

Norsk Data AS, The Fenomenon (brief)

Tor Olav Steine, with the help of former colleaguesⁱ



Abstract. Norsk Data was a remarkable company that went in just 20 years from a glimmer in the eyes of some computer enthusiasts to become number 2 in stock value at Oslo Stock Exchange. Then within a few years it collapsed, without obvious reason. How was this tremendous success possible and why did it collapse?

NOTE: This history brief of the Norsk Data Company is based upon a Springer Verlag publication resulting from the HINC3 Conference in Stockholm 2010. It is ONLY for personal use, and not allowed for distribution or publishing.

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1 The beginning

1.1 FFI

A combination of circumstances led to the founding of Norsk Dataⁱⁱ in June 1967.

A number of brilliant researchers came together at the Norwegian Defense Research Institute (FFI)ⁱⁱⁱ at Kjeller outside Oslo, Norway. Under institute director Finn Lied, telecommunications division director Karl Holberg initiated a digital group and appointed Yngvar Lundh as its project leader. Lars Monrad-Krohn was appointed leader of the digital lab.

Yngvar Lundh had experience with doing research at MIT (Cambridge, MA) during a stay in 1959. Monrad-Krohn followed with a similar stay in 1962-64. Per Bjørge, another brilliant computer developer, did his own MIT tour during 1966.

At MIT, they were impressed with the fast development of computer technology^{iv} and FFI itself was soon active in the field, building two military systems, SAM and SAM2. SAM2 also had a civil potential, having been built with the new Dual-In-Line (DIP) Integrated Circuit technology.

In time the idea was born to launch a spin-off company for the civilian market. Lars Monrad-Krohn and Per Bjørge, together with Rolf Skår and Terje Mikalsen, founded ND in June 1967. Monrad-Krohn, Bjørge and Skår worked for the company, with Monrad-Krohn as the unquestioned leader. Terje Mikalsen did not work for the company but convinced his ship-owner father-in-law to invest in the new company; also Monrad-Krohn's mother and a number of FFI friends and colleagues bought shares in the company.

1.2 The first bumpy years

The first few years were bumpy—a balancing act between failure and success with the latter depending on special contact, a few key sales, and a highly motivated team of employees.

Terje Mikalsen, who had studied with Rolf Skår at The Norwegian Technical University, was employed by NorControl AS, a company making control systems for ships. There he helped convince his boss, Ibb Høivold, to use a general purpose computer as an integral part of their system for a new ship, thus providing ND with its first customer. The basis for this vital project, supported by the National Research Fund, had taken place the year before already.

Taimyr was an ordinary bulk freight ship, ordered for delivery to the Norwegian ship-owner Wilh. Wilhelmsen. Norcontrol supplied on-board electronic control systems. The radar was to be extended with a Nord-1 computer (the first ND computer, designer by Per Bjørge) for automatic collision avoidance. The computer was delivered to SINTEF (a large independent research organization doing projects for many companies) in Trondheim, and remained there a year before it was moved on board the ship.

The development of the system included a new assembly code generator (Mac), a new operating system (Sintran), and application programs written in Fortran. The operating system was named Sintran (from SINtef and forTRAN). The system functioned flawlessly for years!

Another critical early sale was made to SINTEF itself, which ordered the first minicomputer with virtual memory in 1968. Another was made to the University in Bergen (UiB). The contact person at UiB developed a positive attitude toward the newly formed computer vendor and later moved to become the central contact for most purchases from the Norwegian government institutions.

In 1970 ND teamed with Siemens and obtained a contract to build a packet-switching network (based on Norsk Data's new Nord 2B machines) for the Norwegian Air Force Supply Service. Dave Walden, who had been part of the BBN (Cambridge, MA) team that developed the ARPANET packet switch (precursor of the Internet router), spent the year 1970-71 working at ND and leading the software implementation for the network^v. Before returning to BBN in September 1971, Dave Walden recommended Bo Lewendal, a brilliant Swedish-American who was out of a job after having worked two years for Berkeley Computer Corporation (BCC) developing a large time-sharing system^{vi}, to Rolf Skår - then software development manager in Norsk Data.

When Lewendal arrived in 1971 he asked Rolf Skår if it was OK for him to develop a timesharing system for the Nord-1 computer. Since everybody was in holiday during the summer, he spent a few weeks in solitude working on his project, and when the summer was up, Nord TSS was up and running in its first, rudimentary form.

Other key personnel were attracted to the company from FFI, SINTEF, and right out of the universities. Norsk Data became THE place to be for ambitious engineers with an interest in computers.

2. The demanding customers

In the next few years a number of specific, often difficult, contracts enabled ND's continued survival and expanding reputation for computer technology and customer service. We only have space here to mention a few of these activities.

2.2 CERN

In 1973 ND was invited to bid on a contract with CERN^{vii}, the giant research institution outside Geneva. The task was, among other things, to monitor the new SPS particle collider ring. There was heavy competition for this prestigious contract. Fortunately, Norsk Data shareholder Thor Lingjerde was at CERN at the time and managed to arrange on-site demos of the Nord-1 computer. Norsk Data, with the first time-sharing system on any minicomputer (a further developed Nord TSS), eventually won the contract in 1973 after fierce competition with other European bidders and with Digital Computer Corporation of Maynard, MA. Several of the key ND people drove down from Oslo to Geneva in their own cars with various parts of the equipment being delivered and stayed there for days and weeks to make things work.

This contract was at that point in time key to the very survival of the company. Rolf Skår summed it up as follows: No Bo Lewendal, no time sharing system. Without that, no CERN contract, and ND would have been bankrupt in 1973!

The extraordinary effort provided by key personnel during this delivery made Norsk Data's management aware of the fact that sometimes a single programmer or technician is much more important for the future of a company than any boss or chairman. The shaping of the company's personnel policy was made on that basis and it became rather different from other, similar companies in the years to come.

The people working at CERN itself consisted of the best brains in Europe. They influenced the further development of Norsk Data computers through active involvement with the ND developers.

Two of the key persons at CERN were Robert Cailliau and Tim Berners-Lee. Their objective was to solve the problem of organizing the vast amount of documents necessary within CERN using "hypertext".

Their first attempt was called Enquire, developed on a Nord 10 computer^{viii}. Then Tim later implemented it in a windows fashion on a Next computer. In 1993 www (world wide web) was launched internationally, and one can safely say it turned the world upside down, helped by Marc Andreassen's Mosaic browser. Cailliau later served as a chairman for the W3 Consortium for many years.

2.2 The Norwegian Meteorological Service (MET)

Per Ofstad was the head of University of Oslo's (UiO) computer central. He conceived the idea of a special computer for fast computations as a "slave machine" to an ordinary computer. The idea was mentioned to Lars Monrad-Krohn, who thought the idea was good and doable but would be costly to develop. Still, a year later the institute decided to acquire such a system from ND. ND, whose development resources would be tied up for a long time with the project, offered the system at a high price, and the project was launched at high risk. It was

delivered on time, and the Nord-5, the world's first 32-bit- super-minicomputer, was born. This later evolved into the ND 50, 500 and 5000 series of computers.

2.3 Singer Link – the F16 simulator

In 1977 the NATO countries Netherlands, Belgium, Denmark and Norway joined forces in the “weapons deal of the century” for the purchase of new fighter planes to replace their mixed and ageing fleets of jet fighters. Such international weapons contracts often involve “offset” contracts, that is, some of the development work is going to companies in the purchasing countries.

Norway had little to offer with respect to offset projects (a few went to Kongsberg Vaapenfabrikk). In the search for viable offset projects one of the bidders for the pilot training simulators, Singer Link, approached Norsk Data. It needed fast computers for its simulators.

Then newly employed leader of education, Jan Bjerke, looking for a desk of his own, found the forgotten telex request from Singer Link in a drawer. Jan knew about the newly developed Nord-5, and proposed to combine 4 of them into a system for each simulator. The proposed system could easily cope with the requirements. The new Nord 10 with virtual memory and new operating system, Sintran III had just been released, a new Nord 50 and a multiport memory were also developed, allowing several Nord 50s to be connected to each Nord 10.

Thus, the virtual memory from SINTEF, Sintran from SINTEF and the Taimyr project, Nord-5 from the MET projects, and a new multiport memory were combined as the basis for a new and especially demanding project—a powerful on-line computing system for flight simulation!

Jan Bjerke and Rolf Skår (who became ND's Managing Director a few months later) went to USA to close the sale.

Although a very demanding project for a relatively new computer vendor, the systems were delivered and accepted on their planned dates (something the customer hadn't experienced before). A demanding customer can be very helpful to an evolving computer vendor.

2.4 The Norwegian State Railway system (1976)

In 1976 the Norwegian State Railway System (NSB) planned a new system to keep track of all its freight cars. Arranging trains at the shifting station in Alnabru outside Oslo, and optimization of car maintenance, had to be handled. The system could save millions by better utilization of the car pool and was named GTL (Gods Transport Ledelse—“Gods” had no divine link; it simply means “cargo” in Norwegian^{ix}). The system required a Transaction Processing (TP) monitor capable of handling 150 terminals and heavy on-line traffic with a 24/7 operational capability. (ND's competitors were US-based mainframe vendors.)

ND knew that a single minicomputer would be unable to deliver this capacity. Thus, all terminals in the network were connected through ND's new Nordnet, and all transactions would appear at a single pair of threads. The TP system split the job between 4 Nord 10s, each handling specific tasks. The machines could be backups for each other, and inter-CPU communication also was through Nordnet. The database management component of the freight car system was the SIBAS system (previously developed SINTEF in Oslo)—a traditional CODASYL^x DBMS first implemented was on a Nord 1.

The system was delivered on time, functioned as planned, and served with an impressive stability and performance during its entire lifetime.

2.5 Product strategy

New technologies were quickly put to work, and the organization had the courage to take on the formidable risks of new applications while still being able to deliver on time. What this implied about the efforts, skills, and motivation of the employees of ND in its early days is worthy of a study of its own.

As in subsection 2.1-2.4 above, projects often were built upon each other. It may not have been a conscious plan, but limited resources made it necessary, thus teaching ND how to “rationalize” its products (keep the number of products at a compact level, but make sure they interact well and can be combined in a flexible manner).

This ability was one major key to the profitability of the company during the following years of fast growth. Competitors, on the other hand, often had competing lines of products that were sometimes mutually incompatible. ND avoided that, and could therefore keep a smaller staff for development, technical support and customer education.

3 The years of fast growth

3.1 Stock listings

The company became very successful with rapid growth and excellent financial results. Cash was required to finance growth, which the original owners could not support on their own. They had to turn to the stock market in Norway. Annual results were managed to show a steady, profitable growth attractive to potential stockholders, resulting in increasing share prices. Periodically there was a stock split to maintain the stock price within an attractive “value band”.

However, in time ND grew too big for the Oslo Stock Exchange. In 1981 Norsk Data was listed on the London Stock Exchange. This was a major breakthrough through access to larger scale financing. In 1981, Norsk Data was also listed on the “Over The Counter” stock exchange in New York, after Terje Mikalsen and CTO Tor Alfheim had been over there to present the company for the investment bankers at Morgan Stanley (CEO Rolf Skår had to stay home due to a back injury). The bankers had “a good feeling” about the company not felt there since Digital Equipment Corporation some years before. When Terje Mikalsen presented these news at the annual sales meeting at Lillehammer in 1981, a flash of awe swept the room; and, before the sales meeting was over, the stock price doubled initiating an upwardly soaring journey that lasted for almost 10 years.

3.2 The “ND spirit”

During ND’s first few years the focus was on technology and products. Soon it became clear that the attitude of the employees was the success factor that counted most for the future.

The concept of an “ND-spirit” became a vital instrument in developing a highly motivated staff capable of obtaining the extraordinary results that were reached in the coming years. CTO Tor Alfheim illustrated the ND spirit by putting a blank sheet on an overhead projector in front of the employees: “You cannot see it” he said “but it is here”, holding the blank sheet in the air as evidence.

The employee policy was consciously planned and implemented by the early founders, Lars Monrad-Krohn in particular. These rules were told to every new employee:

Work	You spend at least half of your time awake at work—get the most out of it!
Solutions:	Do not choose the easiest one, choose the one you think is right!
Work pressure:	The reward usually is proportional with the difficulties.
Things you dislike:	Do something about them, improve them if they are important enough.
Work instructions:	Until you are sure someone else has taken over the responsibility, the responsibility is your own.
Colleagues:	Find out who are important for you (org. chart disregarded), and treat them accordingly.
Instincts:	Be skeptical of some of them, do some of the things you dislike the most, talk to some of the persons you dislike the most.
Performance:	If you are honest to yourself, you are the best judge.
Improvements:	You are allowed to propose improvements, even if you are not perfect yourself.
Obedience:	If you are convinced that you are right, stick to it.
Personality:	Be yourself. Like yourself. Improve yourself.
Mistakes:	Admit them.
Chances:	Take them.

The company was geared for fast growth in a technologically complex and changing world and had no time for formalism or time consuming procedures. Efficiency was a key success factor, and the best way to obtain this

was obtained on the basis of a philosophy derived from the late Col. Ole Reistad^{xi} which ND, in essence, adopted: “Do whatever you find most efficient to obtain our common goals, and make sure to adjust your activities with the others when needed”.

Not all people thrived in this environment, and some missed education, information and instructions for what to do next. To those, on the other hand, who had a curious, open-minded and independent attitude to life in general, this was heaven on earth.

3.3 “Management by eating around”

The ND top managers had a formidable task. Not only should they satisfy a rapidly increasing group of anxious stock holders, they also had to know and react to developments in the highly complex market while managing their own people who were busy doing equally complex work to meet the challenges from the same market.

Thus, ND management eschewed relying on weekly or monthly reports, attending seminars, or hiring consultants to understand future technology trends. Rather they gathered the information directly from the sources themselves—no filters or delays in getting the information.

An important aspect in keeping up with information flow and synthesizing its essence into knowledge upon which to base decisions that shaped the company’s future took place in the ND canteen. The management always arrived late during luncheon and spread out on the various tables. Business talk during the meals was common, especially if a major boss was present. Information was gathered directly by the people who needed it from the people who knew. And over the long term, management would see how people developed, who were ready for promotion, and who might need some guidance.

Management by eating around has never been announced within ND as an explicit theory—it was just practiced. (There was no partitioning of the canteen into blue collar, white collar, and executive areas.) This ND approach worked until the computer industry changed toward the end of the 1980s.

4. Crisis and downfall

4.1 What happened

In 1981 IBM had launched the Personal Computer^{xiii} era, and the machine independent operating system Unix^{xiii} was beginning to win ground in the research world. Their common denominator was an “open architecture”, and customers welcomed the possibility of not being locked into computer vendors with their proprietary software systems.

The proprietary mini-computer era was drawing to an end. The entire computer industry was rocked by a paradigm shift (a disruptive transition in technology^{xiv}) that lasted for a decade or so. All traditional computer vendors struggled to adapt to the classic situation.

- Existing products were loved by existing customers who continuously asked for the addition of more features.
- The new open standard products had fewer functions than the established proprietary ones; but they were less expensive, both in purchase price and life-cycle operating costs.
- If an established vendor launched open standard products, it also undermined its more profitable proprietary product line.

Hence most computer vendors tried to resist the transition while giving ‘lip service’ to the new trends. To maintain profitability, a vendor which put all its efforts into open-standards products needed to sell in higher volumes, and slimmer sales- and support organization were thus required.

“Lean and mean” became the winning formula.

4.2 Why Norsk Data failed

In 1986 and 1987 Norsk Data ranked among the most successful computer companies in the world in the lists set up by the magazine Datamation^{xv}. ND was ranked as the third most profitable computer company in the world, only behind Cray Research^{xvi} and Microsoft.

However, close observers of the 1986 results may have noted a slight reduction in the growth of profits and that some development costs had been added to assets on the books, a change from ND’s prior policy of treating all development costs as expenses. Norway had become an oil producing country, but a significant drop in oil prices made the government, ND’s largest customer, less willing to invest in more computers. This was a significant component of the pressure on profits.

Norsk Data did not manage the transition.

A shift in technology would have required a total shift in company culture and customer support. The existing customers would not accept any reduction in the support level for their recently purchased products.

The situation was difficult for the ND management, oriented as it was to growth and not to restructuring. Yet ND reacted early and in a reasonably competent manner. A new Unix line was developed, and PCs were added to the product line and integrated with the existing line of minicomputers. The company realized early that the minicomputers would be reduced to “network servers” in the future, and the ND 5000 line of new computers were consistently called a “server” line.

In 1989, after a large loss was posted in the accounts for the previous year, a major reorganization and restructuring of the company was necessary.. The company was split into several new business units. Three of these were sales organizations, and two others were a service organization and a “box mover” style telephone sales organization for PCs and auxiliary equipment. Computer production and development was separated into a company (Dolphin) selling servers.

Jobs for the new companies were posted internally, and all employees had to apply for a job in the new structure. Unfortunately, 800 people became redundant in the initial process, and 500 more had to go two years later.

A rationale behind the restructuring was to save some of the investors' money by selling off the various companies in the new organization, the companies seemingly having been adapted to the anticipated future structure in the computer business.

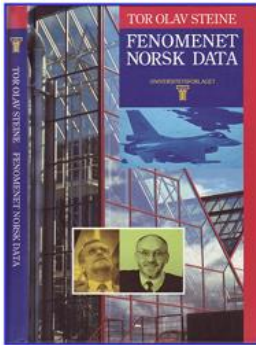
Behind the scenes, visits were made to join forces with, or to sell, Norsk Data to companies such as Apollo Computer, Nixdorf, Siemens, ICL, and even to Sony. None of these attempts were successful. The Nixdorf deal was the most promising one, and a final meeting was planned during the 1986 CeBIT Fair. Just prior the planned meeting between Rolf Skår and Heinz Nixdorf, Mr. Nixdorf died of a heart attack on a dance floor. The German operation, which sold CAD/CAM systems^{xvii} mostly, was eventually sold to Intergraph.

In 1986, when the situation still seemed to be relatively good, Norsk Data used a number of its shares as security for a loan from Deutsche Bank in Germany. The loan was to be paid back in full a few years later. When the company could not pay back the loan, it was taken over by the Norwegian bank, Den Norske Bank, which sold it to Telenor, the major Norwegian telecom operator for less than they could write off in taxes (because of inherent losses in the Norsk Data books).

All that remains of Norsk Data are the skills and competence of one-time ND employees, who went on to companies such as Ergo Group, EDB, Telenor, Umoe, to mention a few.

The hard core of CPU developers is still active and kicking in Numascale^{xviii}, a company spun off from Dolphin. Led by Mr. Kåre Løchsen (a major designer of the legendary ND 500 - used in the F16 flight simulator), they are making revolutionary technology for massive multicomputer clusters, thus carrying the tradition of the ND spirit into the future..

6. About the Author



Tor Olav Steine, a former Norsk Data employee (1977-92), in 1992 wrote the book „Norsk Data - The Phenomenon“. It is widely acknowledged as the most precise description of the internal culture and its significance as basis for the fast rise and fall of the company.

Mr. Steine is presently chairman of Alfatroll AS, a company that makes knowledge based solutions for unmanned installations, among those also unmanned aircraft (UAS). The technology derived from experiences learned during the Norsk Data years.

7. References

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- ⁱ Thanks to Per Bugge-Asperheim, Lars Monrad-Krohn, Bo Lewendal, Rolf Skår, Kåre Trøim, and Dave Walden for early days info. Thanks to Dave also for proofreading.
- ⁱⁱ The company name was initially named Nordata - Norsk Data Elektronikk A/S, later changed to Norsk Data AS for international simplicity.
- ⁱⁱⁱ Forsvarets forskningsinstitutt, FFI
- ^{iv} Tom Green, *Bright Boys: 1938-1958—two decades that changed everything*, A.K. Peters Ltd., Natick, MA, 2010; Arthur L. Norberg and Judy E. O'Neill, *Transforming Computer Technology: Information Processing for the Pentagon, 1962-1986*, Johns Hopkins University Press, Baltimore, MD, 2000.
- ^v <http://www.walden-family.com/dave/archive/net-history/lfk.pdf>
- ^{vi} <http://coe.berkeley.edu/news-center/publications/forefront/archive/forefront-fall-2007/features/berkeley2019s-piece-of-the-computer-revolution>
- ^{vii} CERN, the European Organization for Nuclear Research <http://public.web.cern.ch/public/en/About/About-en.html>
- ^{viii} <http://infomesh.net/2001/enquire/manual/>
- ^{ix} Hence, the “Gods Expedition” at the station “Hell” outside Trondheim in mid Norway is a major tourist attraction...
- ^x <http://en.wikipedia.org/wiki/CODASYL>
- ^{xi} Mr. Ole Reistad led the Norwegian military Olympic team to winning a gold medal in St. Moritz in 1928. One exercise was a downhill race to a goal 3000 feet below. His command became legendary: “We’ll regroup at the bottom”, implying that everyone had to find the best path down the hill, and then join ranks. They won, of course.
- ^{xii} http://www-03.ibm.com/ibm/history/exhibits/pc/pc_1.html
- ^{xiii} <http://en.wikipedia.org/wiki/Unix>
- ^{xiv} http://en.wikipedia.org/wiki/Disruptive_technology
- ^{xv} <http://en.wikipedia.org/wiki/Datamation>
- ^{xvi} <http://www.cray.com/Home.aspx>
- ^{xvii} CAD= Computer Aided Design, CAM= Computer Aided Manufacturing
- ^{xviii} <http://www.numascale.com/>