

OUR MOBILE AS AN EVERYDAY LIFESTYLE OBJECT

HOW HAS IT CHANGED OUR DAILY LIFE AND WHAT ARE THE CHALLENGES FOR THE FUTURE?

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Zusammenfassung

Der Autor hat zu diesem Thema ein Projekt unternommen und das Ergebnis am 23. März 2012 am Tag der offenen Tür des Centers for Telecommunication Research (CTR) des King's College, London [Eylert: 2012] vorgetragen. Im Zentrum des Beitrags steht die Rolle, die die mobilen Medien im Kontext sozialer Netze spielen. Während sich in den Anfängen der Mobilkommunikation der Begriff „Service“ bestenfalls auf die Telefonie allein bezog, hat sich der Begriff im Laufe der Zeit in der Telekommunikation entwickelt und stark verändert. Damit einhergehend veränderte sich auch der Einfluss der technologischen Entwicklung auf die Gesellschaft und umgekehrt. Besonders deutlich wird das am Beispiel der Nutzung von Facebook über Smartphones.

Abstract

The author carried out a project on this subject and presented the results at CTR's Open Day on 23rd March 2012 at King's College in London [Eylert: 2012]. The key point of the study is the role of services in the telecommunication business and its development in the role of social networks in modern telecommunication media. The report takes a look at the implication of new services in mobile telecommunications regarding their influence on the society and vice versa. A specific example is given in the use of Facebook through smartphones.

» INTRODUCTION

First of all we will look back into the development of the mobile communications history and explain the reasons they were created for. Then we will have a look at the present use of mobile communication systems followed by a glimpse into the challenges for the future and the lessons learned from the past.

» I. THE HIGHLIGHTS OF MOBILE COMMUNICATIONS GENERATIONS

The first milestones

We could say mobile communications started with Marconi's first trials of mobile telegraphs followed by the introduction of his system on British and Italian vessels in 1903 as a maritime communication system. It was a semi-public system; it was mainly used under governmental auspices.

The next highlight of mobile communications was the introduction of the railway telephone system in Germany [Baumann, Gold: 2000, p. 77/78] called "Zugtelefonie", in 1925 during the International Communications

Exhibition (IFA) in Berlin by German Railways (Deutsche Reichsbahn) and German P. O. (Deutsche Reichspost). It was the first commercial terrestrial mobile system, using a duplex channel, in common with the plain old telephones, working on long waves (LW). Zugtelefonie was mainly used by business people or by "the rich & the beautiful", very wealthy people of the "Roaring Twenties".

The first system, which we could call the ancestor of our today's mobile systems, was the Mobile Radiotelephone Service (MTS), introduced in 1946 in St. Louis, Missouri. It was the first car phone system working on semi-duplex and a start in a modern communication society.

This system was followed by a lot of new and different mobile systems as a national product in many industrial countries in North-America, Europe and the Far East. Only a few of these systems were exported. All systems were seen as a national asset of their Government owned P. O's. Only the Scandinavian countries decided in 1981 to introduce an international mobile communication system, called Nordic Mobile Telephone (NMT). It

was an analogue system working duplex in the 450 MHz-band, later also in the 900 MHz-band and after 1990 it was introduced into many Eastern European countries to start a new economy with mobile communications. NMT was a milestone in the evolution of mobile communications because it was the first system allowing international roaming. All these systems are based on analogue technology, today called the 1st Generation of Mobile Communication Systems (1G).

Global System for Mobile Communications

After the four mentioned highlights – Marconi's Maritime Communication System, the German Zugtelefonie, MTS and NMT – the 5th milestone in the evolution of mobile communications was the realisation of an old idea of having a Pan-European mobile communication system. The first steps were taken by the French president, François Mitterrand, and the German chancellor, Helmut Kohl. They formed a French-German axis that should include a mobile communication system working in both countries. German and French P. O's (Deutsche Bundespost and PTT France) and the national telecommunication industries received the

order to propose a digital mobile communication system working on 900 MHz, called D900. With this idea the two P. O's went to CEPT¹. There, the idea was finally shared and CEPT established a working group called Group Spéciale Mobile (GSM). Today, as we all know, a new system was born. However, it still took some time until a broad community anticipated the system and in 1987 a MoU² between 14 operators (13 PTT's, plus Vodafone) of 13 countries was signed. One of the goals was to start the system in the early beginnings of the 1990's.

But what was so important about GSM? With respect to a stronger co-operation between the West-European countries in the former EEC³ and the plans to establish a real European Union, which happened (more or less) with the Treaty of Maastricht in 1992, the governments of the 15 EEC countries urged the European Administrations and industry to build a Pan-European mobile communication system which could intensify the political and economical co-operation between them. That was at first a political goal. There were some more political requirements for GSM, e. g.

- GSM should be a telephone system, optimized on speech.
- It should be the first digital mobile system as a consequence of the introduction of ISDN⁴ in the fixed network.
- Following different political problems in the member countries another requirement for GSM was cryptic speech. GSM should be the first mobile system secured e. g. against eavesdropping.

Finally, it should make Europe ready for high quality telecommunication export.

The technical challenges of GSM were broad and different. One of the main problems was the digitalisation of

speech, working properly in all environments.

E. g., the author remembers quite well the difficult tasks in the laboratories of the PTTs and the telecommunication industries to get the vocoders to do what people expected them to do. But that was not the only challenge; more technical requirements were requested:

- New transmitters and receivers had to be built as well as a complete new network.
- Which modulation should be used?
- What should be the access technology?
- What should be the coding rate?

But what made GSM special? For the first time ever, with GSM a mass market for mobile telecommunications opened, which nobody had expected before. Therefore, GSM was a real revolution in mobile communications, not so much from a technical point of view, but certainly from a social point of view. Whoever wants a mobile phone, rich or poor, everyone can have it today for a reasonable price. That also explains the enormous success of GSM in developing countries. Technically, GSM started the 2nd Generation of mobile communication systems. We call it "2nd Generation", because the main technological swap was from analogue to digital. Additionally, what you should keep in mind is the fact that GSM was planned as a Pan-European system, optimised on speech, and ended up probably as the most successful technology that captured the world's communication markets.

Universal Mobile Telecommunications System (UMTS)

Another very important step for the mobile industry was the evolution from GSM to UMTS: the Universal Mobile Telecommunications System. It was born 24 years ago in the late 1980s

in the European research project RACE I (Research in Advanced Communications Equipment), a project with the political goal that the enhanced mobile system should be built on GSM with a focus on a worldwide introduction of European technology from the year 2000 onwards. That means two things: Firstly, in those early days, nobody had any inkling that GSM would be once, in the late 90s of the last century, the number one of mobile communication systems in the world and secondly, the European telecommunication industry should be able to compete with the world leaders in communications technology at that time. So the political requirements for UMTS were:

- Create a world wide communication system (universe).
- Enable the European industry to compete against world leaders on very high level of communication technology.
- Digital telephone system, based on GSM, optimised for data communication.
- Advanced cryptic speech, protecting against eavesdropping.

There were also some technical requirements for UMTS:

- Evolutionary system building on GSM
- New transmitters & receivers
- Modulation
- Access technology
- Coding rate
- Advanced crypto system
- Customer friendly system working when roaming in a so-called "virtual home environment (VHE)"

¹ Conférence Européenne des Administrations des Postes et des Télécommunications

² Memorandum of Understanding

³ European Economic Community

⁴ Integrated Services Digital Network

However, the technical requirements followed the political requirements. Technically, the main difference between GSM and UMTS aside from speed and capacity was the focus on data communications. Researchers expected that the revenue on simple voice communications would remain a vital component but would be overtaken by 2010 by non-voice 3G services. In 2010, two thirds of the operator's ARPU would be related to non-voice 3G services, like mobile internet access, mobile entertainment, location-based services et alia and only a third would remain on simple voice (telephony) according to UMTS Forum's Market Study [UMTS Forum: 2001, p. 64ff]. That was a new challenge and required a new technical system as an evolution of GSM. To make that happen, discussions and decisions in international organisations like ITU and ETSI were very exciting. Europe was not the only region where administrations and industries pushed the new telecommunication generation development forward. Also the US and the Japanese industry were lobbying intensively to get their interests in place. Finally, all players needed to compromise, which means that not a single idea, invention or investment goes straight ahead. The hope is that in the end all participants are even happy (or unhappy), which is how compromises usually work.

The role of services

To talk about all the technical achievements means carrying coal to Newcastle („*Eulen nach Athen tragen*“), but with the new target of data communication a question arose asking which services could be offered on the new mobile system. The word “service” was not used for telephony in the past, except when talking about ISDN, but which services could go on mobiles in addition to voice and facsimile? The internet as a public service wasn't invented before the early years of the 1990s. So services as we know them today, were a new item discussed from 1990 onwards. The UMTS Task Force, a telecommunications expert group that advised the European Commission on next generation mobiles in the mid 1990s, as well as the 3rd generation

development group of the GSM Association created in their final reports in 1996 some new personalised services for mobiles, like business information (e. g. stock exchange news), video telephony, mobile banking etc. The UMTS Forum specified these services in its first Report on “A Regulatory Framework for UMTS” to the European Commission, DG XIII, and has put itself in the driving seat for this development when it published several reports on enabling new Services & Applications [UMTS Forum: 2000] and market expectations. Then the global playing field understood the new challenges of UMTS and especially the industry played on this organ quite aggressively during the spectrum auction process in the year 2000 mainly in the UK and in Germany. That has caused also a lot of misunderstandings, because “John Doe” and “Herr Jedermann” got the impression that the new glorious mobile world would spring up very soon for everybody. There is a timeframe greater than zero between the brilliant ideas of creative people and the introduction of a new system into the market. Finally, after many years and as expected from the experts, the 3G system turned out to be economically quite successful, especially with its further technical development of HSDA⁵.

» II. THE CHALLENGES FOR THE FUTURE

Regarding technology, the early engineers had an idea about what the terminals should look like. E. g., the author initiated a design study through T-Mobil at University of Applied Sciences Cologne in the late 1990s how a future UMTS terminal could be designed.

We were close to today's look, but the technology to build in was still far behind. Anyhow, people's expectations and users' requirements have changed tremendously. Young people between 14 and 29 in particular have a completely different behaviour of using mobile phones than the elderly group [Czok, Gurczik: 2006]. We still use SMS for text messaging. The industry wants

to make money with their products. In the early days of GSM SMS was free. SMS was developed as a service tool for technical maintenance and discovered in Finland by young people as a cheap alternative to, at that time, quite expensive calls. The operators understood and soon charged the users for text messaging. Finally, it was one of the best big businesses of operators, low investment and very big revenues! When UMTS was developed, MMS should have been the tool that replaced SMS and provided even larger revenues. As we know, MMS provides more freedom, space and the opportunity to deliver pictures as well, one of the early day's key items of UMTS services. The early adaptors first used MMS, but the operators charged it too high; customers, especially youngsters, escape to the internet, sending emails or even better, Facebook's IM service and on the whole MMS failed as a killer application. With the next generation, LTE, operators try it again with the new service called JOYN. JOYN is the keyword for a service published recently at the Barcelona Mobile Communications Fair which will be ready soon as an application on all mobiles and gives people the opportunity of sending more than 160 characters. JOYN is an app that works on the internet; most people have a flat rate for internet usage and do not pay an extra service charge. On the other hand, network operators (NO) see a chance to charge people for JOYN when roaming, different to text message services SMS today. With JOYN network operators also hope to escape from the given restrictions, e. g. by the EU-commissionaire, by markets and competition. The point is, SMS, MMS, JOYN are services created and charged for by the operators. Most services the founding fathers of UMTS were thinking about turned away to third parties and operators thought at that time that they themselves would dominate this market as the oldest kids in the block.

⁵ High Speed Data Access

The i-kids

The reader's attention is now drawn to one system that may surprise him: NTT DoCoMo introduced in 1998 a new system, called i-mode (!). This is a very good example for Japanese creativity. GSM was struggling with its WAP-Service based on GPRS⁶ technology, which should give customers access to the internet, but failed because of unsolved software problems. NTT DoCoMo's i-mode services offered to the customers:

i-mode logo & services



Fig. 1) i-mode Logo & Services [UMTS Forum: 2000 GA19]

The business model was very clever and gave NTT DoCoMo a good deal of the revenues generated by third parties. On the whole, i-mode was a great success in Japan, but could not be replicated in the same way in Europe, e.g. introduced by KPN (NL) and e-plus in Germany. A few years later Apple would flood the market with its new i-world, starting with the iPod.

But there was one item as far as the author remembers, that nobody foresaw in those early days: The development of social networks. Most of the founding fathers of UMTS had not even understood the meaning of social networks as it is seen today. Facebook, YouTube and other social networks had not yet been created, and probably, the engineers of that time were not the right computer nerds to think of that. And even Steve Jobs of Apple wasn't that far in getting the technology ready

for the switch from plain old telephone services (POTS) to modern computer/internet facilities as we see them today.

The introduction of Apple's iPhone in 2007 turned the whole value chain and revenue situation for mobile operators upside down, supported by a most questionable strategy of one specific operator in Europe. Well, Apple was able to introduce immediately a lot of services, now called apps, some free, others with a small charge only, where operators were not able to compete. But that also changed the revenue situation in favour of third parties, here especially for Apple. Users have to register on iTunes and soon the consumer data are with Apple and only a small part of the customer data base will remain with the mobile operator. Of course, iPhone and its services were an advantage for the customers and finally the progress of a stuttering UMTS market. iPhone was the turbo for the introduction of smartphones into a boring market. Google, Sony, RIM and all the other vendors of new mobiles, called smartphones, were just followers.

Calling GSM the first revolution of mobiles, because it started the mass market, Apple opened the door for the second revolution of mobile communications. Apple's iPhone gave social networks the platform to operate. Again, it is not about technology, it is because of the paradigm change in using mobiles. Mobiles are not only used for phone calls, text messaging or information downloads from the internet; smartphones are now premier for social life! And the technology of UMTS/3G is just the "engine" that runs the new business and LTE represents the "turbo engine".

The new role of Social networks

With Apple's iPhone comes the hour of the earlier mentioned computer nerds, creating a new user market for social services, free of charge for the users and a tremendous successful business for the entrepreneurs of Facebook, Google and a few other players (like business platforms as LinkedIn or Plaxo). With reference to Marc

⁶ General Packet Radio Service

Zuckerberg, the founder of Facebook, he mentioned recently in a TV interview on the German TV program ARD (13th Feb 2012, 20.15h): “Facebook is pure business, people give their data. They share their life with their friends. It is them, who offer the data. Facebook is just the connector and moderator. The more they offer their life, the more Facebook can create specific profiles, target their customers with information of business partners, they are connected to and get the money from.” To summarise, people do not share their data just with their friends; they share their data and their total life with Facebook as well. Facebook has a tremendous and complete customer database which they use for their own advantage. They create profiles and sell these profiles to companies which offer specific products to people of whom they know names, addresses, behaviour etc.: Transparent people in an intransparent world. George Orwell’s “1984” is a fraction of that what could be done today. Data protection was a key issue in the 1980s and everybody was keen to protect his or her data. Today it seems to me that the contrary is the hype: The more people who know about me, the more I am respected. Warnings are there enough, but who cares? Is the data Protection Act, in which country ever, a toothless tiger? Probably not:

A German judge of a local district court [AG Reutlingen: 2012] has now ordered Facebook (EU centre in Dublin, Ireland) to deliver dedicated data of the accused person’s account to the court to prove that a criminal action (burglary) has been undertaken with the support of Facebook [AG Reutlingen: 2011]. This is the first time that a judge is willing to cross swords with a social network giant.

We are all aware of the success of social networks in the so called “Arab Spring” in early 2011, but on the other hand in countries like Germany political extreme groups organise spontaneous protest marches via their mobiles and social networks, instead of registering a demonstration according to the laws (right of assembly) [GG: 1949]. Before

the LAA⁷ can react, the show is already over. But they can be sure, at least next day they will be in the newspapers and the media.

The third point in this environment to raise is the use and misuse of YouTube. That this service has been misused for many years through putting compromising videos/clips on the platform is not very new. Especially youngsters go through bashings by their comrades, regarding them with envy. Or they find themselves discriminated in short clips of “happy slapping” by other gangs on YouTube or so. How much this can change social life for these people and their families is published many times and all in all well known. The latest example coming from America was in the news early March 2012, ending with suicide. Although fighting each other is a necessary way of growing up to get his or her position known in their social group, the quality of adolescence games and the sustainability of their doings is much different today.

Challenges and learned lessons

In real life our alumni will be confronted with more than just technology. The one or the other may remember the fights over antenna sites for mobile systems. Where should they go? How dangerous are they? Is there a need to install? Many research on this subject was undertaken during the last 15 years, author’s work included. In summary, the learning lesson is: With just the knowledge of proper technology and how it works you can not succeed! Rhetoric skills, psychology, liability, courtesy are social skills that would help to get your interests in place and be finally successful. By the way, that was a very tough learning lesson for mobile operators in the past, they have had never expected two decades before.

Well, engineers are sitting a bit on the fence. On one hand, they see the great success the industry has achieved with the introduction of the wonderful communication tools GSM and UMTS/3G. That will continue with LTE. On the other hand, we recognise the unforeseen results of our work manifested

in the change of social life, where especially young people organise their daily life, private or business, via their mobiles. Direct communication stands back versus text messaging, emailing, chatting or twitter. Mobile people are “always on”, 365 days, 24 hours a day. That could be called: “Comms around the Clock”. If you ask the mobile kids, why they act as they do, the answer is: “If you are not always on, you are very quickly out, forgotten, forever.” Psychologists know the consequences for years: stress, burn out, finally loss of real social life. Does it mean the glass is half empty? Or is it half full? Engineers will step in and turn the wheels.

In a western democratic society, there is never a stand-still. Our political freedom gives us so many opportunities to be creative. This creativity moves our society ahead. Technical systems and products are for good and for evil, nothing new. But it is our responsibility as technicians and natural scientists to take the right conclusions from this development and play our role in social and political discussions. To be able to discuss the pros and cons with e. g. the representatives in parliamentary groups and the law enforcement agencies, we need to extend the fundamentals of our knowledge. But how can we close the splits between the need to prepare our students for high level research skills and on the other hand the social skills they need to negotiate successfully between industry and politics?

Academics have the mission of best education on highest level skills. Consequently, from the author’s perspective one learned lesson is to extend the curricula (syllabus) and offer today’s students, next to extending their skills in natural sciences and technology, more knowledge of social sciences. Not only students of technology need extended knowledge of social sciences; also students of social sciences need knowledge of maths and technology to understand their/our common world.

⁷ LAA – Law Enforcement Agencies

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