



When 12 software developers became 1,000 – the story of a technical and organizational boom

A classic Ericsson ad from the late eighties, featuring the adventurer Harry Hotline.

The big breakthrough for mobile telephony during the 1990s is a piece of technological history characterized by intense competition between innovative companies. For Ericsson, it saw a period of explosive expansion of the software development department in Lund: from a handful to over a thousand developers in just a decade.

➞ By Olle Bergman

There were really only a handful of global companies on three continents. The total number of engineers, developers, and project managers was no larger than the population of a small country town. Even so, their mutual rivalry made mobile telephony into an everyday tool for billions of people. Together they wrote technology history and changed the world in little more than a decade. The battle to be first technically and commercially was hard-fought, but Ericsson Mobile

Communications was always at the forefront. This is the story of some of the most intense years.

– For those who are interested in upscaling processes, the software in Ericsson's mobile phones is a great example of a software project that just keeps growing and growing, says Jan Svensson, Development Manager at Ericsson in Lund during the most intensive period.

The story begins in the 1990s when the technology platform was second generation mobile telephony (2G), better known as GSM in Europe. In 1992, Ericsson introduced their first GSM phone: GH 172. At this time only a dozen people worked with the complete software for mobile phones. Eleven of them were working with the technical and telecoms-related platform software. Only one of the developers devoted themselves to the phones' user interface, i.e. the part of the software where its functionality is exposed to the user. You could use the phone to make calls – but not much more.

Just five years later the mobile phone world looked very different. The technical platform for 2G was being developed and offered an increasing number of more powerful services. Operators could offer better terms and prices for both professional and private users. Email, the web, and other internet services were now being used not only by academia and industry but also by the public, and expectations were high when it came to making all of this available to mobile users. And – also very important – a competition for customers' favors was launched between the major phone manufacturers, with Ericsson and Nokia in the lead. (Design would turn out to be an important factor, but that's another story which we won't tell here.)

All this meant that the development department at Ericsson Mobile now faced major challenges. There were more and more phone models and customer demands were growing for functionality, as well as for network services such as fax, SMS and emails. This led to the actual code base growing exponentially: measurements showed that the size of the total amount of software being handled doubled in 18 months! The development work had to look both forward and backward. Forward to improve and create new functions. Backward to support the existing software.

– At this time we were growing to such an extent that it wouldn't have required much to lose control of the organization and the development, says Jan Svensson. It felt as if new people were pouring in!

When software is expanding as rapidly as in this case, measures have to be taken to ensure that it does not become a formless mass of code that no one has an overview of.

– You have to work actively with the software architecture and set up rules for what can and cannot be done. New products are being launched constantly and it can be difficult to prioritize what needs to be done. This is something that has to be dealt with, or else the software



Timeline of Ericsson's mobile boom

1992 GH 172 – Ericsson's first GSM phone. (see photo)

2000 R380 – the world's first smartphone.

2000 R320 – Ericsson's first mobile phone with WAP browser.

2001 R520 & T39 – two models which offered package data for GPRS and Bluetooth

2001 T68 – Ericsson's first mobile phone with color display and graphical interface. Sony Ericsson is formed.



A book about Ericsson's mobile phones 1983–2001 has recently been published in Swedish. <http://www.harryhotline.se/butik/>



“The software architecture as well as the processes and organization of the company must evolve together with the functionality of the product. You can't just throw in all your resources to create more software!”

Jan Svensson, former development manager at Ericsson, now a consultant.



There has to be a broad process of change throughout the organization. The principle that "engineers work best on their own" is doomed to fail."

Sten Minör

The Ericsson group – in the vanguard of global telephony since 1876

It was the Swedish inventor Lars Magnus Ericsson who sowed the seed for the Ericsson group when in 1876 he founded LM Ericsson & Co. During the 1900s the Group developed into one of the great innovators in landline telephony, in terms of both infrastructure and telephone devices.

Mobile telephony efforts started in the 1980s in the subsidiary company Ericsson Radio Systems. In 1988, Ericsson had 40 percent of the global market for mobile telephony, which at that time was based on the NMT system. Mobile telephone operations were centered around the Ideon area of Lund, linked to the Faculty of Engineering campus at Lund University.

After the boom of the 1990s, which devoured enormous costs for research and development, tougher times lay ahead for Ericsson. In 2001 the mobile phone business was split in two parts. On half was placed in a 50/50 joint venture with Japan's Sony, resulting in the formation of Sony Ericsson Mobile Communications AB. The other half became Ericsson Mobile Platforms.

will begin to erode, says Sten Minör, who was software manager and a colleague of Jan Svensson at Ericsson.

– Configuration management also becomes very important – which software versions belong to which products. Another thing you have to start dealing with is that teams can no longer sit together in the same corridor, but are scattered in different geographical locations within the company.

Interacting with each other, companies, operators and market raised the tempo. Month by month the technical complexity increased: more mobile models, more network services, more features requested by customers, more innovations from competitors. Operators wanted constant deliveries of updated software to the phones they were selling and had no intention of waiting. Milestones for Ericsson were the R380, launched in 2000 and the first mobile phone to be given the epithet "smartphone", and the T68, launched in 2001 and the first Ericsson phone with a color graphic display.

At this time, at the turn of the century, Ericsson's customers were using some 40 different cell phones out in the market. There were countless combinations of hardware, software and infrastructure services. Ericsson Mobile had therefore started to think in new ways, investing in a software architecture that was designed to be able to grow. Gone was the principle of working with a complete software package for one phone model at a time – now the starting point was a base software that allowed a variety of modules to be plugged in and out.

– This enabled us to manage entire product families and create multiple versions at a reasonable cost, says Sten Minör, explaining that tempo and cost were always something that needed to be balanced.

– Working on a platform basis produces more stable software. Working with one product at a time is faster in bringing new functionality to the market, but this can very easily result in a chaotic situation and a range of unforeseen problems.

Something that proved unexpectedly useful were the tougher regulatory requirements set by the authorities responsible for infrastructure in different countries.

– We learned a great deal from the field tests, where we were required to carry out a more structured verification that Ericsson products met standards and technical protocols. In the beginning we had rather made use of "happy testing" in-house, says Jan Svensson.

When Jan Svensson and Sten Minör now look back at those intensive years, perhaps the most important lesson is that organization, system architecture and working procedures must be developed in parallel and in harmony with each other.

– There has to be a broad process of change throughout the organization. The principle that "engineers work best on their own" is doomed to fail, says Sten Minör.

The two colleagues also note that it was possible to maintain a constructive and positive spirit despite the huge pressure placed on the organization at the time.

– There really was no blame culture. Everyone knew that if a bit of digging was needed at any point, then everyone was prepared to put their spade in; quite simply, people tried to solve their problems together!



“ My experience from the wonder years at Ericsson taught me that large scaling project needs a holistic view which includes both the end product and the project organization. The project leaders must not only realise the objectives of the product development, but also drive change in the company.”

Sten Minör, software manager at Ericsson Mobile in the 1990s, now head of innovation at MAPCI – an institute for Mobile Computing at Lund University.

Five experiences from the intensive years

- 1 As the software grows exponentially, the change process must embrace the entire organization.**
Product and system architecture, organizational changes, and development processes – all must change in a coordinated manner towards common goals.
- 2 Keep track of the system architecture.**
Create a system architecture which is adapted for expansion. It is easy for the architecture to erode if it is not constantly maintained.
- 3 Work actively with the roadmap.**
Have a long-term software plan which is developed and modified over time. Never let the plan stand still.
- 4 Ensure that there is software expertise on the management team.**
Many strategic, procedural and practical problems can be understood only by those who have hands-on experience of software development. A lack of such understanding in the management team can easily lead to wrong decisions being taken that may compromise the development of the entire company.
- 5 Do not be afraid to be tough and dedicated in your professional role.**
Fierce market competition involves constant trade-offs between delivery times, quality and use of resources. The discussion between technical and marketing staff has to be tough and there is no room for chickens. Fear of conflict and yes-men are bad for the organization!