ITT Group which was a leading international player with its "Yellow Pages". The trade-unions protested loudly at this decision but it was implemented anyway. **Teleannons AB** was created within ITT and "Gula Sidorna" (yellow pages) was launched. Televerket used an option in the agreement with ITT to purchase the company after five years and in January 1984 Teleannons became a part of the Teleinvest group. Green, blue and pink pages came a few years later.

Directory production had never been centralised but in 1989 the responsibility was given to a newly created Directory division, which the year after changed its name to **TeleMedia**, taking over the videotex business at the same time. The last stage in the directory transition took place in 1991 when TeleMedia became a Ltd company

and joined forces with Teleannons to form **TeleMedia Svenska AB**, a subsidiary of Teleinvest.

From January 1993, TeleMedia had seven subsidiaries and the business expanded into 10 other countries (EE, LV, LT, RU, BY, NL, US, DK, AT, PL and UA). TeleMedia was well positioned when the Internet took off in 1996 as all types of directories now had a new channel to the market. In 1998 directories were produced on CD-ROM discs and gulasidorna.se was the largest and most complete Internet data-base of companies in Sweden. In 1999 Telia's customers were given access to the directory white pages via the telia.se portal. Directory production was transferred to a wholly owned subsidiary **Any Media Solutions AB**, whereby 70% was sold to Elanders AB in 1999 and the remaining 30% in 2000.

One consequence of competition was that when phone customers changed supplier it was no longer credible for Telia to be the owner of a national directory business. In February 2000 a decision is taken to list the directory business on the Stock Exchange. **Eniro AB** was formed in July 2000 when a number of directory businesses within the Telia Group were collected under one hat. Eniro was listed in October and at year-end Telia owned 49.1% of the company. However, Telia was bound by law to make directories with basic subscriber information available to all users of fixed telephony in Sweden. For this reason Telia appointed Eniro as the official provider of such information (i.e. the white and pink directories), for which Eniro received an annual remuneration of 20 MSEK from 1 July 2000. Telia's ownership in Eniro reduced to 25.5% in July 2001, which was sold in December 2001 as a part of Telia's process to concentrate on core business. Remuneration to Eniro ended in 2003 when the telecom regulation was changed.

2.4.2 Personal tele-services

Personal tele-services were from the very beginning based on the manual telephone system. After the network was automated in the 1970s, the concept of actually marketing telecom services was conceived. Directories and personal tele-services were combined into one unit in 1985 but the differences between them were so great that they were split up again in 1989. Directories became a separate division (TeleMedia) and the **Personal Tele-services Division** was created in 1990.

Personal tele-services were of three types: numbering information, call services and directories. Directory enquiries were based on the same information as the directories. A fee for national directory enquiries was introduced in February 1988 but led to such a storm of protests that this was changed to a time-based fee in April 1989. Call services were initially manual connection assistance but after automation the need diminished and was replaced by more sophisticated services. Call-minding services on behalf of end users led to the creation of TeleSvar (Tele answering) in 1982, which was the first telemarketing service of its kind. In the 1980s Televerket was a founder-member and sponsor of a user group called Sweden's Telemarketing Association which formulated and supervised ethical standards for this type of business.

In January 1994 Telia's personal tele-services business was transferred to **Telia TeleRespons AB**, which was renamed **InfoMedia Respons AB** in 1996.

In 1995, Telia TeleRespons AB purchased **Swedline Sverigefakta AB** which supplied information to tourists.

TeleRespons started operations in both Denmark and Finland during 1996. The business was exposed to competition from the start with personnel reductions and rationalization coming soon after. The 118 118 directory enquiry Telephone Number and Brand were introduced in 1999. In 2001, the call centre company **Direct Respons Service** was sold.

Respons AB was incorporated within the Telefos group of which 51% was sold to Industrikapital in June 2001. In 2003 Eniro purchased Respons which at the time was responsible for running the 118 118 directory enquiry service.

2.4.3 Equipment sales

Televerket had always owned all customer-premises equipment and a subscription included only the right to use, (not ownership), of any necessary apparatus. Telephone sockets were introduced as early as the 1960s and by the mid 1970s all customers could connect a telephone themselves. By this time Televerket had started to call its sales- outlets “telebutiker” (tele-shops). When the telephone-device monopoly ceased in November 1985, Televerket began selling telephones in competition with others. As a consequence, in 1989 Televerket’s own telephone factory in Sundsvall was closed down and since then all phones have been manufactured in Asia, many of them in collaboration with Swedish designers. Telia’s shops were well placed to increase market share of mobile phones in 1994 when GSM gathered momentum. In 1995 the chain of tele-shops were transferred to a separate subsidiary, **Telia Butik AB**.

In 1996 a separate wholesale function called **Telia Handel** was started and a network of external distributors created to supplement Telia’s own chain of shops. Telia Handel packaged, distributed, marketed and sold telecom-based information services and products via a network of external sales outlets. The range of services was very ambitious but profitability was hard to achieve.

During 1998 an extensive streamlining and restructuring project produced a much better result, in spite of heavy competition and falling prices. The most important products were telephones, calling-number displays, answering devices, telefax and modems. In 2001, Telia had approximately 8,000 distributors and 80 own shops in Sweden. The shops played an important role not only as a display window for Telia but also as guide to help customers understand the new telecom world.

Sales of **second-hand equipment** within Televerket started life in the 1980s as a subsidiary of Telefinans, (Teletrading), which became **Telia Trading AB**. The company was responsible for selling or re-leasing used equipment, much of which were PBXs left over after leasing agreements had expired. Both sales and leasing increased during 1997.

Demand diminished during 1998 mainly because sales of new PBXs reduced in volume and were replaced by network-based solutions. In 1998, to broaden the range of IT products and to strengthen its position on the second-hand market, Telia purchased 26% of **Smålandsbörsen Data AB** whose business idea was leasing and sales of refurbished used PCs. In December 1999 Telia purchased an

additional 65% in the company, thereby owning 91%. Telia sold its entire shareholding in the company in November 2000.

In February 2001 Telia Trading AB was also disposed of.

2.4.4 Repair of telecom equipment

Teli Service AB, (originally Telefabrikation i Kristinehamn AB, a Televerket subsidiary created in 1966), repaired telephones and other terminal equipment. By 1985, when Televerket's monopoly on phones was removed, Teli Service had become the Nordic leader of bench-service and service-logistics for all types of telecommunication and computer products. In June 1994 the company purchased Combinator Service AB and in December 1995 Facit Service AB.

In November 1997, as part of a re-shuffle in the business area, Teli Service AB was sold to a risk-capital fund, KB Segulah I, which in turn sold the company to French-based Anovo in January 2000.

In order to offer customers a comprehensive IT service, **Telia IT-Service** was created in January 1998, which became Telia's collective resource and competence in this area.

2.4.5 Customer equipment, installation and service.

Telia inherited Televerket's activities relating to marketing telecom equipment for companies and residential customers which had been pursued by the Telecom Services Division. However, Telia decided in 1993 that TELI would stop manufacturing Nortel's Meridian and Ericsson's MD-110 PBXs.

The business comprised development and delivery of products in five areas. **Business Systems** included PBXs, telephony and data solutions plus call centres. **Terminals** were mainly telephones. **Data Products** were connectivity products such as data networks, modems etc. **Installation** comprised installing local networks, internal property networks and equipment. **Service** was mainly the management and maintenance of customer installations but during the 1990s moved towards service of data products. Revenues for 1999 were 6.56 billion SEK, of which 3.8 billion SEK external sales.

Sales were made by other business areas and the market was primarily companies in Sweden and the Nordics. Telia gradually developed and refined each of the business areas and eventually sold some of them.

In June 1994, together with WM-data AB, Telia formed **TWM Kundstödspartner AB** to provide customers with support, active monitoring and a country-wide local service within the IT world. Telia owned 49 % of the company.

During 1994 three national special operational units were created, Telia Network Support, Telia Integration and Telia System Support.

In 1996 these activities were assembled as **Business Systems**, which in 1998 became **Systems and Services** and in 2000 part of the Enterprise business area.

Telia IT Service AB was formed in 1998 to offer support services for standard PC-based workplace solutions, main-frame data services plus integrated network administration services. The main activities were helpdesk and support functions,

remotely controlled service and other IT services to both internal and external customers.

Telia Systems addressed the needs of customer premises equipment mainly for PABX, LAN, CTI (Computer Telephony Integration) and internal networks. Services included product handling, design and advice, customer support and delivery.

Telia Installation sold installation services for telecom solutions based on PABX, internal networks, ISDN and broadband. The Division had the primary responsibility for on-site installations, above all to external customers.

Telia Business support: The division provided telecom support services for PABX, LAN, CTI (Computer Telephony Integration) and internal networks. The main activities were a help-desk service and support function, remotely controlled service and on-site service.

The market for customer placed equipment, plus installation and service became extremely competitive resulting in falling price-levels. The majority of all these activities were corporatized, assembled in the Orbiant Group and in 2001 sold to Flextronics.

2.4.6 Software development

Televerket purchased mini-computer systems for Videotex from **AU-System AB** in 1978. During the 1980s Televerket bought a third of AU-System which became an associated company within Teleinvest. In January 1995 Telia purchased the remaining shares in AU-System Invest AB which was thereby transformed into a wholly-owned subsidiary responsible for advice, investigations and development of services and systems.

AU-System was a software company specialised in applications for telecom and datacom. The company undertook investigation and development assignments and sold both their own and others communication products. They were a world leader in the field of telecom in combination with smart-card technology.

In February 1997 Telia sold 53% of the shares in AU-System Invest AB to Ericsson and to the management team of AU-Systems. The remaining 47% was sold in March 1999 to the British venture capital company Schroder Ventures.

2.4.7 Consulting companies

Telia Promotor AB was created in September 1993 to develop and customize special solutions for business customers. Between 1993 and 1995 Promotor has a central role in developing Telia's emerging Internet services. This role was transferred to the (new) ELLEMTEL AB in 1996. A number of integrated, customer-specific solutions were developed during 1996 by Promotor, principally in the areas of call centres, text-to-speech applications, e-commerce and solutions based on the Internet, intranet and smart-cards.

At the end of 2001 Telia Promotor was transferred from Telia Networks to Telia Equity. In late 2003 Promotor was transferred from TeliaSonera Holding to TeliaSonera Sverige and was finally liquidated in 2005.

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In January 1995 Telia's share in consulting company **AB Communicator** was sold to Saab Combitech AB.

In October 2000 Telia sold all its shares in **Telia Contracting AB**, a subsidiary which had been responsible for mobile telephony systems consultancy.

2.4.8 Banking activities

In September 2001, KF (the Co-op), insurance company Skandia and Telia signed an agreement to form the **Coop Bank** with the idea to provide e-commerce services over both fixed and mobile Internet. Telia's share was 20%. The bank was granted the necessary concession in 2002 but this was rescinded in 2003 and the bank was liquidated shortly after.

2.5 Support activities

Support activities assist the company's core business, generally in the beginning of the value chain. Many of the following activities have been refined and sold or hived-off over the years as Telia's definition of its Core Business has changed or evolved. This has had the effect of forcing the new entity or company to focus on its own core business and sell their services to both Telia and the open market at competitive prices. By the time Telia and Sonera merged in December 2002 most of Telia's support activities had been sold to external investors.

2.5.1. Manufacturing

Sweden's Televerket had a unique position as one of the few operators in the world which designed and manufactured its own equipment over a long period of time. In 1891 the first factory started in Stockholm for repairs and manufacturing. One main reason was the need to secure Televerket's own competence and thus avoid being too reliant on LM Ericsson as a supplier. Televerket's own engineers played an important roll in the development of the wide variety of systems for automation which evolved from 1910 and onwards. Exchanges were manufactured both by LM Ericsson (for export) and by Televerket (for its own use). During the latter half of the 20th century Televerket's manufacturing capability was a major factor in Sweden's industrial policy environment.

Televerket's very first subsidiary was formed in 1966 with the name **Telefabrikation AB (TEFAB)**. It was thought desirable to start some form of competitive business as a limited company and TEFAB's two factories in Skellefteå and Kristinehamn came into being, although the main reason was for the Government to fulfil a regional employment need.

Televerket's manufacturing arm was called **TELI** (Televerket's industrial division) with factories in Nynäshamn (exchanges), Sundsvall (telephones) and Vänersborg (PBXs). After a period of unrest and union conflict the division became a subsidiary, **TELI AB** in 1987. Around 1980 a major technology swing from electro-mechanics to electronics started to change the basics of the telecom business and thereafter TELI's ability to compete as a relatively small international manufacturer became very difficult. In 1989 the Sundsvall factory and its telephone production was closed down, followed in 1993 by Vänersborg.

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The final blow came in January 1994 when Ericsson purchased most of what was left of TELI AB plus a number of subsidiaries, namely TELI Telecom AB, TELI Mobile Systems, TELI Connectivity Systems AB and parts of TELI Business Systems AB. The purchase did not include TELI Service AB, TELI Innovation Capital AB, TELI System Support AB or the remainder of TELI Business Systems. After more than 100 years Telia terminated a long and fruitful commitment to the design, production and repair of telecom equipment and became a pure operating company.

2.5.2. Research and development

R & D has a long history in Televerket. During the First World War, three separate types of automatic telephone exchanges were under development, of which two actually came to fruition.

After World War II, both Ericsson and Televerket were individually developing the first generation of digital exchanges, but the task was so great that the 50/50 joint company ELLEMTEL was created in 1970 to develop what became the AXE exchange. After a long partnership, the competitive environment of the 1990s made it impossible to retain such a close relationship with a supplier and in September 1995 Telia's 50% share in ELLEMTEL Utvecklings AB was sold to Ericsson. In its place a new joint company was formed with the same name but with a focus on services development.

In 1968 all R&D within Televerket was concentrated into a **technical development department** with a central laboratory thus raising the status of R&D. In 1975 a new technical department was created during a major re-organisation. As technical development gathered momentum in 1983, **the Department for fundamental technology and testing** (dept. P) came into being. It was given the responsibility of keeping Televerket's entire R&D, technology and methodology development under one roof, plus all types of test-equipment which started to appear as the market became more competitive.

The main issues of the 1970s and 80s were digital transmission, digital exchanges and optical communication. Digital technology and software were the objects of an extensive R&D activity and Televerket participated in much of the international standardisation work. An internal R&D committee was formed in 1984 to raise the bar to co-ordinate and support different business interests. In 1987 Televerket started **Demotel**, an initiative to test new applications with trial customers.

Radio-technology R&D was the responsibility of the Radio department until 1968. The Radio Division was created in 1975 and included a radio laboratory which conducted a number of pioneering efforts relating to stereo radio broadcasting, paging, radio-based data systems, NMT, GSM and HDTV.

In 1991 all R&D, for both fixed and wireless, was transferred to a new Teleinvest subsidiary, **Telia Research AB** (where the name Telia appeared for the first time), with a staff of about 700 persons. Telia Research was given the responsibility for all types of research and development which formed the basis for the Group's strategic direction. Between 1993 and 2000 the annual research budget increased to 1.7 billion SEK, falling to 1.2 billion SEK in 2002. These figures related to about 4% of revenues which is a fairly high percentage for a telecom operator.

The history of Telia original

Half of the total budget was spent on internal projects, mainly by Telia Research but development work was often conducted in co-operation with suppliers. Ericsson was Telia's most important partner, especially via jointly owned ELLEMTEL Development AB (the new ELLEMTEL). Applied research projects were carried out in conjunction with Universities, with Unisource partners and within the framework of other European research programs such as RACE and EURESCOM. More advanced solutions were also developed together with customers.

In 1998 Telia opened the **Visionscenter** at the head office in Farsta. This was a meeting place and showroom for customers, business developers, the media etc and acted as a forum to discuss new ideas, applications and business concepts.

R&D covered many different areas. Important and recurring themes were digital TV, broadband, mobile technology and IP development. One theme was finding ways to compress broadband signals via smart coding so that less transmission capacity was needed (e.g. for TV) and at the same time to enhance fixed and mobile networks so that higher transmission speeds could be attained (e.g. for broadband).

Achievements in the digital TV area originated in broadcast radio where video signals were digitalised making it possible to reduce redundancy (unnecessary information) and transmit at relatively low data capacity. Within an EU project in 1992, Telia Research demonstrated a completely new totally digital system for HDTV (High Definition) which led to a change of direction for European HDTV development. Somewhat different systems were developed for terrestrial, cable and satellite TV but with a common core picture-coding where SVT, Teracom and Telia worked in parallel with each other. Telia Research specialised in digitalising CATV and later the development of IP-TV via the copper network.

In the fixed broadband area Telia had created a strong base with SDH and ATM as the foundation for digitalising the fixed telephone network in the 1980s. This continued with ADSL and VDSL broadband development in the local network. Telia was able to combine experiences in signal management and modulation techniques with information about actual cables in the local loop (Which were originally only intended for narrow band transmission). In 1997, as one of the first in the world, Telia demonstrated HDTV transmission over a conventional copper cable, plus ATM access over radio.

Mobile systems have a special place in the company's history. Televerket was the prime developer of the first generation (NMT) during the 1970s and many of Televerket's experiences from NMT were demonstrated and incorporated in the 1980s standardisation work for the second generation (GSM). In developing the third generation (UMTS), Telia contributed in much of the standardisation work, a continuation of the GSM efforts but above all to include a true data-channel. This work started in 1992 and comprised 20 Telia people by 1994. Ericsson and Nokia were part of the deliberation process and Telia made vital contributions as an experienced operator. The UMTS standards were decided within ETSI in 1997.

During the second half of the 1990s Telia developed IP services delivered via ADSL. A special e-company was created for this purpose. Telia was late entering the IP market but quickly gained a significant share in the wake of the pioneers. After the year 2000, IP gradually became the universal transport technology for all types of services.

The history of Telia original

Telia Research was also responsible for developing a broad spectrum of applications, not least in the areas of security and payment solutions.

2.5.3. IT and innovation

Slottsbacken Venture Capital KB was formed in April 1996 to invest risk capital in a limited number of small companies in the area of telecom-based information services. External partners were encouraged and the Swedish 6th AP-Fund became a 50% shareholder in December 1999.

In January 1999 Telia started **Telia Business Innovation AB** (TBI) with the objective of developing and commercialising innovations which were on the periphery of the traditional telecom business. The risk-capital model was incorporated and the idea was to create new companies in areas that were deemed to have strong growth potential. TBI invested in a number of funds, including a growth fund. The intention was to identify interesting companies which could be re-structured or integrated within an existing Telia business. TBI encouraged Telia-group innovations by functioning as a support for new business. During 1999, TBI acquired shares in a number of small development companies, amongst others; Maila Nordic AB, UPEC Security AB, IMP International AB and Mobile Community AB. Telia Business Innovation AB was wound-up in 2004.

Telia Prosoft was an internal software unit which identified, developed and delivered telecom and IT integrated solutions to Telia's business areas. Prosoft focussed on e-commerce, customer relationship management, invoicing systems and web-based IT-solutions (mobile and broadband) for customer support, invoicing and logistics. **Telia Prosoft AB** was created as a limited company in 1998 and sold as part of the Telefons group in 2001.

Telia Validation was an internal unit responsible for quality control services within the Telia Group including technical audits, integration tests, monitoring of technical standards, the structure of information and IT-security plus verification of technical solutions. The company also performed customer surveys. **Telia Validation AB** was created as a limited company in 1997 and sold as part of the Telefons group in 2001. TeliaSonera bought back part of the Network Validation Business Area activities in 2004.

2.5.4. Network construction and maintenance.

Building the telecom network had always been an integral part of Televerket/Telia's own organisation. Telia had its own resources for all types of installation and maintenance projects for telephony, CATV, mobile networks, datacom, sea-cables etc. throughout the Nordic and Baltic region. However, market growth and the proliferation of new operators led to a gradual increase in the number of external assignments, at the same time as Telia also increasingly utilised external entrepreneurs. Telia's revenues from external network building assignments in 1997 was 200 MSEK

As a consequence of competition, the network construction part of Telia was hived-off as a separate business and in October 1998 became a limited company, **Swedia Networks AB**. The new company's business idea was to provide complete telecom infrastructure solutions for both Telia and her competitors. Projects could include

fixed and mobile networks, incorporating ATM or broadband solutions. In the year 2000, Swedia Networks had approx. 2000 employees working on projects in SE, NO, DK, DE, FR, IE, MY and the UK. Swedia Networks became a part of the Telefos Group of which 51% was sold to Industrikapital in June 2001. Swedia Networks AB merged with **Eltel Networks AB** in January 2005, which was in turn sold to UK-based risk-capital company 3i in August 2007.

Telia Network Support offered national and international service providers, network operators and network owners a variety of services including installation planning, management and maintenance, surveillance, documentation and optimisation for all types of voice and data-communication solutions. In the year 2000 Telia Network Support had approx 2400 employees stationed in 225 places in Sweden or involved in projects in SE, NO, DK, DE IE and the UK. Telia Network Support was transformed into **Neterna AB** in 2000 and incorporated in the Orbiant Group, which was sold in 2001 to Flextronics.

Unite AB was a security company with 30 years experience of telecom security services. The company provided the Telia Group with services such as security control, security system and alarm design, administration of keys and magnetic key-cards, the production of ID-cards, plus investigation and analysis of network security incidents. **Unite AB** became a wholly owned TeliaSonera subsidiary in 2001, with some 80 customers with Telia as a customer responsible for 90% of the revenue. Unite was sold to Dalkia Facilities Management AB in February 2005.

Telia Documentation sold digital documentation and information services concerning geographical data about cables and network construction in Sweden and Denmark. It was converted to **Comcarta AB** and sold with the Telefos Group in 2001.

2.5.5. Computer support

Televerket had three large systems which were used to manage customer data, invoicing and employee salaries. To manage customers, the TAD-system (Televerket's Automatic Data-system), a Univac installation, was introduced on a trial basis in 1973. The system worked well and in 1980 was extended to cover the whole country. TAD became one of Sweden's largest computer systems as Televerket had nearly 6 million customers. It was highly integrated and not so flexible.

Invoicing was computerised in the middle of the 1960s and a new on-line system was gradually installed and integrated from 1986. These systems and all terminals were connected together via an internal packet-data network around 1990.

The customers were not only inside Televerket. In 1990, Televerket Data delivered a special computer system for the transfer of documentation between the Customs and Excise Authorities and their customers. This was the first national EDI-system to go into production in Sweden. In addition, a TIMS-system was delivered to Qatar in collaboration with Swedtel. TIMS means Telecom Integrated Management System. TIMS was eventually sold to Ericsson.

The development in the 1980s required flexibility and customer orientation. In 1990, the ADB-Service division became the Televerket Data division and in 1991 became Televerket Data AB within the Teleinvest Group. It was transformed into

The history of Telia original

Telia Data AB (TDAB) in 1993. Enhanced efficiency and customer orientation became important tasks and many local units, which had been created in the 1980's, were integrated into TDAB. The company was also subjected to competition to improve its efficiency.

In 1995 Telia Data started working on a common, standardised IT-infrastructure for the whole group.

Telia Data re-focused. Production and development tasks were separated in January 1998. Telia IT-Service was formed to handle production and support. Units dealing with programming were amalgamated with Telia Engineering from the network side to form Telia Prosoft. Units dealing with system verification were united with Telia Validation, formed one year earlier. In 1999 Telia Validation also took over the Group IT support function which had been created in a major re-shuffle in 1996.

A new invoicing system, christened FBS (future billing system) was launched at the end of 1998 and in less than 12 months all fixed telephony and business customers were migrated to the new system, just before turn of the millennium. As a precaution all vital computer systems were renovated prior to the year 2000.

Telia IT-Service entered the outside market offering outsourcing and acquired a substantial order from the insurance company Länsförsäkringar Wasa. Telia IT-Service was transferred in the year 2000 to business area Corporate Customers from business area Enterprises.

Prosoft and Validation were sold in 2001 (51%) as a part of the Telefons Group. Telia IT-Service continued as part of TeliaSonera and was eventually merged with data management within broadband and fixed telephony network operations.

2.5.6. Financial services.

Financial services encompass the provision of capital, customer financing, payment systems (billing), credit assessment and debt collection plus insurance services.

Provision of Capital. A Parliamentary resolution on 1st July 1984 totally reformed Televerket's capital provisioning. The economic umbilical cord with the state-budget was severed and for the first time Televerket could approach the capital market and emit Tele-certificates and Tele-bonds with a Government guarantee via Televerket. To this end a Central Finance Unit (CFU) was created within Teleinvest. The CFU became the Telia Treasury Division when Telia was created with the main tasks of fulfilling the Group's needs for borrowing, managing surplus liquid funds and in addition to be responsible for Group currency transactions.

In the autumn of 1993 Telia AB launched a Flexible Term Notes Program (FTN) with a ceiling of 5 billion SEK, which increased to 8 billion SEK in 1996 and to 12 billion SEK in 2000.

During 1994 Telia established itself as an international borrower via a Euro Commercial Paper Programme (ECP) with a borrowing limit of 400 MUSD. This was raised to 600 MUSD in 1998 and to 1 billion USD in 1999.

In June 1996 Telia signed a Revolving Credit Facility agreement of 1 billion USD with a consortium of 20 banks led by JP Morgan. The credit facility was for seven years and gave Telia a strong liquidity contingency reserve.

In late 1996 Telia utilized a borrowing facility from the European Investment Bank (EIB) which offered Telia medium to long-term financing.

At year-end 1997 Telia AB set up a Euro Medium Term Note Program (EMTN) with a limit of 1 billion USD which was increased to 2 billion USD in 2000.

Telia continued to enjoy a high credit rating according to all the international credit rating institutes.

Customer financing. At the end of the 1970s it became apparent that Televerket must become more customer orientated and in 1979 Televerket petitioned the Government for an increased economic freedom of movement. Amongst the specific proposals was a request to start an internal finance company which could borrow on the open market and finance telecom terminal equipment to customers via leasing agreements. The proposal was accepted, even though the initial financing was a floating credit facility with the National Debt Office, and **Telefinans AB** was created in July 1982 as a Televerket subsidiary. Initially only equipment that Televerket had purchased was financed in this way but after one year this was extended to include terminals that were exposed to competition and from July 1984 even PBXs. Telefinans became a Teleinvest subsidiary in 1984.

In 1986 Telefinans had become Sweden's largest leasing company and was upgraded to an authorised finance company by the Financial Supervisory Authority in 1989. By this time the majority of leasing objects were PBXs for the business community and three Telefinans subsidiaries were created. **Sergelinkasso** for Televerket's debt collection activities, **Teletrading** as a sales outlet for second-hand PBXs and **Telecredit** for Televerket's internal financing. A **Card Centre** for pre-paid telephone cards was created in 1990.

Telefinans AB became **Telia Finans AB** in 1995

Financing solutions were increasingly in demand even for services and service-financing became an important part of an all encompassing contract.

In addition, Telia Finans started co-operating with external IT suppliers and dealers in both Sweden and the Nordics, with positive results.

Financing external IT suppliers' products increased. A special team was created in 1997 to look after the financing of IT based office equipment.

In 1998 a sharp increase in the number of new financing contracts resulted in an annual revenue growth of 13 %, in spite of low interest levels. This was primarily the result of a major increase in the financing of external IT suppliers' products and financing employee home-computer packages.

During the third quarter 2003, the leasing business related to Telia's own products was transferred to Telia Credit from Telia Finans, which thereafter only financed products external to the Telia Group. In early 2004 Telia Finans AB was sold to Netherlands-based De Lage Landen International B.V., resulting in a positive cash-flow of 6.2 billion SEK and a capital-gain of 0.5 billion SEK.

Invoicing (Billing). A separate unit, **Telia Billing**, was created in 1994 to develop payment services, i.e. invoices and invoice-based services. Invoicing services also included consultancy, payment-transfer products, construction and production of reports plus customer bonus programs, all packaged in a product portfolio.

Within the billing business a new invoicing system was developed as a spin-off from the Unisource partnership with PTT Telecom Netherlands and Swiss Telecom and the system came into operation in 1997. During the year, new payment service products such as Telia Payment Account were launched and the development of invoicing for Internet services continued.

The transition from paper-based to electronic invoicing and payment methods meant enormous rationalisation and environmental gains. The demand for electronic payment, especially via the Internet, started to increase in 1997. In the same year, Telia, together with Förenings Sparbanken, was the first European telecom operator to launch invoicing over an Internet bank to private customers entirely without a paper transaction. During the year EDI solutions were developed for both external customers and internal Telia units. During 1997 the business area took over responsibility for Telia's invoicing in DK, NO and FI.

In 1998 Telia administered 40 million invoices with 99.88% reliability. The Billing function had become an important tool providing much valuable information about a customer's consumption patterns. A new invoicing system was installed in 1998.

Debt collection. From Televerket's Sergel debt-collection unit, in 1998 Telia created in **Sergel Kredittjänster AB**. The business was integrated in 1996 comprising debt-collection plus credit and bankruptcy management. An efficiency program was instigated which greatly increased productivity.

During 1997 a project started to sell credit and debt related services to customers outside the Telia Group, a consequence of a shift in this market where more and more companies purchase these services from a full-service provider.

To complete the portfolio of services, Telia purchased **SVEFO Sverige AB** in September 1998, a company which specialised in debt collection of large sums. SVEFO was disposed of in the year 2000. Sergel Kredittjänster AB still remained as a subsidiary to TeliaSonera in 2009.

Insurance. Telia started the wholly-owned **Telia Insurance AB** in early 1994. The company was responsible for the financial risk management of the Telia Group's property, companies and personnel, which included insurance solutions for employees. In addition insurance packages were occasionally sold to some of Telia's business customers as part of a complete solution.

The company was responsible not only for the Group's business insurances but increasingly also offered insurance solutions related to sales of products and services. In 1998 the offers were extended to include Telefax equipment, PBXs, cordless telephones etc. The company was the first in Sweden to offer insurance services over the Internet. TS Insurance was still a subsidiary in 2009

Cards. In Sweden, Telia was market leader for telephone-cards, a market which expanded rapidly during the 1990s. Advertising on the cards themselves certainly helped to double these revenues during 1996. **Telia Access** was a service which expanded the customer base through partnership with the major credit-card companies Eurocard, First Card and Visa. In 1997, Telia Access was also launched in Denmark.

Development in this area was concentrated towards smart-cards. In 1997 a decision was taken to restructure the business and focus on card-related infrastructure, commercial card-services and cards as a relationship-bearer.

During 1998, card products were launched for, among other things, international access to the Internet. At the same time a new service for payment transactions over the Internet called e-CHARGE was developed. This service, which meant that costs for products purchased over the Internet were invoiced via the telephone bill, was launched in Sweden during 1999, but was not a success.

2.5.7. Office Administration

In July 1997 Telia formed a new company, **Telia Assist AB**, to take care of a major portion of the company's administrative support services. At the same time a new purchasing procedure was introduced with the objective of streamlining the process and increasing cost-awareness within the Telia Group. The company changed name later to **IN good company**, offering its services to external customers also.

IN marketed office-solutions, documentation services, salary administration, telephony services, personnel services, book-keeping, development and training. During the year 2000, together with three other companies; IF, Skandia and WM-data, Telia formed a joint company for business-support services. Telia contributed with IN good company (600 staff), Skandia/IF with their common company Ackuratess Administration AB (250 staff) and WM-data with their business services unit (150 staff).

From day one, the new company called **IN Ackuratess AB** offered a wide portfolio of services combining the experiences of the parents. IT was a central component in the product range and was offered both as an integrated part of a service or stand-alone on a consultancy basis.

2.5.8. Materials logistics

Televerket had always had a materials storage activity which had to become more efficient as new logistics principles evolved. At the end of the 1970s Televerket opened a computer controlled central storage facility in the town of Nässjö in central southern Sweden to reduce intermediate storage. A central materials department was created in 1980. These activities increased and in 1991 it was transformed into the Materials and Service Division. The large-scale transports were gradually transferred to external suppliers to save costs.

The work to become more efficient and reduce tied-up capital continued after Telia was created. In July 1995 the Nässjö central store was transferred to **NLV Logistics Village AB**, a new company jointly owned (51/49%) by Telia and Bilspedition – a transport company.

In May 1997 Bilspedition Transport and Logistics (BTL) increased its ownership in NLV Logistics Village to 75%, leaving Telia with 25%.

The final stage in Telia's separation from equipment logistics took place on the 1st January 1999 when Schenker-BTL purchased Telia's remaining 25% share.

2.5.9. Property Management

Televerket's policy was to build and own virtually all the buildings it needed. Some of them were impressive as they were often designed by well known architects. From 1980 the need for technical premises reduced dramatically when AXE exchanges were introduced as these needed much less space than the older electro-mechanical exchanges.

Prior to the 1970s, the provision of all types of premises was a centrally co-ordinated issue. This changed over the next two decades as a consequence of continuous restructuring but by the end of the 1980s the idea of returning to a centralised property-unit was voiced. In 1991, Televerket's property unit, called Telaris, was created.

In parallel, even Teleinvest created a property unit which in 1990 became TIAB Fastigheter AB, renamed Fastighets AB Telaris in 1991. These two property arms were merged in 1993 when Telia was created under the name **Fastighets AB Telaris**. At this time Telia owned 1500 buildings on land it also owned, plus 6000 smaller units on leased property. These buildings were a mixture of commercial and technical.

During the 1990s many of the technology sites were converted into office space and equipped with customer-adapted IT-infrastructure. In 1997 all remaining technology buildings were transferred into a separate company, **Telia Teknikfastigheter AB**, under the control of the Network Services business area, with a book-value of 4.6 billion SEK.

In August 1998, as a component in the focus on core-business, Telia sold the majority of all its commercial buildings throughout the country for 6.3 billion SEK, with a net profit of 1.9 billion SEK. From this point onwards Telia leases all necessary office space instead of owning it. At the end of 1998 the remaining property was transferred from Financial Services to a Group support unit. During the last two years of the 1990s approx. 1.3 million square metres of property was sold for a total value of 6.5 billion SEK.

One of Telia's last property deals of this period was selling the so called "Tändstickspalatset" in central Stockholm. This building was to be the Head Office for the new Telia-Telenor company but was sold in 2000 when the merger failed. .

3 Foreign multinational activities

This chapter deals with activities in an international perspective to provide telecom services, mostly to and from Sweden. The major activities were:

- Services for corporate or private customers abroad
- Wholesale services for telecom operators abroad
- International infrastructure in cables and satellites
- Multinational cooperation for service development

Services for corporate or private **customers abroad** emerged from 1990 due to two factors, market liberalisation and new technology. Digital technology meant a huge increase in international capacity, which in turn lowered **telephony** prices and dramatically increased **data-services**. Mobile services exploded. To further help international customers, Telia was a founder-member of the Unisource alliance 1991-2000 and a shareholder of the Infonet Company 1988-2005.

Wholesale services between international telecom operators had always been provided in accordance with long-standing bi-lateral agreements. Customers have therefore been able to call abroad for many years. Since 1999, Telia International Carrier offered an alternative form of interconnection to foreign operators via a wholly-owned fibre network in Europe and the United States. From the mid-1990s both **Internet** and **mobile telephony** have grown rapidly. **Fixed line telephony** with other continents has grown since the 1960s and within Europe since the 1930s. Since then Televerket/Telia has provided interconnect traffic to foreign operators so that their customers can send traffic to Sweden. Prior to the Second World War a **telegram** was *the* major international communication service ever since it became global from the end of the 19th century.

International infrastructure is the basis for supplying global telecom services. Since 1990 **optical fibre cables** with digital transmission have been deployed on all major routes, both over continents and under oceans. Telia has participated as an owner in key cable projects in order to secure quality and prices. Before the advent of fibre cables, **satellites** and **coaxial cables** offered transoceanic capacity since the 1960s, in some mutual competition. Telia became a member of the three major satellite organisations Intelsat, Inmarsat and Eutelsat at an early stage but left them all during 2003-05. Since the 1990s they are mostly used for TV-transmissions and for fixed and mobile services to remote areas of the globe.

Multinational cooperation is needed for commercial telecom activities, which depend on systems that work in conjunction. International cooperation develops technology, standards, rules and procedures. The transition from monopoly to competition around 1990 implied major changes and the old cooperative world vanished. Important new groups have been formed around Internet and mobile telephony. European cooperation to pursue policy issues in Brussels has been handled by ETNO since 1992. Nordic cooperation continued until 2003. The ITU is a global UN agency, where Telia/Televerket has participated since 1865. Telia's active participation in most of these organisations was reduced around 2000. Many new organisations have been created, some for the new competing operators.

The history of Telia original

3.1 Multi-national co-operative organisations

For many years commercial telecommunications has been based on multi-lateral international co-operation to systemize common rules, procedures, technology and standards for international telecom traffic. The international cooperation has been of great importance for Televerket/Telia and the company has been very active in several organisations over time. Representatives of Televerket/Telia have served in a number of prominent positions.

At the present time, development of the **Internet** is a global initiative after being created in the world of academic research. Two notable organisations are IETF and ICANN.

Mobile telephony's rapid growth is the result of co-operation between hundreds of operators all over the world in the **GSM Association** and its European offshoot **GSM Europe**. The structure of the GSM system has its roots in the standardisation activities of the 1982-92 period, first within the framework of the telecom administration's collaborative body CEPT until 1989 and thereafter in ETSI, then a newly formed telecom standardisation body.

Transformation of European telecom regulation from the end of the 1980s created the need for major operators to co-operate in ETNO, which since 1992 is a trade organisation in Brussels with the objective of influencing EU telecom regulation.

Prior to 1992, **CEPT** was the standardisation co-operative organisation for Europe's telcos. CEPT was also the sponsor for a number of special bodies, i.e. for clearing (Clearcom), satellites (Eutelsat) standardisation (ETSI) and research (**EURESCOM**). CEPT was created in 1959.

Nordic co-operation was pursued in **Nordtel** until 2003, from its start in 1917. During the monopoly period, co-operation was close and effective. Examples are: common utilisation of international cables and satellites, the Nordic mobile telephony network NMT and the Nordic circuit-switched data network, Datex.

The International Telecommunication Union, **ITU**, is a global telecom body which since 1947 has been a specialist organisation within the United Nations. The ITU works with radio frequency planning, standardisation and development-aid issues. Sweden and Televerket/Telia have been involved since its inception in 1865.

3.1.1 The ITU, the International Telecommunication Union, 1865 -

The ITU came into existence as the International Telegraph Union in 1865 at a conference in Paris where 20 countries participated. Sweden was represented by the Director General of Telegrafverket (pre – Televerket name). Even Denmark and Norway, (at that time in political union with Sweden), were also founder members. Iceland joined in 1906 and Finland followed suit in 1920 after its liberation from Russia in 1917.

A separate radio-telegraph union was formed in 1905 and both bodies were amalgamated into the International Telecommunication Union in 1932. The ITU became a United Nations (UN) body in 1947. It is based in Geneva and in 2009 has 191 member countries, i.e. nearly as many as the UN itself. Close on 600 operators and other companies are sector members. In Sweden, the Regulator (PTS) is the national ITU member and TeliaSonera a sector member.

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The ITU has three main activities which are of an administrative and technical character. One major task is the responsibility for international co-ordination of the use of radio frequency spectrum and positions on the geo-stationary satellite orbit, both of which are a limited global natural resource. A second major task is to promote technical standardisation and the harmonisation of international telecom services. A third task, which originated towards the end of the 20th Century, is to promote telecommunications development in a global perspective.

The ITU's highest body, the Plenipotentiary Conference, meets every fourth year. In the interim, business is conducted by an administrative council which meets yearly. Via Televerket, Sweden was an active member of the ITU for most of the 20th Century in close co-operation with the other Nordic administrations.

Sweden was a member of the ITU Council between 1973 -1994, represented first by Televerket up to 1993, thereafter by the newly created Telecom Agency. Denmark was a Council member between 1994-2002, followed by Norway between 2002-06. Sweden became once again a council member from 2006, represented by the Post and Telecom Agency, (the Swedish telecom-regulator).

The Nordic countries co-operated until 1999 at the major global telecom exhibitions arranged by the ITU since the 1960s. Both the exhibitions and Telia's participation have since been curtailed.

At a working level in the ITU, Televerket/Telia has been a very active participant on radio and standardisation issues, both at major conferences and in working groups, but the efforts have been reduced gradually.

The ITU was reorganised at an additional plenipotentiary conference in 1992 with three sectors for radio, standardisation and development aid. Since then the world has changed through liberalisation and many new market entrants. The ITU retains an important role within radio regulation whilst standardisation work increasingly is the responsibility of other organisations, bringing an increased flexibility from the industry and other players, globally or regionally. Development aid issues within the ITU have also changed, from technical aid to regulatory and tele-political development. Over the last few years Telia's contributions to the ITU has decreased considerably. Telia was a member of all three sectors, but left the development sector in 2002 when the consulting arm (Swedtel) was sold.

3.1.2 Nordtel 1917-2003

The Heads of all the Scandinavian telegraph administrations met in a series of meetings from 1858 and onwards to discuss Scandinavian telegram tariffs. More regular co-operation started during the First World War in 1917 which is regarded as the starting point for formal Nordic telecom collaboration. A topical issue of the day was traffic censorship.

Co-operation was extended in 1924 when the Finnish and Icelandic administrations started to participate. However, a certain amount of asymmetry arose in 1927 when the Danes and Finns established combined post and telecom administrations, which was also the case for Iceland in 1935. Both the Swedish and Norwegian telecom administrations managed to avoid this combination. Nordic co-operation was demonstrated by more or less annual conferences, interrupted only by the war years.

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After 1979, co-operation became more flexible when decisions were delegated to working groups and the name Nordtel was adopted.

Activities have been varied, including information exchanges on technology and services, co-Nordic projects plus joint Nordic actions in an international context, especially within the ITU.

Co-operation has been fruitful. Some examples are: Agreement on Nordic satellite earth stations with Intelsat in 1969 (Tanum), with Eutelsat in 1978 (Ågesta) and with Inmarsat in 1979 (Eik, in Norway). Based on a Televerket initiative, a far-sighted and very important decision in principle was made in 1969 to develop a common Nordic mobile system (NMT). NMT came into operation in 1981/2 as the world's first fully automatic mobile system with international roaming across four countries. Prior to this initiative, a manual Nordic mobile system, MTD had been in operation which had incorporated a number of pioneering solutions to many of the operational problems for international mobile systems. Free movement for customer terminals over international borders was one such issue. Televerket's pioneering efforts in the early Nordic mobile development form a starting point for the exceptional global success of the mobile telecom industry during the 1990's.

A common Nordic circuit-switched public data-network (Datex) was supplied by Ericsson in 1976. Both NMT and Datex were based on the AXE exchange developed by the Televerket/Ericsson joint-venture ELLEMTEL.

Acting in unison, the Nordic telecom administration's joint participation in many international contexts added weight to the issues, not least at the ITU's major telecom exhibitions. This action was looked upon as a classic example of positive regional co-operation between neighbours.

Around 1990, separate national regulators appeared, resulting in a review of Nordtel. Marketing issues and activities were directed to network strategy.

In 1993 a new Nordtel agreement was signed in Torshavn, Faroe Islands. At the same time a Nordic trade organisation (NTOB) was created; open to all operators in the Nordics and with an office in Brussels to act in unison towards the EU.

In 1995 the situation changed when Sweden and Finland became EU member states. Resources for the ambitious plans for NTOB were insufficient and the institution was disbanded. Nordtel was revived, and celebrated 80 years in 1997.

Ambitions reduced even more and in 2001 Nordtel was closed down as a formal association. An informal contact group continued to meet but even this stopped in 2003 and the traditional collaboration between Nordic operators went to the grave.

3.1.3 CEPT 1959-1992

A proposal for European co-operation in the post and telecom arena was made by both the Council of Europe and the EEC in the mid 1950s. After many twists and turns agreement was reached to form CEPT, Conférence Européenne des administrations des Postes et des Télécommunications. This occurred in Montreux in June 1959 and the Nordic post and telecom administrations became members. Eastern Europe was not initially included but membership increased to 34 by 1992.

CEPT had a joint assembly but most of the work was divided between a post and a telecom commission over a wide spectrum of issues. CEPT furthered co-operation

between members and the co-ordination of viewpoints towards the rest of the world. CEPT became the sponsor of several telecom bodies.

In 1964 a clearing-house was created in Bern to balance inter-connect revenues and debts for international traffic between member states. As a consequence, the payment transaction costs were significantly reduced.

New services were explored and data network-services grew during the 1970s.

From the early 1960s, Europe and the USA were in talks about new connections across the Atlantic. To ensure the continued development of capacity, in 1975 CEPT formed a committee for long-term planning of connections between the two continents, including the tricky issue of balancing investments in and use of cables and satellites. This committee was chaired by Televerket's Torsten Larsson until 1989 and he played an important role as Europe's spokesman towards Washington.

A steering committee for telecom satellites participated in discussions with the European Space Agency ESA and in the 1970s was sponsor in the formation of Eutelsat which took over the operational management of the European satellites.

A working group for long-term planning started in 1971 which was chaired from 1977-1985 by Bertil Thorngren, Head of Televerket Corporate Planning.

CEPT formed a harmonisation committee in 1975. In 1982 it established Groupe Spécial Mobile (GSM), with both chairman and secretary from Televerket.

When the market for terminals was liberalised during the 1980s it was evident that an extended standardisation body was needed which should also include the industry and others. For this reason, in 1988, the European Telecommunications Standardisation Institute (ETSI) was created based in Sophia Antipolis, France.

In 1991, EURESCOM was formed as a German company in Heidelberg to organise common long-term research. Kurt Katzeff from Televerket was its first director.

CEPT also initiated several co-operative agreements in the form of Memoranda of Understanding (MoU) such as METRAN (Managed European Transport Networks), which intended to create a pan-European transport network. METRAN never materialised due to competition policy resistance from the EU Commission.

The EU proposed separation of regulatory and operative issues, which was analysed by an independent group, proposed a separation of CEPT into two sections. The result was that all operators left CEPT in 1992 and formed ETNO.

The European regulators took over CEPT, which still exists (2008) but with a new mandate.

3.1.4 ETSI 1988-

During the monopoly era, the telecom administrations in CEPT were responsible for standards. In the mid 1980s the EU began the liberalisation of telecom terminal equipment. However, in order to pave the way for an international market it was necessary to define an open standard interface between networks and terminals. This could no longer be defined only by the operators and it was therefore necessary to include manufacturers and other interested parties. CEPT initiated the job of defining a new body, the European Telecommunications Standards Institute (ETSI), which came into being in 1988. ETSI is a common organisation for operators, manufacturers, authorities, service providers, research organisations,

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users and consultants. Its core is European but ETSI has developed into a broader international body with members from all over the globe.

ETSI is based in France with Offices in Sophia Antipolis outside Nice. The office comprises a secretariat for a large number of specialist working groups.

One very important result from ETSI is the GSM (2G) standard. In addition, ETSI put a great deal of effort into the development of the UMTS (3G) standard. This work is pursued through a wider international collaboration called 3GPP (Third Generation Partnership Project). Telia has specifically pushed through an adaptation of the standard for shared 3G networks, i.e. as in Sweden where Telia/Tele2 were the first to share a licence and have built a jointly owned 3G radio network.

Other activities around the turn of the century have focussed on ISDN and Next Generation Networks (NGN) – the networks of the future. Another activity relates to Intellectual Property Rights (IPR), in connection with the use of patented technology in standards, a complex and controversial issue which is of vital financial importance to the industry.

Other areas include security, radio interference and user-friendly adaptation issues.

Telia has worked in close co-operation with other interested parties who are members of the Swedish Technical Information Standardisation body, ITS.

Telia has been a committed member of ETSI and participated in the most important working groups. However, Telia's involvement has reduced as a consequence of increased competition.

3.1.5 GSM development - 1982 -

Development of GSM was a co-operative project which has become a global success. The project has followed two paths, one technical and one operational.

The technical work started when CEPT established its Groupe Spécial Mobile in 1982. Its mission was to define and develop standards for a digital mobile telephone system. The initiative came from both the Nordics and the Netherlands and the first meeting was held in Stockholm. The Chairman was Thomas Haug (1982-92) and the Secretary was Thomas Beijer (1982-91), both from Televerket. Experiences from the NMT system were of enormous value to the project's activities.

The amount of work increased dramatically and in 1986 the group was extended to include a secretariat, called the permanent nucleus, stationed in Paris. After a variety of practical trials, including four Nordic proposals, the main components of the GSM standard were approved in 1987 after tough negotiations.

The GSM group was formally transferred from CEPT to ETSI in 1989 as ETSI TC-GSM and the permanent nucleus was a project team called PT-12. Its activities continued to be based in Paris until late 1991 when it moved to Sophia Antipolis.

In preparation for the operative introduction of GSM, under the leadership of the UK, the four largest countries in the EU proposed a Memorandum of Understanding (MoU), which was signed in 1987 under the CEPT umbrella. This was a declaration of intent with the goal of a common GSM launch by 1991. In reality, for most countries this occurred later. An MoU group with sub-groups was responsible for introduction issues. The abbreviation GSM was retained but the meaning of the

letters was changed to Global System for Mobile communications at the instigation of Televerket's expert.

GSM required practical operational co-operation. As an example, the fact that widespread international roaming was now possible implied that operators must be able to serve each other's customers when they are travelling abroad. Firstly, networks have to be connected and customers must be localised outside their home network. Secondly, call-measurement methods must be co-ordinated to correctly charge for services used and thirdly, operators must create new invoicing and payment routines. This last question was similar to the clearing-house issues that had existed in the fixed networks for many years but in the mobile area new institutions were created based on the computerised technology in the GSM system. All the above required agreement between operators and the Nordic experiences played a major role when the GSM principles were agreed. GSM introduced new functionality and new frequencies (900/1800/1900 MHz), leading to new standardisation demands on ETSI. In particular, Televerket strongly advocated that terminals should function on different frequency bands.

In 1992, Telstra from Australia became the first non-European GSM member. In 1995 the GSM Association was created as a global organisation with 117 operators initially. Based in London it has over 700 members in over 200 countries. The GSM Association also co-operates with similar international institutions. It also formed regional groups of its own. For example, GSM Europe has 150 members from 50 countries and an office in Brussels to monitor European issues, EU rules and frequency questions.

3.1.6 EURESCOM 1991-2002

The European telecom operators in CEPT did not pursue any organised common research during the monopoly years. However, in the 1970s and 80s, many of them participated in different projects within Brussels-based COST (the European Co-operation in Science and Technology), together with various research organisations. COST was engaged in a large number of small projects in the area of new technology.

At this time the members of CEPT were primarily telecom operators only in their own countries and all in a monopoly situation. International telephony was achieved through interconnect agreements between national networks. During the 1980s, new international data-services for multi-national companies created the need for better quality and reliability, which proved difficult to achieve. This gave birth to the idea of pan-European networks with European-wide common monitoring and quality control.

With this end in mind, at the end of the 1980s the major members of CEPT created a common research body called EURESCOM. It was organised as a German limited company (GmbH) in Heidelberg and started in 1991.

Televerket was an energetic founder-member and the first Head of EURESCOM between 1991 and 94 was Televerket's former Head of Research, Kurt Katzeff.

EURESCOM initiated and co-ordinated projects where the research activities were carried out by persons from participating operators in various groupings. Many of these projects focussed on connectivity, control and surveillance of modern

networks, amongst others ISDN. Telia was an active participant in many of these projects, sitting on the executive committee of the board and then on the board of EURESCOM between 1994 and 1998. The Nordic operators co-ordinated their efforts in EURESCOM through a working group within Nordtel.

In the 1990s most telecom markets started a liberalisation process and operators who previously had co-operated with each other now found themselves in competition when they moved abroad. Competing networks now became a fact of life and IP technology increasing threatened traditional technologies. As a consequence it was no longer self-evident that the open exchange of information which had existed under the auspices of EURESCOM could continue. The best ideas could no longer be available to all.

During the year 2000, Telia re-organised its research activities and concluded that the benefits of EURESCOM did not motivate the costs involved. For this reason Telia left EURESCOM in 2002, as did a number of other operators.

EURESCOM still exists in 2009 but the number of members has decreased to 15 and the emphasis has changed to concentrate more on a co-ordinating role of projects within the EU framework programme for research

3.1.7 ETNO 1992-

In parallel with CEPT, at the beginning of the 1990s operators started discussing how they should be organised in a de-monopolised Europe, both between the largest five/six operators and a number of the smaller ones. Finally Telefónica took the lead in starting a provisional body in Brussels with relevant sub-groups.

Televerket was an early starter and well positioned to participate in this work having already established a representation office in Brussels in mid-1990, which became a subsidiary, Telia s.p.r.l. from 1992. The task of this office was to collate information and to act as Telia's spokesman in the increasing tele-political discussions within the EU.

In May 1992, the new organisation called ETNO (European Telecommunications Network Operators Association) was created by 26 operators in Madrid.

Initially a main theme within ETNO was to formulate the industry's common viewpoints on initiatives from the EU Commission. ETNO established a number of tele-political groups adapted to the reality in Brussels. This created an imposing workload to understand the massive amount of EU directives which were needed to harmonise and liberalise the EU telecom market. This was followed by two milestones, the tele-political reviews of 1998 and 2002. The first one collated a number of disparate directives into a handful of coherent directives in order to pave the way for access to existing telecom networks. The second review concerned combing relevant elements from competition law into telecom regulation with the objective of, over time, reducing sector-specific detailed regulation.

A second theme in ETNO was internal co-operation between members. One such question was building a co-ordinated digital transport network in Europe. In 1997 ETNO started a working group to produce a proposal for the introduction of digital ATM networks. This project found itself in a minefield between the EU's opposing ambitions of promoting both harmonisation and competition. Faced with the threat of accusations for behaving like a cartel this project was stopped in 1998.

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Broad network co-operation faded away and was replaced by dynamic network expansion resulting in a capacity much greater than the market needed.

Another co-operative issue was a successor to CEPT's clearing-house. ETNO was instrumental in starting a new independent body in Basel called Clearcom.

A further cooperative issue involved expanding co-operation with operators in the newly liberated Eastern Block countries which applied for ETNO membership.

A third theme concerned ETNO representing its members in wider international co-operation towards society as a whole on questions such as personal data-protection, security, the environment, health etc. ETNO works together with the ITU, ETSI and EURESCOM, plus regional non-European operator organisations.

ETNO has remained a trade organisation chiefly for former European incumbents. Emergent competitors have joined complementary bodies such as ECTA (the European Competitive Telecommunications Association).

Telia has been a board-member of ETNO from its inception and chaired the work during 2001. In addition, Telia has chaired six different working groups: WTO issues, clearing-house, frequency administration (2 groups), data-protection and information security. TeliaSonera is still on the board in 2009 and chairs a working group on content issues.

3.1.8 IETF and ICANN

The Internet is based on IP technology for the transmission of different services. Its initial development starting in the 1960s did not follow traditional telecom models but was mainly the result of activities within the world of academic research, primarily in the USA. Contrary to normal telecom development, today's Internet is the consequence of decentralised bottom-up efforts instead of the other way round. The result is not just a new approach to technology but also to organisations and power structures. One example is that individual governments have had little influence over the Internet which for a long time has been dominated by American interests.

The Internet world encompasses a host of different bodies and working groups all working on a voluntary basis. Swedish experts were part of this work from an early stage which gave them a relatively important role in its development.

From the mid 1990s Telia has invested more and more in IP technology, including employing many external experts.

The **IETF**, (Internet Engineering Task Force), is an organisation with many working groups which collectively push forward the boundaries of technical development and Swedes have played an active role. Telia participates by monitoring developments in the Internet, routing and transport areas. Links have been established between Internet transport and the third generation mobile system through the 3GPP organisation during the end of the 1990's. Mobile experts have also participated in this work.

ICANN, (the Internet Corporation for Assigned Names and Numbers), is the organisation which, since 1998, is responsible for the principles of allotting Internet domain names and IP-addresses which is necessary for the Internet's global

functionality. The founding of ICANN in the mid-1990s was monitored by Telia via ETNO acting on behalf of European interests.

Since 1989, **RIPE**, (Réseaux IP Européens) is responsible for the allotment and registration of European IP-addresses. As a major IP-operator, Telia is an active participant within RIPE.

3.2 Cable consortia

International **telecommunication cables** play a principal role in the task of connecting continents. There are three eras in the history of cable technology.

Since the 1980s digital optical-fibre cables have developed enormously in both increased capacity and lower costs. Digital technology provides a universal solution for virtually any service. Nowadays, telephony piggy-backs on data-traffic, which is a reversal of the situation in the middle of the 1990s.

Previously, coaxial cables using analogue technology had been used which, since the 1950s, made trans-oceanic traffic possible. Prior to this only unreliable shortwave radio was available.

The first trans-oceanic cables, laid at the end of the 1880s, were simple telegraph cables used to transmit telegrams.

Shares in cable and satellite consortia were Televerket's first foreign investments during the 1960s.

3.2.1 Telegraph cables

Telegraph cables were early methods of connecting continents. The first operational sea-cable connected the USA and England in 1866. Europe was connected to the Far East via a Danish-led consortium called The Great Nordic Telegraph Company formed in 1869. At the end of the 19th century most of the world was connected, not least as a result of major private British investments. At the end of the Victorian era in 1910 the British Empire was the dominant player in global telegraphy.

3.2.2 Telephone cables

Telephony, unlike telegraphy, requires electronic amplifiers fairly close together in order to transfer traffic over long distances and it took until 1956 until the first trans-Atlantic cable, TAT-1, mastered the challenge. It was owned by USA's AT&T, Canada's COTC and the British Post Office and had a total a capacity of only 36 speech channels. The Nordic countries shared just one speech channel on payment of a guaranteed sum.

By the middle of the 1960s four new cables were laid between Europe and the USA (TAT-1, 2, 3 and 4) and even two cables between Europe and Canada, CANTAT and SCOTICE/ICECAN, the latter via the Faroe islands and Iceland, thus connecting all the Nordic countries. Capacity and traffic increased rapidly. During the 1970s TAT-5, 6 and 7 were added, initially as coaxial cables with analogue transmission but as capacity was a limited resource, the cables were equipped with advanced signal-processing to push through as much traffic as possible.

The cables were normally owned by consortia created for each project. Partners could either become shareholders in the consortium or be purely tenants and

purchased an IRU (Indefeasible Rights of Use) giving usage rights throughout the lifetime of the cable.

In 1965 Televerket purchased one channel in TAT-4 and thereafter bought into many other cables around the world including, in the Pacific, the USA-Japan route.

3.2.3 Fibre-optic cables

In the 1980s, a technological break-through allowed the optical transfer of digital signals as light impulses over fibre-optic cables. Even these cables required amplifiers on the sea bed but they offered much higher capacity than earlier. From the end of the 1980s, significant investments in fibre-optic trans-oceanic cables were made, starting with the Atlantic. International consortia also included private investors, independent from governments.

In 1988, TAT-8 became the first fibre-optic cable between Europe and the USA.

In 1989, a fibre-optic cable was laid between Sweden and Denmark.

In 1989, PTAT was the first privately owned cable across the Atlantic.

Between 1992 and 1993, three new Atlantic cables were laid, TAT-9, 10 and 11.

Televerket bought capacity in TAT-8, PTAT and TAT-9, which gave several alternative routes and increased redundancy as a consequence.

In 1994, CANTAT-3 was laid between Europe-the Faroe Islands-Iceland-Canada, with Teleglobe as the Canadian promoter. All the Nordic countries were now connected with this new technology.

Estonia was connected with Sweden by a fibre-optic cable in 1995 by Telia, Eesti Telefon and Danish GN Store Nord

In the North Sea, the Odin cable was installed connecting SE-NO-DK-NL and also the Rioja cable between NL-BE-UK-ES as an extension to the TAT cables. At this point in time Telia received an operator's licence in the USA and a new era began when Swedish owned USA connectivity was created replacing expensive leased capacity.

An optic-technology break-through in the middle of the 1990s produced optical amplifiers which regenerated the light impulses in cables. Thus, it was no longer necessary to transform to and from electrical impulses. These innovations meant that many light signals at different wave-lengths could be transmitted simultaneously. Some twenty channels, each with a capacity of over 1Gbit/sec, could be carried in every fibre pair.

In 1995/96 TAT-12/13 came into service, a pair of cables which were the first combining optical amplifiers and cable ring-construction across the Atlantic.

In 1998 the privately owned Atlantic Crossing AC-1 cable was laid which had Telia and the other Unisource partners as major tenants.

In 2001 Telia invested 5.9% in the trans-Atlantic TAT-14 cable with a double-ring construction. It includes a spur to Denmark where Telia Denmark has installed a landing station, thereby allowing the whole Group to utilise its own capacity to the USA, independently of other operators.

Capacity has developed at such a pace that the majority of older cables have been de-commissioned prematurely because they are no longer competitive. Prices have

also sunk dramatically and cables now play the dominant role on all major telecom routes.

Over the years Telia has purchased capacity in some 50 international cable systems as either co-owner or tenant. However, many of them have already been removed from service.

3.3 Satellite organisations

When the space-age started after the Soviet Union's Sputnik in 1957, Telecom development via satellite was one of the first civilian applications. With Telstar, which circulated in a low earth-orbit, the USA demonstrated trans-Atlantic television transmission in 1962. In 1964 came Syncom, the first geo-stationary satellite at 36,000 km directly above the equator and which could transmit signals without interruption.

Over the years, three multinational satellite organisations have been created:

- Intelsat for global terrestrial communication (1964 prov./1972 permanent)
- Inmarsat for global shipping communication (1979)
- Eutelsat for European terrestrial communication. (1977 prov./1985 perm.)

They were created in a time of national monopolies, as international organisations with a two-tier structure. Countries were parties at the political level and their tele-administrations were signatories at an operative level. These organisations acted as a kind of international co-operatives, where the participants were both financiers and customers. Sweden and Televerket were members of all three from the beginning.

As the telecom world liberalised, competing operators at regional and national level fought for shares of a growing market. At the same time, digital optical fibres with enormous capacity were installed all over the globe.

Wherever possible, traffic was moved from satellites to fibre cables. In order to adapt to these changing conditions, the three satellite organisations were privatised around 2000. They all three continue to exist but in completely new structures. TeliaSonera sold all its shares in all three satellite organisations between 2003-2005 and purchases its satellite needs from other operators.

Satellite capacity is limited by the finite room available in geo-stationary orbits and by available radio spectrum frequencies. In the 21st century satellites are used primarily for TV distribution, for mobile or temporary communications or when terrestrial networks are not available.

In 2004 TeliaSonera closed down the satellite earth-stations at Tanum and Ågesta, including all related personal and leased capacity in a number of satellites.

3.3.1 Intelsat

When Intelsat was created the idea was a more or less natural global monopoly for the business. A provisional organisation with 19 countries was started in 1964 which was made permanent with 73 countries in 1972. An American company, Comsat, became Intelsat's executive body with offices in Washington D.C. Participants loaned Intelsat capital in proportion to their traffic shares in the system. Intelsat had a Board with 25 members, the Nordic administrations shared one seat. The first

board member was Televerket's director general Håkan Sterky. He was succeeded by technical director Erik Esping who was even chairman in 1967.

The first satellite, Early Bird, was fired into orbit in 1965. Intelsat placed satellites in strategic positions to cover the world's three main oceans, the Atlantic, the Pacific and the Indian Ocean. Initially, very large earth-station satellite dishes with a diameter of over 30 metres were needed to capture the weak signals. The participants used Intelsat to transmit telephony and TV.

Gradually the transmitter power in the satellites increased and receivers got better making it possible to use smaller and cheaper dishes. These could be placed on an individual customer's site and marketing opportunities flourished radically. Self-contained company systems were sold with the head-office as the hub in a network of small earth-stations in different countries, (VSAT, Very Small Aperture Terminals). Direct TV to individual households was possible, (DBS, Direct Broadcasting Satellites). In this way satellites were used directly by individual customers.

By the 1990s Intelsat had grown into an organisation with nearly 150 member countries and more than 100,000 telephony channels. The Soviet Union built its own communications satellite system and entered Intelsat quite late.

When Intelsat eventually became exposed to competition in the increasingly competitive market, it became clear that the organisation was not sufficiently flexible or nimble. Intelsat's offering was split in two. One part was TV distribution, where satellites still had an advantage. The other part was two-way communication which became increasingly vulnerable to competition from cable. Both were later corporatized.

In 1998 Intelsat was split in two parts and five of Intelsat's TV satellites were transferred to Amsterdam-based New Skies Satellites N.V. A second step was taken in 2001 when the rest of Intelsat was privatised. Intelsat Ltd, based on Bermuda, became the parent company in a group still owned by the original member states.

The member states created at the same time a small international organisation, (a "residual" Intelsat) called ITSO (International Telecommunications Satellite Organisation) with a mandate to safeguard that Intelsat did not desert its universal-service obligations to the world's sparsely populated areas.

After privatisation the ownership was re-structured. In 2004 Intelsat purchased four satellites from (US) Loral and became a national operator in the USA as well. 2005 saw more ownership changes and a private equity company created Intelsat Holdings Ltd which took over Intelsat. In the middle of 2006, Intelsat merged with PanAmSat and became the world's largest satellite operator.

3.3.2 Intelsat and Sweden

Televerket was an active participant in the use of satellites right from the start. Director General Håkan Sterky was personally involved and started a number of initiatives. In 1960 he raised the question within CEPT regarding the use of satellites for international communication and in 1961 proposed the creation of a European group as a counterbalance to the USA.

In 1961/62, the STSK (Scandinavian Tele-Satellite Committee) was created together with the Norwegian and Danish telecom administrations. STSK agreed with

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Chalmers Technical University to utilise prof. Olof Rydbeck's planned radio-telescope on the Råö peninsula to experiment with satellite communication. The telescope was inaugurated in 1964 with the first trans-Atlantic TV transmission to Sweden. In 1967 STSK left Råö, Finland became a member and the name changed to NTSK (Nordic TeleSatellite Committee)

Initially the Nordic administrations utilised the British earth-station at Goonhilly Downs for operative traffic. Later they agreed to build a common Nordic earth-station at Tanum on the west coast of Sweden. This station was launched in 1971 and owned by the Telecom administration in SE/DK/NO/FI in proportions 42/24/24/10. Traffic was initially only trans-Atlantic, but at the end of the 1980s Tanum was extended to include traffic over the Indian Ocean, at which time earth-stations at Blaavand in Denmark and Nittedal in Norway were built. Co-operation via Tanum terminated and from 1990 Tanum was owned by PT Finland and Televerket alone.

Tanum became a reference earth-station in 1984. By 1990 it was responsible for 50% of Televerket's non-European traffic (equivalent to 5% of the total foreign traffic) which was later gradually transferred to new cable networks.

Televerket's satellite business was originally run by a unit within Televerket Radio. After Telia was created, the satellite business became part of Network Services in 1996. In 1998 a separate satellite division was created which was disbanded in 2002.

Televerket's initial ownership in Intelsat was 0.7%. TeliaSonera sold all their shares in New Skies Satellites N.V. in 2003 and in Intelsat Ltd in 2005.

Tanum earth-station was sold in 2004 to Tanum Maskinstation, a local company. Some telecom activity remained but the majority has been disposed of. TeliaSonera's traffic is today transported via alternative routes.

Intelsat's last Director General was a Swede, Conny Kullman. He was nominated in 1998 after a dramatic election campaign and ran the company until 2005.

3.3.3 Inmarsat

After Intelsat it was a natural step to develop mobile satellite communication to the shipping world with much better quality than was possible with short-wave radio.

Much of the technical development was done by ESA, (European Space Agency), which developed the MAROTS satellite. The European tele-administrations were also involved in discussions to decide how a system could be developed and run.

Inmarsat started life during the early 1970s within IMCO (the International Maritime Consultative Organisation) in London. In 1976, an international convention was agreed which Sweden signed in 1979 when Inmarsat was established with its head office in London.

Inmarsat had a similar structure as Intelsat on two levels, with parties and signatories. There were about 30 member countries from the start, growing to 40 in 1984 and to 63 by July 1993. Thanks to Norway, the Nordics were a significant participant in Inmarsat, with a 30% shareholding in 1992. The telecom administrations in SE, FI, CH and IS jointly had one seat on the Board of Inmarsat.

The first satellites were leased from 1981. A number of satellites were combined to ensure coverage of the three major ocean regions.

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The original structure became exposed to competition and was eventually out of date. In 1999, Inmarsat was the first of the three satellite organisations to go public when Inmarsat plc was formed in London. At the same time, the IMSO (International Mobile Satellite Organisation) was started to ensure that the new company complied with the obligations to supply maritime safety services.

Inmarsat launched geo-stationary satellites, providing primarily voice and text communication. Eventually services were expanded to aeroplanes in 1989 and to vehicles and terminals on land in 1993.

The Nordic telecom administration had a common earth-station in Eik in Norway between 1982 and 2002 and co-operated with others globally.

In the 1990s Inmarsat was challenged by new types of satellite systems using swarms of low orbiting satellites circling the globe every 1.5 hours. Telia signed an agreement with one of them, Motorola's Iridium, in 1998. The satellite altitude was so low that world-wide coverage using a hand-held telephone was feasible. None of these systems were a commercial success. However, some of them still live on after bankruptcy and re-construction.

Televerket and the Swedish Maritime Administration were very much involved in the technical work behind Inmarsat. Olof Lundberg from Televerket's Radio division in Göteborg played a leading part. He was Inmarsat's first Director General in 1979 and after two re-elections remained in this role until 1995.

Within Televerket and Telia, Inmarsat activities were managed together with other radio business. Televerket initially owned a 2.3% share of Inmarsat. This share varied over time falling to 1.0% in 1998. The Balkan conflict in the mid-1990s led to substantial telecom traffic from Swedish customers in the region which was handled by Telia. .

From 2000 the satellite business changed perspective within Telia and after the merger with Sonera, all its Inmarsat shares were sold in 2003. Existing mobile satellite customers were taken over by Telemar Scandinavia, a newly formed company with some personnel from Telia.

3.3.4 Eutelsat

Countries involved in the European Space Agency (ESA) agreed in the 1970s to create a European independent telecom satellite capability. A first Orbital Test Satellite (OTS) was launched in 1978. The next project was an operational satellite system called ECS (European Communications Satellites). The first two were launched in 1983 and 1984. ECS needed an operative management organisation.

Prompted by representatives from FR, IT, CH and Sweden, plus the European telecom administrations within CEPT as a base, Eutelsat was formed in 1977 as an interim inter-governmental body for regional satellite communication in Europe. A definitive agreement was reached in 1982 which came into force 1985. Eutelsat had offices in Paris with initially 24 countries as members. A number of Eastern European countries, which had signed the Helsinki convention, joined Eutelsat in the early 1990s, increasing the membership list to 48.

In 2001 the organisation was corporatized and became Eutelsat S.A. based in Paris. A small inter-governmental supervisory organisation, EUTELSAT IGO (Inter-Governmental Organisation), remained after corporatisation. Changes in the

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ownership structure were also made. In 2005 the major owners created a new investment company, Eutelsat Communications, which owned over 95% of the capital in Eutelsat S.A. and was listed later the same year.

Eutelsat's satellites were used both for telephony and for TV distribution but the need for telephony capacity was reduced as optical cables became more common. However, early on, Eutelsat offered a modern digital telecom network over the whole of Europe and gave nations on the periphery the possibility to reach each other directly, putting pressure on transit costs for cables through central Europe. Eutelsat was also used to establish modern VSAT solutions for major companies in the under-developed Eastern Europe.

Eutelsat's market became dominated by mass media services. The satellites were concentrated to a few geo-stationary positions in order to offer hundreds of channels from the same place. Even Eutelsat was affected by competition, not least from SES in Luxemburg, where Swedish Kinnevik had major interests.

The Nordic telecom administrations collectively utilised Eutelsat via, amongst others, a Swedish earth-station built at Farsta in Stockholm in 1985. This station was taken over by the Swedish Space Corporation in 2003, which continues to run it in a slimmed version as the Stockholm Teleport.

In 1985, Televerket's share in Eutelsat was 5.45% which reduced to 3.14% at the end of 1992. Telia's share at the end of 2001 was 0.7%, which was sold in 2004.

During the war in Bosnia, Telia helped arrange international connections with Sarajevo via Eutelsat.

In 1995 Telia placed a 1.9 billion SEK order for six transponders on a 12 year contract for CATV usage. A short time later in 1996 Telia leased six transponders instead from the Swedish Sirius satellite for 1.5 billion SEK and attempted to phase out the Eutelsat capacity. This became a major task for Telia's Satellite Division, which eventually managed to dispose of four transponders to other users. Even the Sirius capacity was phased out, without ever coming into use.

3.3.5 Nordsat and Tele-X

Nordsat was a regional Nordic project which came to life in 1975 as an answer to a proposal from the Swedish Board for Space Activities and the Swedish Space Corporation regarding an investigation by the Nordic Council of Ministers into cross-border television. This indicated that satellite technology could very well be used for a Nordic exchange of TV programs. The Nordsat proposal was sent to all the Nordic countries for comment. This created a lot of debate and was investigated three times. The Nordic telecom administrations felt that TV distribution was traditionally their responsibility and pleaded technical misgivings.

A special question was the availability of frequencies for DBS which were to be allocated at the WARC-77 ITU conference, in Geneva, where Televerket led the Swedish delegation. The plans for Nordsat anticipated that the Nordic countries could reserve somewhat wider antenna beams in order to cover the whole region. This proved possible, thereby removing one obstruction in the creation of Nordsat.

However, after much investigation, program production and copyright costs proved to be so excessive that it was impossible to find the necessary funds from cultural political budgets and in the end Nordsat died before it was even born.

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During this same period a smaller project called **Tele-X** was proposed. This was an industrial politically motivated idea and a component in a space endeavour for Swedish industry which was initiated by the Government in 1979. Tele-X was equipped for direct broadcasting of TV and high-speed data transmission according to a decision in 1982. After several delays, the satellite was launched in 1989 on board a European Ariane rocket. Tele-X functioned satisfactorily and remained in operation until 1997 under the control of Esrange at Kiruna in Northern Sweden.

The original idea was that Tele-X would be a co-operative venture with Norway and Finland but in the end it became a Swedish-Norwegian project in 1983. The satellite was to be developed by NSAB (Nordic Satellite AB) formed in 1982 and owned 85-15 by Sweden and Norway. After launch, the operation of Tele-X was meant to be taken over by Notelsat, owned 50-50 by the telecom administrations in Sweden and Norway. Notelsat was based in Sweden with a Swedish MD (Karl-Erik Eriksson), followed by a Norwegian (John Veastad) whilst waiting for launch.

Unfortunately this Nordic co-operation broke down completely in conjunction with the launch. NSAB became a wholly owned Swedish company in 1989. Notelsat never fulfilled its planned function and was disbanded in 1991, whereby NSAB retained management responsibility for Tele-X

In conclusion, Televerket put a great deal of effort into these two regional Nordic satellite projects and at the end of the day saw very little business from them. Amongst other things, Tele-X was used for TV distribution and remote newspaper typesetting. Televerket was never involved directly in the operational aspects of Tele-X which NSAB later continued with the Sirius satellites.

3.4 International data, telephony and telegraphy services

Telecom history comprises the following services and technology developments.

Data-transfer via digital data networks dominates today's international telecom traffic volumes. This is due not least to the Internet which was opened for public use around 1995. Initially it was a closed network within the US academic world. The Internet as we know it today started in 1969 as ARPANET which connected main-frame computers via dedicated lines. The next stage was connecting PCs over the fixed telephone network, followed by a third stage when the Internet became accessible over mobile devices.

Over the years transport capacity has dramatically increased via optical cables and computing power followed suit – just two reasons for the Internet's surprisingly speedy impact. Technology was based on the data networks deployed from 1980 onwards to meet market requirements for huge data volumes. Packet-switched networks were installed all over the globe which effectively utilised available transport capacity. The actual time-transfer of this data varied but was tolerated. To combat this, the telecom world developed the X-25 protocol, while at the same time the academic world developed the TCP/IP protocol as the basis for the Internet. Today this is the dominating data transfer technology.

International **telephony** is a fast growing service not least since GSM **mobile telephony** offered international roaming was available from the early 1990s. Since the year 2000, the number of the world's mobile phones has surpassed the number of fixed phones. Around 1980, telephony started to be transported via digital

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technology and speech quality no longer deteriorated in relation to distance. It was also possible for other services like telefax and data to piggy-back on the telephony network. Between 1880 and 1980 telephony used analogue technology. The speaker's microphone oscillations were transported to the listener's receiver and the telephone network was constructed specifically to do this. Telephony first became a true international service in the mid 1920s when electronic amplifiers dramatically increased coverage and overcame the microphone's limited power. Prior to this the low power of the microphone limited coverage to about half the length of Sweden.

The oldest service, the **telegram**, was phased out by Telia in 2001. It started in 1853 in Sweden. The telegram service had its peak around 1950 and faded away soon thereafter. It was complemented since the 1940s by a telex service which connected customers directly. Until the 1920s, the telegram was the only significant international telecom service, with a global reach since the late 1800s. The technology was simple, based on robust digital electro-mechanics long before electronic amplifiers were invented.

International Services is a business with long-standing origins. Telia and Televerket have received and terminated traffic from foreign operators and their customers for as long as data, telephony and telegraph networks have been connected with the outside world. International telecom services with foreign countries have been available for Swedish customers just as long, normally on a reciprocal basis.

3.4.1 Telephony tariffs

For many years, only *out*-bound traffic was considered to be a business activity. International traffic was conducted on a strictly bilateral basis between a pair of monopoly operators according to principles agreed within the ITU. For a telephone call from Sweden to another country, Televerket received a fee from the customer making the call, normally calculated on a per-minute basis. If the call was to a country where Sweden had a direct connection, Televerket paid a tariff (fee) to the foreign local telecom monopoly for connection to the called party. For both in- and outbound calls this tariff between operators was calculated from a theoretical mid-point between countries. If the total amount of traffic in both directions was equal, the net payment between operators was zero. However, traffic to most international destinations *from* Sweden was generally greater than traffic *to* Sweden, resulting in a tariff settlement deficit which foreign operators paid to Televerket.

These agreed tariffs between operators were initially excessive and rose sharply as distance increased. This meant substantial revenues for many developing countries which had a net flow of incoming traffic and who naturally insisted that this system should continue when increased competition eventually forced tariffs downwards.

At the end of the 1980s it became possible in a more liberal world to circumvent this bilateral monopoly system by sending traffic via new and unconventional routes. The old system was undermined and had to be replaced with a new approach. In and out-going traffic between countries became two separate businesses and increasingly independent of each other. Televerket began to implement this method in its accounts from 1989.

In 1988, the ITU World Administrative Telegraph and Telephone Conference (WATTC-88) in Melbourne Australia acknowledged this new situation and agreed to revise the old rules. After tough negotiation, the conference eventually established that it was possible for member states to introduce mutual new and liberal rules (called “special arrangements”) in parallel with the old monopoly rules.

This action started the collapse of the old International Accounting Rate system and by 1990 an innovative wholesale business had started to appear in a number of countries, offering telephony to many global destinations at attractive rates. New cables and satellites provided a massive increase in capacity and when this was made available a whole new competitive market opened up for international telephony. Even the old monopolists started to compete on each other’s home markets, which resulted in a substantial reduction of international calling-costs for the lasting benefit of customers.

Telia was an early player in this market, opening a UK business in 1993 and utilising the embryonic principles of wholesale to transport international traffic. The lessons learned from Telia’s UK, and a little later Telia’s USA wholesale activities, became the concept for Telia’s International Carrier business which started in 1999.

3.5 Infonet

By the beginning of the 1980s, liberalisation and computer developments had come so far that many multi-national companies established their own closed private data-networks using leased-lines to connect their subsidiaries as one common organisation. Internal activities such as accountancy, logistics, production planning, the flow of raw-materials and money etc., could now be more effectively monitored and controlled. Some companies went further and started their own data-networking subsidiaries which often resulted in long discussions with the telecom providers on leased-line pricing and delivery aspects. In nearly all countries the public data-networks were generally regarded as below standard and did not fulfil the necessary requirements for security and functionality. This vacuum created a separate international market for customers active in many countries.

One major American data-services company, CSC (Computer Sciences Corp), had its own data-network (Infonet), with access points in the most interesting countries all over the globe. In 1988 Infonet became a limited company, registered in California. A number of telecom administrations accepted an invitation to become co-owners, one of which was Televerket which purchased a 5% share. The motivation was to offer international services to Swedish companies with multi-national activities.

In Sweden, Infonet data-services were sold first by Interpak and from 1989 by STI. In 1993, Televerket started Infonet Svenska AB, a subsidiary based in Stockholm, acting as a dedicated sales channel to the Swedish market.

None of the many owners in Infonet could dominate its activities and this allowed the management to run its business without disruption. However, the ownership situation changed over the years as various other alliances came and went.

Infonet acted in addition to other Telia ventures until the end of the 1990s when Unisource was liquidated. When this happened, Infonet took over the activities which Unisource had managed within the AUCS’ framework.

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During 1999 Telia increased its ownership in Infonet from 19% to just over 20% thereby becoming a Telia- associated company. In December Infonet was successfully launched on the New York and Frankfurt stock-exchanges

Over the next few years Infonet stopped evolving at a time when a new dynamic period was sweeping the globe. In 1995, Telia decided to leave Infonet and sold its 20% shareholding to BT for 1,300 MSEK. At the same time BT purchased all the remaining Infonet shares and incorporated the company into its own business.

3.6 Teleinvest's international services

Major Swedish customers with foreign subsidiaries started asking for new services during the 1980s. One example was leased-lines for company data-networks from a single supplier (One stop shopping). They even asked for services abroad, not just in Sweden and be spared the difficulty of having to contact individual national suppliers. Teleinvest started the following five companies to help customers.

3.6.1 Tele-K

In July 1984, a consultancy unit within Televerket became Tele-K AB, a subsidiary of Teleinvest. Tele-K offered consultancy help to the telecom-areas under the name of Televerket International but it proved difficult to co-ordinate the supply of many different services. Tele-K changed name to TeleDelta in 1987 and the product offerings also included value-added services.

3.6.2 Interpak Network Services

Interpak was created by Teleinvest and Datema consultants in 1986 to market Infonet services on the Swedish market. Infonet had a global packet-data network with access points in a great many cities which were in turn inter-connected with national networks. Interpak was a sales support function for Televerket's salesmen.

3.6.3 Mailstar

Mailstar was created in 1986 with Teleinvest as the majority shareholder with the objective of providing satellite services for e-mail to multi-national companies.

Mailstar was a Swedish concept for a messaging system. An on-board computer in a miniature satellite placed in a near Polar orbit could be loaded with messages when it passed over its home earth-station. These messages would be downloaded to customers via small earth-stations. At the same time new messages were uploaded for delivery to the home earth-station on the satellite's next passage and thereafter to be passed-on to their destination via the terrestrial network. Analysis showed that the development costs were too high for the project to be successful.

3.6.4 Vesatel

The resources from Mailstar were transferred to a new company, Vesatel AB, which started in 1988. The idea was to offer communications networks to multi-nationals using VSAT-terminals. A network comprised a hub-station at a head office connected to small-stations at its foreign subsidiaries using satellite capacity from Intelsat or Eutelsat. The main advantage was fast and flexible installation. Several Swedish companies operating in countries far-away purchased this service.

Vesatel was transferred to the Unisource Alliance in 1991.

3.6.5 STS, Scandinavian Telecommunications Services

In 1987, STS was started in Sweden to improve the range of services for international companies. The year after, STS was expanded to include all the Nordic telecom administrations in Nordtel, owned proportionally 48/16/16/16/4 percent. However, STS was never fully accepted by the Nordic parents who tended to see this new company as a competitor. Nordic ownership was terminated in 1990.

3.7 STI, Swedish Telecom International AB

In 1989 Televerket assembled all its international telecom resources within a new subsidiary of Teleinvest named Swedish Telecom International (STI). Interpak, Vesatel, the Swedish part of STS, plus Televerket's international network services were integrated into STI. In addition, Televerket's shareholding in Infonet was transferred to STI and TeleDelta became a subsidiary. By accumulating all these resources in one centre of competence it would be easier to assist Swedish companies abroad and to deliver the qualified services that were needed. Another task was to provide customers with easy-to-use international telephone-services such as Sweden Direct and international telecom-card services.

When the Iron Curtain collapsed in 1989 new opportunities opened up in an emerging liberalised European market, not least when licences to build and operate mobile systems became available. STI took full advantage of this situation which is explained in the chapter on Foreign National Activities.

After the creation of Telia, all the international activities of STI were re-allocated internally. International Business Development became the Head-Office International Division in 1994. International Network Planning and International Accounting were transferred to the Network Services Division, whilst development and marketing of international telecom services moved to the Telecom-Services Division.

3.8 Unisource

In the late 1980s, Televerket's and the general consensus was that within a few years the European telecom market would be dominated by just a few very large operators. After STS was closed down Televerket initiated discussions with PTT Telecom Netherlands whose Chairman had good Swedish contacts.

The Unisource alliance between Televerket and PTT Telecom Netherlands was announced in October 1991 at the Telecom 91 exhibition in Geneva. The first venture was Vesatel BV in Amsterdam to provide international satellite solutions.

Holding-company Unisource NV was formed by Televerket and PTT Telecom Netherlands in June 1992 and two operative companies were created, Unisource Business Networks (UBN) and Unisource Satellite Services (USS). UBN was responsible for all national and international data-com activities in both Sweden and the Netherlands. USS comprised Vesatel BV and its satellite network for enterprise communication.

In 1993 Switzerland's PTT Telecom joined Amsterdam-based Unisource at which time two new subsidiaries were created: Unisource Mobile and Unisource Cards. In

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the same year Unisource signed strategic co-operation agreements with KDD in Japan, the airline organisation SITA and with Telefónica in Spain. Unisource now operated a pan-European digital network with a wide selection of data-services.

In December 1994 Uniworld was created, owned 60% by Unisource and 40% by AT&T as a joint-venture to provide services to multi-national enterprises. The first major order was a frame-agreement with the European Voice Users Association (EVUA), an organisation of some 70 large companies which strived to lower their costs for telecom services through buying in bulk. Uniworld was in its turn connected to the World Partners Association, an alliance between AT&T, KDD, SingTel and Unisource for global services, in which Unisource had a 20% share.

Unisource Mobile started activities also in 1994, but its strategy to establish GSM operations in Europe was unsuccessful. Unisource changed direction and turned its attention instead to providing services which integrated fixed and mobile solutions. To this end, an integrated pan-European backbone service network with global reach was established in 1995. Together with AT&T, Unisource developed a new generation of IVPN telephony services for the EVUA.

The strategy for Unisource was to be a leading supplier in Germany, France, Italy and the UK as these countries had 70% of the data and telecom market in Europe. Two subsidiaries were created, Siris in France and CNI (Communications Network International) in Germany.

During 1995 it was agreed that Telefónica would become the fourth member of the Unisource alliance on 1 March 1996. During 1996 Unisource notified the EU-Commission about the agreement with Telefónica but a change of Government in Spain created a drawn-out negotiation process on the terms for the EU to approve the deal

During the same year Unisource intensified cooperation with AT&T through the formation of AUCS (AT&T – Unisource Communications Services, formerly Uniworld). It took until the end of the year before the EU-Commission approved both the conditions for Telefónica's entry into Unisource and the AUCS venture.

In 1996 Unisource and AT&T each acquired 7.5% of the shares in Arcor, a German company created by the merger of CNI and DBKom (owned by the German State Railways). Arcor was a fixed telecom supplier competing with Deutsche Telekom.

In France, Siris offered national telecom services to the enterprise sector and was at the same time a distributor of the AT&T- Unisource product portfolio. During 1996 Unisource acquired CGE's share in Siris.

Unisource came under new top-management in November 1996 and major measures were taken to streamline the business which was under pressure due to the cost of starting new businesses in local markets. This involved three activities: AUCS (which sold pan-European services to multi-national companies), Unisource Carrier Services (which provided a pan-European network) and International Business Development (which developed co-operation in local markets). AUCS took over responsibility for Unisource Satellite Services in 1997.

During 1997 negotiations regarding Telefónica's exit from Unisource were finalised, officially from 1st January 1998. A co-operative agreement-in-principle between Unisource, AT&T and Telecom Italia was signed in 1997.

Excessive network costs to buy capacity from national operators meant that profitability within Unisource was impossible to achieve. Telia decided to reduce its shareholding in Unisource. The Unisource owners decided to re-purchase the data-com businesses in their respective markets. In 1998 Telia acquired Unisource Business Networks AB.

In 1998 AT&T announced that it would partner with BT and liquidate its involvement with Unisource by the middle of 2000. During 1998 the other Unisource owners also decided to terminate their activities in Unisource.

All the Unisource companies were disposed of during 1999, with the exception of the business within AUCS which became wholly-owned by Unisource. Infonet and Telia International Carrier became alternatives for customers needing global reach. Telia purchased Unisource Iberia, an Internet operator, which was later liquidated.

Unisource and its owners signed a three-year management agreement in 1999 with Infonet Services Corporation regarding the business in AUCS which was thereby sold to Infonet. AUCS was finally liquidated at the end of March 2004.

Unisource was dissolved on 1 July 2000 and all assets were divided pro-rata to each respective owner. In Telia's case the recipient of these assets was Telia Telecommunications International B.V.

3.9 International Carrier

Televerket's Network Division started offering national wholesale network services to competing operators already in the early 1990s as a result of the open market situation in Sweden. Interconnect agreements with the three GSM operators were signed in 1992 followed by contracts with an increasing number of national fixed network operators. As a reciprocal consequence of Sweden's liberal telecom policies, Telia was awarded licences in the UK (1994) and the USA (1996) and thereby made early inroads on the growing international markets. Telia was early in establishing its own connections with the UK and USA, dramatically reducing costs as a result. This also made it possible to connect with other new operators who had established operations in London and New York. The net result was much lower costs than the old monopoly-based international accounting rates which were gradually undermined. In addition, Telia established an embryonic network infrastructure in the strategic markets of the UK, Germany and the USA in 1997.

In 1994, Unisource established a company for the international carrier business, Unisource Carrier Services (UCS), primarily to create traffic capacity for Unisource and its owners. Initially UCS was obstructed in its efforts for regulatory reasons but in 1997 was able to start offering services on a commercial basis to other operators. However, stiff competition meant that profitability was hard to achieve. It was decided to liquidate the company and in 1998-99 the network UCS had created was divided between the different owners.

Telia established the Telia International Carrier (TIC) business unit in March 1999 to create an international network offering four services: Voice transport, IP connectivity, Leased lines and Infrastructure (canalisation, dark-fibre and equipment co-location). The business strategy was to offer these services independently of geographical location and the international accounting rate system, to Telia itself and to other operators from anywhere on earth. A major component in this strategy

was a belief that around the year 2000 international IP-traffic would explode as the consequence of a massive world-wide growth in both fixed and mobile (3G) broadband but this strategy was somewhat optimistic. The belief was correct, but it happened several years later. A number of other companies had the same idea and competition was fierce.

The Scandinavian Ring was built in the Nordic countries and the Viking Network became an international fibre network, composed of both own cables plus fibres exchanged through swapping with other operators. The International Telia Clearing House was an important new service offering international telephony and Internet traffic -settlements to operator customers. During 1999 TIC established subsidiaries in eight countries (FR, DK, FI, PL, UK, SE, DE and US) plus a representative office in Singapore to own licences and network components in each respective country.

The Viking Network was enlarged during 2000 via the exchange (swapping) of both canalisations and fibres. The number of contact nodes increased from 27 to 52. In May 2000, TIC's US subsidiary Telia Internet Inc. purchased the US Internet operator Apex Global Information Services (AGIS), which had recently filed for Chapter 11 bankruptcy. Buying AGIS gave TIC the much coveted Internet Tier-1 status and Telia's presence in the United States changed dramatically from being a gateway-operator to a supplier of backbone services on a major scale. Operator customers were now connected to the Viking Network in 11 US cities. During the year, additional subsidiaries were established in nine countries (BE, IT, NL, NO, RU, CH, ES, AT and HK).

The Viking Network's components in the USA and Europe were completed during 2001 and were connected over the Atlantic via the TAT-14 cable, in which Telia owned 5.9%. The entire network was equipped with wave-length multiplexing equipment and monitored 24/7/365 (from Sweden) to ensure controlled quality and security. By mid 2001, 12 billion SEK had been invested in TIC.

Too many players, failure of the expected traffic growth and not least the IT bubble busting the year before all contributed to a turbulent situation. During the 4th quarter 2001 it was decided to write-down the book-value of Telia International Carrier by 3 billion SEK, primarily for swapping deals.

Uncertainties and market turmoil continued. There were still too many competitors, traffic growth was too slow and prices were continuously falling. One after the other carriers went bankrupt. TIC changed strategic direction during the 3rd quarter 2002 to concentrate on only selling wholesale capacity, IP and telephony in the profitable parts of the wholly-owned network in Europe and across the Atlantic. Transport of Internet traffic in the IP-network was also included. However, the rest of the business saw major reductions. All activities in Asia were disbanded as was national telephony for both residential and business customers in the UK and Germany. National capacity services in the USA were also disbanded. These developments led to an asset write-down in 2002 of 6 billion SEK and a reservation for re-structuring costs of nearly 4 billion SEK.

After the TeliaSonera merger, International Carrier was one of the companies which survived and revenues continued to grow in anticipation of increased traffic volumes which finally came several years later than originally had been expected.

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4 Foreign national activities

This chapter covers the period when Telia started to expand its business outside Sweden and created new national telecommunication companies all over the globe mostly in partnership. These activities began around 1990.

They can be summarised in the following regional groupings:

- The Nordic countries
- The Baltic countries and the area around the Baltic Sea
- The rest of Europe and the USA
- Africa, Asia and South America

At the end of 2002 Telia had a broad range of activities through subsidiaries in the three **Nordic countries** Denmark, Norway and Finland. The Finnish ones were dissolved after the merger with Sonera in 2002. The activities in Norway were affected by two attempts at an alliance with Telenor in 1998 and 1999, but which resulted in a resounding crash by Christmas 1999. Activities in all three Nordic countries were initiated around 1995.

In the three **Baltic countries** Telia acted largely in tandem with Sonera and established co-ownership in fixed line and mobile service companies. Activities started in *Estonia* in 1991, in *Latvia* in 1992 and in *Lithuania* in 1997.

In the rest of the **Baltic area** Telia participated in the Russian mobile market through MegaFon from the year 2001. Telia entered the *Russian* mobile market in 1993 through ownership in North West GSM, a mobile company operating in and around St. Petersburg. In *Poland*, Telia devoted major efforts to Netia, a fixed line company active in large parts of the country. Telia withdrew from the market in 2003 after considerable profitability problems. Netia started in 1996.

In the rest of **Europe** Telia was engaged in some ten countries during the 1990s. The major engagements through a wholly-owned subsidiary in the *United Kingdom* with fixed services which started in 1994 and was transferred to Telia International Carrier in 2000, in *Ireland* in cooperation with KPN in both fixed and mobile operations through partial ownership in Eircom 1996-2002 and in *Italy*, where Telia was a part owner in the mobile operator Omnitel during 1993-98. Telia's first commercial foreign representative office was opened in the UK in 1991.

In the **USA** Telia established its own operations in 1997 through a wholly owned subsidiary when it was possible to obtain a license for leased line and voice activities. The national activities were dismantled and the rest became a component in Telia International Carrier 2000-02. A US representative office was opened in 1993.

In **Africa, Asia and South America** Telia had operations in a dozen countries. They were mostly license applications and investments in fixed or mobile networks when opportunities appeared. Most of the operations were started around the middle of the 1990s and were prepared for dismantling in 2002 after Telia had decided in 2000 to narrow its activities to Sweden and its neighbours. The largest engagement by far was Tess in *Brazil*, a mobile company in the Sao Paolo region.

4.1 The Nordic countries

In the beginning of the 1990s the Nordic countries came increasingly into focus as interesting telecom markets due to increased liberalisation in the sector combined with a strong presence of multinational Nordic companies. Sweden and Finland had few formal hindrances to establish a new business and many of the larger European telcos decided to start operations in Sweden. In 1995, Tele Denmark, Telenor and BT (British Telecom) formed the Telenordia joint-venture in Sweden. Telecom Finland established a presence in Sweden the same year.

These actions radically changed the Nordic market situation. After intimate co-operation for three quarters of a century, the former Nordic incumbents now became competitors and a thorn in the side in each other's home markets. In 1998, when most forms of telecom monopoly were removed within the EU, it was now possible to compete for basic telephony services.

In 1995, Telia established subsidiaries in Denmark (Telia A/S) and in Norway (Telia Norge AS), with the objective of developing them into operators with a broad portfolio of services.

In 1996, Telia purchased 75% of Finnish Telivo Oy, a subsidiary of power company Imatran Voima. The remaining shares were bought a year later and the company was re-named Telia Finland.

In the Nordic markets Telia established fixed services (telephony, data-transfer and broadband), mobile services, CATV, and telephone directory businesses, more or less in every country but with varied results.

The Danish venture fought long and hard with profitability issues but after 2002 both the fixed and mobile businesses slowly became positive earners.

Development of the Norwegian business was hindered by two attempts at a merger between Telia and Telenor in 1997 and in 1999. The second attempt succeeded in October 1999 but was terminated soon after in December 1999. Telia's fixed business in Norway was sold to Enitel.

In June 2000 Telia was successful in buying Norwegian mobile operator NetCom right from under the nose of Danish TDC (who already owned 40% of the company), and thus Telia rebounded in strength back onto the Norwegian market.

During 2001 Telia started to integrate the Nordic mobile businesses. The intention was to create common network architecture and co-ordinate technical platforms to gain economies of scale, not least when developing and launching new services. A Nordic price-plan plus some pan-Nordic services were launched during the year.

Telia's portal business was concentrated to the Nordics. Synergies were gained by combining the technology and organisational aspects.

During 2001 Telia launched GPRS in Sweden, Norway, Finland and in 2002 also in Denmark. Telia was the first operator to introduce GPRS roaming between the four Nordic countries in February 2002, enabling customers to use Nordic data services.

During 2002 negotiations were conducted between Telia and Sonera which led to the merger of the two companies in December 2002. As a consequence Telia phased out all its Finnish activities.

4.1.1 Denmark, DK

The former incumbent, Tele Denmark, was established in 1990 as a holding company for the existing four regional companies (Zealand, Jutland, Funen and South Jutland) which had previously managed the entire telecom networks in Denmark. The company was partially privatised in 1994 and in 1995 the regional companies were incorporated into Tele Denmark A/S. The Danish market was finally de-regulated in 1996.

When Telia A/S was formed in 1995 the market was already working according to competitive conditions. Telia had many ambitions and the intention was to develop the company into a full-service operator when the market became fully liberalised.

Fixed network services

In November 1996 Telia installed two AXE exchanges in Eiby outside Copenhagen and Århus and an interconnect agreement was signed with Tele Denmark. Two wholly-owned fibre-optic cables were laid across the sound between Sweden and Denmark (Öresund). By year-end 1996 Telia A/S had taken 4% of the Danish market for international telephony and had a turnover of 96 MDKK.

In 1997 Telia established itself as a fixed network operator utilising its own prefix (1010) offering local, national and international telephony to residential and enterprise customers. Later during the year, internet, data-com services plus network capacity to other operators was also introduced. By the end of 1997 Telia's transport network encompassed the 6 largest cities and 80% of the market.

By the end of 1998 Telia's market share of international and national telephony had increased to 10% and 5% respectively plus a 10% share of the internet market.

The infrastructure company Powercom A/S was acquired for 310 MSEK in June 2001 greatly increasing Telia's broadband capacity in Denmark.

By 2002 Telia was the third largest supplier of fixed telephony to the end-user market with 257,000 customers and the second largest supplier of network capacity in Denmark. The dominant player was still TDC (Tele Denmark's name after 2000).

The fixed network business did not develop according to plan and during 2002 steps were taken to reverse this trend. Focus was placed on telephony sales to enterprises and residential customers, plus sales of network capacity on a wholesale basis to operators and service providers. New sales of unprofitable products were discontinued during Q4, 2002 and personnel were reduced by 91 to 336 employees. Consultants and temporary manpower were reduced by more than 100 and write-downs amounting to 3.03 billion SEK were made.

Mobile network services

Telia Denmark's mobile activities started in 1997 with the construction of 120 GSM-1800 base-stations in urban areas.

This new network was launched commercially in the beginning of 1998 when a national roaming agreement with (competitor) Sonofon was signed to give nationwide coverage in Denmark. Telia and Sonofon in Denmark were also the first in the world to transfer an on-going call in the same country between two different operator's networks with no break in the call (i.e. national roaming).

The history of Telia original

The Danish market now had four competing operators and one service provider.

In addition to pre-paid SIM-cards, Telia introduced two new concepts for mobile telephony, one for residential and one for enterprise customers. Sales were satisfactory and by the end of 2008 Telia's market share was 6%, the network covered 16% of the geography and 58% of the population.

During 1999 the GSM 1800 network-build continued in urban areas. The financial results were better but continued to be negative.

To ensure full geographic coverage Telia obtained a GSM 900 licence. During 2001 Telia was awarded one of four UMTS licences (3G) at a cost of 1.024 billion SEK.

The country-wide GSM 900 network was completed during 2002, which meant that Telia could offer more attractive services and better prices in Denmark. The product portfolio increased and in addition, faster mobile-data (GPRS) and mobile multi-media services were introduced in 2001 and 2002 respectively.

During 2002 mobile customers increased by 60% to 466,000 and as a consequence, profitability increased. Telia's 10% market share at the end of 2002 meant fourth place in the market. The main competitors were TDC, Sonofon and Orange.

CATV

In May 1995, Telia purchased 94% of Denmark's second largest CATV operator, Stofa A/S with 135,000 customers. Stofa started in 1959.

Upgrading the Danish CATV network for high-speed internet access, plus increased costs for customer service and telephony-invoicing, resulted in a lower underlying EBITDA result for the year 2000.

However the CATV business increased in July 2000 through the purchase of Jydsk Central Antenne A/S which was combined with Stofa in 2002.

By the end of 2002, Telia had 13% of the Danish CATV market (188,000 cust.) through Telia Stofa, and also offered broadband access to the internet over the CATV network (346,000 customers). Telia Stofa had become the second largest provider of CATV and the largest provider of broadband internet via CATV in Denmark.

Content services

In 1995/96, the newly formed subsidiary Telia InfoMedia A/S purchased two Danish directory companies and in 1997 Telia bought 51% of Chili Net A/S which produced information services on the Internet for young people.

In early 1998, Telia and Danish firm Egmont formed Egmont Online A/S offering internet-based entertainment services - in the first instance for the Danish market. Telia owned one third of the new company. In August the same year, Telia purchased 12.8% of the broadband technology company COCOM A/S.

Telia invested 402 MSEK in the mobility part of portal company Scandinavia Online.

In mid-2000 Telia divested its shareholdings in directory production company Any Media Solutions AB and in Danish Egmont Online A/S.

In late-2000 the Speedy Tomato portal was test-launched in Denmark.

The history of Telia original

4.1.2 Norway, NO

Former incumbent Norwegian Telecom became Telenor AS in early 1995. Telia Norway AS was formed at about the same time with the objective of developing the company into a full-service operator, as and when the market would become fully liberalised.

Fixed network services

From November 1996 it became possible to offer data-com, international telephony and mobile services via alternative networks in Norway. Full liberalisation of the market took place during 1998.

In early 1996 Telia Norway and Norwegian State Data Centre AS formed ENET AS, a company which would act as an intermediary to transport electronic mail. Telia had a 40% share. In December, 90% of Norwegian internet operator RiksNett AS was acquired.

The Norwegian regulations forced Telia to limit its portfolio of services which could be delivered over leased lines to closed user groups. By year-end 1997, Telia's Norwegian network covered 11 cities and 90% of the population.

On 1 January 1998 the Norwegian telephony market opened for competition allowing Telia to offer local, national and international traffic via its own prefix (1516). An interconnect agreement was signed with Telenor. Later, internet and data-com services were also offered.

In March 1998, Telia and Enitel ASA (a Norwegian telecom company formed by the power companies) created NorSea Com AS to install and manage an optic-fibre cable from Stavanger to five oil platforms in the North Sea and terminating at Lowestoft in the United Kingdom.

On 1 January 2000 the majority of Telia's fixed telephony services in Norway were transferred to Enitel ASA, as a consequence of the EU demands to approve the merger with Telenor.

Telia took over control of NorSea Com in September 2001 when Enitel's Norwegian network business went into bankruptcy.

Mobile network services

In 1998 Telia received a licence for GSM 1800 in Norway. However, Telia's network construction was put on hold awaiting the outcome of a case from another player who wished to enter the market without a licence and requested the right to utilise the dominant operator Telenor's mobile network. This was a test-case for what later became a global activity, Mobile Virtual Network Operators – MVNOs

At the end of June 2000 Telia had managed to buy 51% of the Norwegian mobile operator NetCom ASA (Established in 1989 by Nora, Orkla and Kinnevik), in spite of Danish TDC owning 40% of the company. By December, Telia took command of the entire company after a public bid to the other shareholders and a final compulsory redemption for the remaining shares. As a result the customer base reached 773,000.

NetCom ASA continued to develop in a positive manner and during 2000 was awarded a Norwegian UMTS (3G) licence. GPRS was launched in Norway in 2001.

The history of Telia original

In common with all the Nordic countries, Norway had a well developed mobile communication market and a penetration in 2002 of around 85%. In particular, SMS usage was already very high. By year-end 2002, NetCom's market share reached 30%, with nearly 1.1 million direct customers and a further 90,000 indirect customers via service providers.

Customer growth, increased traffic volumes per user and efficiency streamlining all resulted in an improved underlying EBITDA. The main competitor remained Telenor but in addition there were a number of service and/or content providers.

Content services

In June 1998, Telia's internet-based PC-services were transferred to Scandinavia Online AB, in which Telia owned 40%, Schibsted 40% and Telenor 20%.

In April 2000 Telia agreed with Nextra AS (a Telenor subsidiary) and Schibsted Multimedia AS to develop a pan-Nordic network of portals under the structure of Scandinavia Online AB (SOL AB) where Telia would own 26%. In 2001, SOL AB's business was acquired by search company Eniro.

4.1.3 Finland, FI

In Finland, competition was already established between the similarly sized state-owned Telecom Finland and privately-owned Finnet Group. Telecom Finland's activities were initially part of the Finnish Post & Telecommunications Administration. This was corporatised into PT Finland in 1994 and Telecom Finland was a subsidiary. Its name was changed to Sonera in the end of 1997, when it was partly privatised.

Fixed network services

The Finnish market was de-regulated and in 1996 Telia purchased 75% of the shares in Telivo Oy from power company Imatran Voima. Telivo was a telecom operator which specialised in long-distance and international telephony plus data-com services. At year-end 1996 the company's turnover was 130 MFIM (190 MSEK), amounting to four percent of the national and eight percent of the international telephony traffic revenues. In October 1997, Telia purchased the remaining 25% of Telivo, the company was renamed Telia Finland and was incorporated into the Nordic business structure.

In 1997 Telia offered Finnish residential and enterprise customers telephony via its own prefix (1041 for national long-distance and 994 for international). At the beginning of the year there was a slight reduction in market share for national and international telephony but by the end of 1997 this has recovered to four and eight percent respectively. During the year the telephony network was complemented with a network for data-com and Internet.

Internet and data-com services for the enterprise market were introduced in 1998 but Telia choose not to address the residential market due to the existing high penetration level. Market shares for national and international traffic increased to five and eleven percent respectively.

In June 1998 Telia and the Finnish State Railways started an alternative long distance fixed network in Finland called Railtelia Oy, in which Telia owned 40%.

The history of Telia original

In June 2001 all the shares in fixed-network subsidiary Telia Finland Oy were sold to Song Networks as a component in Telia's restructuring and concentration on core business.

Mobile network services

Through its purchase of Telivo, Telia inherited a GSM 1800 Finnish licence. This new mobile network started operations in Helsinki during December 1997.

GSM 1800 was established in some major cities during 1998 but Telia Finland made little inroads into the mobile market. Two concepts for mobile telephony were launched in the three main cities of Helsinki, Tampere and Turku. They were called "Telia City Basic" for residential customers and "Telia City Business" for the enterprise market. Unfortunately sales were somewhat below expectations, not least because interconnect negotiations with the other operators did not reach a positive result.

A national roaming agreement was concluded with Radiolinja in 1999 and WAP services were launched in December. In Finland the world's first UMTS (3G) licences were awarded and Telia received one of three. Expansion of the GSM 1800 network continued in urban areas.

In Finland, Telia owned the Sirkus portal which in a short space of time achieved a position of strength. GPRS was launched in Finland during 2001

A pre-paid mobile subscription, "Dual Pre-Paid", was a major Finnish success. By the end of 2001 traditional mobile subscriptions were similarly successful. During the year, customer numbers increased from 90,000 to 239,000 and both the volume of traffic minutes per user and the average revenue per user (ARPU) increased.

The underlying EBITDA improved due to increased revenues plus reduced costs attributable to a new roaming agreement with Suomen 2G.

However, during 2002, Telia Mobile Finland prepared for a potential disposal of the whole company to comply with the EU's demands as a condition for a merger with Sonera. In 2002, the Telia Mobile business area made a write-down of 536 MSEK in its Finnish Mobile Business.

Other

The Finnish business increased in 2000 through the purchase of Tietopuhelin, a major nation-wide distribution chain with some 70 tele-shops. The tele-shop network was subsequently rationalised and the two shop outlets, Viestitiote and Telia Vaitohtoliike were amalgamated. Telia now had its own shops in some 50 towns in Finland.

During 2002, 31 of Telia's 85 Finnish tele-shops were disposed of.

4.2 The Baltic countries

The three Baltic countries broke free from the Soviet Union after the fall of the Iron Curtain in 1990, resulting in a series of dramatic changes. All three countries sought contact with the West and amongst other needs, required help to improve their international telecommunications, rebuild their neglected fixed networks and establish new mobile companies. The task was to help the national state entities to develop and modernise. Televerket became involved, often in co-operation with

The history of Telia original

Telecom Finland, as the general situation in the early 1990s was uncertain. These activities were a component in the efforts by all the Nordic countries to help their new neighbours on the other side of the Baltic. It should be remembered that the three new nations were fundamentally different and that their future also evolved in different ways.

Estonia is the smallest and closest to Sweden, both geographically and culturally, and was the first to receive help. Televerket and Telecom Finland co-operated from the start, both in the fixed and mobile spheres.

In Latvia, which came next, the situation was similar on the mobile side. However, the Latvian fixed network became the subject of competitive tenders, arranged by foreign consultants, where Telia and Telecom Finland were members of opposing consortia. Telia found itself on the losing side.

In Lithuania, Telia and Sonera first entered the market (together) at the end of the 1990s and were able to secure a dominant roll both in mobile and fixed operations.

Telia's Baltic businesses also included CATV, internet and broadband, directories etc and in all 3 countries these activities had a positive development.

By 2002, Telia and Sonera had individually built up strong positions in the Baltics and after the TeliaSonera (TS) merger in December 2002 the two companies' operations could be consolidated. As a consequence, in Lithuania TeliaSonera now owned 60% of fixed network operator Lietuvos Telekomas and 55% of mobile operator Omnitel. In Latvia, TS owned 60% of mobile operator Latvijas Mobilais Telefons. This meant that TS controlled all three companies which were now consolidated as subsidiaries.

TS now also owned 49% in Estonian holding company Eesti Telekom (with separate fixed and mobile operating companies) and 49% in Latvian fixed network company Lattelekom. TS ownership in Eesti Telekom increased to over 50% during 2004.

4.2.1 Estonia, EE

Televerket started discussions in Tallinn already in the late autumn of 1989. The first request from Estonia was to create direct connections between Estonia and Finland/Sweden. Swedish Telecom International (STI) provided the necessary equipment during 1990. The international switch in Tallinn and an existing radio-link over the Gulf of Finland were both upgraded. In the summer of 1990, an NMT 450 base-station was installed in Tallinn as a part of the Finnish network. Discussions on future co-operation for mobile and fixed activities were initiated.

Mobile network services

In April 1991, STI and Telecom Finland formed AS Eesti Mobiltelefon (EMT), each with a 24.5% share and the Estonian State owned the remaining 51%. The embryonic NMT 450 network was successfully enlarged and continued in operation until 2000 by which time customers moved over to GSM.

The first GSM base-station opened in 1993 as a part of the Finnish network and in 1995 EMT launched its own GSM 900 network, followed by GSM 1800 in 1998.

The history of Telia original

Mobile telephony expanded rapidly. In 1997, EMT had two GSM competitors, Radiolinja and Tele2 Eesti.

EMT marketed a wide portfolio of services and usage quickly became widespread all over Estonia. WAP was launched during 2000 and faster mobile data-services (GPRS) in 2001.

By the end of 2002, EMT had 428,000 customers and a 50% market share. Mobile penetration was 60% of the population. During 2002 the rules for distribution of four 3G licences were announced and EMT was one of the winners in July 2003.

Fixed network services

In May 1991 the old telecom ministry was dissolved and the Estonian State's telecom assets were placed in a new state-owned company, Eesti Telekom. A Letter of Intent was signed in October 1991 between the Estonian Government and Televerket regarding development of Estonia's fixed telephony system. Telecom Finland was not on board initially, but a hesitant Televerket was not prepared to bear the risks alone and therefore Telecom Finland was brought into the picture.

In December 1992 the fixed network was transferred to a new Estonian limited company, Eesti Telefon (ETC). Televerket and Telecom Finland formed a joint-venture company, Baltic Tele AB, which in turn owned 49% in ETC. The remaining 51% was owned by the Estonian Government through Eesti Telekom, which became a holding company. The parties agreed to construct a modern tele-system throughout Estonia. The work was estimated to take 10 years at a cost of 2.3 billion SEK. 30,000 lines would be installed annually.

Sweden and Estonia were linked with a new fibre-optic sea cable in 1995, with Telia, ETC and Danish GN Store Nord as co-financiers.

To prepare for future telecom competition, many projects were started to restructure, streamline and adjust the company to meet the demands of a market economy.

The monopoly for fixed telephony came to an end in Estonia on 1 January 2001.

After a few years, fixed-communications penetration had risen to approx. 35%.

The service portfolio increased and by year-end 2002 ETC offered fixed telephony, internet and data-com. ETC was market leader with an 80% telephony share. The main competitors were Tele2 and Uninet. Internet access gathered momentum and the number of ADSL customers reached 30,000.

In 2003 ETC changed its name to Elion to reflect the more diversified portfolio.

Restructuring

In 1998, the Estonian State, which through its wholly owned holding company Eesti Telekom owned 51% of both ETC and EMT, initiated a privatisation process to reduce its ownership in Eesti Telekom. Telia's and Sonera's shares in subsidiaries ETC and EMT were converted to a 49% share in holding company Eesti Telekom.

During 1999, the Estonian State sold 23% of its shares in Eesti Telekom and the company was successfully introduced on the Stock Exchange with a strong rate increase during the year.

When TeliaSonera was formed in 2002 the company owned 49% in Eesti Telekom. During 2004 this increased to over 50% through shares bought on the stock market.

CATV and directories

During 1996 Telia purchased 60% of the Estonian CATV company Starman Kaabeltelevisiooni AS. The company built a network in Tallinn and was successful. Telia was forced to sell its shares in September 2000 for regulatory reasons after legislation was introduced which prohibited Telia from being a major shareholder in both Eesti Telekom and Starman. At this point Starman had 28% of the national market and was dominant in Tallinn. The sale brought in 82 MSEK capital gain.

In 1992, Televerket purchased 40% of AS Eesti Fakta. This directory business was a success and was later incorporated into Eniro.

4.2.2 Latvia, LV

Televerket began discussions in Riga during 1990. As in Estonia, both a new mobile network and expansion of the existing fixed network was on the agenda.

Mobile network services

In 1991 agreement was reached to form a mobile telecom-company in Latvia. Latvijas Mobilais Telefons, LMT, was established in 1992 as an NMT operator in Latvia. Televerket and Telecom Finland owned 24.5% each. The remaining 51% was owned by different Latvian state entities: the Ministry 5%, radio company VAS 23% and electronics company VEF 23%.

LMT launched GSM 900 in 1995 plus GSM 1800 in 1999 and was the only mobile operator in Latvia until 1997 when a new GSM operator entered the market.

By 2002, Telia and Sonera owned 60.3% in LMT (49% directly and 11.3% indirectly via Lattelekom), and offered a wide portfolio of services. Faster mobile data (GPRS) was introduced during 2002 and by year-end LMT had 474,000 customers and a 55% market share. The only competing operator was Tele2. A number of service providers were also established. Mobile penetration had rapidly increased and totalled 37% by the end of 2002. LMT and Tele2 were both been awarded a 3G licence in 2002.

Fixed network services

A Letter of Intent was signed with the Government in 1991 to expand the Latvian fixed network.

During 1992, Televerket provided Latvia with equipment for international telecom traffic via a radio-link from Estonia and an AXE switch in Riga. The Swedish King, Carl XVI Gustaf, inaugurated automatic traffic in Riga on 9 September.

Lattelekom was established in 1993 as a State-owned company. The Latvian Government, assisted by foreign advisors, arranged a tender competition for Lattelekom. Telia and Deutsche Bundespost formed HanzaTel and submitted a tender. A competing tender came from Tilts Communications A/S, a consortium comprising Cable & Wireless and Telecom Finland.

In 1994, Tilts won the competition for a 49% stake in Lattelekom. However, in September 1998 Cable & Wireless sold their share in Lattelekom to Sonera and withdrew from the Baltics.

At a later stage, Tilts Communications A/S and the Latvian State were in dispute which was subject to arbitration by the Stockholm ICC. This dispute related to the consequences of a reduction in the 20-year exclusivity clause which the State had given to Lattelekom in 1994 and the State's failure to ensure that telecom tariffs were fixed at agreed levels. The State argued that Tilts had not complied with the agreed rate of digitalisation of the Latvian fixed network. TeliaSonera inherited this dispute in 2002 and reached a settlement in 2004.

On 1 January 2003 the monopoly for fixed communications in Latvia came to an end, which made it possible for new operators to enter the market. Internet access started to accelerate in Latvia.

Data communication

In 1994 Telia acquired mobile paging company Info SIA which was transformed into Telia Latvija. The company was re-structured in 1996 and a launch of internet and data-com services was initiated on a limited scale. In 1997 a satellite connection to Sweden was opened to secure network capacity access. Telia Latvija was re-structured again in 1998. The paging business was disposed of and the business concentrated only on internet and data-com. By 1999, Telia Latvija had established itself as one of the four main internet providers in Latvia with a fast-growing share of the enterprise market. The company was still active in 2009 offering Internet and LAN services with excellent connections via TeliaSonera International Carrier.

CATV

In October 1997 Telia purchased 49% of the Latvian CATV company Televizijas Komunikaciju Centrs (TKC), established in 1984 and mainly active in Riga. The company changed name to Telia MultiCom in 1998. Telia purchased the whole company in 2001. In 2004 Telia MultiCom, was sold to Tella Capital Ltd, a Latvian investment company, but the name was retained. It was the country's second largest CATV company with 75,000 customers. The company name changed to IZZI in November 2005 and was sold to investment company Contaq Latvian Cable in 2008.

4.2.3 Lithuania, LT

Telia entered Lithuania later than the other Baltic countries, starting in 1996 with a Government agreement to develop broadband services. In 1997 Telia formed subsidiary Lietelija to provide data-com services. In 1998 Telia and Sonera purchased 60% of fixed network operator Lietuvos Telekomas plus 55% of mobile operator Omnitel at a price of 2.053 billion SEK and 686 MSEK respectively.

Mobile network services

Mobile network operator Omnitel was created in the beginning of the 1990s by an ex-Lithuanian American businessman Juozas Kazickas as a private company named Litcom to offer international telecom services. In 1995 the company received a Lithuanian GSM licence, as did its competitor Bité GSM.

The history of Telia original

In 1998, when Telia and Sonera were preparing an offer for fixed operator Lietuvos Telekomas, they approached Omnitel's owner and succeeded in purchasing 55% of the company in September, via (Telia and Sonera) jointly-owned Amber Mobile Teleholding AB. At that time Omnitel's market share was 60% and the customer base at year-end was 160,000.

Omnitel strengthened its position in spite of tough competition. Tele2 received the third mobile licence in 1999. Omnitel launched faster mobile data (GPRS) in 2001 and mobile multi-media services (MMS) in 2002.

By the end of 2002 Omnitel was the leading mobile operator in Lithuania with a market share of 54% and 850,000 customers. Competition came from Bité GSM and Tele2. The mobile penetration was 45% with a rapid expansion of mobile services usage.

TeliaSonera later increased its shareholding in Omnitel, first to 90% in 2003 through the purchase of Motorola's 35% for 117 MUSD, plus thereafter to 100% in the autumn of 2004 with the remaining 10% from the Kazickas family for 64 MUSD.

Fixed network services

The State-owned monopoly Lietuvos Telekomas was created in February 1992 and transformed into a State-owned limited company in June 1997 in preparation for privatisation. A new telecom law was passed in June 1998 and in the same year 60% of Telekomas was offered for sale in an international tender competition. Telia and Sonera joined forces and formed Amber Teleholding A/S which won the competition with an offer of 510 MUSD. Swedtel played an important role in the competition and contributed with an analysis of the company plus a concrete modernisation plan.

On the purchase date, in July 1998, Lietuvos Telekomas had a turnover of 1.8 billion SEK, with 1,075,000 customers and approximately 10,000 employees.

The work to re-structure the company which Lietuvos Telekomas started in 1998 had a very positive effect on the business, which led to considerably better financial results. Telia and Sonera formed UAB Sontel, a personnel resource company for Telekomas. Telia Swedtel played a key role in the change process of turning the company into a customer orientated and efficient entity. Personnel numbers were reduced by half between 1998 and 2002.

In 1999, the employees were given the opportunity to purchase nearly 5% of the shares at a favourable rate. AB Lietuvos Telekomas was listed on the Stock Exchange in June 2000. The Lithuanian State thereby reduced its holding from 35% to 10%. The remaining 25% was placed on the international capital market.

Lietuvos Telekomas was a fixed network services operator offering telephony, internet and data-com. In 2002 the customer-stock was 936,000 with a penetration of 33%. Low fixed-penetration was symptomatic of the situation all three of the Baltic countries and the decline continued. Although internet penetration in Lithuania was low, mainly because few households had their own PC, during 2002 internet access gathered momentum and by year-end there were 40,000 internet dial-up customers (including ISDN) and just over 10,000 ADSL broadband customers.

The history of Telia original

The fixed telephony monopoly came to an end on 1 January 2003.

In 2006 Lietuvos Telekomas changed its name to TEO Ltd AB.

Data services

Telia commenced activities in Lithuania in the spring of 1997 by establishing the wholly-owned company Lietelija which received a licence for internet and data-com services. Sales and demand were both positive. Lietelija was sold to Lietuvos Telekomas in March 1999.

A new fibre-cable between Gotland and Klaipeda came into operation in late 1997.

4.3 The Baltic Sea area, other than the three Baltic countries

After the fall of the Iron Curtain, Russia and Poland emerged as new, promising and huge markets where, for years, telecom development had been neglected.

4.3.1 Russia, RU

During the Soviet era the telecom network was severely neglected and in the 1980s Sweden had only a dozen telephone lines to Moscow for communication with the whole of the Soviet Union.

Mobile network services

In the summer of 1992, Russian interests made contact with Televerket regarding the development of mobile telephony in North-Western Russia. Swedish Telecom International (STI) suggested a project partnership with both Telecom Finland and Televerket Norway which commenced during the autumn. 12 urban areas in Russia were the scope of the project.

In 1993 a licence was awarded to the newly formed North West GSM mobile company (NW GSM) with 49% Nordic and 51% Russian ownership. The Russian shareholders were long-distance and regional operators, a local company in St Petersburg plus two minor financiers.

Telia participated with 12.74%, Telecom Norway with 12.74% and Telecom Finland with 23.52%. The GSM network was inaugurated in January 1995.

The company was a success and the mobile telephony experiences from St Petersburg were utilised for further expansion in European Russia. By 1998, NW GSM was Russia's third largest mobile operator and increased turnover by more than 50% during the year. The North West region comprises 15 million inhabitants, and in addition to NW GSM there were two large and a few smaller local mobile operators.

During 1999 the company increased its customer base by nearly 40%. Russia was in the midst of a financial crisis but the company was less affected than competitors due to a high percentage of enterprise customers. An additional factor was that both costs and revenues were predominantly in US dollars rather than Russian roubles

In February 2000, for 690 MSEK, Telia purchased 29.5% of Luxemburg-based First National Holding S.A., which owned 85% of Russian holding company TelecomInvest. The latter had interests in a number of fixed and mobile operators in North-West Russia, the most important of which was a 45% share in NW GSM.

The history of Telia original

In August 2001, an agreement was reached to form a pan-Russian mobile operator given the name MegaFon. The agreement meant that NW GSM would be combined with several other Russian operators, amongst others in the Moscow area. Telia's share was 17.8% and Sonera's 26% in the new company. The other owners were TelecomInvest and CT Mobile. In 2001 Telenor sold its share in NW GSM to Telia and Sonera to concentrate on other Russian investments.

After the merger between Telia and Sonera in 2002, TeliaSonera owned (directly and indirectly) 43.8% of MegaFon. The company had mobile licences for all the 89 Russian regions with 150 million inhabitants and was Russia's third largest mobile operator with approx 3 million customers by year-end 2002.

2002 was a year of substantial growth with a 230% customer increase. MegaFon's market share in the following places was: Moscow (4% = low), the St Petersburg region (65% = high), Volga and Caucasus (35-30%) the Ural region (15%). At year end 2002 MegaFon's total Russian market share was approx 16%.

MegaFon's two main competitors are MTS and Vimpelcom, with Deutsche Telecom and Telenor respectively as their main foreign owners.

Cable TV

In 2000 Telia acquired 65 % of a local CATV company in the St. Petersburg suburb of Kalininsky, which had started under the name of Sprut in 1991. The name changed to Telix, reminiscent of Telia. The company operated a CATV network which was adapted for interactive broadband services. Telix was disposed of in early 2003 when TeliaSonera decided to focus the business in Russia.

4.3.2 Poland, PL

Poland is an important trading partner with Sweden.

In 1990 STI's subsidiary Vesatel established VSAT-connections via satellite for speech, text and data between ABB in Västerås and their subsidiaries in Poland.

Swedtel was also active in Poland in the beginning of the 1990s as a consultant working on projects for the national operator TPSA.

Mobile network services

Televerket via STI participated in a consortium together with British Telecom (BT) and American Bell Atlantic in 1990/91 to make an offer for a Polish NMT licence. The consortium was unsuccessful but lessons were learnt how to prepare a licence application. When Polish GSM licences came on offer in the middle of the 1990s, Telia did not participate as this activity was now handled by Unisource Mobile. Around the year 2000 Telia also decided not to bid for a Polish 3G licence as the price-tag has escalated out of all proportion.

Fixed network services

In 1994 Telia International and Netherlands KPN discussed the opportunity to participate in the planned privatisation of TPSA but refrained from doing so when the magnitude of the task became apparent.

Instead, Telia came into contact with RP Telekom, a company which had won regional licences to build fixed-telephony networks outside the major cities, in

The history of Telia original

competition with TPSA. RP Telecom was owned by Israeli, American and local interests. In 1996, Telia collaborated with RP Telekom and formed Netia Telekom and Netia South, where Telia had a 25% share and operative responsibility. Each had in turn local subsidiaries. The goal was to build new local networks and, via interconnect agreements with TPSA, connect to the long-distance and international networks, (which later proved to be very difficult). Equipment for this construction was supplied by Alcatel. Efforts were made to broaden the scope of the business and improve profitability.

During 1997, Netia received further licences for five of Poland's largest cities. The company now had licences covering 35% of the country's 40 million inhabitants.

A licence for national data-com was awarded in 1999 which allowed Netia to connect its local networks and offer a national internet service plus a variety of broadband services.

Telia's ownership was re-structured in the beginning of 1999. Netia Telekom and Netia South became wholly-owned subsidiaries of Netia Holdings which, on 1 July 1999, became the first Polish company to be quoted on Nasdaq. At the end of 1999, Telia owned 30% of the shares.

In April 2000, Telia became owner of 11% in the newly established long-distance company Netia 1, where Netia Holdings owned an additional 38%. In February 2000 the company received a licence for long-distance telephony in Poland. In May 2000 Telia increased its shareholding in Netia Holdings to 48.1%.

This business demanded perseverance in order to earn money from the relatively low revenues per line on the Polish market. The owner's capital contributions were limited as the majority of investment funds were financed by the international junk-bond market. When the junk-bond market went into recession as a result of the IT bubble in 2000, Netia found itself in a financial crisis.

In Q2, 2001 the remaining goodwill in Netia was written-down by 1.82 billion SEK.

In March 2002, the owners of Netia Holdings decided on a financial reconstruction of the company where debts to lenders were converted to capital in the company. The name changes to Netia.

Telia's share of the losses in Netia during 2001 was 2.464 billion SEK and during 2002 it was 1.459 billion SEK

At year-end 2002, TeliaSonera owned 48% of the shares in Netia. In the reconstruction of January 2003 TeliaSonera's share was reduced to 4.4%.

In May 2003 TeliaSonera sold its 11% share in Netia1 to Netia.

During 2003 and 2004 TeliaSonera sold all its interests in Netia.

Directories

In July 1997, together with American GTE, Telia purchased US West Polska (name change to Panorama Polska soon afterwards), which produced the Polish Yellow Pages. Telia's share was 49%.

In May 2001, Telia acquired the remaining shares from American Verizon. In accordance with an option agreement all the shares in Panorama were immediately transferred to Eniro AB

The history of Telia original

4.4 The rest of Europe and North-America

In the beginning of the 1990s, Televerket/Telia entered a number of markets in Europe and North America. Partly as members of consortia starting new mobile companies but also with fixed network activities, primarily in the UK and USA both of which were early supporters of telecommunication liberalisation. Telecom in Sweden was virtually unregulated, which by default permitted foreign entrants to compete on the Swedish market. In the spirit of reciprocity, Televerket/Telia was therefore an acceptable competitor in the UK and USA and could obtain licences much earlier than many other operators.

Together with Netherlands KPN, Telia also co-operated in a major venture in Ireland at the end of the 1990s.

The majority of these Telia undertakings were sold off around the year 2000. However, a number of other local national companies were started as subsidiaries to Telia International Carrier.

4.4.1 The United Kingdom, UK

In an attempt to market the Mobitex mobile-data system in the UK, RAM Mobile Data Ltd was created in London during 1991 by Ram Broadcasting (USA), France Telecom and Televerket (7% share). The company was only moderately successful and Telia sold its share in 1995. Mobitex in the UK was bought by BT in 2001.

Swedish Telecom International opened a representative office in the UK in January 1991 in response to British Telecom (BT) establishing an office in the unregulated Swedish market the year before. The objective of a Swedish presence in the UK was threefold.

- To monitor the development of the Duopoly (BT in competition with only one operator, MCL, for seven years).
- To create a contact network for future operational opportunities.
- To learn and understand the pre-requisites necessary for an emergent operator to compete in a liberalised market.

An application for an International Simple Resale (ISR) telephony licence was submitted in 1992 and granted by the Department of Trade and Industry in April 1994. This thereby confirmed that Sweden's liberal telecom regime complied with the mutual reciprocity demanded by the UK government. ISR was the first ubiquitous telecom service that allowed competition with BT. The ISR licence made Telia the first non-British European operator to receive a licence to offer International telephony in the UK.

Prior to receiving the licence, Telia International UK was established as Telia's first wholly-owned foreign subsidiary in September 1993. An AXE international exchange was installed in London in March 1994 and whilst waiting for the ISR licence, the business idea was to transport enterprise customer's international telephony traffic in the Greater London area via leased lines (from BT) to the AXE exchange and send it via Sweden to the rest of the world. This was termed Single-end-Resale (which did not require a special licence) and was only possible if customers were so large that the cost of a leased-line was motivated.

The history of Telia original

Interconnect traffic with BT started in April 1995 on the basis of the ISR licence utilising a four-digit access number in BT's existing telephone network. In this way Telia could now offer telephony services throughout the UK.

The London telecom market developed at a tremendous pace with many new international operators (mainly from the USA) who could offer low rates to many worldwide destinations. Telia UK signed agreements with all of them and thereby developed a wholesale activity as a second business opportunity. Initially Telia UK only sent traffic to Sweden but the business developed yet again when Telia started sending traffic generated in Sweden through the UK switch and via one of the new operators out into the world. This greatly reduced costs for Telia in Sweden and actively contributed to undermining the monopoly-based international accounting rate system between all the world's operators. By default, this action was also a driving factor in lowering prices to end-users.

Telia UK also co-operated with Unisource which had established a London office.

Activities entered a third phase when Telia UK broadened its UK customer base. The company created a national dealer network of retailers which sold other products and included telephony in their portfolio. One example was companies which sold PBX equipment with the built-in functionality to choose the cheapest route for any destination. Traffic and the number of customers outside London increased dramatically. The primary customer group was small and medium-sized enterprises. However, increased competition meant price pressure, which led to the need for even greater volumes. Eventually, in spite of the introduction of innovative services it became extremely difficult to maintain acceptable margins. The dealer activity became more difficult to control and was divested between 1998 and 2000. Employee numbers reduced from 200 to 50. Sales of national telephony were terminated during 2002.

However, the wholesale business was a resounding success and was the embryo of Telia's international carrier business. From 1998 onwards, London is one of the most important hubs in the network that became Telia International Carrier.

During the year 2000 Telia UK opened an international node for internet traffic.

The Speedy Tomato mobile portal was test-launched in the UK at the end of 2000 but was phased out in 2001 after a decision to concentrate the portal business to the Nordics.

4.4.2 USA, US

During 1993 Telia International opened a representative office in New York with the objective of offering international telephony services via an 0800-number to Sweden and even to other European countries via Sweden. The service never materialised because AT&T became a partner in Unisource.

In 1995, as the first European operator, Telia received a licence to build an IP-network in the USA. Telia North America Inc was established with a head office in Washington DC and an operative centre in New York. At the same time Telia obtained a 155 Mbit/s IP-connection between Stockholm and New York and thereby established the company as an IP-carrier over the Atlantic. The US business comprised wholesale for telephony, leased lines, IP traffic and co-location of equipment.

The history of Telia original

Sales in the US developed positively and in a short time Telia positioned itself as one of the leading operators of internet traffic between Europe and the US. Even telephony increased after an AXE-exchange was opened in New York.

During 1999 intercontinental cable capacity swapping became possible which gave Telia access to a fibre-optic network in the US. Telia also gained access to six percent of the TAT-14 Atlantic cable which now became a part of Telia's global IP-platform, the Viking Network. The Viking Network was completed during 2001. Telia utilized an 18,000 km fibre network across the US. Both the European and American components of the Viking network were up and running and the two networks were joined together by the TAT-14 Atlantic cable which came into operation in 2001.

During 2000, Telia moved from being a gateway operator to a supplier of trunk network services in the US. In May, Telia Internet Inc purchased the business of American Internet operator Apex Global Information Services (AGIS). This gave Telia a much coveted Tier-1 status on the American market which allowed the company to exchange IP-traffic with other Tier-1 operators at no inter-connect charge in either direction.

AGIS, a company with roots in the academic internet world, had massive debts and had been forced to re-construct its activities in accordance with the American Chapter 11 bankruptcy laws. However the financial situation was worse than assumed. In October 2001 all the shares in Telia Internet Inc were sold to Aleron Inc. Telia's US national IP-business ceases to exist.

A strategic review of International Carrier was carried out in 2002 which led to a restructuring of the business. Sales of US national capacity services and co-location services were terminated in late 2002 and some transmission equipment dismantled to reduce costs for operation and surveillance. However the international business activities continued.

4.4.3 Italy, IT

In order to bid for a German GSM licence in 1989, the Eurotel consortium was put together comprising Cellular Communications (US), Lehman Brothers, Televerket and a few others. The German licence was won by Mannesmann which thereby entered the telecom market. However, Eurotel learned a great deal from the project.

The consortium was restructured to compete for a GSM licence in Italy, whereby Olivetti became a member. This led to the formation of Omnitel. In May 1990, Televerket became a founder owner of Omnitel Sistemi Radiocellulari S.p.A. (OSR) with a 9.67% share. Prior to the GSM licence application, OSR partnered with Pronto Italia and formed Omnitel Pronto Italia S.p.A. (OPI), with a 70/30 share split.

Telia's executive management were hesitant when it became apparent that approx. 500 MSEK investment capital was needed. Nevertheless, agreement was reached before Omnitel received the licence in March 1994, just before a change of Ministers in Italy.

The licence requirement of 40% coverage was achieved in December 1995. The company was fully capitalised at the end of 1996 with Telia's share costing just over

The history of Telia original

500 MSEK. Some ten Televerket/Telia employees actively involved themselves in the company and Omnitel was a very successful second operator in Italy.

In April 1998 Telia sold its entire shareholding in Omnitel with a capital gain of 3.3 billion SEK. This profit was used in investments elsewhere.

In a separate Italian venture, Telia signed an agreement with Olivetti Tecnost in February 2001 to establish the Speedy Tomato portal in Italy. This venture was disbanded at the end of 2001 as the result of a decision to concentrate the portal business to the Nordics.

4.4.4 France, FR

In order to sell the Mobitex mobile-data-system in France, a consortium was formed in 1992. This comprised: Transmission des Données par Radio (TDR), SFR (the first competing mobile operator in France, which later became Vodafone France) and Swedish Telecom International (STI). As in the UK, STI's 10% share was sold in 1995.

In 1988, Telia's subsidiary Scandinavian Telecom Services employed a part-time Swedish representative in France to assist on contract issues with France Telecom.

In 1991, STI established a representative office in Paris to help Swedish customers in France. Both large Swedish subsidiaries and Swedish residents were offered Telia's telephone-card services via a free-phone number. One specific success was when Telia, in the middle of the Volvo-Renault negotiations, managed to win the contract for international traffic right from under the nose of France Telecom.

Telia's office helped to establish an operative Unisource subsidiary in France at which point the representative office was closed in 1994.

At the end of 1998 Telia France S.A. was established to broker traffic between Sweden and France. After one year the company had signed up more than 15 French operators and service providers. This company later became a part of Telia International Carrier

4.4.5 Spain, ES

As a consequence of the Unisource liquidation in 1999, Telia acquired Unisource Iberia, a wholesale company providing IP-based services to enterprise customers. The company built and operated a national IP-network in Spain which gave Telia an IP-platform in Southern Europe. The name changed to Telia Iberia S.A. In September 2001 all the shares in Telia Iberia were sold to Cableuropa S.A. as a component in Telia's focus to concentrate activities to the Nordic region.

4.4.6 Germany, DE

ST International established a representative office in Dusseldorf in 1992 with the objective of helping Swedish customers in Germany. The office was active for a few years but was closed in 1994 primarily because the telecom regulatory environment in Germany at the time did not allow competition from other operators. The establishment of a Telia office was simply too early.

Telia Telekommunikation GmbH was formed in 1998 to mediate traffic between Sweden and Germany via an AXE exchange in Hamburg. This company later became a part of Telia International Carrier.

The history of Telia original

4.4.7 The Netherlands, NL

ST International placed a representative with KPN in 1991 to strengthen a growing relationship between the two companies and to help Swedish customers in the Netherlands. KPN made a corresponding representative placement with STI in Sweden. This exchange was terminated in 1993/4 as Unisource developed.

4.4.8 Ireland, IE

In December 1996, Telia and KPN formed the joint-venture company Comsource (40/60) and acquired 20% of Telecom Éireann, with an option for an additional 15% over the coming three years. The agreement stipulated that Telia and KPN would contribute knowledge and experiences within a number of areas in order to strengthen the company in the face of growing competition in the market. Telia would also supply a number of executives to key operative positions. Telecom Éireann was a full-service telecom provider and in some areas still retained a monopoly in Ireland. At year-end 1996 the company had 12,000 employees, and a turnover of 1.3 billion IEP (Irish punt – replaced by the Euro in 2002).

Customer numbers increased strongly during 1997, both in fixed and mobile services. During the year some 15 strategic projects were started, all with the objective of combating the challenges of competition. The partnership with Telecom Éireann was strengthened during the year through the start of a new data-services company, Accuris, in which Telia owned 33%. Accuris was important tool in the modernisation process.

The Irish market de-regulated quickly. Telecom Éireann expanded its home market and established offices in Northern Ireland during 1997. In 1999 the company also started operations in London. As majority shareholder in Telecom Éireann, the Irish State, decided to introduce the company on the Stock Exchange in 1999, at which point the name changed to Eircom.

In connection with the stock exchange introduction, the Irish State sold the remaining 65% of its shares in the company. Telia and KPN exercised their options and increased their shareholding to 14% and 21% respectively. Eircom's value had increased six-fold since 1996.

On 21 December 2000 Vodafone Group and Eircom announced that Vodafone would purchase Eircom's mobile business Eircell. Telia and KPN which, via Comsource owned 35% of Eircell accepted the offer and the company was transferred to Vodafone in May 2001.

In March 2001 Telia decided to dispose of its shares in Eircom. On 16 November 2001 the whole company was sold to Valentia Telecommunications Ltd.

The sale of Eircell in the second quarter resulted in a 314 MSEK capital loss for Telia but the sale of Eircom in the fourth quarter gave a capital gain of 1.07 billion SEK.

On 18 April 2002 Telia sold its 40% share of Comsource to KPN which became the sole owner.

4.4.9 Hungary, HU

Satellite connections for Swedish customers in Hungary were established in 1991 by ST International's subsidiary Vesatel.

The history of Telia original

In 1993, at Telia's initiative, the Pannon GSM consortium was created. Owners were the Nordic telcos in SE/DK/NO/FI, KPN plus General Electric. An offer for a GSM licence was submitted in early 1993. The Pannon consortium plus another group including Deutsche Telekom were the winners of two licences in mid-1993.

The Pannon GSM Rt company was established in Székesfehérvár, Hungary. Telia owned 14% and commanded the post of Deputy Managing Director. The network was operational in 1994. In 1995 Telia increased its share to 16% when a few local owners left the company.

At the end of 1996 Telia sold its entire shareholding in Pannon to release capital for other investments. Telenor became the main owner.

4.4.10 Slovenia, SI

When a second GSM licence was offered in Slovenia, Telecom Finland was part of a bidding consortium. However, the Board of Telecom Finland rejected the company's participation and a replacement member was needed. The choice was between France Telecom and the newly created Telia Overseas. Overseas was chosen. SI.Mobil was created with Overseas and local partners owning 25% and 75% respectively. Telia was the only owner with telecom expertise and took a leading role in the company. SI.Mobil was awarded Slovenia's second GSM licence in 1998. Services began in early 1999.

During 2000 Telia Overseas increased its shareholding to 29.3% and was even offered the opportunity to become majority owner, but declined. Instead, in 2001 Mobilkom Austria, who wanted to enter the country, purchased the majority of the shares from the local owners and in addition even Telia Overseas' shares. At this time the company had 130,000 customers.

4.5 Africa

Telia started telecom activities in two countries in Africa in the 1990s, Namibia and Uganda.

4.5.1 Namibia, NA

Namibia is twice the size of Sweden but has only some 2 million inhabitants.

As the result of close co-operation with the Namibian authorities and the country's telecom company, Telia, through Swedtel, was given the opportunity in 1994 to participate in the start of a new mobile operator. The company was named Mobile Telecommunications Ltd (MTC) with offices in Windhoek. Co-investors were: State-owned Namibia Post and Telecom Holding (NPTH) 51%, Telia 26% and Swedfund 23%.

MTC was Namibia's first mobile operator and established a GSM network business in the 900 and 1800 MHz-band and the business expanded much faster than expected. Over the next 10 years the company had a number of Swedish Managing Directors.

In 2004 MTC was sold to NPTH, by which time the annual turnover was approx. 700 MSEK and the company had 300,000 customers.

The history of Telia original

4.5.2 Uganda, UG

In 1998 Telia Overseas, together with the South African operator MTN and a few smaller partners, were awarded a licence for both fixed and mobile telephony in Uganda – a country with 22 million inhabitants. Telia Overseas had a 32.5% share in the new company which started operations the same year and in just a short time became the country's dominant telecom operator. The company was sold to the MTN Group in 2006, by which time MTN Uganda had approx 1.3 million customers and an annual turnover approaching 1.6 billion SEK.

4.6 Asia

Televerket started purchasing activities for telecommunications equipment in Hong Kong. Televerket/Telia also entered telecom service business in six countries, India, Sri Lanka, The Philippines, China, Hong Kong and Japan.

4.6.1 India, IN

In 1991, ST International's subsidiary Vesatel established satellite connections for Swedish companies in India. This applied primarily for ASEA which was involved in a power-station project in the Himalayas where satellite communication was the only viable alternative. The project was of such importance to India that the Government awarded the necessary authorization to a foreign company even though the country had not yet started its telecom liberalisation process.

Paging

In mid-1996 Telia purchased a 49% share in the Indian paging company Punwire Paging Services Ltd, with licences in the federal states of Punjab, Haryana and Himachal Pradesh in Northern India. The company offered a service similar to the Swedish paging service Minicall. Punwire's sphere of operations covered a population of 60 million persons and initially was the only operator. Paging was spreading quickly in Asia and the three states are the first in India with access to the service. During the year, 10,000 customers signed-up for the service.

The paging market in India gradually became a victim of competition when mobile telephony entered the market. Punwire were also affected by irregularities in the way the company was run, all of which led to bankruptcy in 2001.

Punwire's bankruptcy is still (2009) under investigation.

Mobile telephony

In 1995 Telia, together with partners, was awarded GSM licences in the Indian federal states of Punjab, Karnataka and Andhra Pradesh – together a population of 120 million persons. JT Mobiles Ltd (JTM) was formed the same year in Bangalore with local and Thai partners. Telia owned 26% of the company and had the project responsibility for the endeavour. Two other operators were active in the same region which was one of the most economically expansive areas in the whole of India.

Network services were launched in late 1996 and by the end of the year 10,000 customers were connected which accelerated over the next few years.

The history of Telia original

In 1999 the ownership structure in JTM changed when Bharti Telecom became the majority shareholder. (Telia still owned 26%).

Telia's ownership in Bharti Mobile Ltd (ex JTM) was transferred to Overseas Telecom AB in 2002 and one month later was sold to Bharti Tele-Ventures.

4.6.2 Sri Lanka, LK

In early 1996 Telia established the jointly owned subsidiary Suntel Ltd offering telephony services in Sri Lanka. Telia's ownership was 75%.

Telephone density was very low (1% of the population) in Sri Lanka and 250,000 persons/enterprises stood in line for a subscription.

In competition with the State owned entity and another operator, Suntel had a licence to build and run a national network for fixed telephony using a wireless access technology which has not been used on such a scale by many operators. The network was supplied by Ericsson and was based on a radio technology called wireless in the local loop, (WLL), combined with DECT. In a short time the company built a network which covered the capital city, Colombo and by year-end 1996 had 1,200 customers connected. Initially Suntel focused on the enterprise segment.

In 1997, 20% of the company was sold to TVG, a Hong Kong based private equity fund and 55% was transferred to Telia Overseas (today Overseas Telecom AB) which still (2009) retains this ownership. Customer numbers at year end 2007 were approx. 400,000.

4.6.3 The Philippines, PH

In 1995 Telia purchased 9.44% in Digitel (Digital Telecommunications Philippines Ltd), one of the fixed network operators on the main island of Luzon, including the capital city, Manila. The transaction was mediated by Swedtel. Digitel is a listed company and TeliaSonera still (2009) retains its ownership. The company has 460,000 active lines.

4.6.4 China, CN

In mid-1996 Telia purchased a minority shareholding (13%) in the Chinese mobile company Shanghai Skycell Telecommunications Network Ltd which was the second operator in Nantong province, just north of Shanghai. The network was operational in early 1997.

Telia's ownership in Skycell was transferred to Telia Overseas in 1997 and sold to the Chinese partner in 2001.

4.6.5 Hong Kong, HK

Hong Kong had for many years been a base for Televerket /Telia to co-ordinate the purchase of customer premises equipment manufactured in the region. In 1994 Telia Asia Ltd was created by Telia Systems to strengthen these ties and activities and to introduce an efficient quality control. Equipment included telephones, faxes etc. which were sold under Telia's own brand name in Sweden.

In 1995 Telia Asia's sourcing services were extended and even offered to other European operators, including the Unisource partners and others.

The history of Telia original

In 1997 an IP-node was installed in Hong Kong connecting Europe via the USA. This node continued to be operated by Telia Asia until 1999 when Telia International Carrier (TIC) opened a subsidiary in Hong Kong.

Telia Asia was closed down during 2000. Even TIC's office was closed down in 2002, but it was reopened again in January 2006.

Unisource Mobile participated in a Hong Kong based consortium called Peoples Telephone Company Ltd which was awarded a GSM 1800 licence in 1996. In 1997, of Unisource Mobile's 22% share, 11% was transferred to Telia Overseas and 11% to KPN. Peoples Telephone launched services in 1997. The company developed in very hard competition, amassing around 1 million customers when it was launched on the Stock Exchange in 2004. Telia Overseas sold all its shares at that time.

4.6.6 Japan, JP

In 1992, ST International established a representative office in Tokyo to monitor developments in the Japanese market, to assist Swedish companies in Japan with international 0800 services and to provide local support for Televerket's purchasing of customer premises equipment.

In 1996 the representative office was transformed into a branch office of Telia Asia Ltd in Hong Kong. A call-back operation was proposed from Japan but did not have the backing from Sweden and as a consequence the Japanese office was closed down at the end of 1996.

4.7 South America

In South America Televerket/Telia started telecom business activities in two countries, Brazil and Ecuador.

4.7.1 Brazil, BR

In 1991 ST International's subsidiary Vesatel established co-operation with Embratel for satellite connections to Sao Paulo in Brazil where many Swedish companies had established manufacturing entities.

Together with Eriline Cellular S/A (comprising former LME employees) and local Brazilian partners, Telia Overseas formed mobile company Tess S/A. In 1998, Tess received a licence for mobile telephony in the federal state of Sao Paulo, with the exception of the city of Sao Paulo. The licence covered 17 million inhabitants and the licence fee was more than 1 billion USD.

The network was based on the American TDMA standard with equipment supplied by Ericsson who had a major interest in the project. Tess was the second operator in the region, competing with the dominant State owned company, so getting started was not easy. The scope of the business however started to exceed the framework defined for Telia Overseas and Telia was forced to become a shareholder alongside Overseas. Initially Overseas owned 49% but reduced its share when Telia went in directly. A separate management agreement transferred know-how from Telia.

Financing the project was demanding due to the precarious economic situation in Brazil. It was not possible to accomplish the planned financing via junk-bonds and Ericsson was forced to come to the rescue.

The mobile network was launched in December 1998 and by year-end the company had 18,000 customers. Telia Overseas injected a further 788 MSEK

In 1999, 1.196 billion SEK was invested. Year-end customers were 345,000.

In 2000, 4.131 billion SEK was invested. 939,000 customers by year-end.

During 2000 Telia increased its capital share, both directly and indirectly via Telia Overseas, from 44.9% to 60.8%. However, Telia alone did not have a voting majority and was therefore unable to consolidate the company. A licence condition stipulated that Telia must remain as an owner until 2003 but Telia sought alternatives in order to reduce its involvement. The shares were therefore divided into voting (A) shares and ordinary (B) shares. Telia tried to sell the latter.

In February 2001 an agreement in principle was reached to sell a significant portion of Tess A/S to Mexican Telecom Americas. The purchase sum was 950 MUSD, (approx. 9 billion SEK) Telia's share was around 63%, including ownership via Telia Overseas.

Telia and Telia Overseas sold all their ordinary (B) shares in Tess. By hanging on to a number of voting (A) shares Telia and Telia Overseas together retained the voting majority in the company. The buyer thereby took over Telia's and Telia Overseas' entire economic commitments in Tess. At the sale Tess had 1 million customers.

The majority of the remaining voting (A) shares were disposed of during 2003

4.7.2 Ecuador, EC

In 1994, assisted by Swedtel, Telia International purchased 5% of mobile company Otecel S.A. based in Quito, Ecuador. Otecel operated a network based on the AMPS standard. During 1995 Telia increased its ownership to 28%, which was transferred to Telia Overseas in 1997.

In 1998, Otecel was sold to Bell South (US) at a significant profit. When the sale took place the company has approx 100,000 customers.

5 Consultancy, Swedtel's history

International consultancy in the field of telecommunications was conducted through Telia's subsidiary Swedtel until it was sold in 2001. During the 1990s Swedtel increasingly contributed with its excellent international contacts to the international establishments which Telia made in many countries. Swedtel's turnover was increasingly generated by other parts of the Telia group.

The conditions for consultancy activities changed dramatically during the 1990s with the increasing liberalisation of telecommunications and a growing understanding that telecom could be profitable if managed correctly. It became clear that telecom played an increasingly important role in a country's economic growth and therefore needed to be managed efficiently. This led governments all over the world to start privatising state-owned telecom entities and one result was that they began to attract investors with capital and expertise, rather than hiring consultants.

Before 1990, Swedtel's main activity was consultancy for governments and telecom companies in third-world countries with the aim of assisting their telecom development efforts. These tasks were largely financed from development funds via the Swedish foreign aid authority SIDA or with funds from international aid bodies.

Swedtel Academy, a subsidiary for international telecommunication training activities, was set up in 1992. Similar training had been initiated at the Telecom School in Kalmar since 1979 and had given Sweden and Telia a very good reputation within the telecom community in more than 100 countries world-wide.

Swedtel was started by Televerket (Swedish Telecom) in 1968 with the active support of Olof Palme, Minister of Communications at the time, and was the second subsidiary of Televerket. Telecom consultancy had started already in the 1950s in Ethiopia as part of a major Swedish development assistance effort for that country.

The consultancy operations were never a major source of revenues, but gave a good return in the form of contacts and experiences from other countries and markets. The consultants were largely recruited from Televerket/Telia and they could draw upon the internal expertise of the parent company. The consultancy also provided considerable PR and goodwill, both for the company and for Sweden, all over the world.

5.1 The 1950s

Sweden initiated extensive foreign-aid collaboration with Ethiopia during the 1950s. Televerket (Swedish Telecom) participated and created a project- organisation to develop the Ethiopian telecommunication authority, which by the mid 1960s had achieved a position of strength. Televerket assembled a core group of 30-40 specialists with international experience within relevant areas which became the foundation for Swedtel. Televerket already has a very good reputation as a highly competent operator and as an active contributor within the area of international standardisation. In addition, the unique competence through its own design and manufacture of crossbar telephone exchanges combined with a close collaboration with Ericsson was an excellent background to form an international consultancy arm within Televerket.

The history of Telia original

5.2 The 1960s

Requests from a number of developing countries led to the creation of Swedtel. In 1967 the Minister for Communications, Olof Palme, was a driving force behind the Parliamentary adoption of a proposition to create a separate specialist company to support the development of telecommunications in other countries. The Limited Company format (AB in Swedish) was adopted as this was best suited to the nature of the activity. Swedish Telecommunication Consulting AB (Swedtel) became Televerket's second subsidiary after Telefabrikation AB (Tefab) created two years earlier. This idea was before its time and only Great Britain had an Overseas Development Association working within the British Commonwealth. Swedtel started officially on 1 January 1968 and had a flying start via a contract to develop a master plan for Zambia. Similar contracts followed soon after in Central America and Thailand.

5.3 The 1970s

This decade was a period of rapid growth. In the mid-1970s, major assignments were undertaken in Saudi Arabia, Iran, Libya, Thailand and Jordan, primarily in network development and installation. Swedtel also built up a major market presence in Africa. Business development commissions financed by SIDA or similar agencies were completed in Kenya, Uganda, Tanzania, Nigeria, Zambia, Lesotho and Mozambique. Customers also received assistance to produce new project proposals.

An important asset for Swedtel was the ability to borrow network experts from Televerket thus keeping the level of permanent employees relatively low.

In 1978 the name changed to Swedish Telecoms International AB. The company continued as a consultancy, but now faced increased competition.

1979 saw the start of international training courses for students from the third world at Teleskolan in Kalmar under the name of The International Programme in Telecommunications Management, IPTM.

5.4 The 1980s

In 1981 Swedtel was transferred to the newly established Teleinvest Group within Televerket.

Increased competition implied additional problems and Swedtel was forced to look at new and more advanced markets. Accordingly, the company entered the UK with a new idea, telephony over a cable TV network. Swedtel Ltd started in 1986 but was liquidated already in 1990.

Swedtel's major contracts related to network development but more and more customers were looking for better support systems to combat increased telecom competition. In 1986 the company started development of a product called TIMS (Telecom Integrated Management System). This product was a series of computer programs designed for the special needs of small to medium sized telecom operators to enable invoicing and customer support. TIMS utilised Swedish experiences.

The success of the AXE switching system, jointly developed by Televerket and Ericsson, created a demand from both Ericsson and their customers for assistance

The history of Telia original

with installation and operational management. A separate Swedtel consultancy subsidiary was created in 1988 called Scandinavian Switching Support AB (Scanswitch).

The end of the 1980s was a difficult time for Swedtel. In addition the company had to change name again to Swedtel AB in 1989 when Teleinvest established Swedish Telecom International AB for its international operator expansion.

5.5 1990-1994

In 1990 Swedtel initiated a rationalisation programme to reduce costs. Liberalisation and privatisation in the global telecom industry affected the outlook for Swedtel in a big way and extensive changes in the business were made over the next five years.

In 1991 the company had to restructure, accelerated by Televerket's increased internationalisation. Swedtel was re-organised into four business areas (Swedtel/Swedtel Development/Swedtel Europe/Scanswitch) and in addition Swedtel Personnel AB was formed to professionally support the increasing number of Televerket's employees working abroad.

In 1991 Televerket and PTT Telecom Netherlands formed the Unisource alliance to meet the international needs of enterprise customers. The fall of the Iron Curtain also created new markets in Eastern Europe. Swedtel received commissions in Estonia, Latvia, Poland, the Czech Republic, Slovakia and Hungary. These assignments in Europe supported Televerket's expansion outside Sweden and the creation of new operator constellations.

1992 was a strong year for Swedtel Development in Africa and the Middle-East. To emphasize this positive situation, Swedtel Development changed name to Swedtel Consulting AB and a joint venture, TELEConsultores, was established with the operator in Mozambique in the Portuguese speaking region of Africa. Commissions in Africa continued to be technical aid and business development programmes.

In 1992 the educational facility in Kalmar became a separate company, Swedtel Academy AB. Over the years since the start in 1979, a large number of young potential telecom executives from all over the world had come to Sweden and received training from an organisation with a very good reputation. As a consequence, Swedtel established an extensive contact network in more than 100 countries which led to many new contracts and assignments.

1993 saw the birth of yet another company. Swedtel West in Gothenburg, which was later re-named Swedtel Contracting AB, was engaged in network installation for foreign operators. A major customer was Ericsson which has just started a new type of outsourcing business, the management of an operator's network.

In 1993 Swedtel opened sales offices in Costa Rica and the Lebanon. Swedtel Europe won contracts in Poland and Belarus plus in Hungary to develop an IT plan. Swedtel Europe was integrated into Swedtel Consulting from 1994 and a representative office was started in Hong Kong.

In 1994 all consulting activities were transferred to Swedtel AB and Scanswitch was sold to Ericsson and Telia (50/50 each).

1994 was also a breakthrough year in South-East Asia with two major contracts in Indonesia, new commissions in Thailand and China and a development contract for Digitel in the Philippines.

5.6 1995-1999

The robust expansion continued during 1995. Service contracts in more than 50 countries included development projects in five segments, enterprise, business, personnel, networks and finance.

The Swedtel Group now comprised three national units, Swedtel, Swedtel Academy and Swedtel Contracting, plus three International units, TELEConsultores, Telia Swedtel Philippines Ltd and Swedtel Inc in Miami (moved from Costa Rica).

Major activities in 1995 were in the Philippines, Indonesia, Kuwait, Oman, Poland, Angola and Mozambique, the latter two financed by SIDA. As a consequence of contacts made at the ITU exhibition Telecom 95 in Geneva, Thai Telephone & Telecommunications awarded Swedtel a contract to manage the installation of 500,000 telephone lines in Thailand.

An office within Swedtel becomes Telia's nucleus to prepare an offer for a share in Telecom Eireann. Telia formed a strategic alliance with Dutch KPN in Ireland the year after.

In 1996 the entire Telia Group was re-organised. An International business area was created, which included Swedtel. The subsidiaries changed names to: Telia Swedtel AB, Telia Academy AB and Telia Contracting AB. The business offerings now included IT strategies and the development of Internet Service Providers (ISPs).

The market expanded with new sales offices in Brazil and Zimbabwe. Turnover grew by 40% and in 1996 Swedtel was active in 60 countries even though interest from development organisations such as the World Bank started to diminish. Swedtel sold services to those local companies where Telia Overseas was a part owner. Major projects were started in Angola, the Philippines, India, Indonesia, Ireland, Mozambique, Oman, Poland, Sri Lanka and Thailand.

In 1997 the Brazilian office became a subsidiary, Telia Swedtel do Brazil. The Middle-East office moved from the Lebanon to Dubai and Swedtel bought into an Indian Development company, TeleCompetence (India) Ltd. Business development projects were started for IT support systems, ISPs, Customer Relationship Management systems and Tele-medicine.

In 1997, Swedtel received its largest contract ever, worth 500 MSEK, from Telecom Colombia for an IT project and a new subsidiary, Telia Swedtel de Colombia was created. OTE in Greece and Telecom Eireann signed contracts for IT projects and in Africa a project was completed for COMESA (Common Market of Eastern and Southern Africa) to connect telecom networks between 25 countries. An Internet node was established in Miami for the Caribbean and South America and a national node was installed in Ecuador. Swedtel was well armed for continued development but was very dependent upon Telia for competent consultants.

During 1998 virtually every telecom market in the EU opened up for competition. Most countries in South-East Asia were telecom-liberalised, ahead of Europe. Even in Latin America and in a few African countries, markets had become liberalised

and competition was allowed. Chapter four of this history describes Telia's continued foreign expansion although the pace was reducing. There was a market for new services, but traditional consulting was on the decline. Financing from SIDA disappeared and consultancy salesmen encountered customer demands for financing and/or capital injections. Swedtel did not have the resources for these demands and was dependent upon the willingness of Telia or Telia Overseas for help. Some opportunities could not be exploited but a few major projects were started. One project was in Brazil where Swedtel assisted in the creation of the mobile operator TESS, where Telia was a major shareholder. Another was in Lithuania to help convert fixed network operator Lietuvos Telekomas into a modern business, with Telia and Sonera as shareholders. Telia understood the ISP business and, in conjunction with Telia Network Services, Swedtel opened ISPs in Peru and Mexico.

By the end of 1998, Swedtel had three companies in Sweden, four majority-owned subsidiaries abroad, four minority-owned foreign companies and five sales-offices abroad. Once again the business was re-structured and the organisation adapted to the latest reality. Sales growth was marginal.

In 1999, the major part of the year involved preparations for the merger with Telenor where Swedtel was expected to play a new role. Customers were caught in the middle and in December a new Managing Director was appointed. However, a number of long-term contracts were still on-going and projects in Ireland, Lithuania, Columbia, Nigeria, Indonesia and Brazil kept turnover flowing at 369 MSEK for the year with 380 employees.

The merger with Telenor was disbanded just before Christmas and Swedtel changed direction down a new path to support Telia's business areas in their international expansion. Swedtel's mobile competence was transferred to Telia Mobile.

The table below shows the distribution of Swedtel's turnover during the 1990s.

Telia's percentage of Swedtel's turnover

1994	1995	1996	1997	1998	1999
10 %	15 %	18 %	30 %	33 %	43 %

5.7 The 2000s

The year 2000 began with a bang when the IT-bubble burst causing a substantial reduction for Swedtel which now only had one company in Sweden, one abroad (in Colombia) plus four regional offices in Bangkok, Dubai, Johannesburg and Miami. On-going projects existed in 15 countries and the number of employees was reduced to 100. Swedtel increased co-operation with Telia's international business operations and noted successes in projects with Telia Mobile's Home-Run export venture and with projects for International Carrier. Major projects were performed in Lithuania, Colombia, Nigeria and Saudi Arabia where Swedtel constructed the Middle-East's largest ISP. In China, Swedtel participated in the construction of a portal for e-Medicine and e-Commerce. Swedtel Academy was sold in 2000.

In the year 2000, Swedtel started co-operation with WorldTel, an international investment company initiated by the ITU and chaired by Sam Pitroda an Indian

entrepreneur. The market wavered and orders declined, not least because Telia increased its focus on core business in the Nordic and Baltic region.

Swedtel needed a new owner so the company was transferred to Telia's Enterprise business area and placed on the for-sale list.

In June 2001 Telia sold 51% of Telefonos to Industri Kapital. Telefonos was a group of eight separate companies within Telia, of which Telia Swedtel was one. The company reverted to its old name Swedtel AB. The business was re-structured and in October 2002 it comprised the parent company with three foreign subsidiaries. To further reduce costs, sales activities were gradually transferred to agents.

During 2002 Swedtel concentrated on new markets outside of the Telia sphere and a large contract was won in Nicaragua. In November 2002 Swedtel came under new ownership when WorldTel Ltd purchased the company.

The ownership situation changed again in 2007 when Holding Company Bronsstädet, run by a Swedish entrepreneur Peter Gyllenhammar, bought Swedtel.

5.8 Swedtel facts

5.8.1. Company names

1967-1978	Swedish Telecommunication Consulting AB (Swedtel)
1978-1989	Swedish Telecoms International AB (Swedtel)
1989-1996	Swedtel AB
1996-2001	Telia Swedtel AB
2001-2007	Swedtel AB
2007-	Swedtel International AB

5.8.2. Owners

1967-1981	Televerket
1981-1993	Teleinvest AB (Televerket 100%)
1993-2001	Telia AB
2001-2002	Telefonos AB (Industri Kapital 51%, Telia 49 %)
2002-2007	WorldTel Ltd, and others.
2007-	Förvaltnings AB Bronsstädet

5.8.3. Managing Directors

1968-1974	Arvid Lundqvist
1974-1981	Hans S Andersson
1981-1988	Janne Blom
1988-1989	Leif Mattson (interim)
1989-1992	Kjell Olsson
1992-1994	Rune Nyman
1994-1997	Lennart Ljungblad
1997-1999	Lennart Michaëlsson
1999-2003	Jimmy Sundström
2003-2007	Pär Eriksson
2007-	Per Dahl

5.8.4. Swedtel's Turnover & Profit (MUSD)

Year	Turnover	Profit
1974/75	2.8	0
1979/80	6.8	0
1984/85	10.6	0
1989	15.7	0
1991	14.1	0.1
1993	19.0	1.8
1995	29.3	2.4
1997	42.8	4.2
1998	43.3	1.2
1999	46.1	1.4
2000	27.3	0.8
2001	22.8	1.1
2002	20.3	0.3