The adoption, use and social consequences of mobile communication

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In 2003, 100 % of Norwegian teens between the age of 16 and 19 had a mobile telephone. This surprising statistic points to the rapid adoption of a technology that was only marginally commercialised when these teens were born in the mid to late 1980s. This paper is based on analysis of survey data that has been collected by Statistics Norway in cooperation with Telenor and surveys conducted by Telenor. Over the period described here as many as 10,000 individuals have participated in the various surveys. I will look at some of the watershed transitions associated with mobile telephony, including its adoption into the broader society, teens' enthusiastic embrace of the technology and the rise of SMS – led by teens. The paper also examines some of the dynamics that have not changed including general time use on the phone, and the gendering of the technology. Finally the article considers some of the broader social consequences of mobile telephony.

Introduction

According to statistics collected by Statistics Norway in 2003, 100 % of the teens aged 16 – 20 they interviewed in their media use survey had a mobile telephone. That is to say, Norway's best organization in the area of survey research was not able to turn up teens without mobile telephones. This finding is as astonishing both in the speed with which the transition has come and the omnipresence of the technology. Only five years previous to this, a minority of the teens had a mobile telephone. However, in the intervening period the device had established itself into the teen identity as securely as any other artifact. The same survey showed that 86 % of all Norwegians over the age of 8 had a mobile telephone.

By way of a somewhat poor comparison, the telephone took 60 years to reach 80 % household penetration in the US. Electric lights took 30 years and the automobile took 60 years to reach 80 % penetration in the US. The radio reached an 80 % adoption rate in about 16 years starting in 1920. The TV took 12 years to reach 80 % and about 35 years to reach nearly universal adoption (Fischer 1992).

These are poor comparisons because many of these innovations required the development of extensive infrastructure where GSM telephony could in some respects hitch a ride on the pre-existing landline telephony system. Another difference is that the statistics cited by Fischer are for household adoption, not personal adoption. In this respect the figure of 86 % represents a much higher rate of penetration than the household items described above.

In this article I am interested in looking into the adoption and use of mobile telephony over the past decade in Norway. From the commercialization of GSM – which happened in 1993 – until the present, there has been a dramatic shift in the adoption and use of mobile telephones. Norway and indeed Scandinavia are among those areas where this revolution has been the most intense. The mobile telephone has become commonplace across Europe, in Japan, Korea, Israel and in some other portions of the world. This revolution has been visible in North America and it has been relatively unknown in large portions of Asia (outside south eastern Asia) and particularly in Africa. Thus, the experience of Scandinavia is likely to provide insight into how mobile communication will change society in other areas of the world.

Interestingly, the adoption of mobile telephony has not been uniform even within Norway. Various socio-demographic groups have, at various times, gone through the adoption process. In the early stages of adoption it was often business persons – as seen in the stereotype of the yuppie – and perhaps delivery persons who were the adopters. As the system developed, and as alternative subscription systems were developed, teens and young adults started to own and use mobile telephones. As will be shown below, there are relatively few people in Norway (about 7 per 100) who have no access to a mobile telephone. In almost all other cases there is at least the ability to borrow a mobile telephone on an irregular basis.

With this dramatic change, one can also see elements of stability as well as various forms of social consequences. On the one hand there are gendered use patterns that, in some ways, mirror the broader gender patterns in society. At the same time, there are various social consequences of mobile telephony that include the enhanced ability to coordinate activities, the provision of security, the development of identity and the strengthening of social networks.

Watersheds in the use of mobile telephony

The general adoption of GSM

The dominating trend over the last decade is the widespread adoption of GSM telephony (see Figure 1). Access to this form of communication has penetrated into the Norwegian everyday life. It was really that system that popularized the mobile telephone in Europe and in many parts of the world. On a world wide basis about 7 out of 10 mobile telephones use GSM. GSM telephones were often the telephones that allowed people to make calls whenever and wherever they wished. However, there have been at least two transitions previous to the commercialization of GSM telephony, namely manual mobile telephony and the NMT system.

Manual mobile telephony was available in Norway from the late 1960s. Using this system the caller had to call a telephone operator and request that a call be set up with the desired party. Starting in the early 1980s, however, there was the commercialization of the NMT system. It represented one of the first cellular systems wherein one could "roam" from one country to another, albeit within Scandinavia. During the mid 1980s the growth rate for NMT telephones was well over 150 % per year.

NMT (and other systems of its ilk) were those that were adopted by yuppies and other highflying users. The system was relatively expensive and the equipment was bulky and awkward to use. It often meant that one used a car-mounted device, or a large suitcase sized portable unit that was filled mostly with batteries. Eventually, the size of the devices was reduced to where it was more similar to a smallish loaf of bread. The actor Michael Douglas playing Gordon Gekko, the rogue financer in the film Wall Street, outlined the use of these devices in the popular imagination. Gekko is pictured calling to the young, uninitiated stock trader from the beach outside his home in the Hamptons. Gekko, of course uses one of the early hand held mobile telephones for the call. The imagery is that of the well-heeled stock magnate who can afford to use the latest technology. Interestingly, within a decade, the mobile telephone would be available to literally all persons, at least all Scandinavians, at absurdly low prices. Thus, the early image of the mobile telephone as a plaything of the rich gave way to the consumption of certain types of devices as opposed to simple consumption.

Indeed it was not until the mid 1990's and the introduction of GSM that the subscription rates for the NMT system began to fall. The NMT system still lives a marginal life at the time of this writing. Those who wish to have the maximum level of coverage such as hunters and those who use the wilderness favor it. However, NMT will eventually be decommissioned and the band width reallocated to other uses.

From 1993 it has been the GSM system that has dominated the market for mobile telephony. During the period of introduction the growth rates were truly phenomenal. In Denmark, TeleDanmark hoped for about 15,000 users in 1993 but was able to sell more

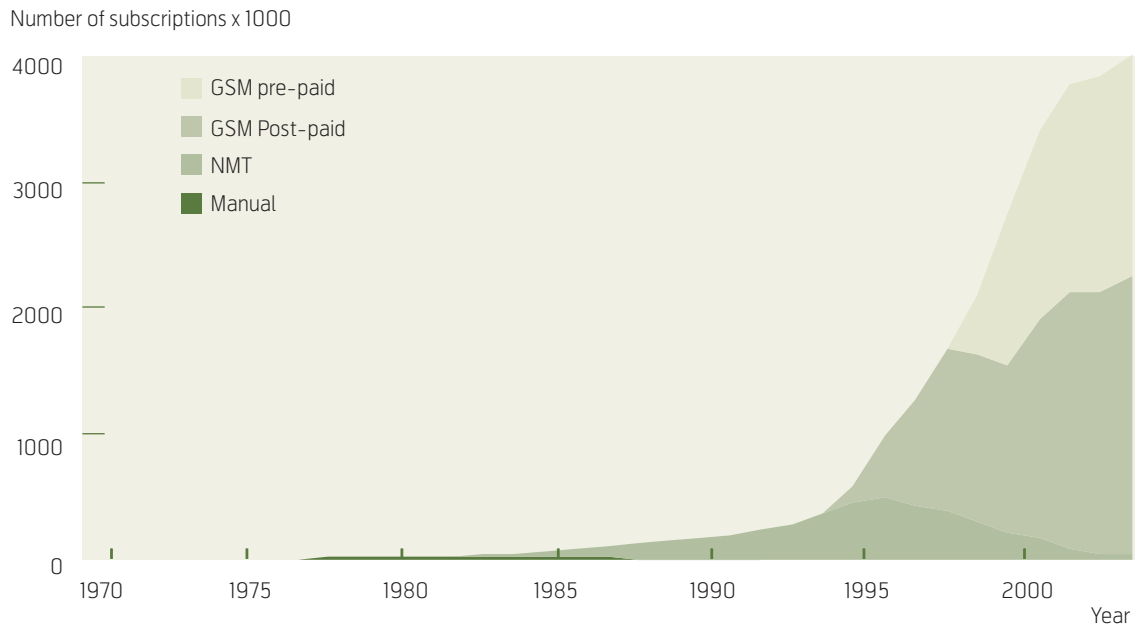

Figure 1 The rise of mobile telephony in Norway 1969 – 2003

than four times as many. The same was reported by Sonofon (Haddon 1997). Indeed the growth rates for Norway were on pace with those of the other Scandinavian countries. As noted above, this transition may be one of the swiftest adoption curves for a major technology. Where the car, the traditional telephone, the TV and even the PC/Internet have taken years and decades to be adopted, the mobile telephone seems to have been swallowed whole. GSM dominates all other systems and has become the de facto world standard for mobile telephony.

The final transition shown in Figure 1 is the growth of post-paid GSM subscriptions. Starting in the late 1990s this subscription form became one of the most popular ways to start using a GSM telephone. The subscriber could purchase a complete package including the mobile terminal, a SIM card and a certain amount of pre-paid use in a simple package. These packages have been sold from newsstands, grocery stores and even from venders on the street. The traffic costs per minute for prepaid subscriptions are relatively high, but at the same time the subscriber does not need to pay any fixed subscription fee every month. Thus, these subscriptions are ideal for those who have only occasional use for a mobile telephone since they can use the mobile phone as needed, but they do not need to pay the fixed subscription fee. The other group that has welcomed this subscription form is younger teens. It is perhaps the most common form for this group. Somewhere around 70 % of all 13 – 20 year olds use this type of subscription. As the teens move out of their parents' home and establish a life of their own, they also migrate over to a traditional post-paid subscription. However, approximately 40 % of the women and 20 % of the men in the 20 – 60 year age group, and about half of retirees have a pre-paid subscription.

Pre-paid subscriptions have an immediate appeal for parents who wish to control the use of their child's mobile telephone. In addition, parents often use the pre-paid card as an early object lesson in letting the teen earn the money they need to support their mobile telephone habit. Another element in the teen's adoption of mobile telephony was access to inexpensive – and heavily subsidized – terminals. The establishment of prepaid subscriptions and the general access to inexpensive terminals resulted in the growth of the teen market as we will see below.

The final feature of the chart is the flattening of the curve after 2000. The material shows that we are approaching the absolute number of persons in Norway. There are approximately 4.58 million people in the country and there are slightly more than 4 million telephone subscriptions. There are often subscriptions associated with functions (ambulances, payment terminals, etc) and there are cases of people having multiple subscriptions. In addition there are some groups that are not part of the mobile revolution, notably the elderly and the young pre-teens. Thus, every person will not necessarily have a subscription. However, the total number of subscriptions could easily exceed the population, particularly if devices such as vending machines, heating systems in cottages and the like receive their own subscriptions. Indeed in Luxembourg and in Taiwan there are more mobile subscriptions than there are people.

Teens and their adoption of the mobile telephone 1997 – 2001

The year 1999 was a watershed year when thinking of teens' access to the mobile telephone. Our data shows that in 1997 there were relatively few teens who reported owning a mobile telephone (see Figure 2). This was in the period before the development of pre-paid subscriptions and handsets were relatively expensive. Thus, ownership was generally reserved for those teens who had jobs and who were specially interested in mobile communication. This often meant that it was the males who had mobile telephones, presumably not only because they had jobs but because they were the ones interested in mobile telephony. During this period there were significantly more males who reported ownership.

Two years later the adoption rates were much higher and gender differences had been eliminated. The material here shows that the actual profile of the curve had changed between 1997 and 1999. Where fewer than 20 % of the middle aged teens had a mobile telephone in 1997, this had risen to over 70 % in the interim. The difference was no longer between the mid and older teens, but between the younger and the middle aged teens. Interestingly, the gender gap had also been erased.

Finally, in 2001 the great preponderance of teens between 13 and 20 had a mobile telephone. In this last period the gender gap had again opened up, however this time it was the females who were the most enthusiastic consumers. In 2001 there were significantly more female than male teens with a mobile phone. By way of interpretation there are several issues at play. Early in the adoption cycle it seems that there was a fascination with the technology that motivated adoption. This technical relationship to the device seems to be more often developed among males than females. As the adoption process proceeds the mobile telephone goes from being seen as a technical device to being a tool to support social interaction. Where males seemingly excel with technologies, many have commented that women are often facile

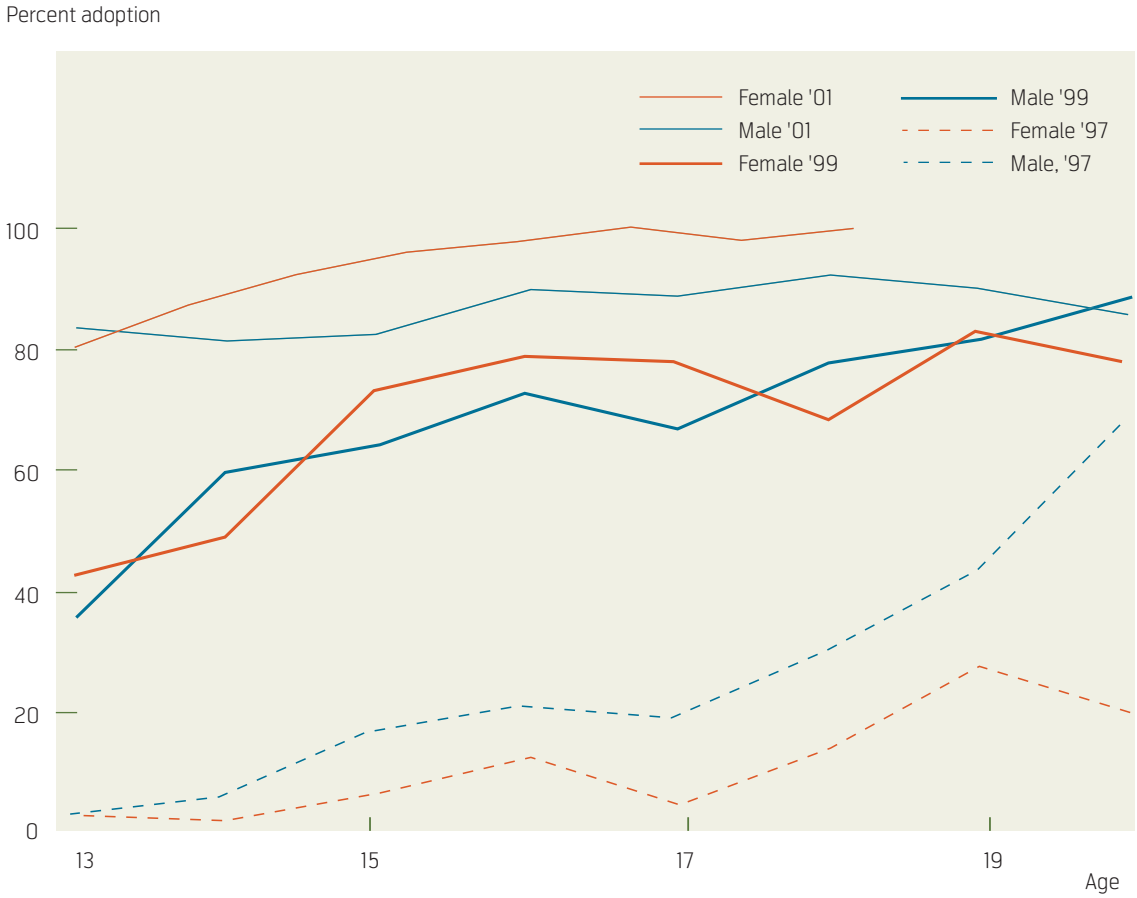

Figure 2 The adoption of mobile telephones by teens, 1997 – 2001

when considering social interaction. Indeed women are often better at the mechanics of conversation and social interaction. In addition, women often have the responsibility to organize social dealings.

Thus, to trace the gendered adoption of the mobile telephone is to trace its transition from being a technical fascination that is perhaps a status symbol to being a tool to support social interaction.

Teen adoption of SMS in the late 1990s and adult adoption in 2003

Teen users were among the first to adopt the use of SMS on a regular basis. Already in 1998 teens with mobile telephones were sending two to three SMS messages per day (see Figure 3). Thus, along with their adoption of the mobile telephone, there was the almost immediate discovery of SMS as a way to communicate. Some of this may be a legacy from the extended use of pagers by teens. Immediately previous to their adoption of the mobile telephone and SMS, the use of pagers represented the leading edge of teen technology. Teens had developed various forms of sending coded messages to one another using the landline telephone system and pagers. Thus, a "3" could mean that the gang is meeting now, a "6" might mean that I cannot come this evening etc. The discovery and adoption of mobile telephones along with the discovery of the SMS system provided a two-way version of this form of signaling. An added advantage was that originally the system was free of charge. This meant that it was a natural channel of communication. The teen needed only to learn how to access SMS and learn the somewhat clumsy form of text entry.

Teens took SMS into use quite quickly. The material in Figure 3 shows that between 1998 and 2003 the number of SMS per day had more than doubled. In addition, it shows that use had been largely concentrated among teens. This again underscores the situation seen in Figure 3 where it was teens and young adults who were the most likely to use SMS on a daily basis. Here, looking at the actual number of SMS messages being sent on a normal day, teens were the most active. Until 2003 the curve describing the number of SMS being sent had been characterized by having a rather steep peak around the late teen and young adult stage. As the reader follows the curve describing the use by adults and the elderly it falls dramatically. Thus, in many respects the use of SMS was highly focused around teen culture. It was not a part of adults' repertoire of communication channels. Teens and young adults were more likely to use SMS

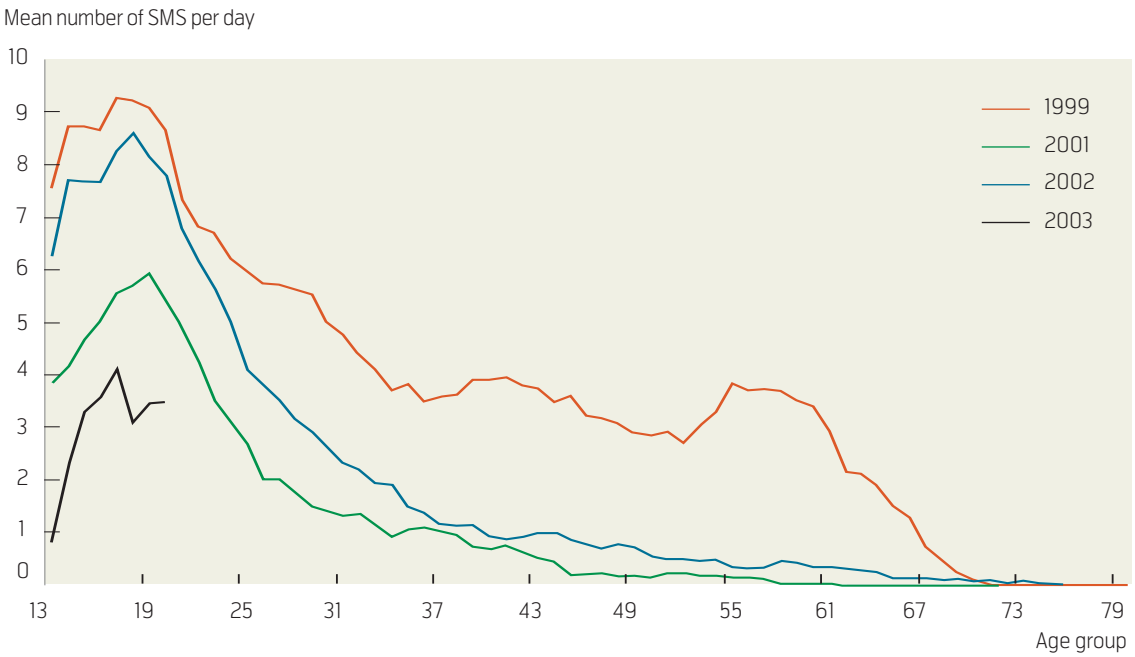

Figure 3 The mean number of SMS messages per day 1998 – 2003 by age and gender

on a daily basis and they were likely to use it many times during the day. The same was not true of other groups.

This situation however is evolving. The data from 2003 shows that the dramatic fall in daily use for adult groups has been eliminated. Rather than a direct fall, there is more of a gradual downward curve. The same is true when considering the number of SMS messages sent. In 2003 adults have gone from sending one or perhaps two SMS messages per day to sending 3 – 4 messages.

The situation in 2004

What is the situation with regard to the use of mobile communication in Norway anno 2004?

Access to mobile telephony in Norway – Increasing personalization

By almost any measure it is clear that Norway is a mature market when it comes to mobile telephony. As of the start of 2004, 87 % of all persons over the age of nine reported personally owning a mobile telephone. In 1999 slightly less than six of ten reported owning a mobile (see Figure 4). Looking at a somewhat broader measure, in 1999 about 80 % of the population had some form of access to a mobile telephone.[1)] They either reported owning one or having access to a mobile telephone that was perhaps shared with outers. Thus, in 1999 58 % owned a mobile telephone alone, about 22 % had shared access and the remaining 20 % reported having no access at all.

These numbers had changed by 2003. In that year 87 % had exclusive ownership of a mobile telephone. In addition about 7 % had some form of shared access and the remaining 6 % reported having no access. There are two general trends here. The first is the growth in ownership and the second is the increasingly individualized ownership of mobile telephones. In countries where the adoption rates are lower, it is far more common to have a shared "family" mobile telephone, particularly among the youngest and the oldest portions of the population. However, as the adoption rate increases and as use becomes more common, there is the growing sense that a particular device belongs to a single individual. Many of the features of the handsets and the subscriptions support this latter interpretation. Having a personalized calling list, a log of one's own SMS messages, various personal information on the telephone in effect personalizes the device. In addition, as features such as MMS, electronic payment and various PDA functions become more common, the mobile device will also become increasingly like a woman's purse or a man's pocket book; that is, it will become a personal effect and a repository for our personal affairs.

Beyond the functional dimensions of the mobile device, there is also a style related aspect. The owner-

1) *These statistics are in reality for all the population that is over 9 years of age.*

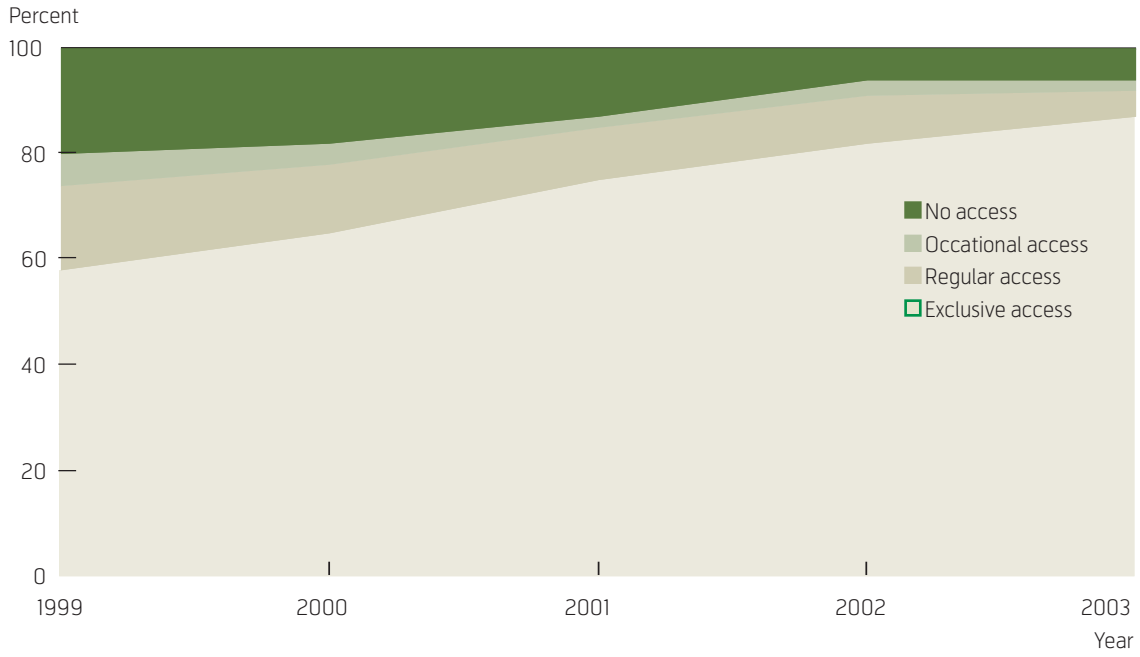

Figure 4 The individualization of the mobile telephone in Norway, 1999 – 2003

ship and display of a mobile telephone is, and will continue to be used as a type of fashion accessory. It will be selected, displayed and interpreted as an extension of the self, just as jewelry, clothing and other accessories are. Again, this plays on the growing personalization of the device.

Number of calls per day

The material from SSB shows that men use both the landline telephone and the mobile telephone more often than women (see Figure 5). In addition the material shows that women talk longer on the landline telephone, but not on the mobile. Starting with the number of calls per day men generally call more often than women (4.3 vs 3.5 times per day, respectively). In addition men are more inclined to use the mobile telephone when they call. In general men place about half of their private calls via a mobile telephone while women use the mobile telephone in about a third of all cases.

These things vary somewhat with age (see Figure 5). For both men and women, and considering both landline and mobile telephony, the golden age of use is

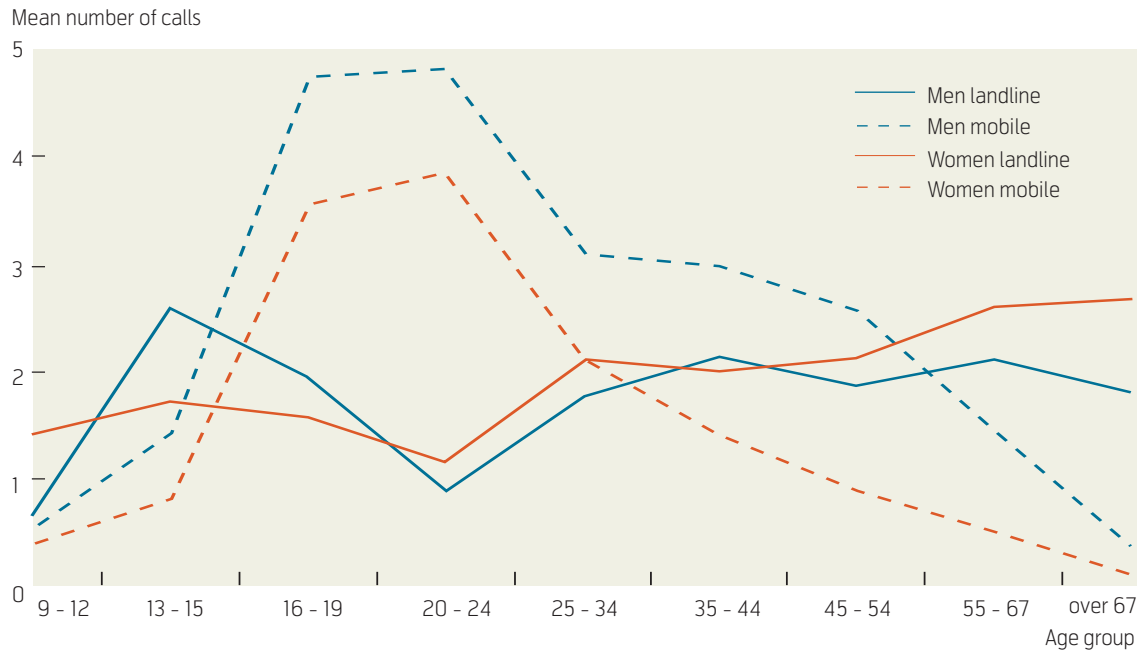

Figure 5 Number of calls per day (all platforms) and mobile

the late teen years and the early 20s. It is during this decade in one's life that the telephone seems to be the most central, at least when thinking of the number of calls made. Males reported making about six calls a day during this period and women reported making about five. Roughly eight of ten calls are mobile based for men and slightly more than seven of ten are mobile based for women during this period of life.

The intensity of calling and the fact that it is largely mobile based is not surprising in many respect. It is in this period of life that one is quite nomadic. Often teens and young adults are in transition from the homes of their parents into either student life or into the early portions of their careers. In addition, partnerships are often in flux and there is not the routinized stability that one finds in the earlier portions of one's life or in those portions that follow this period. Teens and young adults do not necessarily have the convenience of having their most intimate sphere living in the same home and thus there is a need to contact others via the telephone in order to coordinate activities and maintain friendships. In addition, their nomadic life style means that mobile telephony fits well into their daily routines.

In the 9 – 15 age group one often operates within a relatively bounded range of movement, and particularly while one is in elementary school. During this period the stirrings of emancipation have only begun. The child operates within the local sphere and there is little need for telephonic contact on any broad scale. In a different way the stability of middle-aged life means that there is less need for telephonic contact with one's peer group. The most intimate sphere is often equivalent to those who live within the four walls of the home. In addition, the pressures of scheduling within various organizations (work, day care, children's free time activities etc) mean that there is a regularity to one's scheduling. There is not the same room for free renegotiation of activities that perhaps characterizes the lives of teens and young adults. This is reflected in the number of calls made. While there are many calls being made in the private sphere, the volume is approximately a third less.

Interestingly, the number of landline calls drops during the "nomadic" period. The drop for both sexes is about one call per day. However, this group is still about two calls per day over the average of others when considering the use of mobile telephone. Thus, the number of mobile calls more than makes up for the drop in landline calls. In addition, a certain percent of this group do not have access to a landline telephone.

Length of the calls

Where men call more often, women speak longer when they have first called, particularly in the case of landline telephony (see Figure 6). The other interesting aspect in terms of the time spent on the telephone is that – with some exceptions – there is not the same "golden age" during the late teens and young adulthood that one finds when looking into the number of calls. In general women report using the telephone just about 30 minutes a day where men say that use it about 20 minutes. There is a rapid rise in voice based telephony use when considering the difference between the youngest users and the late teen users. The data shows that teen girls between 16 and 19 report using the longest time on the telephone in general and also on the mobile telephone. The older female users reported somewhat lower use, particularly when considering their landline use. The other interesting issue here is that mobile telephony is used in about equal parts with landline telephony among men. However, aside from the teen respondents, women use about twice as much time on the landline telephone as the mobile for voice based communication.

Thus, while SMS has generally been the realm of teens and specifically teen girls, voice mobile telephony is in many respects the realm of middle aged men. There is a certain irony here. It is often women who have the responsibility for the coordination of familial life. This is in terms of the instrumental aspects of daily activities (the "soccer mom" as portrayed in the US experience). In addition there is often an expressive dimension to women's work in the sense that they are often the person who is in contact with the extended family and carries out various forms of care giving. Given this situation, one might suggest that the mobile telephone would be ideal as a tool to carry out at least the instrumental portions of this work. However, it seems that they have not adopted the device to the same degree as men. By way of explanation, men often have a job subsidized mobile telephone and thus there is not the same economic barrier for men. At another level, the mobile telephone is not seen as being the appropriate device for a longer telephone conversation. It is seen as being expensive, the device becomes warm during longer calls etc. Thus, care giving and the more expressive aspects of network maintenance – that is those areas of activity that are often within the purview of women – are better carried out via the landline telephone.

Clearly this means that the average length of a call increases as one goes from the younger age groups to those that are older. The elderly female callers report the longest mean call length (about 12 minutes per call) while teen boys report the lowest mean (less than 2 minutes per call).

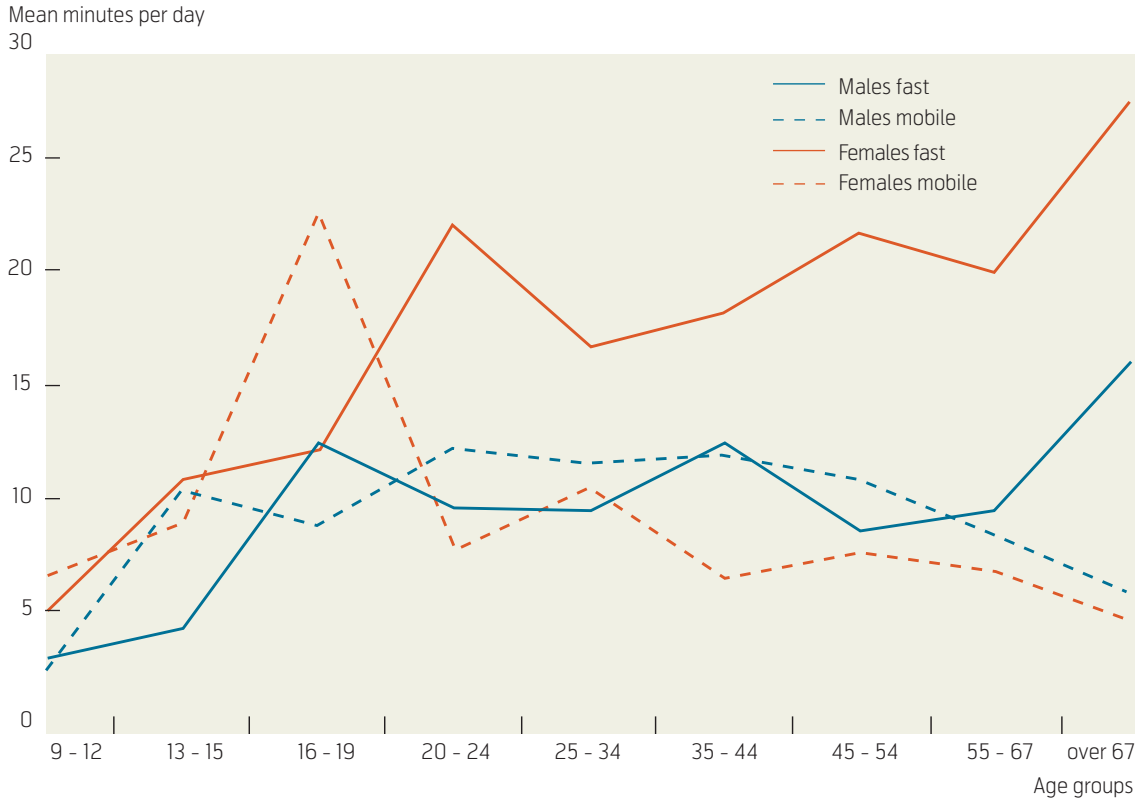

Figure 6 Minutes per day for all telephony and mobile by age and gender, Norway 2003

The use of SMS

There is a rough similarity when looking at the curves describing the daily use of voice mobile telephony and those describing the use of SMS (Figure 7 shows SMS use). In general the curves are low for the youngest pre-teens. Those who are in the teen groups and the young adult groups are at the top of the curve and finally those who are in the adult and the elderly groups report far lower use. We have seen this same general pattern when considering the use of mobile

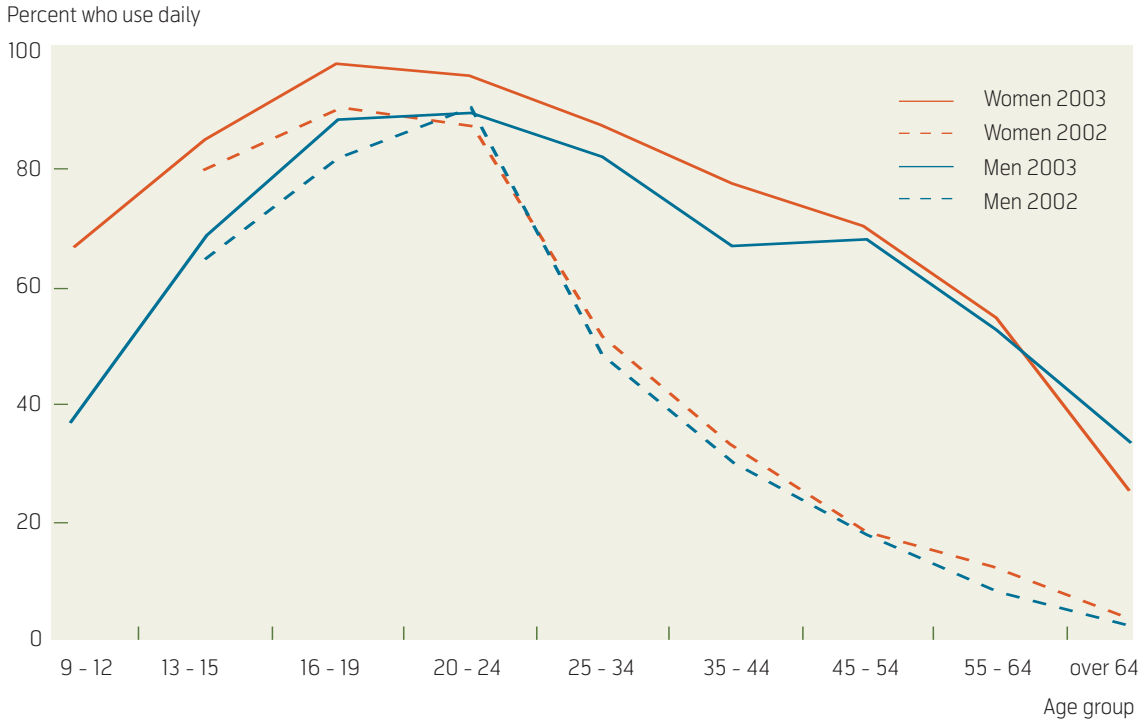

Figure 7 Percent using SMS on a daily basis by age and gender, Norway 2002 – 2003

telephony for calling. It is also apparent here. About half of the pre-teens with a mobile telephone reported sending SMS messages on a daily basis. This rose to 90 % for those in the late teen and early adult groups and then fell gradually to around 30 % of those with a mobile telephone in the oldest age group.

It is interesting to note that women report somewhat higher rates of use[2]. While 72 % of the men with mobile telephones reported using SMS on a daily basis, 81 % of the women reported the same. The data shows that for almost all age categories women were more inclined to use SMS than men. It is only among the oldest groups that there is parity.

There is also data on the daily use of SMS in 2002 contained in Figure 7. One can see that there has been a transition between 2002 and 2003 in this regard. Where in 2002 SMS was largely a teen and young adult form of interaction, older users have started to use this form of communication to a greater degree. This point will be further developed below.

What has not changed

General time used on the phone

One of the first things that seems to be quite stable since the late 1990s is the general amount of time we use for calling (see Figure 8). In 1998 the mean time respondents reported spending on the telephone was 23.8 minutes per day. In 2003 it was 24.3. The same is generally true with regard to the reported use of mobile telephony for voice calls. The respondents who had a mobile telephone in 1999 reported using 7.1 minutes per day while in 2003 it was 8.7 minutes.[3]

The age based profiles have also been rather stable (see Figure 9). The youngest respondents have not used much time on the telephone. However as they progress through the teen years their usage more than triples. For the youngest users the mean daily time on the telephone is about 10 minutes. For those in their early 20s it is over 30 minutes. This change is the most dramatic shift in use for all age groups. There is no other life transition that witnesses the same radical change in telephonic behavior. Clearly this change takes place against the backdrop of the child's emancipation from their parents. The telephone is that realm where many of the aspects of teen life find place. Gossip is exchanged; romances are established, maintained and ended. Social activities are arranged and teen identity is developed. As one moves away from their parents' home and into a more or less nomadic young adult period, the telephone continues to play a central role. During this period in one's life many of the same social affairs need to be arranged telephonically as in the case of teens.

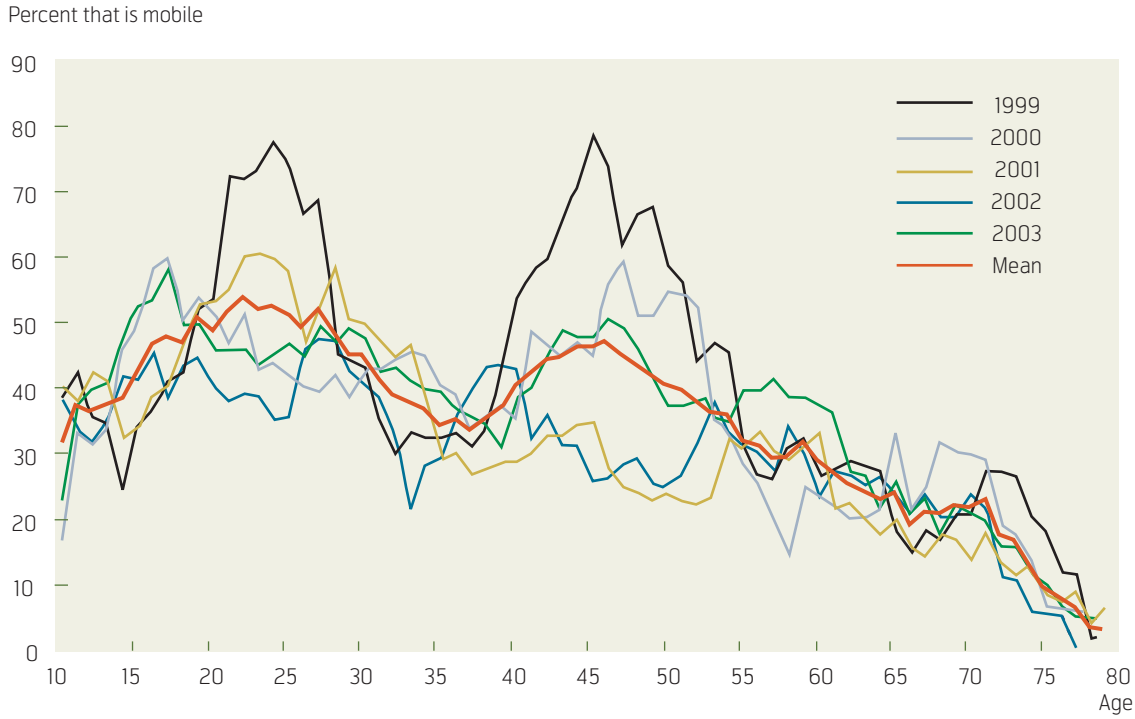

Figure 8 The mean minutes per day on the telephone

[2] *Chi2 (1) = 9.9, sig. = 0.002*

[3] *It needs to be noted that there were more mobile telephone users in 2003 than in 1999.*

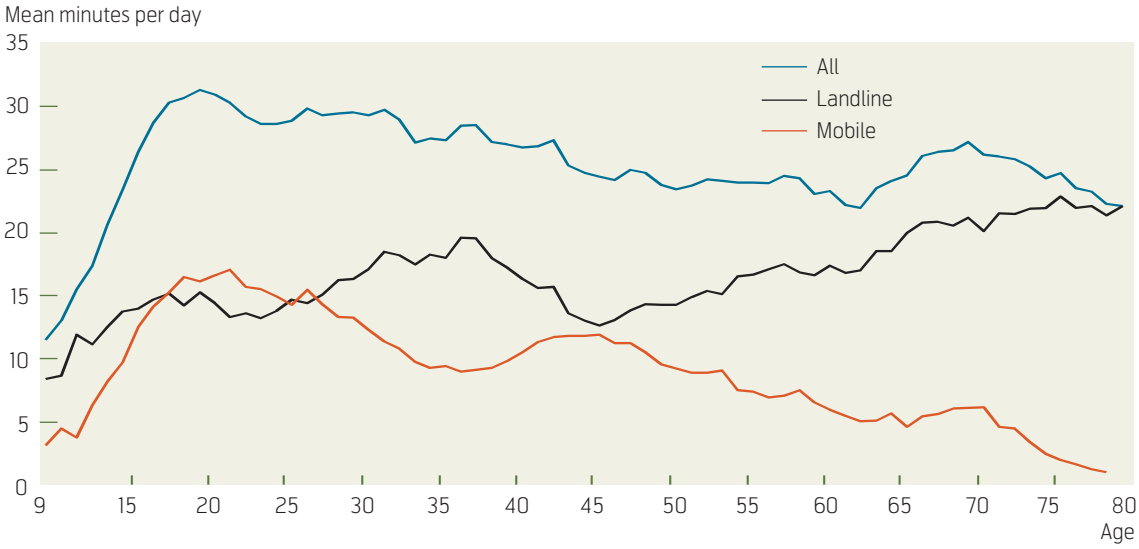

Figure 9 Percent of calls that are made on the telephone

As noted the peak time of use comes when one is in their mid 20s. From that point the respondents reported a decreasing amount of time on the telephone. This long slow decline continues until approximately the point at which the retirement period begins. The summary data from 1998 to 2003 shows a slight rise in reported use among the oldest respondents.

It is interesting to also look at the age groups who choose to use mobile and landline telephony. Young adults reported using more time with mobile than landline telephony. By way of contrast, the elderly users reported almost no time on mobile telephony, all the while maintaining a relatively high level of landline telephony use.

The percent of all telephony time that is spent on the mobile telephone also shifts for different age groups. In reality it is wrong to discuss this issue in a chapter examining stable elements in the use of telephony since it has increased with time. In 1999 approximately 30 % of all telephone time – that is all time in telephone conversations – was spent on the mobile telephone. In 2002 this had risen to 41 %. The year 2003 saw a drop to 36 %. Thus, while the total time spent on the telephone has remained about the same, it seems that mobile telephony has nudged its way into the total time budget here.

When looking at this same material across the age groups one sees that it is particular groups that have adopted the use of the mobile telephone. Here one sees that it is the young adults and middle aged individuals that are the most active voice mobile users. The young adults report that more than half the time used on the telephone is spent talking on mobile telephones. The other group is middle-aged telephone users. This is the group that most often has subsidized access to mobile telephony via their job. Thus, one might expect that the increased use is a consequence of this.

Those outside the revolution

We have been interested in following the adoption of mobile telephones. Early in the adoption process the mobile telephone was often seen as part of a family's holdings of equipment. It was used by that individual who may have had use for it at a particular moment. Children often had to, in effect, show a stronger need than adults since there is often a moral barrier to a child's use of the device. As time has gone, a more individualized relationship to the device has arisen. Instead of being a commonly held item in the home, it is an individual's. Indeed, many of the services are focused on individual consumption. As noted above, the catalog of names, sent and received SMS messages, various personalizations such as the ringing sound, logos and covers, and even the specific model – are all individualized. Even the fact that the PIN codes are commonly used underscores the sense that the mobile telephone is an individualized device.[4)]

[4)] *It is interesting to note that concrete ownership is often a slippery concept. In many cases the de jure and the de facto owner of the mobile telephone can be different. Many people who work in larger organizations report owning a mobile telephone that has actually been purchased by their employer.*

Thus, as the market develops it seems that one moves from a situation in which the mobile telephone is seen as a type of common property to a situation where it belongs to a single individual.

As we will see below, generally most people between 15 and early 70s either have a mobile telephone, or they have access to one. The two major groups who do not have one are the very young and the very old. Data shows that the elderly are only slowly adopting the mobile telephone. Part of this may be due to the parsimonious ethic of the pre-WWII generation. As a cohort that experienced both the depression and the depravation of the Second World War, they often carry an attitude of careful consumption. This is in contrast to the post WWII "baby boom" children who perhaps carry an ethic of freer consumption and also were often exposed to more electronic developments in their working lives. As the generation of pre-war persons moves from the scene and is replaced by those born after the WWII, one can suggest that there will be a more open attitude towards the ownership of the mobile telephone.

It is unlikely that young children will have mobile telephones unless they become some form of ambient device. The data shows that only about 10 – 15 % of the youngest children have a mobile telephone of their own.[5)] This has been quite stable for the last few years. There are some who receive one in the case of their parents' divorce. In this way, the non-resident parent has a direct line of contact with the child and does not need to go through the perhaps hostile filter of their ex in order to speak with the child. Beyond this group, there is little need for younger children to own a mobile telephone. Their social world is often quite close by and the responsibility of owning and maintaining a device may be beyond them.

Gendered use of the telephone

As noted above men make more calls per day than women, particularly when considering mobile telephony. In almost all age groups this is the case. It is particularly obvious when considering the use by young adults and in the case of middle aged persons. By way of contrast women talk longer on the telephone. Aside from the situation of teens and their use of the mobile telephone, this is most often the case for when considering the landline phone and its use by adult women. Finally SMS seems to be more of a female than a male arena.

These patterns, and in particular those associated with voice telephony seem to play on more traditional relationships to the technology. Where men seemingly have a large number of shorter interactions while ostensibly moving about, the data points to the notion that women have fewer, but longer telephone conversations from a fixed location. A simplification may be the quick, spontaneous call vs. the good friendly chat on the phone. These two approaches to voice telephony point, perhaps, to the socialization into different social roles. Where the spontaneous call may be an instrumental affair in order to quickly take care of some arising issue, the long conversation may point to the expressive maintenance of social ties. It is incorrect to say that it is all one way or another, but the data here seems to point to some of the broader issues that have been described by others with regard to the gendering of communication (Tannen 1991).

What is likely to soon change

The current situation indicates that the mobile telephone is overwhelmingly being used for voice interaction and to send SMS messages. These are the main areas of income for the mobile network operators. However, there are other areas where mobile communication may become more common. These include enhanced forms of interaction (MMS, push to talk and chatting), and other forms of data transmission.

MMS, that is the transmission of messages that can include text, pictures and sound, is a new form of interaction that is now on the market. In many respects this is a further development of SMS messaging in that it is relatively speaking asynchronous. It may come to occupy a somewhat similar position in the public imagination. It may become a way for individuals to share their daily experiences with others in their intimate sphere. Another function may be to enhance the communication between, for example, tradespersons who need to specify with relatively high degree of precision the situation at a work site. The MMS photo in Figure 11, for example, was sent by a carpenter to an architect in order to confirm that the conception and the execution of a particular plan were the same. Thus, we see that there are both expressive and, perhaps more importantly, instrumental issues that are at play in the eventual adoption and use of MMS. One can also speculate that, just as with the evolution of email, SMS and MMS will eventually merge into a single type of service. Along the same lines, one can imagine that multiparty chat rooms may develop in the mobile realm.

Another functionality that has already arrived on the scene is the so-called "push-to-talk" service. This is

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5) A much larger group has various forms of access to the device.

Figure 11 An MMS photo taken by a carpenter and sent to an architect to check on the details of a construction situation

a form of IP telephony that is simplex, as opposed to the traditional duplex of the telephone world. That is, the "channel" is only available to one person at a time. Thus, users often have to adopt the "walkie-talkie" traditions of saying "roger" and "over" etc. The advantage is that more than two persons can simultaneously participate in a session. In addition, it is a relatively efficient service when seen from the perspective of system resources. Finally, it is not limited to only local use, as with traditional radio. Rather a push-to-talk session can include persons from broadly different geographic locations. In practical terms, groups that are in need of close coordination can use services like this. Families at shopping centers and working crews at building sites come immediately to mind as potential users.

Social consequences of mobile telephony

Up to this point I have focused on the number of phones, the length of conversations etc. Another issue is the actual impact of mobile telephony on our lives. It seemingly satisfies certain needs and at the same time can lead to difficult and unexpected situations. On the one hand it is wonderful to get a message from a child while we sit on the bus, it is good to coordinate (or perhaps micro-coordinate) a meeting, or it is good to call ahead to our family or friends and let them know that because of traffic we will be late in getting to dinner. At the same time, it is perhaps embarrassing to hear it ringing when we forgot to turn off the sound during that critical sales meeting.

We are in the process of working out our relationship to the mobile telephone. This is clearly not a static thing. As new situations arise we use the device in new and unexpected ways. New features give us new possibilities. At the same time we have to work out how and when to use the device. We are bending the device to our purposes, and we are reformulating our lives around the possibilities that it provides us. We are domesticating it (Ling 2004).

A short list of the mobile telephone's social consequences indicates that the device provides us with an enhanced ability to coordinate our activities with others, it gives us a sense of safety and it has become an element in teens' and parents' negotiations over emancipation.

Taking these in order, the greatest contribution of the mobile telephony will be its contribution to coordination. In a modern society, we have experienced the rapid growth of the cities and the adoption of rapid, individualized transportation in the form of the automobile. We know from many studies both in Norway and in other countries such as France, Germany, Japan and Korea that the bulk of traditional landline telephone calls are primarily used to for instrumental purposes, in other words for coordination. We use the telephone to make and confirm appointment, organize schedules and arrange the delivery and recovery of children at various events.

Mobile telephony expands these possibilities. With the mobile telephone we can plan – and re-plan – activities anywhere and at any time. This can be done far more conveniently than with the traditional telephone since we are, in effect, calling a person, and not a geographical position. Thus, we do not need to be at a specific place, node or location to receive information. This increases the efficiency of planning our everyday activities. If we get out of a meeting early we can call our spouse and alter who will pick up the kids at day-care or shop for groceries. When in the grocery store we can again call to find out if it was Swiss or Cheddar cheese that is needed for tonight's dinner. These are mundane issues, but they are significant in the way that they lubricate the machinations of everyday life. Indeed, the ability to quickly coordinate activities in a complex society is probably the most significant contribution of the mobile telephone.

Coordination is also a key use among tradespersons, sales people and other workers who spend their time away from an office. The ability to quickly exchange information with colleagues, order materials and check details with the office facilitates their work process.

The ability to coordinate on a mobile basis has indeed been revolutionary for some portions of society. A good example of this are deaf persons. Previous to mobile telephony, and specifically SMS, this group

was reliant on a special telephone and translation service in order to coordinate their activities and to coordinate their daily needs. If, for example, an unexpected problem arose and there was the need to re-plan a meeting it was often impossible to assemble the technology and competence to send out the message, particularly if people were en route. Text based SMS has cut through this Gordian knot with a simple and effective way to help this group coordinate their activities.

Looking now at safety the mobile telephone has found a niche in that it provides us with a sense of security. Mobile telephony offers persons with chronic conditions (and those who care for these people) a broader range of movement. The mobile telephone means that help is accessible should a problem arise. The same can be said for those suffering from an acute problem that can range from punctured tires to life threatening situations. We need to take care here however. It is important not to be lured into a false sense of sanctuary. The nearest base station can be out of range, the batteries can be empty and the electronics can be vulnerable to moisture. In addition, use of the mobile phone in certain situations (most particularly while driving) has been shown to be dangerous. It is easy to think that we can clear up a few quick tasks while driving. However, research shows us that driving and talking on the phone is a dangerous combination.

Finally, as discussed above, one of the most surprising aspect is its adoption and use by teens. The combination of pre-paid cards and easy access to mobile telephones has meant that this group is among the most enthusiastic mobile telephone users. To put this into context, one of the major tasks of teens is to develop a sense of identity and to emancipate themselves from their parents. The role of the parent is to provide their children with the ballast they need for this transition. The peer group is also an important element in that they provide the teen with a reference group and a milieu in which the individual can try out their nascent adult roles.

The mobile telephone is a perfect tool in this situation, particularly when seen from the perspective of the teen. It provides them with a communication channel over which they have control. It is free from the surveillance that parents and siblings can enforce over the traditional landline telephone. Beyond free access, the terminal itself is an icon to freedom. One need only look at the advertisements for the popular mobile telephone terminals. The terminal is also a locus for information on who is a part of the gang and a variety of SMS messages. Thus, the (relatively) unhindered access to friends as well as the ownership of a device that serves as a type of "friendship central" is a powerful philter.

Teen girls are central in this development. While teen boys were the first to really adopt the device, one can say that it is among teen girls that mobile telephony has found a robust form. Analysis shows that teen girls are more active users. They are also strong SMS users. When comparing the types of messages teen girls send to those sent by boys we see that teen girls write longer messages. They include more information in their messages. They use more complete grammar and they seem to be more nurturing in their messages.

In sum, mobile telephony has found its place in Norway. It is still working out how, where and when it will be used by various groups. That it will be used, however, is not in question.

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