From Mobile Phone to Mobile Device: News Consumption on the Go

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Abstract: The mobile phone has technologically changed from a voice- and text-oriented communication tool to a multimedia device. But are people using it as a multimedia device? This article examines the diffusion and adoption of mobile devices for multimedia, with a focus on journalistic news content. The article highlights two aspects of mobile multimedia use: diffusion, seeking the factors that differentiate users from non-users, and attitudes, looking specifically at adoption behaviour. The results are based on several quantitative surveys conducted in 2005, 2006, and 2007, which are representative for the country of Sweden.

Keywords: Electronic culture; Media/mass media; Diffusion of innovation; Multimedia; Convergence; News

Résumé : Le téléphone mobile, à l'origine un instrument privilégiant la voix et le texte, est devenu un appareil technologique multimédia. Mais dans quelle mesure les utilisateurs profitent-ils de ces fonctions multimédias? Cet article examine la diffusion et l'adoption d'appareils mobiles multimédias tout en mettant l'accent sur leur contenu journalistique. Il souligne deux aspects de l'utilisation mobile multimédia : sa diffusion (quels facteurs différencient les utilisateurs des indifférents?) et les attitudes à son égard (plus précisément, quels sont les comportements d'adoption typiques?). Les résultats proviennent de plusieurs sondages quantitatifs représentatifs de la Suède qui ont été effectués en 2005, 2006 et 2007.

Mots clés : Culture électronique; Médias de masse; Diffusion des innovations; Multimédia; Convergence; Nouvelles

Introduction

This article analyzes diffusion and adoption of the mobile phone as a multimedia device. The mobile phone was diffused in the eighties to early adopters in a few Western societies and then had its commercial breakthrough in the nineties. During this first phase, the mobile phone was diffused as a personal voice-com-

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munication tool. Since the beginning of the new millennium, a second phase of diffusion has occurred. The convergence of mobile phones and multimedia has meant that the technological architecture of the mobile phone has changed. The mobile phone is no longer only a telephone; it has become a personal mobile device that integrates both communication and multimedia functionality. The term "mobile device" will be used in this article to emphasize that it has developed into a device that integrates multimedia functions, that it is no longer simply a phone. Multimedia is media that enables content and information processing through audio, video, graphics, text, and animation in an interactive manner. The mobile device, as a multimedia tool, has four main characteristics: it is portable, constantly connected, personal, and has a small screen (Sundet, 2007).

Researchers have mostly studied the mobile phone's first phase, analyzing instrumental and expressive functions, such as the microcoordination of daily activities and the formation of identity (Ling, 2004; Westlund, 2007b). User research on the second phase is limited, but it has become increasingly common in studies focusing on business models, technology, or policy and regulation. One explanation for this is that the usage of multimedia with mobile devices has been limited, although the situation is changing. Previously there was only widespread usage in Japan and South Korea, but now diffusion is also taking place slowly in Europe and North America (Ito, Okabe, & Matsuda, 2005; Westlund, 2007b; Wilson 2006; World Association of Newspapers [WAN], 2007). The telecom sector in the Western world currently develops infrastructure, mobile devices, and services that encourage people to use multimedia with mobile devices. In the long term, the social impact of the mobile device as a multi media tool is likely to be great. It is not a question of whether people will change their use of media and mobile devices, but rather a question of how and when.

Diffusion researchers have traditionally studied the diffusion of possessions: the number of people within a group or nation that acquires a specific innovation. This measure is problematic, since most mobile devices sold in Western countries nowadays can be configured for mobile Internet, although few are actually using these services.[1] Researchers should therefore focus on usage, rather than possession, analyzing both the number of users and their frequency of usage. When looking at multimedia for mobile devices, it is important to limit the study. A range of multimedia features and services can be studied. This article discusses previous research on usage of mobile Internet,[2] but it has an empirical focus on mobile news services in Sweden. News for mobile devices represents the latest extension of traditional news media organizations' cross-media news production. The choice to focus on news content was made because news is commonly used in most other media, and it is also relatively commonly used content when compared with other types of mobile Internet content. Along with download services, news is among the most popular forms of content or service for mobile devices in countries such as Japan, Korea, Greece, and Finland (Westlund, 2007c; Westlund & Bohlin, 2008). It is also an area in which more and more media companies are making efforts to develop. For example, in 2007, the Canadian newspaper publisher Gesca launched mobile-specific sites for several of its titles (World Editors Forum, 2008).

The article applies a quantitative methodological approach that involves several national surveys from the years 2005, 2006, and 2007. The first research question is to identify diffusion of mobile news services over time and among different groups. It is an analysis of the characteristics of those who are using mobile news services and those who are not. An assumption in diffusion theory and for the article is that diffusion is more prevalent among some groups than others. The empirical results will make an important contribution, as these can be compared with our current knowledge about the usage of the mobile device as a multi media tool. It is furthermore assumed that the diffusion in terms of usage is rather limited, and therefore it is important to gain an understanding of current barriers to adoption. The second research question focuses on understanding the importance of costs and user-friendliness concerns to the adoption of news for mobiles.

Setting the context: Sweden

Some countries around the world have an especially high diffusion of computers and Internet. Among these are Asian countries such as Japan, Korea, Taiwan, and Singapore; North American countries such as Canada; and countries in Western Europe such as Sweden. The diffusion in these countries is high when it comes to both possession of these technologies and usage of them (Zamaria, Caron & Fletcher, 2005; Findahl, 2007). Sweden is interesting, because its entire ICT sector is well developed. Sweden belongs to the leading group of countries in the world when it comes to both mobile and Internet penetration (WAN, 2007). Sweden has one of the world's most developed third-generation networks (3G), which covers almost all the households in the country. Furthermore, since 2006 there has also been a rollout of even higher-speed mobile Internet in urban areas.[3]

Regarding the mobile sector and 3G infrastructure, Sweden is similar to countries such as the United Kingdom, Italy, and the other Nordic countries; the accessibility to mobile Internet is high, but the usage is rather limited. This is different from Japan and Korea, where both access and usage are high. Sweden is also different from Canada, where diffusion of mobile phones is rather high, but the deployment of 3G networks and usage of mobile Internet is less developed (Canadian Wireless Telecommunications Association, 2008). The usage of mobile multimedia is an important but still little-researched area. There is a lack of studies outlining the current situation in terms of usage in Canada. Meanwhile, recent research contributions have illustrated that an "always-on environment" is emerging among particular user groups in Canada. Furthermore, these studies of email and BlackBerry usage indicate that mobile multimedia provides instrumental functionality, but also that it is socially dysfunctional (Middleton, 2007; Middleton & Cukier, 2006). There are also many other similarities between the Swedish and Canadian societies—for example, level of wealth and a high degree of uninhabited land mass. In both these and many other Western countries, the rise of online news media has had a great impact on traditional media. The use of television and paid morning newspapers has declined, while the use of Internet news and free dailies has increased (Bergström, 2005; Bergström, Wadbring, & Weibull, 2005; Wadbring, 2003; Westlund, 2007e, 2007f). More individualized patterns of news consumption are

on the rise, involving news media that are interactive and available on the go, such as on the mobile device.

The first research question is to identify diffusion of mobile news services over time and among different groups—and diffusion theory constitutes a starting point. Diffusion researchers focus on innovation mostly from a macro perspective—the society as a social system and its communication channels. Sometimes the micro perspective is also applied—diffusion to different groups or individuals (Rogers, 2003). Diffusion researchers often categorize the society into five groups of adopters: innovators, early adopters, early majority, late majority, and laggards. This categorization focuses on the speed of adoption, and often special attention is given to innovators and early adopters, who influence others in the adoption process. The diffusion process is affected by the characteristics of both the innovation and the adopters, such as socio-demographic factors (Rogers, 2003). In this article, diffusion theory is used as a starting point to identify the usage of news services among different groups. It is used to provide a description of diffusion, rather than as an explanatory model.

Diffusion theory is applied in studies of many different types of innovations, as a broad framework. The characteristics of early adopters vary with different types of innovations, although occasionally there are similarities between the adopters, as can be the case with adopters of Internet and mobile Internet. Diffusion research has been criticized because it often conducts retrospective studies on successful innovations (Lennstrand, 2001; Lievrouw, 2006). Therefore it is appropriate to study the diffusion of innovations such as Internet services for mobile devices in real time. Quantitative empirical research is rare, especially research that makes international comparisons. Much of the quantitative data about diffusion in nations has been carried out by market research companies.[4]

A study of mobile Internet penetration in the five largest countries in Europe from 2006 shows that although seven to eight out of ten users have the possibility to use their mobile devices for Internet, only about half of them have ever actually used it. The United States was also included in the study, showing similar patterns. In the U.S., 71% of users have access to mobile Internet, but only 41% have used it (World Association of Newspapers, 2007). Another analysis shows that one in five Italians uses his or her mobile device to download data and that the average amount of downloaded data in Italy is more than any other European country. Swedes and Spaniards download about half the amount of data as the Italians, followed by the French and English. According to the same study, one out of four Swedes uses mobile Internet, the highest percentage in Europe (WAN, 2007). Although many European countries have well-developed telecom infrastructures, the adoption of mobile Internet is low compared with Japan. In 2002, four out of five Japanese had an Internet subscription for their mobile devices (Matsuda, 2005a). The Japanese are accustomed to using the mobile Internet, and in 2006 about half of the population had acquired 3G handsets, which enable faster Internet services (WAN, 2007). During the same year, a similar quantity of people indicated that they indeed use their mobile devices for Internet (Yang, 2007).

An extensive study of the global use of mobile Internet shows that users are most often young males with above-average incomes (WAN, 2007). Several studies indicate that early adopters of Internet services are men, teenagers, and young adults, often with a high income and educational level. On a general level, these results apply to both Finland (Kivi, 2007; Versakalo, 2006) and Sweden (Bolin, 2007 Ohlsson, 2007; Westlund, 2007d, 2008; Westlund & Bohlin, 2008), and they are also similar to findings from Denmark (Constantiou, 2006). These patterns appear also in Japan (Matsuda, 2005b), although one Japanese study indicates that among Japanese youth, women are actually using mobile email slightly more frequently (Miyata, Boase, Wellman, & Ikeda, 2005). It has also been concluded that people's interest in technology is of importance—people with a higher interest tend to be the early adopters (Constantiou, 2006; Ohlsson, 2007). Interestingly, a study from Sweden shows that 88% of men are interested in new technology, but only 43% of women. The number of users of mobile news services is significantly higher among people with an expressed interest in new technology. Actually, interest in technology is more important as a differentiating factor than people's interest in news, entertainment, sports, culture, and so on (Westlund, 2007a).

In many countries, news is a popular type of service and content for the mobile device. Few studies have addressed the usage of news with mobile devices among different groups. Current studies from Sweden illustrate that its early adopters of mobile news services share a similar socio-demographic composition with its early adopters of mobile Internet services. These early adopters are mostly men aged 15 to 49, often with a higher educational level and often engaged in social activities outside of their homes (Westlund, 2007c). These early adopters are not news junkies, since they are using traditional news media such as newspapers, TV, and radio much less than others. On the other hand, they favour online news media and free dailies—news media that are constantly accessible (Westlund, 2007c).

Research about the diffusion of Internet and news services for mobile devices

The mobile device is currently little used as a multimedia or news medium among the public, although such use is more common among specific groups of users. This article elaborates on adoption research to seek explanations of people's adoption. The second research question focuses on understanding the importance of people's attitudes to the adoption of news for mobile devices. What follows is a discussion of current adoption research, from which two factors are chosen for empirical analysis.

The adoption research tradition applies a micro perspective and focuses on theories about decision processing (Pedersen & Ling, 2002; Westlund, 2007b). Three starting points are used: the first is the "theory of reasoned action" (TRA), which is a theory of people's assumed rational behaviour developed by Fishbein & Ajzen (1975). From this model, Ajzen (1985) developed the "theory of planned behaviour" (TPB), which deals with four main concepts: behavioural attitudes, subjective norms, intentions to use, and factual usage. The third model is the "technology acceptance model" (TAM), developed by Davis (1989). It applies

the ideas of TRA on new technologies (Pedersen, 2001). TAM focuses on attitudes and people's intentions to use an innovation, examining five concepts: user-friendliness, usability, attitudes toward use, intentions to use, and whether people actually use the innovation. User-friendliness refers to how easy and convenient mobile devices are to use. Usability concerns the functions and tasks for which people can use the mobile devices. Attitudes toward use are general ideas about the phenomenon, whereas intentions indicate people's interest in adopting it. Previous research about adoption of multimedia services for mobile devices has often been carried out within the TPB and TAM traditions (Pedersen, 2001; Pedersen & Ling, 2002; Pedersen & Methlie, 2004).

Pagani (2004) applies a revised TAM framework in a study of 3G services in six countries. Her conclusion is that the four most important adoption criteria are usability, user-friendliness, price, and transfer speed. Nysveen, Pedersen, & Thorbjornsson (2005) conclude from their research that four criteria are most important to people's intentions to use multimedia services for mobile devices: motives, attitudes, normative influence, and feeling of control. The Online Publishers Association (2006) report concludes that the three major sources of dissatisfaction for mobile Internet users in the world are site load time, site navigation, and user-friendliness. Pedersen & Methlie (2004) argue that services should be useful, functional, and easy to use. There must be a balance between complexity and usefulness, as well as great variation in the amount of available content and functions. These adoption studies illustrate that attributes such as transfer speed, usability, and user-friendliness are important factors. These factors constitute a dimension of how well the mobile device can be used for different types of multimedia, such as news services. The cost attribute is another important dimension.

A common denominator among most adoption studies is their focus on how people value different characteristics of the mobile device and its services. Since such research most often uses a quantitative approach, the features measured are predetermined. Similar results were derived from a qualitative study in Sweden (Westlund, 2007g). Some respondents expressed criticism of the relatively low quality of instrumental aspects such as usability, user-friendliness, and transfer speed, which goes hand in hand with previous results. Other important arguments against adopting Internet services for mobile devices were also found. For example, people's need for improved instrumental functions collides with their need for expressive functions. Individuals who value expressive functions the most may give priority to design and size aspects over having a more advanced mobile device (Westlund, 2007d, 2007g). This can be understood in relation to research that stresses the importance given to expressive functions such as identity and social status (Ling, 2004, Westlund, 2007b).

It was also found that many people simply have no need for Internet or news services on their mobile device at all. Some are simply satisfied with their current access to the Internet and other news media from other sources, while others express a strong need to maintain their personal sphere. They feel that media have become too pervasive, and they want to keep their mobile phone as a personal communication tool. Their fundamental perception of the mobile is as a phone,

not as a multimedia device. This is different from cultures such as Japan, where the mobile phone is viewed widely as a mobile device that can and should be used for Internet (Okazaki, 2006).

Methodological approach

This article makes a statistical analysis of usage and attitudes related to news services on mobile devices. Data from five different nationally representative surveys from Sweden are used; these were carried out during 2005, 2006, and 2007. There are naturally difficulties in comparing surveys that are not identical to each other, although it will help to give empirical indications of changes between years. It should be noted that the three surveys used for measuring diffusion of usage include the age spectrum of 15 to 85 years, while the two surveys used for analyzing adoption attitudes include only 16 to 65. Since the elderly are less inclined to use mobile multimedia, the attitudes reported are likely to be more positive than if this age group was included. Throughout the data analysis, all cross-tabulations have been tested with the chi-square test. In almost all cases, the data are valid at the 99% level. In the comments for each table and figure, there are descriptions of the exceptions.

All data presented about diffusion measured as usage derive from the annual surveys conducted by the SOM-institute at University of Gothenburg. The SOM-institute is research collaboration between researchers focusing Society, Opinion and Media. The national surveys have been carried out by post since 1986 and results from the surveys of 2005, 2006, and 2007 are analyzed for this article. For each of these years, 6,000 Swedes aged 15 to 85 years, chosen independently and randomly, received the SOM survey by post during the fall. The net response rate was 63% in 2005, 60% in 2006, and 63% in 2007. The survey is divided into two parts, one focusing on media and one on politics and society. Some questions are only included in one of the surveys, as is the case with the "mobile news services" dependent variable of this article. The total number of respondents in this part of the survey for the different years was 1,755 for 2005, 1,707 for 2006, and 1,769 in 2007.

Two other surveys are used for the analysis of adoption issues, measured as attitudes to cost and user-friendliness matters. The data from 2006 derives from a postal survey focusing on news and digital media, called the Gota survey. The survey was managed by the author and Annika Bergström through the Newspaper Research Program at the Department of Journalism and Mass Communication at Gothenburg University during the fall of 2006. The survey was sent by post to 3,000 randomly chosen people aged 15 to 65 in six middle-sized Swedish cities. The net response rate was 55%, and there were 1,594 respondents in total. The final survey used is called the Mobile Barometer and was carried out as a postal survey during the fall of 2007. This survey focuses on questions of usage and attitudes toward mobile devices in Swedish society. The survey was the first among several annual surveys and is managed by the author and Erik Bohlin at the Department of Technology Management and Economics, Chalmers University of Technology. The survey was sent by post to 2,000 randomly chosen people in Sweden aged 16 to 65.

Table 1: Diffusion of news services for mobile devices among groups, 2005-2007 (percent)

	Never			Monthly			Weekly			Daily		
	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007
EVERYONE	93	89	88	4	7	7	2	3	4	1	1	2
Gender												
Man	92	84	83	5	9	8	3	5	7	1	1	3
Woman	95	94	92	3	4	6	2	1	1	1	0	1
Age												
15-19 years	92	84	78	5	11	12	2	4	6	2	1	3
20-29 years	87	80	81	7	8	12	5	10	5	1	2	2
30-39 years	89	81	79	6	13	10	4	5	6	1	1	5
40-49 years	89	88	83	7	8	7	4	3	7	0	1	2
50-59 years	97	94	92	2	4	5	1	2	2	0	1	1
60-75 years	98	96	96	1	3	2	1	1	1	0	0	0
Educational level												
Low	98	95	94	2	3	4	0	1	2	0	1	1
Middle-low	92	88	86	4	7	7	5	4	4	4	1	2
Middle-high	91	89	86	3	6	8	3	5	4	2	0	1
High	93	86	86	1	10	7	1	3	5	1	2	3
Payment model												
Private pre-paid	95	95	93	3	3	4	1	1	2	1	0	1
Private subscription	92	84	85	5	10	9	3	5	4	1	2	2
Corporate subscription	86	82	79	7	11	9	5	6	9	1	2	3

Source: The Swedish national SOM surveys, 2005, 2006, and 2007.

Note: The number of respondents for the different factors and years varies. The total varies between 1,569 and 1,659 between 2005 and 2007. The other factors vary from 758 to 925 (gender), 143 to 407 (age), 311 to 600 (education), and 366 to 384 (payment model). The data for each year and for all the specific groups are valid on a 99% level according to the chi- square test.

Diffusion of news services for mobile devices among different groups

The number of Swedes who use news services for mobile devices at least once a month increased from 7% to 12% between 2005 and 2007. This is the number of people who can be seen as users, although they are using it only occasionally. The number of more frequent (weekly) users is more limited, although it has increased over the years, from 3% in 2005 to 6% in 2007. The results illustrate that for the majority of Swedes, the mobile has not been adopted as a news medium. Among those who do use it, the low frequency of usage implies that it is used mostly as a supplement to other news media. For example, the mobile is likely to be used in situations where no other news media are accessible. Meanwhile, although the total number of users increased little between 2006 and 2007, Table 1 shows that existing users intensified their frequency of usage. According to the previous discussion on diffusion theory, these user patterns are most likely to vary between different types of socio-demographic groups. The number of data points in some cells is naturally smaller when analyzing different groups. One must take the margin of error into consideration, which means that small differences should be interpreted with caution, as with the differences between specific age groups.

A first observation is that the differences in usage between men and women have escalated during the years, as men's usage has increased significantly more than women's since 2006. Furthermore, among those women who do use mobile news services, there are fewer who do so at least weekly. In 2007 mobile devices were used for news at least once a week by 2% of the women and by 10% of the men. One conclusion is that the digital divide between men and women is increasing when it comes to usage of news for the mobile device.

There is also an age dimension in Swedes' usage patterns for mobile news services. In all of the surveys, people aged 15 to 39 used news with their mobile devices to a higher degree than the older age groups, especially compared with senior citizens. Among specific age groups, it seems that adoption in the 15 to 19 age group was slightly lower than the 20 to 39 age group during 2005 and 2006, but has since caught up.

When it comes to educational level, the least educated are using mobile news services much less than other groups. These differences were apparent in 2005 but have become more pronounced over time, just as with the differences between men and women. There are few differences, however, between people with middle-low and high educational levels. The tendency that is emerging is that the most educated have developed slightly more frequent news usage with their mobile devices during the time period.

In Sweden three main payment models are used with the mobile: pre-paid, private subscription, and corporate subscription. Users with pre-paid payment models use their mobile for news services the least. One explanation is that mobile devices sold with a pre-paid plan are usually less technologically developed and appealing than those sold with subscriptions. Another explanation is that users of pre-paid payment models are more price sensitive. Among subscribers, people with a corporate subscription are the most inclined to use news

services with their mobile. The number of users with a corporate subscription has increased from 14% to 21% from 2005 to 2007, while the number has increased from 8% to 15% among private subscribers. It is among the corporate subscribers that we find the most frequent users—12% use mobile Internet news at least once a week. Those differences are explained partly by the fact that people with corporate subscriptions do not have to worry about the cost of usage. In Sweden the households with the lowest income levels are found among people aged 15 to 29 and 65 to 85, while the highest levels are found among people aged 30 to 64. High numbers of users are found among both groups with low income (ages 15 to 29) and high income (ages 30 to 49). Costs and economic concerns can therefore not be seen as the determining factors for usage.

It was noted previously that general news usage is of little help differentiating between users of news services for mobile devices. However, the use of specific news sources, namely, usage of online news media and free dailies, does provide a basis for differentiation (Westlund, 2007c). The analysis of these patterns is presented in Figure 1, which compares the use of mobile news services by frequent users of free dailies as well as frequent users of morning and evening newspapers in print and digital formats. It shows that frequent users of online newspapers have adopted the mobile device as a news medium to a higher extent than the general public.

This is especially notable when it comes to frequent users of online evening newspapers. Among this group, 13% use their mobile device for news services at least once a week. A possible explanation is that this type of news user has become accustomed to consuming the news in a selective and interactive way. They have developed not only a need for such news consumption, but also a competence for it. Frequent readers of newspapers in print tend to rely only on the print edition, with the exception of readers of free dailies. Among readers of free dailies, the number of users of mobile news services is slightly higher than the general public. One tentative explanation is the age structure of the group—that readers of free dailies are mostly teenagers and young adults. Another possible explanation is that many are commuting travellers, and they have become accustomed to reading news on their way to work. The mobile device constitutes an option for updated news on their way home in the afternoon or evening.

Frequent usage of mobile news services is associated with two particular lifestyles. The first is associated to being on the go: usage is higher among people who often engage themselves in activities outside their homes, such as going to pubs and restaurants. The second lifestyle dimension is related to work: people who often work overtime and travel in their work are overrepresented as mobile news users.

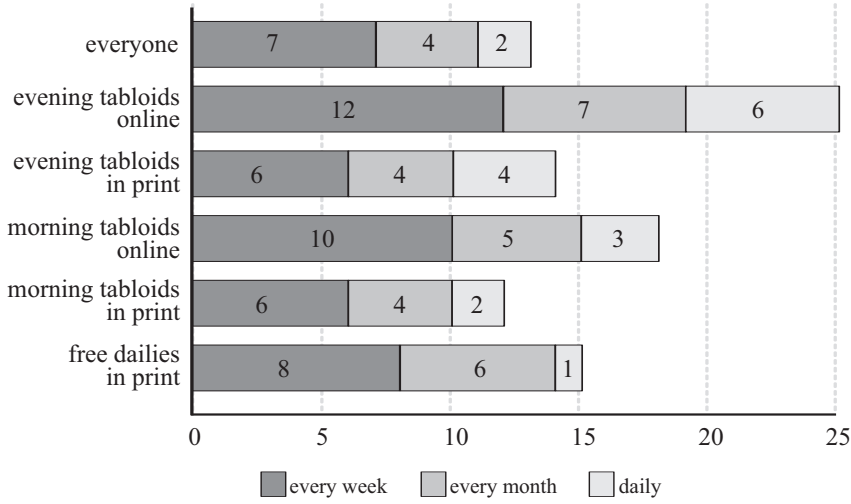
The fact that usage of mobile news services is higher among online news users implies that there is a technology dimension regarding the use of mobile news services. Such news-usage habits are more common among people who possess technologies such as an MP3 player, laptop computer, IP telephony solution, or home cinema system. Results from the 2007 SOM survey illustrate that among 3G users, one third use mobile news services monthly, while 18% use them weekly. It seems that possession of 3G is of great importance, a result also

supported by other studies (Kivi, 2007), although it is not yet known whether this is related to the pricing and selection of a data plan or the high speed of access. Another factor could be that 3G devices typically have a better screen and faster processor, also enhancing the mobile user experience.

Adoption of mobile news services: An analysis of attitudes and non-attitudes

Current research indicates that several factors are influencing the adoption process of the mobile device as a multimedia device. This article focuses its empirical elaboration on two specific factors: cost and user experience relating to news consumption. Both factors were measured as attitude statements in the years 2006 and 2007. Naturally, there are difficulties in constructing statements that capture an important attitude dimension in a suitable way. In these surveys,

Figure 1: Usage of news services with mobile devices among the general public and specific groups of highly frequent users of other news media, 2007 (percent)



Source: The SOM survey, 2007. **Number of responses:** The public: 1,664, morning newspapers in print: 1,143, morning newspaper online: 145, evening newspaper in print: 137, evening newspaper online: 217, free dailies: 368. **Note:** Frequent usage of free dailies and morning newspapers (print and online) refers to at least five times per week, while usage of evening newspapers (print and online) refers to usage at least six times per week. This means that the differences for users of the evening press might be somewhat stronger. Tests such as chi-square are difficult to apply in this case since it compares frequent and non-frequent users in each group, not in comparison with the public and other types of user groups. Taking the margin-of-error effect into consideration, it should be noted that the differences regarding printed newspapers are small and should be interpreted with caution. Also the differences for online morning newspapers must be interpreted carefully, due to the small number of respondents.

rather broad statements were chosen in an attempt to capture a wider view of Swedes' attitudes in relation to these factors. The cost factor was captured through the statement "News on the mobile device is still too expensive." As the forthcoming discussion will illustrate, it is very complex to seek knowledge about attitudes toward a phenomenon that few people actually have a personal experience of and an attitude toward. The second factor was captured through the statement "The mobile device is a good way to keep updated about news." The second statement is supposed to capture people's general attitudes toward the mobile device, related to a range of important factors identified previously. Different people will relate to this statement in different ways, but these ways will most likely be related to factors such as usability, user-friendliness, transfer speed, size of screen and keypad, et cetera.

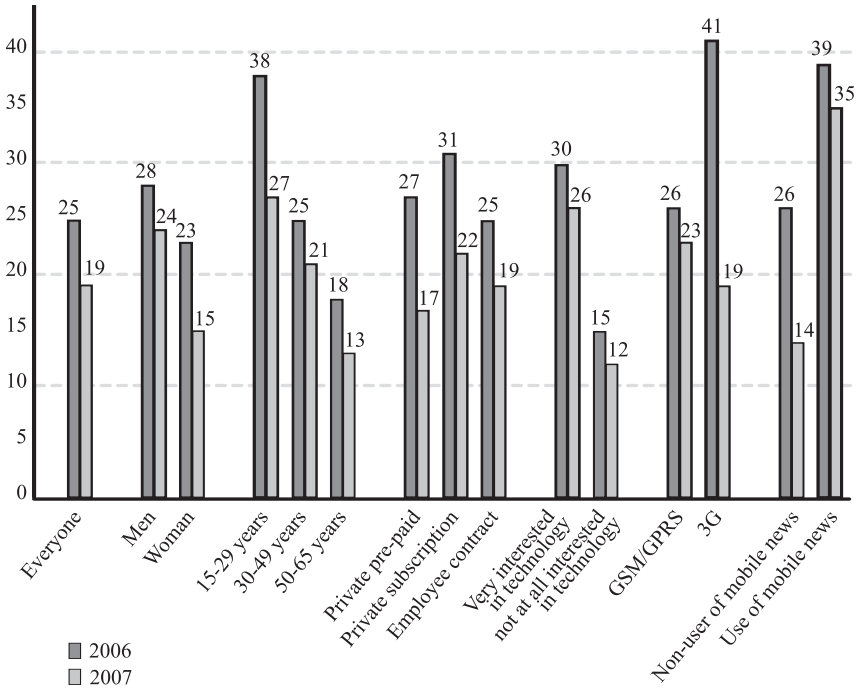
Is it too expensive to access news with a mobile device?

The cost dimension is often regarded as an important factor in explanations of why people adopt an innovation. People may make cost–benefit evaluations of the usage of mobile news services: whether the perceived value received is greater than the amount invested. Lower costs for usage can be important, but it is also important to be informed about the costs. When people are unsure about costs, they tend to avoid using mobile news services (Westlund, 2007d; 2007g). People often prefer flat-rate price models, as these provide a higher degree of control (Mitomo & Otsuka, 2008). It should be noted that in Sweden, more telecom operators offered different types of flat-rate price models for their customers in 2007 than they did in 2006, although mostly applied to voice calls and SMS, seldom for the use of mobile data.

Measuring people's attitudes toward costs of usage of news services on mobile devices is very difficult, since most people do not have an opinion. In fact, in the two surveys, about 60% to 70% indicated that they do not know whether mobile news services are too expensive. This response was about twice as high among non-users of mobile news services as users. This illustrates a very high degree of uncertainty regarding cost matters—and it is a very important result. An essential explanation is that few people among the general public have had personal user experiences of mobile news, but also that few people cared to gain knowledge about the costs. This indicates that people have a low level of engagement with the mobile device as a news medium. One interpretation that could be derived from this result is that cost may not be important to the general public. They may simply not care about the costs, since they have no interest in using mobile news services, no matter what the costs are. Such interpretations find support in previous studies (Westlund, 2007d). Alternatively, these people might assume that the costs are high or more than they would wish to pay and therefore do not bother to find out. What follows is an analysis of attitudes about costs among different groups of Swedes, based on the results shown in Figure 2.

One out of four respondents found mobile news services to be too expensive in 2006, while this decreased to one in five in 2007. The general perception that the costs are too high is accordingly also decreasing among different groups over the years. The groups of people who *most* find mobile news services expensive are the early-adopter groups: men, 15- to 29-year-olds, and people who are very

Figure 2: Expression of the attitude that mobile news services are too expensive, 2006-2007 (percent)



Sources: The GOTA survey, 2006, and Mobile Barometer survey, 2007. **Note:** The respondents could express their attitude on an attitude scale from 0 to 10 or with the option "do not know." The range from 7 to 10 was then coded as "agree" and is presented in the figure. The number of respondents for the different factors and years varies. The total varied between 1,585 (2006) and 727 (2007). The lowest number of answers for the different years concerning the different factors were 764 (2006) and 334 (2007) for gender, 386 (2006) and 173 (2007) for age, 115 (2006) and 177 (2007) for technology, 384 (2006) and 161 (2007) for payment model, 292 (2006) and 94 (2007) for type of network, and 173 (2006) and 172 (2007) for users of mobile news services. The data for each year and for all the specific groups are valid on a 99% level according to the chi-square test, except for gender in 2006 (95% level) and payment model in 2007 (not significant).

interested in technology. It is among these groups that we find people with experience using mobile devices for news services. Among people aged 15 to 29 years, as many as 38% perceived mobile news services to be too expensive in 2006, but only 27% in 2007. One explanation is that this group has experience with usage, but that its members are also likely to have below-average incomes. Among the middle-aged, there are fewer people who perceive the usage of mobile news services to be expensive. Their lack of experience is of course an important explanation, since many people in these age groups have no opinion on this question. Meanwhile, these groups have better economic resources and can therefore

make a different judgment about the costs of using mobile news services.

The importance of economic resources is related to the type of payment model people use. In general, there are fewer users of mobile news services among people with pre-paid models. A relevant question is whether more people in this group find it too expensive. The results associated with the different types of payment models used vary between 2006 and 2007, but the differences are small and should be interpreted with caution. The main conclusion is in fact that there are no major differences between these groups in this regard. It is evident, however, that among people with a great interest in technology, more people perceive the costs to be expensive.

Figure 1 further illustrates that in 2006, 4 out of 10 3G users perceived usage of mobile news services as too expensive. The amount was significantly lower among GSM/GPRS users. One interpretation of this result is that 3G users may have had actual experience with mobile news services and found it expensive. Then in 2007 the results show the opposite—that 19% of 3G users and 23% of GSM/GPRS users find mobile news services too expensive. This shows that 3G users' personal cost–benefit analysis has changed dramatically between the two years. An explanation could be the new and more favourable price models for mobile Internet that have recently been offered to 3G users. Finally, when analyzing the attitudes among users in Sweden and non-users of mobile news services, it becomes clear that it is mostly users who find it too expensive. Fewer non-users express this attitude, which has to do with the fact that fewer of these people have an opinion on the matter.

So what general conclusions can be drawn from the analysis of attitudes toward the cost dimension of mobile news services, considering the difficulties interpreting the results? Basically there are positions at two different ends. At one end, we have actual users or groups with early-adopter characteristics. It is among these groups that we find the highest number of people who perceive mobile news services to be too expensive. At the other end, we find groups that currently are not inclined to use news services on mobile devices. Among these groups, fewer people find mobile news services too expensive. However, it must be taken into account that few have personal experiences and opinions related to this matter. It is evident that they care less about the costs, although it is difficult to know whether this is related to a lack of intention to use.

Is the mobile device a good way to keep updated about news?

Previous results have shown that the current usage of mobile news services is relatively limited and that, as such, people lack engagement and attitudes regarding the associated costs. When it comes to people's attitudes toward the mobile device as a news medium, Figure 3 shows that more people have expressed an opinion. It is easier to have an opinion about such a matter, since people are accustomed to using the mobile device for different purposes and can therefore imagine how well it can be used for news services. However, in 2006 about 20% expressed uncertainty regarding the issue of whether the mobile device was a good way to keep updated about the news, a number that doubled in 2007. This change is difficult to explain. It might be that the respondents developed a pattern of expressing that they "do not know" to a larger extent in the 2007 survey com-

pared with the 2006 survey. The reason would be that the 2007 survey dealt with more questions about advanced technologies. Meanwhile, there was a transition between the years. In 2006, 4% percent believed the mobile device is a good way to keep updated about news; in 2007, this number had increased to 15%. As more people perceive it to be a good way to keep updated about news, those who were previously certain that it is not are becoming uncertain about their own stance. As Rogers (2003) argues, when the positive features of an innovation are highly observable, this may stimulate diffusion.

The results show that few people view the mobile device as a good way to keep themselves updated about news, although this number is increasing. The increases are most significant among early-adopter groups. In 2007, 1 of 5 men perceived the mobile device to be a good way to keep updated about news, compared with 1 in 10 women. Regarding age, it is actually among people aged 30 to 49 years that the highest increase has taken place.

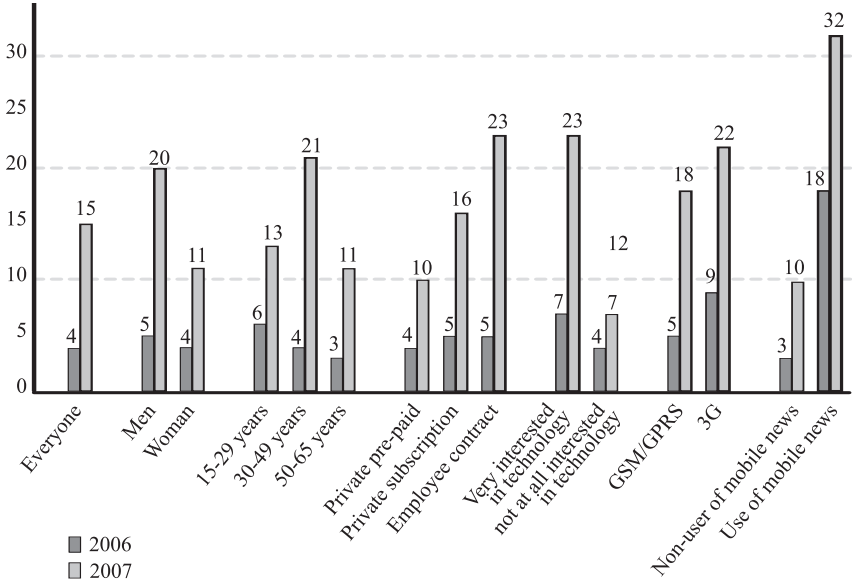
The analysis of people's attitudes by payment model illustrates a clear direction. Only 10% of users of pre-paid models perceive the mobile device to be a good way to keep updated about news, while 23% of people with an employee contract perceive it as such. The latter have gained personal experiences and probably find that mobile news services offer a good news medium in relation to their lifestyle and needs. When it comes to the technology dimension, it is evident that people with an expressed interest in technology have a more positive attitude toward using their mobile device for news than those who do not have such an interest in technology. Among those who are technologically inclined, there was an increase in the number of respondents, from 7% to 23% between the two years.

When it comes to type of network, 3G offers at least 10 times faster transfer speed than GSM/GPRS. With 3.5G (HSPA), it is about 100 times faster. Viewing transfer speed as a criterion of relative advantage, more users with 3G devices than GSM/GPRS ones would be expected to perceive the mobile device as a good way to keep updated about news. In 2006, there were rather big differences, as 9% of 3G users expressed this perception, compared with 5% of GSM/GPRS users. In 2007, both user groups were more positive, although the differences between the groups decreased. This result implies that transfer speed does provide a relative advantage, although it might not be particularly strong.

Finally, the differences in attitudes between users and non-users of mobile news services should be addressed. In 2006, only 3% of non-users perceived the mobile to be a good way to keep updated about news, while 15% of users felt that it was. The differences were great, and they were also expected. People who actually use mobile news services have formed a more positive attitude toward the mobile device as a news medium than those who do not use it. In 2007, the numbers increased for both groups, to 10% for non-users and 32% for users. The differences between the two groups are maintained. A conclusion is that users have the most positive attitude among all groups analyzed, and the trend over the years shows that more and more attitudes are becoming positive.

Meanwhile, it should be stressed that only one third of the mobile news users actually perceive the mobile device as a good way to keep updated about news.

Figure 3: Expression of the attitude that the mobile is a good way to keep updated about news, 2006-2007 (percent)



Sources: The GOTA survey, 2006, and the Mobile Barometer survey, 2007. **Note:** The respondents could express their attitude on an attitude scale from 0 to 10 or with the option "do not know." The range from 7 to 10 was then coded as "agree" and is presented in the figure. The number of respondents for the different factors and years varies. The total varies between 1,585 (2006) and 731 (2007). The lowest number of answers for the different years concerning the different factors were 764 (2006) and 338 (2007) for gender, 386 (2006) and 174 (2007) for age, 115 (2006) and 177 (2007) for technology, 400 (2006) and 162 (2007) for payment model, 304 (2006) and 94 (2007) for type of network, and 179 (2006) and 173 (2007) for users of mobile news services. The data for each year and for all the specific groups are valid on a 99% level according to the chi-square test.

This implies that two thirds of current users are not satisfied with using the mobile device as a way of keeping updated about news.

Concluding remarks

Multimedia mobile news services can serve as a use case for new mobile technologies featuring "always-on" connections to the Internet. Researching the second diffusion phase of mobile technology can be compared with shooting at a moving target. The empirical field work of this article was carried out in the fall of 2005, 2006, and 2007. When writing these concluding remarks, more than half a year has passed since the field work of the last survey was completed, in a field that is changing constantly. New mobile devices and price models have been launched, 3G and WLAN networks have improved, and content producers such as newspapers are enhancing their mobile sites and services constantly. The sub-

title of the paper, "news consumption on the go," refers to the use of news services with the mobile device beyond time and space boundaries. The title refers to the fact that people's patterns of news consumption are changing, partly because of the introduction of the mobile device as a news medium.

Diffusion of mobile Internet and news services is very high in Sweden, if measured by possession of a technology. When usage is the measure, diffusion is rather limited, as illustrated in this paper. There is a gap between what users can do with their mobile device and what they are actually using it for. The results demonstrate clearly that Swedes use the mobile device as a multimedia device in a very limited way. This is shown through an analysis of how different groups use their mobile devices for news services. The article confirms the hypothesis in diffusion theory that early adopters have specific characteristics.

Early adopters are likely to be men, 15 to 49 years old. They are rather well educated and have a great interest in technology. These early adopters are most likely to use some form of subscription model, have a 3G device, and are oriented toward online newspapers and free dailies in their news media consumption. It should be stressed that over time, the differences in usage between early adopters and others are increasing. This illustrates that there is not only a gap between possession and usage in general, but that this gap is especially strong among specific groups. The empirical research of the paper has been carried out in Sweden, a nation that has its own specific media culture and structure. Meanwhile, similar diffusion patterns will probably emerge in other nations that have similar cultures and structures, such as Canada and other Western countries. This argument is strengthened by the fact that the empirical results of the paper find support in previous international research about diffusion of the mobile device as a multimedia device.

The analysis of attitude patterns among different groups illustrates the complexity of studying emerging innovations from a user's point of view. When it comes to the cost dimension, early adopters perceive costs as higher than other groups, who on the other hand show little engagement in and knowledge of the matter. Cost is a barrier for usage, but probably more so for people who have an interest in the first place. A conclusion from the empirical results is that for most people, the cost issue is not *the* barrier for adoption, as it has not crossed their minds that they can/should/want to use mobile news services in the first place. There are several explanations for this that are not studied empirically in the paper—for example, lack of time and satisfaction with current news coverage from other news media. Among those who do have an interest in adoption, the quality of the mobile device and its functions and content are important. The analysis of the attitude regarding whether the mobile device is a good way to keep updated about news illustrates that only a minority insist that it is, even among current users.

The social impact of the mobile device as a multimedia device is rather small at the moment, but current user trends point toward increased impact. Meanwhile, there is also a positive trend in attitudes over the years concerning the two adoption factors related to the costs and usefulness of the mobile as a news medium. The analysis of usage and attitudes among different groups indicates an increas-

ing digital divide. The mobile device is becoming a supplementary news medium to other news media predominantly among specific user groups. These people are always connected and appreciate access to news independent of time and space. The mobile device is improving people's ability to receive news about current events in the world. For some, there is a desire to use the mobile device for such a purpose, while others avoid it. Mobile news services, just as email, can be perceived as both functional and dysfunctional (Middleton & Cukier, 2006). Although the technological architecture of the mobile device has made it a multimedia device, different users will continue to form their own individualized usage patterns. Some will use their mobile device only for interpersonal communication, while others will use all of its capacity as a multimedia device.

Notes

1. People might want to buy and use use a mobile phone in a traditional sense—to make voice calls. These people are likely to acquire a mobile device with the capacity to handle several other functions as well, not because they necessarily want to, but because these functions have become standard among basic handset models.
2. "Mobile Internet" means access to the Internet with mobile devices through networks such as GSM (WAP and GPRS) and 3G or through a wi-fi network.
3. The high-speed mobile Internet uses High Speed Packet Access (HSPA) technology, which in Sweden currently offers download speeds of 3.6 or 7.2 MB per second.
4. Some of these researchers do not have diffusion research as an explicit theoretical departure point, but do similar types of descriptive analyses.

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