The diffusion of mobile telephony among Norwegian teens:

A report from after the revolution[1]

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Abstract

This paper is an examination of the diffusion of mobile telephony in Norway, and particularly among teens. There has been a near saturation of this social group. Given this situation, it is of interest to know what this can tell us regarding the mechanisms of adoption. Given this focus I look into the work of Rogers' and that of Silverstone and Haddon and their domestication perspective. The positive and the negative sides of these approaches are examined in the light of the recent experience with the mobile telephone. Rogers' discussion of the social mechanisms behind diffusion and his work on the critical mass of communication equipment are of interest. On the other hand his basis in the world of marketing and perhaps simplistic diffusion progression are questioned. The alternative approach, that of domestication is seen to be a more of a global analysis of adoptions *ex post facto.* The approach provides one with an understanding of how innovations change and are changed by their social contexts. Finally, several areas of further research are outlined.

1 Introduction: the saturation of MT data among youth

The background for this is that in many respects mobile telephony has saturated the market among teens in the last three to four years. Among the general population, slightly more than 58% own a mobile telephone and another 23% have access to a mobile telephone. When looking specifically at the situation of teens we have witnessed a transition in telephone ownership since the summer of 1997. During that period teens had begun to recognize that the mobile telephone was arriving on the scene.

Age	Oct.1998	Nov. 1999	May 2000
13	4.8	38.9	51.7
14	10.6	54.1	62.6
15	23.6	68.3	80.5
16	32.5	75.5	80.2
17	32.5	72.5	86.6
18	38.3	73.1	79.1
19	57.8	82.1	81.8
20	71.2	82.5	89.2

Table 1 Adoption of the mobile telephone among Norwegian teens, 1998 - 2000

Interviewer: OK. Can you remember, is this something that has happened in the last year?

Bente: It is now, in the last month in the school year because it has been so "in."

Interviewer: Ok. In the last month

Bente: It is now that it has been "in" with mobile telephones you know. So all the time since Christmas it has been pagers but now it is mobile telephones.

This was the period after the introduction of heavily subsidized handsets but before the introduction of pre-paid cards. These two elements were integral in the teens' adoption of the device, as we will examine below. Analysis shows that in

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October of 1998 about 33% of 13 to 20 year olds had a mobile telephone, by May of 2000 about 75% reported the same thing.

The material shown in table 1 also illustrates the saturation of the market among teens. The material shows that almost 90% of the 20 year olds had a mobile telephone in May of 2000.

Another twist in this analysis is the gender differences associated with the use of the mobile telephone. When the first quantitative material on teens' use of the device was examined, it was found that boys were significantly more likely to own a mobile telephone. At that point, it seemed that the girls lagged behind in their adoption. By the sample in 2000, however, the girls, in particular the youngest girls, were quicker to adopt the device. Looking into material from qualitative studies it seems that there is a different approach to the device, based on one's gender. For the boys, physical mobile terminal seems to have an importance where with the girls the device seems more important as a link to others. Indeed, the teen-aged girls match or exceed their same-aged male counterparts in terms of the number of calls made per day. Interestingly, this falls off for women over 20 years of age. Among the older age groups, men report using the mobile telephone most often. These trends have been examined during the last 3 – 5 years (Ling 1999; Ling and Helmersen 2000; Ling and Yttri forthcoming).

The mobile telephone had been commercially available for at least a decade before teens adopted the device. The things that directly led to the popularization of the device were the development of small handsets, the radical fall in prices for the handsets and finally the commercialization of pre-paid subscriptions. After these conditions were met the device has become a part of the culture. Indeed teens' adoption of the mobile telephone has provide it with a social currency. One can purchase a mobile telephone balloon at carnivals, parents adopt the use of text messages, there is a focus on the style, color and audio/visual effects in the use of MT. All of these issues point to the fact that the device is well entrenched in society.

Thus, we have witnessed a rapid transition from a situation wherein the mobile telephone was a novelty to where it is nearly ubiquitous among teens. As we sit on the edge of the 3G era with the development of UMTS and mobile Internet it is perhaps useful to look at the lessons that the recent past can provide. Specifically, what does the adoption of the MT by teens tell us about the adoption of technology?

This is the question that will be dealt with in this article. Based on the analysis of material covering the teens' adoption of the mobile telephone over the last three to four years I am interested in determining if there is the basis to either validate, or to at least shed light on the traditional theories of adoption and diffusion.

2 Rogers and the diffusion of innovations

Rogers (1996) is a major fixture in the discussion of diffusion. His description of the adoption cycle, i.e. early adopters, late majority etc., is perhaps one of the most cited works in this area (Barns, S. undated). His work is instructive and provides one with a comprehensible approach to understanding how innovations are adopted through a particular population. In addition, and perhaps this is part of the secret to his success, he provides concrete strategies for the introduction of technologies. Thus, his work is widely used among the developers and marketers of innovation.

2.1 Positive elements with Rogers' diffusion process

There are several elements in Rogers' analysis of adoption that are of note. These include the attributes of innovations, his discussion of the social interaction associated with adoption, i.e. the two-stage process, and finally there are interesting elements associated with his discussion of the critical mass, particularly when dealing with innovations in communication devices.

Attributes. Turning to the first of these, Rogers outlines attributes associated with items that are adopted. These include relative advantage, comparability, simplicity, availability to be tested and visiblity to others.

Two stage process. Rogers' discussion of the social interaction regarding the diffusion of innovation is of note. This is the so-called two-stage process. Innovators and opinion leaders provide an initial opportunity for others to experience a particular innovation and to at least observe the way the innovation operates and potential benefits.

On the one hand, others have shown the importance of "weak ties" in the introduction of information (Granovetter 1973). Thus, Rogers' suggestion that innovators are generally from a specific socio-demographic group seems a little off base. However, the important thing here is the recognition that person-to-person social dynamics play an

essential role in the adoption process. The implication for marketers, of course, is that they will focus efforts on those who are seen as market leaders with the hope that others will follow.

Critical mass. Finally, Rogers provides a very useful discussion of the way in which critical mass is central in the adoption process, particularly in the case of telecommunication devices such as the mobile telephone. The basic idea here is that the value of a communications device increases as the number of persons owning one increases. In the situation where only a few persons own a communications device there is less utility then when the device is generally distributed through society.

2.2 Problems with Rogers and the diffusion process.

In many respects, Rogers' work is focused on business models and marketing and thus it is often held at arm's length by academic audiences. Even though it is actively cited in the academic literature (Barns, undated) it is still, in many respects "cross-over" work. Beyond this, several elements are problematic with Roger's perspective. These include the assumption of rational actors, a simplistic notion of the diffusion system, the analysis stops with the actual adoption of the innovation, and finally that the ideology of anti-adoption is not considered in a realistic way.

Assumption of rational actors. Rogers and those who follow seem to fit into the broader utilitarian project by assuming that individuals generally behave in a rational way. The individual develops a general equation of the positive and negative issues associated with a purchase, weighs these up against the price and then makes a decision about adoption. This drives adoption and not broader social processes.

Others have asserted that we do not act rationally in any broad sense of the term, rather we make decisions based on the best we can keep in mind and then adopt a strategy of adjusting behavior as various positive and negative aspects of the decision become apparent. To use another metaphor, when one goes on a walk they do not tackle all the potential issues that will arise at the same time. Rather they metaphorically cross each bridge as they come to it (Boulding 1983). Simon and March formulated this by saying that one does not so much maximize but rather satisfies (1958; See also Collins 1994). This implies that one makes a decision, for better or worse, and then troubleshoots the decision based on other exigencies that arise along the way.

Simplistic diffusion. The actual adoption curve that Rogers uses is simply a Gaussian curve. While this is an ideal in social sciences, it is rarely achieved in reality. Further, the partitions between phases in Rogers are standard deviation points in the curve. Kenneth Boulding said something like "The problem with statistics is that somebody might actually believe them." This is certainly the case with Rogers' adoption curve. The sense that the world (read: market) is compromised of Innovators (2.5%), Early Adopters (13.5%), Early Majority (34%) etc. has become reified in the marketing literature. (Barns undated).

There are a couple of issues here however. The first is that early adoption is not, as assumed by Rogers one and one. It is usually systemic. Organizations who were quick to adopt the fax machine bought two or more for intraoffice communication. It was only after the device reached a certain level of diffusion that individual terminals began to make sense. That is, it is only after the metaphor goes from being an "intra" to being an "inter" level that the ownership of an "uncoupled" terminal makes sense. E-mail and the Internet also illustrate this issue. In their childhood and youth, electronic messaging systems were often designed for intraoffice communication on a systemic basis. In this situation, there were a variety of protocols and systems. This meant that while the idea of electronic communication developed it had to deal with a variety of incompatible systems. The "critical mass" issue that Rogers addresses was only in a meso-social scale. As the Internet and IP developed, it displaced the earlier versions of electronic messaging. This was not on an individual-by-individual basis however; it was on a system-by-system basis. This means that the calculus of deciding when to transfer from a preparatory system to the open Internet protocol was done on a more systemic level and that the transition probably went faster than if it was on an individual basis.
Thus, the metaphor of individuals awaiting on the sidelines until some mental calculus indicates that it is rational to now own a communications device and then hopping onto the bandwagon is not completely correct.

Another issue is that the boundaries of the group that adopts a particular innovation are not well determined here. The Gaussian distribution assumes a stable enumerated population. However, the market for an innovation is often more piecemeal with new groups hopping onto the bandwagon en masse while other sub groupings adopt it on a one–by–one basis. If one looks at the situation from an abstract enough level then something approaching a normal curve might be discernable. However, this is noting upon which to bet one's personal fortune, nor their entire marketing budget.

Stops with the adoption. Rogers work is designed for marketers and their job, in some respects, stops with the adoption of the particular or innovation. Beyond the actual purchase of an innovation, there is only an interest in the exposure and eventual "contamination" of others in his two-stage process. The interest here, however, is in one's capacity as a contaminated person, not as to how the device becomes embedded into his or her own life, how it changes routines etc.

2.3 Rogers and the adoption of the mobile telephone among teens

When thinking of the mobile telephone among teens, there are several points at which the outline provided by Rogers fits neatly and others where one must stretch credulity a bit.

On the positive side, Rogers' attributes of adoption provide some insight into teens' adoption of the mobile telephone. In Norway, they could easily see the advantage of the device in the way that it allowed them to organize their social lives and also it provided them with a physical symbol of status. These advantages were in a currency that was easily comparable to other consumption items in the lives of teens.

The device is not by any means complex, it was easily available to be tried since parents, and in particular fathers had been using the device for some time. Finally, the results of the mobile telephone are easily seen, both in terms of one's ability to coordinate activities and also in the (perhaps imagined) enhancement of one's status.

Rogers' notion of the social element in adoption is obvious in the diffusion of the mobile telephone among teens. The "marketing strategy" used by teens that "all my friends have one" speaks to this point. Finally, the critical mass issue is also relevant here. As the device spread, its utility in facilitating communication also spread. There is, however, a caveat here. However, the extreme saturation of the mobile telephone and the social nature of the teens mean that it is not necessary for all teens to have one. Even if one does not have a device, they are still "in the loop" to some degree since the information regarding group activities is available. The utility of the mobile telephone rose dramatically as it started to spread. However, there was a type of saturation point when each group of teens had a mobile telephone. Thus there was a high chance that whenever there was a device in the group when they were together, then the market was, in some ways saturated. The fact that there is more than one device per group is a type of super saturation from this perspective.

On the other side of the equation, there are issues that do not seem to fit in Rogers' work. One, perhaps incorrectly, gets the sense from Rogers that given the correct spin; an innovation will be adopted by a group. The point is to understand both the innovation and the potential group of adopters. In the work of Rogers, there is the sense that if one has the right sales pitch that it is possible to sell ice cubes to Eskimos.

There is no real idea in his work that the background situation of the group, i.e. their life situation, is of overarching relevance. One sees, however, that with the mobile telephone, it is specifically the life situation of the teens that made the adoption so quick. Teens are in a period where in they have a great need for social interaction. With the traditional telephone, this need is frustrated by a communication channel wherein parents have the opportunity to control the length of conversations, and can gain insight into who their children are talking to and how often they are in contact. Further, the telephone bill serves as a form of evidence regarding their activities. The point here is that it was not a sales campaign that resulted in teens' adoption of the mobile telephone, rather it was the opposite. The marketing followed the adoption. Indeed the marketing of the device and the various services such as SMS followed after the teens themselves had adopted the device itself.

When looking specifically at teens it is easy to assert that they are not "rational actors" in the economic sense of the term, but then neither are any of us. The difference between teens and more mature consumers is perhaps that one develops the savoir fair to cover over our purchases with more of a veneer of functionality and less fetish.

The last point here is that there is no real follow up in Rogers. With some minor exceptions, the things that take place after the sale are not of interest. There are several reasons that this is a disadvantage. First, as noted above, it seems to underscore Rogers' focus on the marketing side of innovation as opposed to the social dynamics of innovation. Secondly, with items such as the mobile telephone, the technical development has not stood still. Thus, there are continually new devices and indeed, with GPRS and UMTS there are completely new systems of mobile telecommunication being developed. Thus, to simply stop with the individual's adoption of the mobile telephone means that their maturation as a user is missed. Finally, some of the real social dynamics take place after the purchase. While the item has been adopted in a specific sense, it may not have found its place in the life of the individual or their social group. Thus, to stop at the sale misses a lot of the real action.

3 Silverstone, Haddon and the domestication of technology

Another examination of the adoption process is provided by Silverstone and Haddon (1996). While the work of Rogers and that of Silverstone and Haddon cover a lot of the same territory, they none-the-less differ in emphasis and are often used for different purposes. Silverstone and Haddon have developed another approach to the adoption and use of ICTs that generally goes under the title of domestication. Where Rogers' approach is usually more focused on the situation in the marketing world, the domestication approach is often more academic in its use.[2] Unlike Rogers, the domestication approach is generally based on work carried out by Silverstone and Haddon in addition to a network of researchers largely focused in Europe. In addition, the domestication approach does not focus on the marketing of particular innovations to the degree of Rogers, but rather takes a more neutral stance. The domestication approach is largely impartial to technology per se in that the approach does not provide a road map for how a developer or marketer should approach the sale of a particular innovation. The domestication approach takes the stance of an interested observer to the process of adoption and tries to discern the interaction between the innovation and the context into which it is being placed.

3.1 Elements in the domestication process

According to Haddon there are several assumptions associated with the domestication approach. He notes that it looks at consumption rather than use, that is, it looks at the broader implications of adopting a particular device. In addition, and similar to Rogers, domestication looks at adoption as a process rather than as a specific event. Third, Haddon notes that the "adoption" process is on going. That is, a device has a developing role as it becomes embedded in a particular social context. Which leads to Haddon's fourth point, i.e. within a context both users and non-users can have a hand in the shaping of a technologies meaning for that context. Finally, he notes that technology's can be socially shaped but also shaping in their consequences (Haddon forthcoming).

There are various stations in the adoption process according to Silverstone and Haddon. These include imagination, appropriation, objectification, incorporation and conversion. *Imagination* is the way in which a device, such as the mobile telephone, a new type of scarf or any other innovation enters into our consciousness. Obviously, there is a link here with Rogers and his notion of the two-step process. That is, one becomes aware of the innovation via various personal and commercial information channels. The next stage, *appropriation* is seen as the actual purchase of, for example, the scarf. Beyond the acquisition of an artifact or service, the next stage in the process is *objectification.* As the word indicates, it is the process wherein one makes the item a part of their own milieu. It is the way in which one makes an item of consumption a part of oneself. One can think of this as a type of bridge between the commercial display of an artifact and the individual's use of the object in the presentation of themselves to the world. The scarf that they have, or will have purchased gains a place in the individual's consciousness. The individual tries to think about how they will use the item. Which jacket the scarf will fit with, where they can store the scarf when not in use, how to wash and maintain it, etc. The final stage is the *conversion* of the artifact. It is here that the artifact becomes seen as a part of the individual's identity by others. To use the example of the scarf, others come to identify the person vis-à-vis their particular use of the scarf. In this way the scarf becomes a part of the individual's ongoing identity.

3.2 Positive aspects with the domestication approach

The domestication approach provides one with a holistic approach to understating adoption. It does not have, as its main task, the encouragement of adoption, as in Rogers' work. Rather, it is part of the more academic project of providing insight into the surrounding the social processes involved in adoption and consumption (Haddon 2001). The fact that information and communication technologies such as the mobile telephone arrived on the scene is only incidental to the domestication approach. In reality, it should be able to also describe the adoption of any innovation in any setting.

The approach allows one to see why innovations have been adopted, usually *ex post facto.* It does this by setting both the innovation and the group into context. Taking the example of teens and mobile telephones, they are in a life phase where mobile, personal communication is a premium. After the technical and the economic aspects of the system were in place, the analysis allows one to examine how the context and the users match.

[2] The domestication approach has been used in more commercial situations. (Silverstone and Haddon 1996; Falmer and Haddon 1998)

Another issue is the ideological career of those who choose to not adopt a particular artifact or service. Rogers discusses these in contrast to the innovators and opinion leaders. Silverstone and Haddon and others who are interested in the domestication approach have focused extensively on the non-adopters and the meaning of technology in their lives (Haddon and Silverstone 1993; Falmer; Haddon and Silverstone.1995; Falmer; Haddon, and Silverstone1996; Haddon 1999 Punie 1996; Ling 1999).

This insight and the omnipresent nature of artifacts such as the television and the mobile telephone mean that both adopters and – perhaps even to a greater degree – non-adopters, need to have their ideological argumentation in order. This is a theme that has also arisen in my own research.

In essence, one need not clarify why they have a mobile telephone; rather one is called to answer if they do not have a mobile telephone. The family in the following citation shows an active relationship to the cultivation of an anti-adoption stance.

> Henrik (father): We are against [mobile telephones] because I see as a photographer, I recently had, I photograph weddings. I recently had a couple that I photographed last Saturday. The groom was continually using the mobile telephone while I was taking pictures. I said 'either you put that down or I am going to stop taking pictures.' And so he put it away and I said that 'Now you turn on the mobile answering or I will stop taking pictures.' And I also had a situation where it rang in the church during the ceremony and he begin to talk. I don't have a mobile telephone and I don't want one because I have seen too much negative use of them. People use them regardless of if they are on the train or driving their car, so people almost collide and they sit on the train and talk. They use it too much. It is not necessary and I see teens walking around and talking. . . .
>
> Martin (son 15 years old): And in school
>
> Elise (mother): They are very dangerous I have seen several near collisions with mobile telephones where they are talking on the mobile telephone and have almost collided. . . .
>
> Martin: There are some in my class you know. There are quite a few that are like snobs and have real expensive clothes and such and a lot of them have like a mobile telephone to show that they are rich.

The comments show that the family has a clear ideology surrounding the rejection of the device. The justifications are ordered into groups, i.e. "the mobile phone is disturbing," "the mobile telephone is dangerous" or "the mobile telephone is used to show off." They have these justifications close at hand and are prepared to present them at the least provocation. In addition, they are active in the collecting reports of various situations that support the justifications.[3]

3.3 Weaknesses with the approach

3.3.1 The progression from non-owners to owner is perhaps perceived as being as sequential

The process of objectification is, to some degree, seen as a progression going from the introduction to the artifact to its purchase and finally to it being an embedded part of one's presentation of self.[4] However, this is not necessarily a progression. One can be, for example, quite far into the objectification process, i.e. the placement of the object into the context of their lives, before the purchase ever takes place. This pre-consumption imagination qua objectification can be seen in the following citation from a 1997 focus group:

> Interviewee 1: I want a mobile telephone that you can feel in your pocket so that will cost a little extra, otherwise I don't want to bother with one.
>
> Interviewee 2: Is that anything to brag about, that it's expensive? Isn't it important that you can call cheaply and that you . . .
>
> Interviewee 1: I am happiest by having the best. The best isn't good enough.
>
> Interviewee 2: I don't understand that, but . . .

[3] Haddon discusses a similar point in Haddon (1998).

[4] Obviously, not all innovations are considered, and many are derailed before they reach any type of acceptance.

> Interviewee 1: All my friends are great, they have the best cars, and the best and most expensive stereos, the most expensive TVs and the most expensive mobile telephones and since nobody has bought that Philips yet then I will be the first.

The first interviewee is obviously quite far into the objectification and even is tipping over into the conversion process, i.e. the fact that he has no mobile telephone is irrelevant. He is well oriented in the market. He knows the brands and styles. He knows what type of phone he wants and the image he wants to project. The mental furniture is all in place. The only thing missing is the mobile telephone.

Looking at another possibility here there are those who have actually purchased the device but are not quite clear as to its role in their lives. Thus, the issues of integration and conversion are not accomplished.

> Irene (42 year-old single mother of two) I have one but I don't use it much. I saw, I just got a bill and I had calls for 24 kroner or something like that during the last three months. I just have it; it is for those times that, I needed it like if I am sitting in traffic, if the children are alone home. . . . That is why I bought it, if for example they should be alone, for example I am at a parent's meeting at school or something like that you know. Then I can have it with me, so they know that they can reach me if there is something.

The comments of this woman contrast sharply with those of the young man who was cited above. Where the non-owner seemed to have a secure grasp on how the mobile telephone would fit into his life, and not incidentally, into his presentation of self, this single mother, who is an owner of the technology, fumbles with this issue. The point then is that the sequence of domestication is not necessarily linear progression.

3.3.2 Does not lend itself to prognosis

A second issue here is that the domestication approach does not lend itself to making prognoses as to a particular item's potential diffusion. Where Rogers' approach at least holds out the hope that diffusion will follow a particular path and that there are steps that one can take to encourage the process, this is not the point with Silverstone and Haddon. This is in reality perhaps an unfair critique. It is like saying that you cannot pound a nail with a saw. Domestication is not meant as a tool for the prognosis of adoption. Rather, domestication is a type of stance one takes in the observation of innovation.

The basic issue here is that product development has its own career and adoption has another. Product development often attempts to consider the social context, but this is a tricky business. The intention of an item and its social elaboration are two quite distinct things. Thus, there is an inherent indeterminacy in the process that is difficult, if not impossible to predict.

4 Other issues in the analysis of mobile telephony

This paper started by making the point that the "revolution" of teens as mobile telephone users is largely over in Norway and in the Nordic countries. Similar developments have been seen in Italy and Israel. The shift is coming in other places. As teens adopt the device, some of the same issues will arise and also, other culturally specific issues will be a part of the picture. In this section, I want to look at some of the things that still are not laid to rest.

4.1 The use of the mobile telephone in public spaces

The first of these is the issue of mobile telephony in public spaces. From the earliest period of the current boom to the present, this has been an issue (Ling 1997; Klamer et al 2000). In many situations and in may settings the mobile telephone is seen as a nuisance by those who are unwittingly asked to eavesdrop on a conversation. Informants who are experienced as well as those who are not bring up this issue. Further, it is a point of common lore. Journalists, comedians and others notice and comment on this aspect of the mobile telephone.

This indicates that the device has not reached its final, taken for granted, state. The implicit norms of mobile telephone use are not in place. Just as it took time before the role and position of the traditional telephone found its place in society the same will be true of the mobile telephone. Further, as the technology matures and changes it these norms will again be up for negotiation. For example, the "traditional" mobile telephone is being augmented with hands-free devices. This means that the posture of the person talking on the phone, i.e. hand to ear, is being replaced by a posture that does not readily disclose why one can be seemingly talking into space. The visual clues are not available for others and thus there is the danger of interruption and also misinterpretation of the situation. The work of Fortunati comes into this aspect of mobile telephony (forthcoming).

This, however, is good news for the social sciences. The disjuncture will provide the curious social scientist with insight into the establishment of norms and also the negotiation of the presentation of self.

4.2 Micro-coordination through the use of the mobile telephone

One of the major impacts of mobile telephony is likely to be its contribution to the micro-coordination of everyday life (Ling and Yttri, forthcoming; Ling and Haddon forthcoming). The mobile telephone is used by those with a stressful schedule to arrange and rearrange daily appointments and the other logistical details of everyday life on a real time basis. In the case of families with young children, for example, all the elements of the "soccer Moms'" suggest that there is a need for a type of real time coordination to evoke Townsend's concept (2000). The suggestion here is that the mobile telephone can be used to allow for a more nuanced, and also a more effective management of transportation.

Further analysis suggests, however, that there are gender based differences in the adoption and use of the mobile telephone. Specifically, men who have seemingly less need for the device in the coordination of domestic life are the dominant users (Ling and Vaage 2000)

4.3 Cohort vs. life style

Another issue is the degree to which mobile telephony adoption and use are characteristic of a life phase or of a cohort. That is, to what degree will today's teens carry the habit of mobile telephone use with them as they age and become more stable in their life styles.

Looking quickly at data from Norway, it shows that Norwegians of all ages used just over 25 minutes a day for private telephone conversations when considering all terminals and about ten minutes per day when considering only mobile terminals.[5] Looking further at this, the material shows that Norwegian women used about 30 minutes a day for private conversations when considering all terminal types where men used only about 20 minutes. This difference is statistically significant. Interestingly men and women both reported about the same time use for mobile terminals. Earlier research shows that women that are older than ca. 25 – 30 years are particularly reluctant to talk on the mobile phone. Younger women, i.e. teen aged girls, have shown that they speak significantly longer than teen aged boys (Ling 2000). If one looks at the number of personal calls per day, there is no significant gender based difference when all terminal types are considered. However, when looking at the number of calls from mobile terminals males report an average of about 2 calls per day while women report only about 0,7 private calls per day. The difference in the latter case is statistically significant. The final brick in the argument here is that the number of calls per person by gender is virtually the same for teens. It is only when one looks at the difference for those above 20 years of age that the gender difference arises.

Thus, if the life phase effect is stronger here one would expect that the teenaged girls will reduce their mobile telephone use as they mature into young adulthood. The opposite may also be true, i.e. that they will carry with them the use of the mobile telephone into their adult lives. The answer to this question will again provide insight into the socialization process and also the strength of habits acquired during adolescence.

4.4 The wireless Internet

Finally, there is an open question as to the efficacy of new types of mobile technology. The next innovation on the technical horizon is the wireless Internet. The development of UMTS and also items such as web pads indicate that there is movement in this area. The issue is the stance to be taken by those who are looking into the social consequences of these developments. One can argue, for example, that voice telephony fulfills the functions of users and that there is no real niche for the development of advanced mobile telephony. The opposite perspective is that these new developments will enhance the users' lives and thus will be readily adopted.

Beyond these two possibilities, the eventual development of these technologies illustrates the cleft between Rogers' approach and that of domestication. The Rogerian approach would suggest that one look to the early adopters and try to influence their adoption of the devices associated with UMTS. Indeed significant investments in these systems mean that telecomm operators and equipment developers are involved in this process already. The point will be to introduce the devices and to encourage the two-step process as described by Rogers.

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[5] Based on personal estimates of time use.

The domestication approach adopts a more neutral stance. There is not necessarily an interest in waiting until the majority of people adopt an innovation until one sets to work. To be sure, the evaluation of pilot studies is equally at home in the domestication and the Rogerian approach. However, while the latter is in search of identifying barriers to adoption and methods with which to enhance elements that would drive adoption, the former would be likely to be interested in both the adoption and the rejection of an innovation.

5 Summary

This analysis here takes its point of departure in suggesting that mobile telephony has essentially saturated the teen market in Norway. If this is indeed the case, it is of interest to know what the recent history of the mobile telephone can tell us regarding the mechanisms of adoption.

In order to address this issue I look into Rogers' analysis of diffusion and also that of Silverstone and Haddon. Rogers' analysis is of interest because it provides several insights into the way that an innovation, such as the mobile telephone, came to be adopted. Among other things, his insight into the social mechanisms of adoption and also the critical mass of ownership are of interest. On the negative side, his approach is founded in the world of marketing and not in the more disinterested world of academic research. This means that the focus of his work is on the marketing and sales process and not on the broader issues of technological adoption.

The alternative approach is that of domestication as developed by Silverstone and Haddon. Here the point is more of a global analysis of adoptions *ex post facto.* The approach provides one with an understanding of how innovations change and are changed by their social contexts. This is a useful framework for understanding these social processes. However, it is pointed out that the approach perhaps assumes a sequence that is not necessarily there. In addition, neither of the approaches looks into the ideological world of the non-user. A final issue with the domestication approach is that it is not particularly focused on making prognoses. This is not, however, an expectation.

Finally, I outline several areas of further research. These include the use of the mobile telephone in public spaces, its use in the coordination of everyday life, the issue of life phase use of the device and finally the issues associated with the social acceptance of future developments.

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