

Towards Telecommunications



Nokia since 1865

FROM MULTIBRANCH TO TELECOMMUNICATIONS

Tires
Footwear
Plastics
Power supply
Consumer electronics
Data
Mobile phones
Telecommunications
Cables
Machinery
Robotics
Engineering
Paper
Chemicals

Intelligent networks
Transmission systems
Fixed networks
Access networks
Wireless/mobile data
TETRA networks and terminals
GSM networks
Smart traffic products
Multimedia
Internet
Digital exchanges
Mobile phones
Base stations

Nokia focuses on the fastest growing segments in telecommunications



Nokia

Focused on Telecommunications

Nokia is a leading international communications company, focused on the key growth areas of wireline and wireless telecommunications. Nokia is a pioneer in digital technology and wireless data communications, continuously bringing innovations to the highly competitive and growing telecommunications markets. Nokia is also actively involved in international R&D cooperation, including the development of the standards for third generation mobile telephony.

Nokia's history dates back to 1865. Since then, the company has evolved first into a conglomerate encompassing several industries ranging from paper to chemicals and rubber, and in the 1990s with a clearly defined strategy into a dynamic telecommunications company.

The ground work for telecommunications was already laid in the 1960s, as Nokia was researching the field of radio transmission in its electronics department. In the late 1970s, mobile phones and telecommunications infrastructure products were developed for both domestic and international customers. In the 1980s and 1990s, Nokia became a global leader in digital communication technologies.

From the very beginning, Nokia has faced competition from established international competitors in the open domestic telecommunications markets. Among other factors, the ability to exploit the opportunities created by continuous technological and market change has helped Nokia develop into the company it is today.

Nokia's history starts in 1865 when engineer Fredrik Idestam established a wood-pulp mill by a river bank in Southern Finland. Since then, the company has evolved first into an industrial conglomerate, and in the 1990s into a telecommunications company.

While focusing on telecommunications, the range of Nokia's business opportunities has expanded with the rapid growth of the telecommunications sector.



Today

Nokian Paper belongs to the U.S.-based Fort James River Group.

A soft tissue paper mill still operates in the town of Nokia.

Nokian Tyres and Nokian Footwear both operate in the town of Nokia.

The Nokia Group sold the footwear factory in 1990 and its major share in Nokian Tyres in 1995.

Nokia's former cable industry operations are part of the Dutch Draka Group.

Tire production started in the 1930s.

The Beginning

Three Roots



Cable production in the 1930s.



Nokia's paper factory in the 1890s.



Galosh production in 1933.



Nokia Company

Nokia's history starts in 1865 when engineer Fredrik Idestam established a wood-pulp mill by a river bank in Southern Finland

and started manufacturing paper. The company, which he named Nokia, soon became successful as industrialization got under way in Europe and the consumption of paper and cardboard rapidly increased. Around the factory, a community grew, which was also later named Nokia.

Idestam established an international network of salesmen and Nokia's products were first exported to Russia and then to the UK and France. In the 1930s, China also became an important trading partner.

From galoshes to winter tires

The Finnish Rubber Works initially opened in 1898 to manufacture galoshes. The Rubber Works became Nokia Company's neighbor after two of the company's executives passed through the area and realized not only its beau-

ty, but that hydroelectricity was available. In the 1920s, The Rubber Works started to use Nokia as their brand name.

In addition to footwear and tires, the company later went on to manufacture rubber bands, rubber industrial parts, raincoats, rugs, balls and other rubber toys.

Cables – the root of telecommunications

The company that became known as the Finnish Cable Works opened in 1912 in the center of Helsinki. Cables were needed for the growing need of power transmission as well as telegraph and telephone networks. Initially employing only a few people, the company grew rapidly. After World War II, Finnish Cable Works began trading with the Soviet Union, and exports to the West took off in the 1960s.

In 1922, the Finnish Rubber Works bought the majority of the Finnish Cable Works shares, and gradually the ownership of these three companies began to shift into the hands of the same owners. Finally in 1967, the three companies were merged to form Nokia Group.



Nokia Electronics' testing ground, 1971.

Inventors

Scientists and Visionaries

The seed for Nokia's telecommunications sector was planted in 1960 with the establishment of Cable Works' Electronics department. Work on telecommunications systems began at the Cable Works in 1962 and initially concentrated on radio transmission.

Cable Works set its sails for the new era at a good time. Semiconductor technology was just making its way from the lab to the industry. Not only the newcomers, but also the industry leaders at that time had just begun learning the ABC's of new technologies.

Into the digital age

Transmission systems based on Pulse Code Modulation, PCM, were the latest innovation in telecommunications in 1967. In PCM, analog sound signals are converted into digital form, substantially increasing the capacity of telephone cables.

In 1969, Nokia was the first company to introduce PCM transmission equipment that conformed with CCITT (Consultative Committee on International Telegraphy and Telephony) standards. By stepping into the digital age early, Nokia had made one of its most important strategy decisions ever.

The early 1970s also marked the start of Nokia's continually growing mar-



The predecessor to the mobile phone: the radiophone in 1964.

ket share in wireline and microwave transmission equipment in the neighboring Sweden and Soviet Union and later world-wide. Customers included gas, oil and railway companies.

"Anything is possible"

The Electronics department was the idea of Björn Westerlund, the President of Cable Works at the time.

Westerlund maintained good relations with universities and colleges and was open-minded enough to hire visionaries in the form of scientists, inventors and young apprentices. Kurt Wikstedt, the head of the Electronics department, then 'squeezed' production-feasible

products out of them. Wikstedt had a clear vision of where the department was heading and even called himself 'digitally crazed.' The spirit was that anything was possible and everything should be tried.

When the Nokia Group was formed in 1967, Electronics generated three percent of its net sales, and provided work for 460 people.

Radio phones for professional use

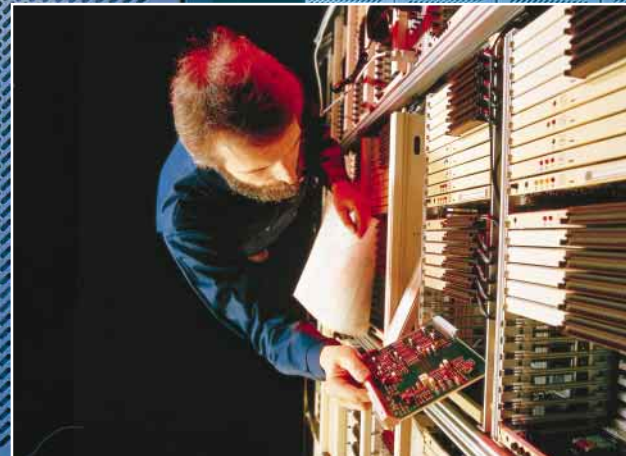
Development of the radio telephone – the precursor of the cellular phone – began in 1963. Phones were made for Professional Mobile Radio (PMR) systems – for the army and other authorities, public utilities and emergency services.

Sales of the SRP 20 car phone, utilizing semiconductor technology, began in 1966.





The development of the DX 200 digital switch began in the early 1970s. It is still the basis for Nokia's mobile and fixed network switches today.



Becoming a Total System Supplier

In the 1970s, Nokia's goal gradually became providing equipment for a totally digitalized telecommunications network. Nokia already manufactured digital transmission products, but a switch was now needed.

In the early 1970s, the majority of telephone exchanges were still electro-mechanical, analog switches, and no general consensus about digitalizing existed. Yet Nokia began development work on what became the Nokia DX 200. With it began Nokia's rapid and successful development in switching systems. The DX 200 gradually evolved into a multi-faceted platform and is still the basis for Nokia's mobile and fixed network switches and base station controllers today.

The revolutionary digital switch

A major factor in Nokia's success with the DX 200 was the early decision to use high level computer language and Intel's microprocessors. The objective was modularity: Nokia's DX 200 grows by adding more computers in parallel. The user can first build a small switch, and then easily increase capacity in line with demand and developments in technology.

From the start, the DX 200's best selling points have included its adapt-



Testing second generation DX 200 equipment in Mäkkylä, Espoo, Finland in 1984.

ability for various solutions and easy extendibility. In the 1990s, the DX 200 became a global success. The future generations of DX 200 will incorporate broadband properties, as ATM (Asynchronous Transfer Mode) technology is introduced to the concept.

Unique competition

One of the reasons for Nokia's strength in telecommunications is that Finland,

unlike many other countries, has always encouraged competition in the telecoms industry.

In the 1960s and 70s most European operators still purchased their switches from national suppliers and the expensive research needed was in the hands of just a few companies.

However, in the Finnish market, a unique competitive situation reigned. Since the country's first local telephone networks were established in the early 1880s, there have been several operators in Finland. Neither they nor the Finnish PTT (Post, Telephone and Telegraph Administration) automatically bought their equipment from national suppliers. Since entering the telecom markets, tough international competition and demanding customers have helped Nokia constantly develop its businesses and products.

The first DX 200 switch was set up in Korppoo, Finland in 1980. Its capacity proved so large that, although its initial purpose was to take care of only one node, it handled the demands of the whole network.





In addition to the Nordic countries, NMT was also taken into use in many other European countries and also outside Europe in the 1980s. At the same time, Nokia was already providing mobile phones for other standards.

The Nokia 150 for NMT 450 networks was manufactured during 1993–1994.

Roaming in the North

In the beginning of the 1970s, new legislation allowed the Finnish telecommunications authorities to follow Sweden and set up a mobile network for car telephones that was connected to the public network. The other Nordic countries followed suit.

The various systems in the Nordic countries were not linked together. There was no 'roaming' as we call it now. It soon became evident that it made commercial sense to develop a common network and standardize the technology. The Nordic Mobile Telephone service (NMT) opened in 1981, using 450 MHz. It was then the world's first as well as the largest common cellular network spanning across several countries, and it was a success.

In the 1980s, NMT was also taken into use in many other European countries and also outside Europe. At the same time, Nokia was already providing mobile phones for other standards, for example in the UK, Germany, France and Italy.

Rapid expansion of industry

The NMT network offered a new kind of choice to the consumer. Now anybody could acquire a radio phone and subscribe to the new services. Phone-user needs – availability, price



*Using the Nokia 101
NMT phone in Lapland in the 1990s.*

In 1975, the Nokia Electronics department divided its work into three distinct branches, one of them being telecommunications. Sakari Salminen headed the branch and from the start set about transforming it into a significant part of Nokia. At the time, the net sales from telecommunications amounted to 5% of total net sales.

The different branches of the Electronics department gradually developed into independent business groups. The radiophone department was merged with Salora's corresponding department into Mobira in 1979. Mobira became Nokia Mobile Phones in 1989. The telecommunications department later became Nokia Telecommunications in 1992.

and usability – were already taken into consideration in the planning of the network.

With the NMT network began the rapid expansion of the mobile phone industry. Nokia's (then Mobira) first NMT 450 mobile phone, Senator, was introduced in 1982. The demand for telecommunications equipment also accelerated swiftly. NMT switches, transmission equipment and a large amount of base stations were needed. The specifications of the new standards were published and open to international competition. In addition to base stations and phones, Nokia also provided NMT switches from 1986 on.

*The Mobira Talkman
450 car phone for NMT
networks, manufactured
during 1986–1992.*



The Nokia brand of mobile phones has become a symbol of user-friendliness, simplicity and style.

The Nokia 8100 series, launched in 1996, is a family of high-end phones with elegant design, light weight and enhanced quality and functionality.



Nokia introduced its first handheld phone, the Mobira Cityman, in 1987.

Pocket-sized Personal Technology

The Mobira Talkman, launched in 1984, was a truly advanced product of its time, the first transportable phone. It was a great success in the NMT markets and took Nokia (Mobira) into new markets, including the UK and the USA.

In 1987, Nokia introduced its first handheld phone – the Mobira Cityman. When the Mobira Senator of 1982 had weighed 9,8 kilos, and the Talkman just under 5 kilos, the Mobira Cityman weighed only 800 grams with its battery. Today's Nokia 8210 weighs a mere 79 grams. The cost of a Mobira Cityman

back in 1987 was FIM 24,000, but despite the high price, the first phones were almost snatched from the sales assistants' hands.

Initially, the mobile phone was a 'yuppie' product and a status symbol. In 1991 there were 15 million mobile phone users around the world. In mid-2000 the figure was already around 570 million, and that number is expected to surge to more than one billion by the end of 2002.

Usability and design

During the 1990s, the number of mobile phone subscribers in Finland increased rapidly and the prices of mobile phones went down at a fast pace. Products that had initially been thought of as toys and

later as luxury products became an everyday means of communication available to all.

The size of mobile phones diminished. At Nokia, more and more attention was given to the usability and design of the phones. Nokia realized very early that a mobile phone is personal technology – not only is it a functional device, but it must also suit the the personality of its owner. The Nokia brand of mobile phones soon became a symbol of user-friendliness, simplicity and style.

Several standard qualities of today's mobile phone industry were originally developed by Nokia, such as the large graphics display, signal and battery indicators, colored covers and ringing tones. Today Nokia produces a range of mobile phones for all major digital and analog standards and for various user segments.

During the past fifteen years the size and weight of mobile phones have dramatically diminished while new features have been introduced.



Mobira Senator
Car phone for NMT
450 networks.
1982–1984



Mobira Talkman 450
Car phone for NMT
450 networks.
1986–1992



Mobira Cityman 900
Handset for NMT
900 networks.
1987–1990



Nokia 101
Handset for NMT
900 networks.
1992–1996



Nokia 2110
Handset for
GSM networks.
1994–1997



Nokia 6110
Handset for
GSM networks.
Launched in 1997.



Nokia 8210
Handset for
GSM networks.
Launched in 1999.



Nokia 7110
WAP handset for
GSM networks.
Launched in 1999.



From the very beginning, Nokia has been one of the main developers of GSM technology.

Nokia's first GSM handset, the Nokia 1011 was on the market during 1992–1994.

GSM

Global System for Mobile Communications

With the gradual unification of the European markets at the end of the 1980s, the organization for European PTTs (Post, Telephone and Telegraph Administrations, CEPT) decided to develop a common mobile telephony standard, which was to be implemented digitally.

From the very beginning, Nokia has been one of the main developers of GSM technology, originally chosen by 18 countries to be the European standard for digital mobile telephony. The first GSM call was made with a Nokia phone in Radiolinja's Nokia network in Finland in 1991. In the same year, Nokia made agreements to supply GSM networks to nine other European countries.

Expertise on GSM technology has paved Nokia's way to international success.

The world's leading digital standard

GSM has wide market coverage in Europe, Asia and Africa – everywhere



In addition to mobile voice telephony, GSM technology enables versatile development of new services, including packet switching technology needed for the increasing amount of high-speed data transmission within wireless telecommunications networks.

Installation of the Nokia PrimeSite GSM base station in Hong Kong.

the corresponding 900 or 1800 MHz frequency is available. In August 2000, Nokia had supplied GSM systems to 94 operators in 43 countries. The first Nokia GSM 1800 network agreements were signed by the UK operator Microtel Communications Ltd. (now Orange PCS Ltd.) and Nokia in 1991. GSM technology based GSM 1900 (PCS) has also been chosen by several American operators. In 1996, Nokia supplied its first GSM 1900 network to Aerial Communications Inc. in the United States.

Nokia introduced the premium design model Nokia 8850 in 1999 and the Nokia 6120 WAP-enabled phone in 2000, both for GSM 900/1800 networks.



In many Asian countries, Nokia's telecommunications systems and mobile phone supplies have grown at the same pace with the countries economic growth and increasing demand for infrastructure. A good example is Thailand, where Nokia has built several mobile networks: first NMT and then GSM-based networks and broadband IP networks.

The Mobira Cityman 100 in Thailand, 1991.



Out to the World

From 1962 to the mid-1970s, Nokia's market share in telecommunications grew in Finland. In the late 1970s and early 1980s, important market entries were made into neighboring countries. Sales volumes expanded rapidly during the 1980s as deregulation started to create further business opportunities in Europe and the U.S. Kari Kairamo, Nokia's CEO at the time, vigorously encouraged the company to enter new market areas. In 1988, about 70% of net sales originated outside of Finland.

In addition to mobile handsets, Nokia's telecommunications operations abroad included mobile networks (especially NMT and GSM), dedicated networks to authorities and utilities, as well as optical transmission systems among other products and solutions.

Towards market-driven solutions

In the mid-1980s, Nokia's mobile phones entered the U.S. market through Tandy's Radio Shack stores. A joint production facility with Tandy Corporation was set up in 1985 in South Korea for the production of the AMPS (Advanced Mobile Phone System) models sold through Tandy.

Simultaneously with the increased globalization of markets, business con-



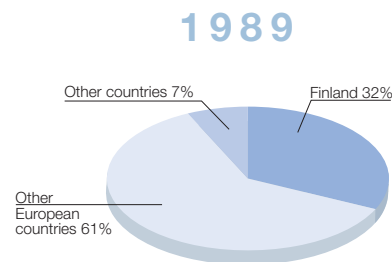
In Finland Nokia has been listed on the Helsinki Stock Exchange since 1915.

cepts changed from technology-driven to more market-driven ones. As the importance of marketing grew, so did the significance of customer services and fast roll-out and production times. Seamless logistics and every employee's individual responsibility for quality became core issues of Nokia's business.

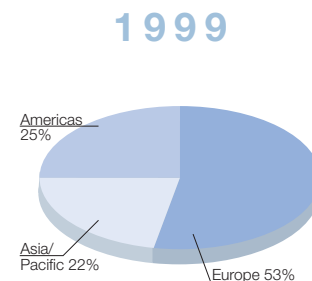
To international financial markets

As Nokia grew and became more international, it also started to be of interest to international financial markets. Nokia is the oldest company listed under the same name on the Helsinki Stock Exchange (since 1915). Nokia's shares are also listed on Stockholms Fondbörs (since 1983), London Stock Exchange (1987), Frankfurter Wertpapier-börse (1988), Bourse de Paris (1988) and New York Stock Exchange (1994).

The 1990s were a time of strengthening market positions not only in Europe, but in the U.S., Asia-Pacific and Latin American markets.



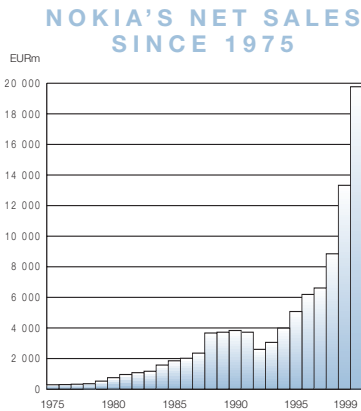
Net sales by market area.





Today, Nokia is a leader in digital technologies, including mobile phones, telecommunications networks, wireless data solutions and multimedia terminals.

Focus on Telecommunications



During the 1980s, Nokia Group, which originally formed in the merger of a paper mill, rubber industry and cable works, further diversified into several other fields. Machine engineering, chemicals, light bulbs, capacitors, aluminium, plastics and power plants were brought alongside the traditional industries of paper, tires and cables. The strategy was to grow aggressively because at the time, diversification was believed to offer protection against economic fluctuations.

In 1988, Nokia was one of the largest television manufacturers in Europe and the largest information technology company in the Nordic countries. Nokia had established a successful data

transmission department, and sold its modems around the world. Later the accumulated knowledge was put into good use in mobile data communications.

Streamlining

During the deep recession at the beginning of the 1990s, both the telecommunications department and mobile phones were the supporting pillars of the company. Despite the depth of the recession, Nokia recovered quickly as CEO Simo Vuorilehto started streamlining Nokia's businesses.

In 1992, Jorma Ollila was appointed CEO and Nokia made the next major strategic decision to focus its business on telecommunications by divesting its non-core operations.

The latest divestments took place in 1995 and 1996 with the sale of the cable industry operations and the television business.

Global leader in telecommunications

For Nokia, the 1990s have been a time of strengthening market positions not only in Europe, but in the U.S., Asia-Pacific and Latin America markets. In the beginning of 1994, Nokia Mobile

Phones was the first manufacturer to launch mobile phones for all major digital systems: GSM, GSM 1800 (PCN), TDMA and Japan Digital. In 1997, the list was completed with Nokia's CDMA mobile phone.

In addition to local marketing companies, production and R&D facilities have been built in Europe, the Americas and Asia. In April 2000, Nokia had sales offices in 50 countries, production locations in 10 countries and research and development facilities in 14 countries.

Aerial Communications Inc. in the U.S. launched its Nokia GSM 1900 network in 1997. This was one of Nokia's breakthroughs into the U.S. network market.



RESEARCH & DEVELOPMENT EXPENDITURES 1989-1999



Nokia's research and development (R&D) programs are dedicated to keeping Nokia at the forefront of telecommunications technology. The majority of Nokia's R&D work is product development conducted within the business groups. The corporate R&D unit, Nokia Research Center, focuses on maintaining Nokia's technological competitiveness and strengthening Nokia's core competencies.



Towards the Future

Nokia's success as a mobile network supplier has provided a good base for also building the company's presence in the fixed network markets. During the 1990s, liberalization of telecommunications markets advanced rapidly in Europe and Asia resulting in opportunities for new operators and system suppliers.

Digitalization and broadband technologies are changing the nature of communications in a profound way. Voice and data networks are converging, making services available through one device.

Nokia invests in future technologies through research and development in key growth areas of communications. Broadband solutions, wireless data applications, increasingly user-friendly devices and third-generation mobile multimedia services are good examples of Nokia's businesses today and tomorrow.

Nokia intends to continue its strategy of targeting and entering market segments that it believes will experience rapid growth, such as data networking for both fixed and wireless communications.

The Nokia 7110 was launched in 1999. It is the world's first mobile phone compliant with the Wireless Application Protocol 1.1, for access to mobile Internet services such as banking, e-mail and news.



The Nokia 9110i Communicator for GSM 900 networks complements Nokia's range of WAP enabled products. It will continue to support the Internet browsing and e-mail services and will also support the Quick Imaging and Find applications as new add-on software.

Today, Nokia is the leading mobile phone supplier and a leading supplier of mobile, fixed and IP networks, related services as well as multimedia terminals. In 1999, Nokia's net sales totaled EUR 19.8 billion (USD 19.9 billion). Headquartered in Finland, Nokia employs more than 60 000 people and has sales to over 130 countries. Nokia is listed on the New York, Helsinki, London, Stockholm, Frankfurt and Paris stock exchanges.

The Nokia 2.0 Card phone is the world's first high speed (HSCSD) data terminal.





Nokia House, located by the Gulf of Finland, was constructed between 1995 and 1997. It is the working place of more than 1000 Nokia employees.

NOKIA

Nokia comprises two business groups: Nokia Networks and Nokia Mobile Phones. In addition, Nokia includes a separate Nokia Ventures Organization and the corporate research unit, Nokia Research Center.

Nokia Networks is a leading supplier of data, video and voice network solutions for the Mobile Information Society, meeting the needs of operator customers and Internet Service Providers. Nokia Networks will combine the benefits of IP and mobility, through seamless services enabled by unified core communications networks. As well as being a dynamic champion in systems integration and technology provision, Nokia Networks is a leading innovator in mobile and broadband networks and IP service creation, provisioning and management.

Nokia Mobile Phones is the world's largest mobile phone manufacturer. With its comprehensive product portfolio covering all consumer segments and standards, Nokia is in a strong position to lead the development towards the Mobile Information Society. Our mission is to enable people to connect with one another and to information regardless of time or place. Nokia's technology and applications are designed for human needs and are based on solutions that function seamlessly and effectively together.

Nokia Ventures Organization explores new business areas facilitating future growth and boosting Nokia's product and long term business development. Nokia Internet Communications offers enterprises and managed Internet Service Providers strategic IP oriented products and solutions.

Nokia Home Communications develops digital platforms and communications solutions for the home environment, and Nokia Mobile Display Appliances focuses on new mobile devices for Internet-based, visually rich communications. Nokia Ventures Fund focuses on start-up businesses and technologies which are not in the natural scope of Nokia's current business units and has a global investment scope. In addition, Nokia Ventures Organization includes Nokia Multimedia Terminals division, a pioneer in digital multimedia terminals for digital TV and interactive services via satellite, cable or terrestrial networks.

Nokia Research Center interacts closely with all Nokia business units to enhance the company's technological competitiveness. The center covers the full range of activities from the exploration of new technologies and product/system concepts to their exploitation in actual product development undertaken in the business units. To keep up to date with the latest technological developments and to influence them, the center maintains strong global contacts. It actively participates in the work of standardization bodies and various international R&D projects in cooperation with universities, research institutes and other telecommunications companies.

Nokia Milestones

- 1865** The forest industry enterprise Nokia Company was established.
- 1898** Finnish Rubber Works was founded.
- 1912** Finnish Cable Works was established.
- 1960** The Electronics department of Finnish Cable Works was founded.
- 1962** Nokia started work on telecommunications equipment.
- 1963** Development of Nokia's radio telephone began.
- 1965** The development of data modems started.
- 1967** Nokia Corporation was formed by the merger of Nokia Company, Finnish Rubber Works and Finnish Cable Works.
- 1969** Nokia introduced the world's first 30-channel PCM (Pulse Code Modulation) transmission equipment conforming to the standards of CCITT (Consultative Committee on International Telegraphy and Telephony).
- 1979** Mobira Oy (Nokia Mobile Phones) was founded.
- 1981** Telenokia Oy (Nokia Telecommunications) was founded. The world's first international cellular mobile telephone network NMT opened in Scandinavia and Nokia introduced the first car phones for the network.
- 1982** Nokia introduced the first fully digitalized local switch in Europe, the DX 200.
- 1984** Nokia introduced the world's first portable NMT car telephone: the Mobira Talkman.
- 1986** Nokia introduced an NMT cellular mobile switch.
- 1987** Nokia introduced the world's first NMT handportable, the Mobira Cityman.
- 1988** The world's first ISDN (Integrated Services Digital Network) exchange conforming to CCITT standards, manufactured by Nokia, was taken into use in Finland.
- 1991** The world's first genuine GSM call was made in Finland with equipment supplied by Nokia.
- 1993** The world's first SMSC (Short Message Service Centre) was taken into commercial use in Europolitan's Nokia network.
- 1994** Nokia was the first manufacturer to launch a series of hand-portable phones for all major digital standards (GSM, TDMA, PCN, Japan Digital): the Nokia 2100 family.

Nokia introduced the world's first digital cellular data products, including the Nokia PC Card and the Nokia Cellular Data Card.
- 1995** Nokia PrimeSite, the world's smallest base station for GSM networks, was introduced.
- 1996** Nokia 9000 Communicator, the world's first ever all-in-one, easy-to-use mobile communications tool was introduced.

The Nokia Mediamaster, the first digital multimedia terminal in the world was introduced.
- 1997** The Nokia 8110 plus GSM hand-portable with Asian SMS made Nokia the first manufacturer to offer both simplified and traditional Chinese as well as Thai characters in one phone.

Nokia was the first manufacturer able to provide the complete Smart Messaging solution, a new direct Internet access service technology.
- 1998** A revolutionary new solution, the Nokia GSM Intranet Office, was introduced. It gives employees total mobility in the workplace via the company intranet.

The Nokia LPS-1 loopset, an easy to use device for smooth interaction between a hearing aid and a digital mobile phone, was introduced.
- 1999** Nokia announced the world's first media phone, the Nokia 7110 dual band GSM 900/1800 phone, that is fully compliant with the Wireless Application Protocol (WAP).

Nokia introduced the world's first triple-mode (GSM, EDGE, WCDMA) base station, the Nokia UltraSite.
- 2000** Nokia successfully carried out the world's first WAP service over a trial WCDMA system, in Beijing, China.



Nokia

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