1990's

Redefining the strategy – **heralding the triumph of digital technology**

Having worked for Teleste since the company was founded Pekka Valkama retired in 1990 after 36 years of loyal service. The last four years he had been President.

That year – 1990 – the company was divided into two, the new business units being Teleste Antenna headed by Pekka Ketonen and Teleste Communication under the management of Markku Aalto.

The new premises of Teleste Communication in Kaurakatu were inaugurated in the spring of that year. Throughout Teleste's history there had been a constant drive for enlarging and building more. The first enlargement project of Kaurakatu plant had been initiated back in 1968 with the company moving in two years later. Nonetheless, the production premises were being enlarged yet again in 1972. The following new construction would rise after another two years had passed featuring the storage facilities. After this Teleste's new construction projects moved for a decade and a half or so to Nousiainen and Littoinen; that is until now when new space was being prepared on the Kaurakatu plot.

Pekka Vennamo, head of the National Board of Post and Telecommunications, unveils Teleste Viestintä telecommunications unit's new premises in Kaurakatu.

New Optimism After the Gloomy Recession

At Teleste hopeful preparations were being made for a new era when the economy took a turn for the worse. Finland was plunging headlong into a deep depression. The first sign of trouble became evident in the beginning of 1991 following by a banking crisis, tidal waves of bankruptcies and an unprecedented surge in unemployment followed. At the same time one of Finland's most important trading partners, the eastern neighbour Soviet Union collapsed.

In the aerial business there was a slump in the demand in the Scandinavian market, which lead to the unification of the sales organisations in Finland and Sweden. The dwindling demand forced Teleste to let go of the production unit in Forssa and the R&D units in Salo and Espoo. In 1992, after abandoning the

Due to banking crisis the Finnish economic slump went deeper than anywhere else did.

In the mid -'90s the telecommunications unit Teleste Communication developed an ISDN telephone line directly connectable to the computer. The phone was called Miratel Dataphone, a name later adopted by the company Miratel Oy.

Teleste Educational shifted emphasis from language laboratories to multimedia and software based solutions.

Teleste Antenna designed a number of operator-specific amplifiers, a tell-tale sign of customer orientation. Tailored solutions provided a foothold in the UK and Dutch markets.

The A/V business unit mastered the sound playback and control systems. The technology in which the audio amplifiers were based on had remained unchanged for a long time. What was new, however, was the software and computers used to control these systems. In the 90s design became increasingly important.

business unit framework, new changes were made to the business functions and the company moved back to the concept of developing Teleste as a whole. The company consisted now of four areas: aerial, education, AV and Telephone. Each of these lines of business had priorities of their own with their established markets overseas. Yet even more radical changes were in stall for the business operation.

After a lengthy difficult time 1994 marked a turning-point. The wind changed when the turnover and business result of Teleste Antenni grew due to the recovery of the Scandinavian market. The strongest growth was met in the UK, where the recently deregulated telephone market boosted the build-up of cable television networks. Networks were also upgraded in Benelux countries and Switzerland. A breakthrough was achieved in the challenging Danish market.

Demand for educational products from Teleste Educational started equally to show signs of improvement and the set targets were reached in terms of volume and turnover. A new objective was defined, which was to develop the sales of classroom recorders and language laboratories for schools. Introducing an entirely new range of language laboratories reformed the product range. In the same year Teleste Open – a massive R&D project – was launched to create educational facilities making use of multimedia and information networks.

The telecom business Teleste Communication was still hampered by the limited investments made by the companies related to the development of fixed network communications. They decided then to focus on its core business, which by way of a management buy out arrangement lead to the creation of Teleste Audio Oy and Levytekniikka Oy carrying on the audio and metal businesses. Direcom Teleservice AB was established in Sweden to continue the service functions related to intercom and related products. In Finland the telecom business Teleste Communication had already delivered a communication and information system to the Pendolino train service in place between Turku and Helsinki and an announcement system for the Helsinki railway station, both operated by the Finnish State Railways.

New Spin-Off Trends From The Digital Revolution

Despite the fact that Teleste was still focussing mainly on analogue technology the company was well aware that the future would go digital. Teleste was involved in creating a new and revolutionary communication environment. This new techno-

In the early 1990s fibre optic systems were a definite priority to Teleste Antenna's aerial business. Matti Susi presents the DXO amplifier featuring an optic input.

The manufactured fibre optic equipment underwent a thorough testing procedure with a device-specific measuring report delivered to every customer.

logy made communication easier and much faster. At Teleste there was no doubt in anybody's mind that in addition to the transmitter and receiver all data transfer was dependent on the capacity of the actual transmission path. There was a wide awareness that this path was subject to requirements of ever growing capacity and increased versatility. Networks would change from one-way over to two-way, and with the coming of broadband, they would finally enable a fast, simultaneous, two-way transfer of voice, data and images.

Fibre optic systems had become a priority area in the early 1990s. At the time the company was one of Europe's leading suppliers of AM and FM fibre optic transmission systems. In co-operation with, for instance, the Technical Research Centre of Finland the company developed an optical amplifier.

Then already significant applications for fibre optics included large-scale security and surveillance systems. Teleste became interested in video surveillance systems and soon enough a new 32/64-channel FM optical link – CFO700 – was developed. This system was to become something like a household name in the video surveillance market effectively providing the foundation of Teleste's success in the field.

Teleste's first optical amplifier was installed in a test network in Finland.

The CFO700 fibre optic link was a great success in the market; the item is still in production.

The MHE headend came out in 1990 replacing the master aerial main amplifier A-20, which had given alot of service over the years.

v The Lillehammer Olympic Village's cable television system would have been the jewel in the crown for anybody.

Teleste Fibre Systems, currently known as Video Networks, was founded in 1993. Optronics Ltd acquired from the UK was subsequently merged into it.

In the 1990s a comprehensive digital television standard system was being developed in Europe. This European standard was called Digital Video Broadcasting, DVB for short. Teleste was involved in these developments.

Teleste was busy building local communication networks for transferring television signals. The main applications included cable television networks and housing company master aerial networks. For the latter, Teleste came up with a new MHE headend, which was the most advanced state-of-the-art device in the field.

Development of a number of surveillance networks for the emerging crime prevention and fire safety systems was underway. These included Intelligent Transportation System (ITS) for monitoring traffic and the City Centre Surveillance network designed to provide a tool for the authorities for city safety monitoring. What these all had in common was that they were based on closed circuit data network for the transfer of video, audio and data. There was this view that in the future all surveillance and control data would be integrated and transferred via fibre optic cable.

Cable network assignments kept coming in, sales in Central Europe and the UK picked up and new agencies were established in Germany and the Benelux Countries. Teleste managed to bring home significant cable television projects from the UK, in the Olympic fields of Lillehammer in Norway and in Sweden. The deliveries often included customisation to accommodate the local conditions. This is, for instance, how Teleste's all time best seller – the DXX compact amplifier – came about having initially been developed for the requirements of the Swiss Rediffusion AG (today Cablecom Engineering AG).

Teleste had acquired the UK-based video surveillance company Optronics Ltd who provided clientele with fibre

Several lines of the London Underground feature Teleste's CFO links to ensure passenger safety.

v Motorway video surveillance and traffic control can prevent traffic jams and improve safety.

BXX, the modular intelligent optical node, was developed in the mid–'90s for the new generation cable television networks to support two-way pay-TV and cable modem services. The first significant client was Telenet and Interelectra in particular.

Based on the DXX compact amplifier the DXO fibre node came out in the early 1990s. Along with DXX it has been one of Teleste's best selling products of all-time.

Digital versatile headend DVX hit the market at the end of the 1990s to replace the SAT900 Series. DVX was fully programmable and yet smaller again in size than the corresponding pieces of equipment provided by the competition.

optic cable transfer equipment. The first assignment from British Telecom went to Birmingham. Following this, in the mid-1990s, Teleste received significant deliveries from the UK concerning surveillance of the motorways and the London Underground. The acquisition of Optronics turned out to be the turning point in gaining ground in the UK market.

A determined focus on product development went on and many new products were introduced to the market. New digital DVB products were launched upon completion of international standards. Internet and the interactive television stood out as new challenges to which Teleste responded by introducing the new modular intelligent optical node BXX designed for broadband cable television networks.

The UK was leading the way by introducing the first terrestrial digital television broadcast in the world. At the same time Teleste concluded a framework agreement with the NTL, the largest cable operator in the UK. According to this Teleste was one the three approved suppliers. Based on this agreement NTL placed an order for fibre optic links and amplifiers.

Focus on the Core Business

In 1991 Pekka Ketonen had become President of Vaisala Oy and his former post at the head of Teleste Antenna was to be oc-

Teleste's first ever digital television device was the SQM022 modulator in 1996. The MHE series also came to include a unit, which converted digital bit streams into conventional analogue transmission.

cupied by Pekka Koivisto. Markku Aalto continued as President of Teleste Oy until the end of 1993. Director-General, Administrative Affairs of Sponsor Oy Pekka Pystynen was standing in while a new President was being looked for until spring of 1994, when Paavo Sinivuori stepped in.

Mr. Sinivuori split and clarified Teleste, which by now had grown considerably larger through acquisitions. Under him the telecommunication business Teleste Communication was sold and the telephone business was dropped altogether. These reforms constituted to form a greater whole. The adopted view was that Teleste could not maintain its developments of operating in several fields of special technology simultaneously. Between 1994 and 1996 Teleste was involved in no less than 12 acquisitions.

As a consequence of Teleste's pulling out of a number of areas several spin-off companies started up, including Miratel Oy and Audico Systems Oy. Miratel Oy, headed by Managing Director Hannu Tikka, a former Teleste employee, continues to run the telephone business. These companies came to be known as Teleste's offspring and they are still in touch with each other and with Teleste.

In 1996 Teleste's Chairman of the Board of Directors Timo Toivila was selected CEO. His contribution clearly involved turning Teleste into a listed company. Under him additional adjustments were implemented in the strategies of business units and the Teleste group structure so as to respond better to the

Timo Toivila was appointed Teleste's CEO in 1996.

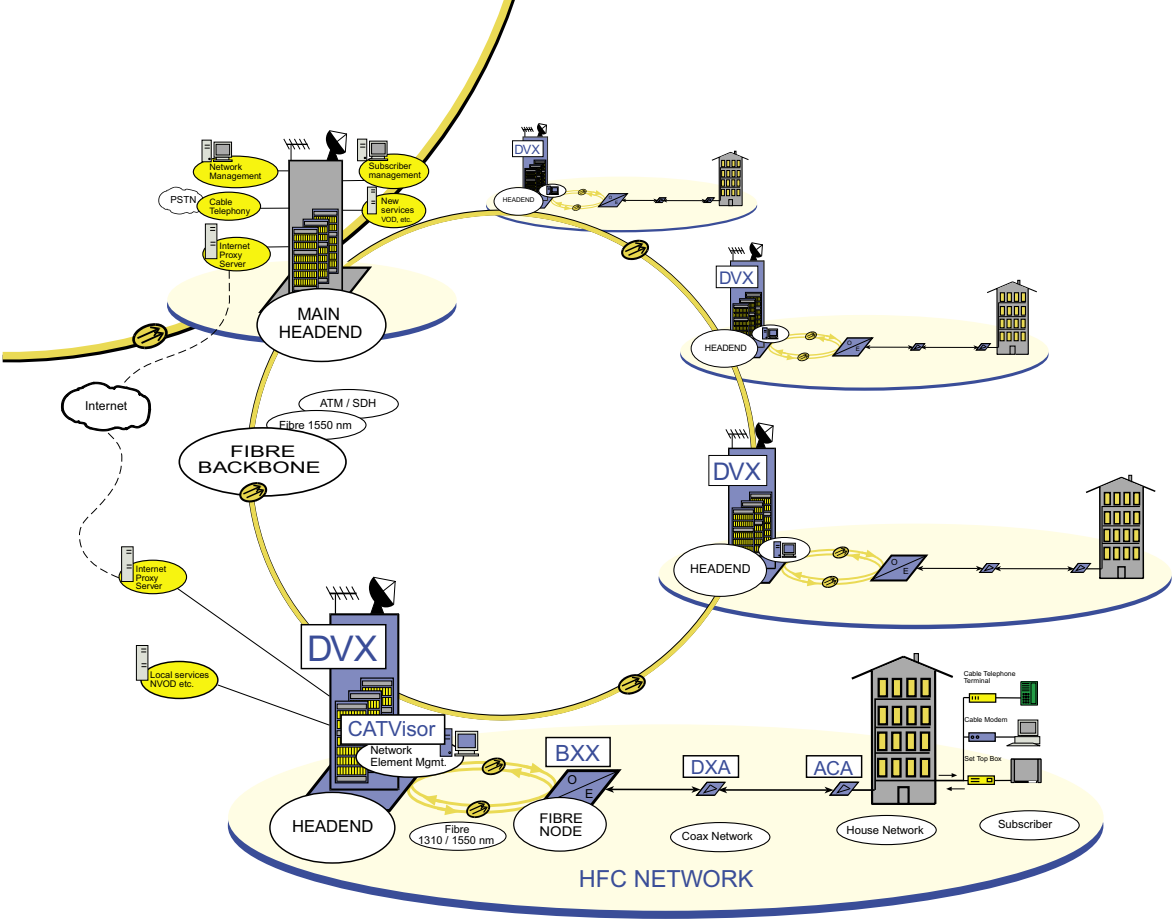
clients' changing requirements and to make operations more effective. Business lines of Access Systems, Home Networks and Educational were formed. Teleste itself focussed on the development of broadband networks, video surveillance networks and language laboratories.

Teleste Access Systems – Top of the League in Broadband Networks

Network management systems were introduced as a response to the increased complexity of the networks. **CATVisor software** was Teleste's solution for remote control of the company's proprietary equipment.

Teleste Access Systems made reliable European solutions available. These were products based on expertise in global technology and video surveillance networks geared to cable television operators. The company worked in close co-operation with the world's leading suppliers of technology. The solutions were based on official standards in the field as well as on de facto standards relating to technology required in networks, network management, encryption and security as well as the provision of services. Teleste was equally active in the development of international standardisation.

In other words, the company was in the business of developing, manufacturing and supplying equipment and solutions designed for broadband data communication networks. These involved applications for voice communications, high-speed Internet connections and high-quality services involving digital radio, video and television. Equipment-wise whatever it was, Teleste could take it on – the company managed the entire product range of the subscriber network – Hybrid Fibre Coax,



The **'ring picture'** introduced in the 1990s became a familiar sight to many customers and employees alike. The picture was designed to illustrate Teleste's idea of good network architecture based on available Teleste components.

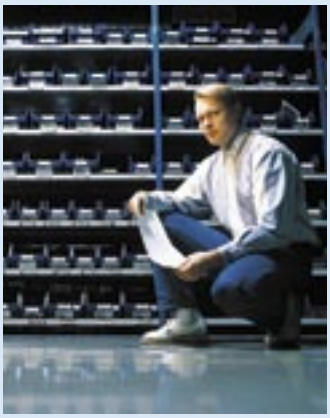
HFC for short–hich involved optical links, fibre optical nodes and broadband amplifiers. Solutions were also developed for the most valuable parts of the network such as the signal processing system and the growing needs for video surveillance.

New products were constantly developed to cater for the international market. Thanks to their comprehensive product range Teleste was in a position to develop special broadband networks for hotel, hospital, school and business applications. This technology was also used in several video systems for railways, motorways, airports and building surveillance.

The drastic upheaval having taken place in the cable television market opened up new opportunities for Access Systems, network operators, content providers and companies involved in the development of business facilities. But all of this technical progression and the rapidly emerging competition also created new global competitors. There was a need for responding to the changed situation by investing even more into the new broadband technology and by making provisions for structural change about to take place in the cable television business.

The general view was that growth in the conventional one-way provision of television and radio services in closed circuit cable television networks would grind to a halt. Traditional

Esko Myllylä, Pasi Järvenpää and Juha Säteri churning up ideas related to the mechanics of an amplifier.



Turkka Lehtonen takes a close look at inventory balance.

1990s: Teleste enthu

^ Initially all fibre welding and gluing connector links and grinding was performed in the company's own fibre laboratory. At the time fibre techniques was still handwork requiring great accuracy.

siasm in action

^ Group picture of the R&D in front of the Teleste main entrance in the early 1990s.

> **The headend research** and development team at work in the beginning of 1990s. At the time the SAT900 Series was about to become programmable and be provided with NICAM stereo audio.

v **Jaana Liikanen** knows the ins and outs of testing amps on a computer.

At the end of the 1990s Teleste was marketing various third-party cable modems in order to gain experience set by the system requirements in the network.

In 1996 Teleste achieved the **ISO 9001 Quality Certification.**

ways of operation would become obsolete and the time had come to focus on more individual solutions. At the same time there was an increase in customer requirements for the provision of related services.

Customers with a global presence naturally required the technology to be of high quality and reliable not to forget the availability of international services. The role of deliverer changed from an equipment supplier over to that of a system supplier providing partnerships in technical solutions. Teleste was familiar with this multifaceted type. Versatility and expertise also came in handy with the hybrid technology. That is, experts in analogue networks were still very much in need since the old system would stay in the market for a long time.

In 1996 Teleste was the leading supplier of electronic equipment for broadband networks in the Nordic Countries and was also gaining ground elsewhere in Europe. New significant supply contracts were signed with clients from France, Germany and Russia. Positions were either maintained or advanced in Teleste's traditional markets including Scandinavia, the Benelux countries, Switzerland and the UK. Thanks to the flourishing business of Access Systems their products were sold in almost every country in Europe, North America and even in parts of the Far East.

By the end of the decade Teleste Access Systems had become one of the leading developers of technology for broadband and digital cable television networks and an outstanding supplier of the related equipment and systems. Access Systems has also become one of the foremost developers and suppliers of video surveillance networks in the world.

Home Networks – Making More Out of Television

In 1990s Teleste Home Networks was in the business of developing solutions for the reception and distribution of television signals particularly for the UK market where the company was

Due to rising demand the R&D of broadband products moved to Teleste's traditional plant in Kaurakatu. Housewarming party on the fully renovated premises.

also the market leader. Above all, the products were related to video and audio quality and for making available the introduction of new additional service channels. These were put in place to accommodate the requirements of household users and multi-user environments such as blocks of flats, hotels and office buildings.

The advancement in television technology created the need for people to getting the most out of their TV set. On top of high picture quality people wanted to view VCR and receive satellite and cable television broadcasts. By means of Teleste's technical know-how in the transmission technology the way could be paved for future challenges. In the company, particular emphasis was put on R&D modifications for products and applications, which were required for digital television broadcasts.

Novelties introduced to the market at the end of the decade included the Super Loop indoor aerial, a switching system for the distribution of satellite channels, distribution amplifier and device designed for controlling television equipment remotely from another room.

The breakthrough in digital television had been a long time in coming. When we include the increased supply of products made in the Far East the eventual result was a market-field characterised by aggressive price competition. The effect this had on Dixon's, who were one of the major distribution channel for Home Networks' products in the UK, was that they had to drop most of Home Networks' product range and a replacement distributor could not be found quick enough to make up for the loss.

Teleste rose to the challenge by signing a contract with the Taiwanese Jebsee Electronics Co. Ltd. Based on this, manufacturing of many Home Networks products moved to China.

Changes in the market were not limited to the above. In the UK, Home Networks products were available under Lagbear, the most well known brand in the country through electronics chains and installation companies. Demand for these product plummeted as their products were increasingly moved from retail outlets, in the city centre, to DIY shops, usually located in the outskirts, but nevertheless popular amongst the consumers. Nonetheless, digital television was hailed as the new growth area and Lagbear's product range was enlarged to better meet the new consumer needs. New distribution chains were also set up.

Educational – Language Laboratories Embrace Multimedia

Teleste Educational was in the business of developing, manufacturing and marketing learning environments and solutions for language training. The products included language labora-

Consumer and master aerial equipment of **Home Networks.**

Assembling a Super Loop aerial at the Ealy plant. The aerial included Teleste's first application-specific integrated circuit (ASIC), which detected whether the TV set was turned on and activated the aerial amplifier accordingly.

Management group of Teleste Home Networks: from left, Les Turner, Martin Smith, John Summerfield and David Seely.

tories, multimedia-based learning environments, content provision for the tuition and the tools needed for the learning control and classroom accessories of language training. The market area for these was global.

The prospects of multimedia-based language training systems looked particularly promising. The main resources available for R&D were focussed on the development of the new Auditek 3+ studio. This innovation was introduced to the Central European public at the Educate Fair in Paris. The marketing of the educational business was concentrated in the Education agency located in Leeds, UK. To bring in improvements in cost-effectiveness and to shift the priority in services to a client-oriented basis, Teleste founded a unit including R&D, production and client support, in Turku. This new section was shared by the brands of Tandberg and Auditek.

Without underestimating the sales taking place in the USA and the Far East in any way Europe had been the main market area for the educational line of business ever since the mid-1990s. On top of this, Teleste was making huge strides in the Northern African, Brazilian and Chinese market.

In the 1990s the education business Teleste Educational started to develop computer controlled language laboratories. Gradually, computers took over more and more functions. Multimedia entered language teaching.

The massive product development efforts initiated in the mid-1990s focussing on multimedia and information networks had brought about the first ever Finnish multimedia-based product.

Now the time for making major changes to production had arrived. In the beginning of 1997 the Tandberg plant in Oslo was shut down and production was concentrated in Turku. Similarly, the contract manufacturing, management and logistics of the LP products moved from the UK to Turku. After the merger of the Norwegian and Finnish businesses Tandberg's and Auditek's brand lines – it became vital to stabilise the situation and activate their global distribution network. The process of operation was radically simplified. Once the production team was independent the plant adopted a flexitime model, making allowances for the substantial seasonal variations in the market.

At the end of 1990s the product development of language laboratories continued in Turku. The speed at which analogue language training systems were upgraded to modern digital multimedia systems was increased significantly. Products launched by Teleste included digital recorder Divace and several other multimedia appliances.

At the end of the decade Teleste Educational was one of the world's leading developers and suppliers in the multimedia-based learning environment. Teleste also made software available for these learning environments. The software products were instrumental in production, use and management of multimedia learning materials and in controlling the training taking place in computer classes and networked settings. The learning systems had moved from analogue to digital and from equipment over to software.

Nevertheless, due to the period of transition in the market the business results went down. The demand for conventional language laboratories was grinding to a halt whereas the sales of new software products had not yet taken off. Teleste transformed their distribution channel by breaking in old distributors to the new technology and by acquiring partnerships of companies with a good command of the new technology. Promotion on the Internet was commenced.

There was, however, light at the end of the tunnel and markets were soon opening up for the learning environment making use of multimedia. This was because education and training were increasingly computerised and studded with multimedia applications. Moreover, distance learning and self-tuition were clearly on the increase.

Divace virtual recorder, which supports Teleste's proprietary software application. One of the clients is the University of California in Los Angeles (UCLA).

Teleste Educational could provide a comprehensive solution: equipment, computer hardware and software.

For content management and creation Teleste provided **Partner Tools** applications allowing teachers to make educational programmes of their own.

Teleste's BCN Beijing Office is located in this impressive setting. Beijing was chosen as the location for the China Office because its status as the country's governmental centre with all the administrative telecommunication authorities present.

A view from the entrance hall.

Teleste goes international

The American operations of Teleste Video Networks kicked off from Georgetown in Texas. The target was set on achieving a significant share in the American traffic control market. Prior to this Teleste was represented in the USA through retailers.

Soon after America Teleste Video Networks established an office in Singapore, mainly for the nearby markets of Thailand and Malaysia. The Chinese video surveillance market was not deemed to be significant at that time.

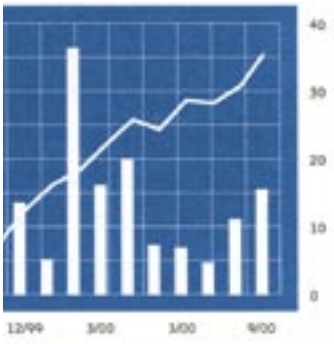
Time to go Listed

All things considered the reshuffling of the business lines and focussing on the core operations paid off because in 1998–to mark the arrival of the company's 45-years in operation–Teleste achieved its all time record result. At the time the number of personnel stood at 580.

The opportune moment had arrived for the company to go listed, an idea Sponsor had toyed with as early as the 1980s. At the time they had made up their minds about it but had decided to wait for an opportune moment. The key issue was that the stock market would have to improve.

Now all three business units–Access Systems, Home Networks and Educational–were more profitable than what had been the case. This positive trend in the development of the entire group was believed to continue in 1999 and the profitability was considered to remain good. The time had come for turning Teleste into a public limited company so on the 6th of April 1999 Teleste's shares commenced trading on the Helsinki Exchange. The listing went smoothly according to plan. Sponsor sold Teleste's shares to foreign and domestic investors and the issue was oversubscribed 8 times. In addition, a private offering was made to the Finnish employees participated by about 40 per cent of the staff. This issue was similarly oversubscribed. The feedback received during the road show preceding the listing and directed to Europe and the United States did nothing but increase the confidence in the feasibility of the selected growth strategy.

At Teleste the last year of the century was a time for a number of new defining priorities as the company shifted the emphasis from improving profitability to profitable growth. The primary focus was set on marketing, development of marketing network and R&D. To improve the prospects for future growth new agencies were set up in the United States, Singapore and the Baltic Countries.



Teleste's share price went up like the speed of lightening as did all the IT shares at the time.

Teleste's prospectus directed to the general public. This was distributed widely particularly in the Turku area.

Teleste Board of Directors in 1999: from left, Matti Suutarinen, Timo Toivila, Olli Anttila, Heikki Keränen and Mikael Leskinen.