

# SWEDEN'S TELECOMMUNICATIONS INDUSTRY

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## Introduction

The year is 1853 and, while the second wave of cholera strikes Sweden, an electric telegraph line is opened between Stockholm and Uppsala. Sweden at the time is a poor agrarian country with a population of about 3.5 million. (Polsson) Fast forward to 2002, when Sweden has been placed for three consecutive years at the top of the IDC/World Times ranking of the world's most advanced information societies. ("ICT — Information...," p. 4) Furthermore, the mobile phone market penetration (number of subscriptions per total population) is 80 percent. ("ICT — Information...," p. 5) Additionally, according to the Human Development Report index published by the United Nations, Sweden is identified as one of the best countries in which to live in the world, based on high standards of education, democracy, income and public health. ("United Nations...")

The above chronological contrast is drawn only to underscore the sweeping progress this country has made over the past 150 years, espe-

cially in the telecommunications sector. In this article, I first survey the birth and growth of Sweden's telecommunications industry, coupled with the evolution of Ericsson as a company. I also discuss the reasons for Ericsson's decline and make suggestions that would be conducive to Ericsson's revival. I evaluate whether the long marriage between Ericsson and the telecommunications industry of Sweden is on the verge of a split. Finally, I analyze the consequences of this split and forecast the future of Ericsson and Sweden's telecommunications industry.

## A History of Sweden's Telecommunications Industry

In 1794 the optical telegraph,<sup>1</sup> invented by the Swedish poet and scientist Abraham Niclas Edelcrantz, was already in use as a means of

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<sup>1</sup>The optical telegraph comprised a network of linking stations, each with a binary system of ten shutters. The pattern on shutters could be read off at a distance, and the signal was duplicated from one station to the next. ("Optical Telegraphy")

improving the existing system of communications in Sweden. Due to poor road conditions, the communications infrastructure was comprised primarily of highways and waterways. An optical telegraph network gradually grew up around Stockholm, and the 1808 war against Russia promoted network expansion even further. However, the end of war in 1809 slowed the rapid telegraph network expansion.

Europe's political tensions in the 1830s caused Sweden to further develop its optical telegraph network as a defense strategy. In 1853 an electric telegraph line was opened between Stockholm and Uppsala, which led to a gradual replacement of optical telegraph stations with electric telegraph stations. Again, the political tensions in Europe caused Sweden to extend its network, leading Sweden to establish communications links with Denmark and Norway by 1855 and with Finland and Russia by 1860.

Meanwhile, in 1857 Stockholm's telegraph director A.H. Öller founded a telegraph workshop that aimed at improving telegraph instruments through research and experimentation. Later Öller & Co. became the leading supplier of telegraph equipment, and in 1866 Lars Magnus Ericsson joined the factory as an apprentice. Now Sweden's demand for telegraphic facilities was swiftly growing, from municipal authorities to railway stations to international connections. This fast growth in demand is evident by the launch of the Atlantic cable connecting Sweden and America in 1866, the start-up of 30 new telegraph stations between 1872–74, and the formation of The Great Northern Telegraph Company (a merger among three companies), which later created a cable system between Sweden and Great Britain, Norway, Denmark, Finland, and Russia. ("Telemuseum")

In 1876, however, Lars Magnus Ericsson, a young apprentice at Öller & Co., and a colleague, Carl Johan Anderson, jointly opened a workshop by the name of Ericsson & Co. They did a good business manufacturing and repairing telegraph instruments. The arrival of Alexander Graham Bell's telephone in Sweden, however, dramatically changed the picture for Ericsson & Co. Ericsson purchased and studied a few U.S.-made telephones, and redirected his company from repairing phones to manufac-

turing its own phones, called a "telephone with a trumpet." In 1880 Ericsson met with international competition when American Bell Company set up the first telephone network in Sweden. Despite the competition, Ericsson flourished; and in 1887 the world's largest telephone exchange was set up in Stockholm, using Ericsson's switchboards. Increased demand caused the company to expand beyond Sweden's borders to China, Russia, and Mexico by the 1890s, to New York in 1902, to Britain in 1903, to France in 1911, and to Australia in 1954. ("Telemuseum")

In addition to Ericsson's advancement, Sweden's telecommunications industry was also advancing. The Navy tested wireless telegraphy for the first time in 1899, and coast stations were established in 1910. Shortly after 1910 cable channels were replaced by wireless circuits, and during World War I Sweden's neutrality established it as the telegraph center of Europe. Radio circuits between Sweden and neighboring countries were established in the 1920s, and in 1924 a direct transatlantic radio circuit between Sweden and the United States was opened. Sweden was again at the forefront of telegraph communications during World War II. However, the 1950s marked the onset of a steady decline in both inland and international telegram usage. To reduce manual operation costs in Stockholm's telegraph office, ATESTO (Automatic Telegraph Exchange for Stockholm's Telegraph Office) was inaugurated in 1974, which in 1991 was replaced by Meritel, a system that could automatically handle telex, telegrams, telefax, electronic mail and other services. The Telecommunications Administration, Televerket, became a state-owned public company called Telia AB in 1993. ("Telemuseum")

As Sweden's telegram services declined in demand, there was an increasing rise in demand for Ericsson's products, both domestically and internationally. Ericsson made use of the electronic switching technology that emerged in the 1970s. The electromechanical<sup>2</sup> technology was widely used in the telecom switching equip-

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<sup>2</sup>Electromechanical devices consist of electrical and mechanical components: for example, electric motors and calculators. ("Electromechanical")

ment business in the 1960s, but the electronic switching<sup>3</sup> technology shifted the cost dependence from hardware to software. To expand its global presence, Ericsson formulated a series of cost-efficient modular software packages, which could adjust to the telephone systems of different countries. Indeed, global sales increased significantly and AXE, Ericsson's computer-controlled local exchange system, was a huge success. By 1992 the AXE system was in operation in 101 countries, and by 1995 the AXE system had a market in 63 countries and was being used in 22 mobile telephone systems. (Vedpuriswar, pp. 4–5)

Both Sweden's telecommunications industry and Ericsson grew concurrently between 1900 and the late 1990s. While the total production volume for Swedish telecommunications increased by 258 percent between 1900 and 1995 ("The Swedish Engineering Industry..."), Sweden's total exports grew increasingly reliant on Ericsson. And Ericsson's share of total Swedish exports amounted to 11 percent in 1996, growing to 16 percent in 2001. ("Ericsson More Important...") In 2001 *Business Week* stated that in recent years Ericsson has accounted for about 15 percent of Swedish exports and close to 20 percent of annual economic growth. (Reed and Sains, "Sweden's High-Tech...") However, between June 1998 and September 1999, Ericsson's share of the global mobile handset market fell from 15 to 14 percent. And on January 25, 2002, the company announced its first ever loss of 21.1 billion SEK, or U.S. \$1.97 billion. Since then, Ericsson has posted losses every quarter, barely returning to profit in the last quarter of 2003.

## Ericsson: Today and Tomorrow

As of 2003 Ericsson stands as the only company of the eighteen major companies of Swedish origin (including Volvo, Pharmacia, and Electrolux) to have stayed in Sweden. For Swedes, Ericsson has long stood as a symbol of technological prowess and entrepreneurial suc-

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<sup>3</sup>An electronic switching system converts analog signals to digitized signals and interconnects them to the appropriate time slots. ("Electronic Switching System")

cess because, unlike Volvo and Electrolux, Ericsson has simultaneously maintained its headquarters and manufacturing sites in Sweden. Also, its rise to a world-class company from a humble beginning has made Ericsson a cultural icon of sorts. It is not merely the company's origin that is inspiring: "If Ericsson slows down, by definition Sweden slows down," says Klas Eklund, Chief Economist at SEB, a major Stockholm bank. (Reed and Sains, "Why Ericsson Is...") Hence, when Ericsson announced its loss on January 25, 2002, Swedes were apprehensive, not only because of Ericsson's financial importance to Sweden, but also because of the cultural significance of the company.

Economists all over the world blamed Ericsson's downfall on its slow response to deregulation, privatization, and the mobile phone revolution, which created hundreds of new operators. Meanwhile, in the telecommunications industry, both in Sweden and globally, Ericsson had been acquiring the reputation of becoming predominantly an equipment manufacturer, dealing with large companies and state-owned monopolies as opposed to customers and individual users who were fast becoming the real drivers of business growth. Ericsson was also seen as a highly technical company that over-engineered and delayed launches of its phones, while failing to make key decisions in time. For example, Ericsson could not decide whether or not to exit its doomed handset<sup>4</sup> business, which cost the company U.S. \$2.4 billion in 2001. Over-engineered designs, such as Ericsson's T-18-z<sup>5</sup>, received strong criticism because of poor construction and difficult user-interface. As Adam Baker, in his weekly column "Theory," commented on Ericsson's T-18-z model:

The phone book requires the user to specify memory locations in which to store entries, and even worse, if you want to edit an entry, you must first

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<sup>4</sup>The handset includes the receiver and transmitter of the telephone. It may also include the dial buttons. ("Handset")

<sup>5</sup>The Ericsson T-18-z includes such features as voice-activated dialing, a 99-name phone book, a vibrate mode, and short message service (SMS) for sending and receiving text messages up to 160 characters. ("Cellphones")

memorize the memory location it's in. Computers are good at remembering arbitrary numbers; people aren't. Even after familiarizing myself with the phone book, retrieving numbers took at least seven or eight seconds, whereas with my Nokia it took about one or two seconds. It would have been faster to dial manually, but the keypad on the T-18-z makes dialing nearly impossible. (Baker)

In 2001, Ericsson undertook a restructuring program to cut costs. This rapidly eliminated 50,000 jobs in Sweden and around the world. The company further aimed to cut its annual operating costs from SEK 51 billion at the end of 2002 to SEK 38 billion at the end of 2003, the equivalent of approximately 10,000 more jobs. This downsizing has certainly angered employees. Peder Bostrom, who is the head of the metal workers union in Kumla where Ericsson has reduced employees from 3,200 to 2,350 within the last two years, says, "People have done a really good job, and as thanks we get big layoffs." (Reed et al., "Saving Ericsson") It was indeed encouraging for the company when Ericsson celebrated its first return to profit in nearly three years in October 2003, when it reported a third quarter profit of one billion SEK (U.S. \$129 million).

As Ericsson hopes for a prosperous comeback and struggles to survive its current situation, the question arises: Where is this telecom giant headed in the future? It appears that Ericsson is gradually transitioning from a manufacturer to a service provider. Ericsson seems to be already well on its way with the launch of Ericsson Mobile Platforms — a company that will provide companies with component specifications, circuit board layouts, software and technical support. "We will provide instant access to cutting-edge technology, making it possible for all mobile phone and wireless device manufacturers to bring new advanced products to the market quicker and more cost efficiently," said the new president of Ericsson Mobile Platforms, Tord Wingren. (Sundgot) Besides providing services based on the company's experience, Ericsson may emerge as an upgrade service provider. Sean Faughnan, a technology analyst at J.P. Morgan in London,

said, "The world leader with a third of the market, Ericsson is best positioned to vie for the upgrade business, which could amount to tens of billions of dollars." (Reed and Baker, "A Lot of Static...") Additionally, Ericsson's Global Services Division, divided into Advisory Services, Integration Services, and Managed and Support Services, is already gaining significance, accounting for 30 percent of revenue in early 2003. Besides emerging as a service provider, Ericsson, with over 10,000 patents under its belt, can certainly evolve in the future into a leading knowledge provider as well.

Since returning to profit, Ericsson has been winning deals globally. In October 2003 alone, Ericsson won a U.S. \$150 million network order from Indian Operator TATA teleservices, and AIS chose Ericsson for its U.S. \$10 million order of EDGE live network in the Bangkok metropolitan area. Ericsson has also signed over 40 lucrative contracts that allow it to be the exclusive provider of 3G<sup>6</sup> in certain areas, expanding its business into Sri Lanka, China, Thailand, and Lithuania. (Litov) It is worthwhile to consider where Ericsson will find the employees needed to contend with this increase in its global business, especially after its recent massive downsizing. Will Ericsson stay in Sweden regardless of the circumstances? Mr. Carl-Henric Svanberg, Ericsson's chief executive, has not kept the answer a mystery. In an interview on August 27, 2003, when asked about Sweden joining the EMU, he said, "When you develop a product and are going to build a new production line, you always have a choice: should you do it in your Swedish factory or in your French, or German, or Japanese factory? In the end more of those decisions are going to work against Sweden (in the event of a 'no' vote)." (AFP) Profit is what drives decision-making, as Michael Treschow, the Chairman of Ericsson's Board of Directors, says, "Companies are about profit. And we go where the profit is. We do not manufacture for fun." (Treschow)

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<sup>6</sup>3G means third generation of cellular phones and carries high data speeds, always on-data access, and greater voice capacity. The first generation was analog and the second generation was digital. ("Glossary")

That being the case, whether or not Ericsson chooses to keep its headquarters in Sweden, it is highly probable that Ericsson will choose to manufacture globally in order to take advantage of lower manufacturing costs, cheaper labor, and transport savings. Although Swedes regard Ericsson as the nation's flagship corporation and cultural icon, when it comes to purchasing a product, it is a different matter altogether. As global competition has increased in the past decade or so, users today have many options and many manufacturers from which to choose for any given product they purchase. And as this has happened, people want to have the best their money can buy. Swedes are no exception to this behavior. "Yes, national pride is always there, but when you are a customer you buy what appeals to you the most. The country after 'Made in' is secondary," said a student at Stockholm School of Economics while justifying his choice of cell phone. (Student) Hence, if Ericsson relocates outside Sweden, ultimately people will be more interested in whether it can supply better and more competitive products.

## **Suggestions for Ericsson**

Even though external causes, like the saturation in the telecommunications industry in the late 1990s, telecom operators' over-investment, and unpredictable market conditions, may account for Ericsson's recent misfortunes, there is no denying that problems in the company's own backyard need to be resolved as well.

Take the ownership structure of the company, for example. There are two groups that own a majority of the company's A shares: namely, Investor, a holding company controlled by the Wallenberg family, and Industrivarden, a subsidiary of Sweden's largest bank, Svenska Handelsbanken. Most shareholders hold the B shares. According to Ericsson's 2002 Annual Report (p. 80), "Each A share has a thousand times the voting power of each B share. Accordingly, as of December 31, 2002, our A shareholders held 4.1 percent of our capital stock and 97.7 percent of our voting rights." As is evident, this structure creates an imbalance of influence on the company's policies and decisions among the shareholders. Furthermore,

the two groups who are the major owners of A shares are known to frequently disagree at the board level. Ericsson needs to diffuse the voting rights more equitably among its shareholders to avoid deadlocks in decision making due to stalemates at the board level. More equitable voting rights may also lead to more engagement and motivation on the part of B shareholders, many of whom hold A shares partly responsible for Ericsson's troubles. Chairman of the Board Michael Treschow has made efforts in the past in the direction of a more equitable voting rights system among the shareholders, but nothing conclusive has been achieved to date.

Besides its organizational structure, Ericsson needs to cut costs based not only on current conditions, which it is doing thus far, but also on future trends. Ericsson must also prepare itself to meet the growing demand for telecom equipment before further reducing payrolls. The company is well positioned to take advantage of the expanding market for 3G mobile technology; however, with growing competition from companies like Nortel Networks, Lucent Technologies, and Cisco systems, the development and implementation phase of 3G technologies may be shorter than anticipated. Ericsson needs to make sure that it is prepared for any sudden increases in demand.

Another area where Ericsson might change for the better is its corporate culture. After the initial losses, Ericsson's corporate culture was often criticized as overly focused on manufacturing equipment with not enough attention given to marketing. Ericsson was blamed for not bringing products to market on time, for ineffective marketing strategies, and for making unappealing and non-user-friendly equipment. The company also did not spend enough time establishing itself as a brand name, and this contributed to its losing the mobile handset competition. As of 2003, Ericsson's board of directors is male-dominated and middle-aged, which is surprising in Sweden where women comprise such a significant portion of the work force. Ericsson would surely gain from a larger representation of women and younger engineers on its board.

## Sweden's Telecommunications Industry: Here to Stay

Despite the recent global downturn in the telecommunications industry, Sweden's telecommunications industry still exudes confidence and a feeling of permanence. Indeed, as Ericsson grew throughout the twentieth century, Swedish society developed a vision of itself as "Always Best Connected." ("ICT — Information..." p. 5)

The primary impetus for the development in the telecommunications industry has been Sweden's zeal for innovation and advancement. Hence, it is no surprise that Sweden was ranked number one on the European Innovation Index in 2001. Whether I was visiting the Riksdag, Sweden's Parliament, Ericsson's Stockholm headquarters, or the Stockholm School of Economics, I always noted that Swedes have a tendency to set very high standards. And it is this urgency that has brought Sweden to a leading position in telecommunications technology worldwide. Today Sweden spends generously on both private and public sector research centers. According to the *World Competitiveness Yearbook*, 2002, Sweden spends more on R&D in relation to GDP than any other country. Additionally, Empirica Delassasse/Wirtschaftwoche 2002 performed a study that covered 214 European regions and measured the number of patents, expenditure on R&D, and numbers of people employed in R&D. The study ranked Stockholm first, Göteborg sixth, and Uppsala tenth. ("ICT — Information..." p. 4)

Sweden is performing noteworthy research within the telecommunications industry; and the government, universities, and private companies are carrying out this research, both individually and jointly. This diffused research effort enables Sweden's telecommunications industry to keep from having its fate bound up with the fortunes of any one company. Today, regardless of Ericsson's business prospects, telecommunications research projects in Sweden are moving forward. Sweden is currently aiming to be at the forefront of the convergence of mobile and Internet technologies through 3G (third generation) mobile services. Extensive research is underway at the Victoria

Institute, the Swedish Institute of Computer Science (SICS), the Swedish Research Institute for Information Technology, and Interactive Institute, to name a few. Besides 3G mobile services, Sweden also has its eyes set on developing photonics.<sup>7</sup> Photonics research is being carried out at universities such as the Royal Institute of Technology, the Chalmers Institute of Technology, Acreo (the industrial research institute), and the Kista Photonics Research Center (comprised of both Swedish and international industry and academic leaders).

Sweden has also begun to merge its different industries to give rise to new sectors in the economy. Telematics, which generally refers to the fusion of mobile communication, the automotive industry, and wireless technology, is a developing sector in Sweden. The Telematics Valley in Göteborg is rapidly growing, and today it is often described as one of the leading centers for vehicle telematics. The providers are Telematics Valley, Lindholmen Science Park, and the Viktoria Institute.

## The Future of Sweden's Telecommunications Industry

Based on the extensive research in wireless/mobile technology, telematics, and photonics that is already underway, the Sweden of tomorrow appears well positioned to retain its reputation for providing top-notch expertise in telecommunications. In the years to come, the telecommunications industry of Sweden will benefit from both national and international capital investment and will be a pioneer in knowledge intensive operations. The global research and development environment in Sweden is already coupled with good test and launch facilities. In 2002 the World Economic Forum ranked Sweden second in terms of "Favorable Business Climate Rankings." ("ICT — Information..." p. 38) And in 2003 A.T. Kearney's *Foreign Policy Magazine* also ranked Sweden second on their list of ten most globalized economies in 2002. Furthermore, as Lars Stanghed, Chairman of IBM Sweden, says:

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<sup>7</sup>Photonics involves the use of photons (from light or radiant energy) for communication and information processing. ("Photonics Online...")

In 2003, IBM celebrates its 75th anniversary in Sweden. The decision to enter Sweden was based on the country's history and strengths as an industrial nation. Many innovative Swedish companies are IBM customers or business partners. In this climate — in addition to providing our global portfolio of products — we develop and test new Internet and wireless solutions, which can be marketed worldwide once completed. (“ICT — Information...,” p. 11)

Besides a healthy business climate and investment environment, Sweden today has research institutes such as the Kista Photonics Research Center as mentioned above, TelecomCity, and the Centre for Distance-Spanning Technology-CDT that extensively collaborate with universities, commercialization systems, and the venture capital industries. In the future these institutes will pave the way from academic discovery to global launches of innovations in telecommunication technology.

Along with the dominance of knowledge-intensive operations, the future telecommunications industry in Sweden will also comprise an abundance of small companies, rather than one or two large companies. Already there are over 400 wireless technology companies in Sweden, and Stockholm/Kista has the highest concentration of wireless technology researchers in the world. At the 2003 TELECOM WORLD event<sup>8</sup> in Geneva, Yoshio Utsumi, Secretary-General of the International Telecommunication Union, said:

We are enormously pleased to see the major influx of companies attending a TELECOM WORLD event for the first time. This is a graphic illustration of how the telecommunication industry is reshaping itself, with a new wave of smaller, innovative companies beginning to emerge. As new companies emerge, Sweden's business climate and research facilities

make it a top choice for business development. (“ITU...”)

In addition to the advancement in research, knowledge-based operations and the emergence of smaller companies, the telecommunications industry will also extend into other sectors. Sweden already has a vision of “borderlessness,” which is said to have two meanings. According to the report “Swedish Technology Foresight” (p. 7), “Borderlessness refers to the interplay between different fields of technology and knowledge leading to entirely new applications.” One example of borderlessness is the merging of information technology and health care sectors to perform collaborative research and the development of biosensors, artificial sensors, and home health care. Another example is the merging of the telecommunications industry and the transportation sector, as in the National Road Administration Proposal for the development of electronic services, sensors and adaptive systems, tailored to travelers and traffic systems. Also, it is borderlessness that gives rise to Sweden's dream of e-democracy, e-education, e-commerce and e-health, where electronic communications and information transfer are merged with such sectors as education. Wireless advertising is yet another example where marketing is merging with wireless communication, and talk of wireless advertising is already underway in Sweden. Recently Ericsson performed a survey in Sweden in which users were asked if they would like to receive SMS — Short Message Service — advertising messages provided they were relevant to their profiles and interests. Sixty percent of the users responded positively. (Graham) Borderlessness of different disciplines with the telecommunications industry not only means a merging of disciplines, it also means more cash flow for Sweden's telecommunications industry.

A second definition of borderlessness, according to “Swedish Technology Foresight” (p. 12), is in European integration where national borders have begun to lose significance. World trade, multinational corporations, global capital flows, and virtual companies arise from groups of players in different countries performing specific tasks. While the unity of different disciplines gives rise to stronger indus-

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<sup>8</sup>Organized by ITU, the TELECOM WORLD events provide a platform for its members to address and discuss telecommunications issues. ITU is an international organization that arranges exchange of ideas between government and industry in the global info communications community. (“Welcome to ITU...”)

tries, the blurring of national borders gives rise to greater competition with less regulation, which can promote the advancement of emerging companies from the local to the global level.

The future of Sweden's telecommunications industry looks promising, solidly grounded in research and development and knowledge-intensive operations, while at the same time fostering the emergence of smaller companies, which will benefit from Sweden's vision of borderlessness.

## Conclusion

On average we spend 75 percent of our waking lives communicating. (Tubbs and Moss, pp. 4–5) It is this very need to communicate that has quietly driven us to develop faster and more far-reaching modes of communicating. It is true that only time will reveal the future of Sweden's telecommunications industry; however, the need to communicate and the increasing demands placed by other sectors in Sweden

such as education, business, and banking make it reasonable to predict that Sweden's highly developed telecommunications industry is here to stay. According to a study by Cybercom Research, there are four million Internet bank accounts in Sweden. ("ICT — Information...," p. 15) Furthermore, it is reported in "Swedish Technology Foresight" (p. 9) that "the Internet already reaches more than half of Sweden's households and its traffic volume doubles every hundred days."

In fact, so strong is the presence and effect of telecommunications that it will not only maintain its own ground, but will in the future also diffuse into other sectors such as transport, biotechnology, health care, and education. Regardless of the path leading Swedish companies like Ericsson take, Sweden's hunger for innovation and knowledge will keep it at the forefront of telecommunications research and development and strengthen its international presence as a country with a knowledge-intensive society.

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