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The SMS Bandwagon in Norway: What Made the Market?

by
Kjetil Andersson
Øystein Foros
Frode Steen

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The SMS Bandwagon in Norway: What Made the Market?[ψ]

Kjetil Andersson
Telenor R&D
kjetil.andersson@telenor.com

Øystein Foros
Norwegian School of Economics and Business Administration
oystein.foros@nhh.no

Frode Steen
Norwegian School of Economics and Business Administration
frode.steen@nhh.no

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Abstract

Short Message Service (SMS) has been an overwhelming success in Europe, substantially larger than in the United States. In relative terms Norway represents one of the largest SMS markets in the world. The aim of the paper is to examine the relationship between economic theories of bandwagon effects, and the Norwegian mobile providers' management of the SMS market. We narrow the focus to the problem of getting the SMS bandwagon rolling. We emphasize two features crucial to the SMS success. The first is low prices on text messaging relative to the mobile phone call charges for low-end tariffs. The second key feature is the high degree of interlinking with respect to both functionality and pricing. Both these features differ between Europe and the United States, and we argue that this might explain the difference in market development. In the SMS market the absence of regulations and *ex ante* superfluous functionality have ended up as *ex post* major successful services. This suggests that the regulator should be very careful when designing regulation regimes in bandwagon markets in order to avoid reduced innovation.

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Introduction

If you type 7777 44 2 555 555 0 9 33 0 4 666 0 666 88 8 0 333 666 777 0 2 0 3 777 444 66 55 1111 on your Nokia mobile phone, you would be sending a message asking your friend "Shall we go out for a drink?". Even if the user interface does not seem to be that good the Short Message Service (SMS) has been an overwhelming success in Europe, and in particular in Norway, where the Norwegian mobile customers on average sent 53 person-to-person SMS per month in 2002. The person-to-person services have been followed by a successful deployment of information services distributed by SMS (e.g. downloading of logos and ringtones, SMS voting, interactive TV, quizzes and games, jokes, betting, pay per view web content and so on). Moreover, additional communication services such as chatting are now widely used. While the average mobile subscriber in Europe sent 30 messages a month in 2002, text messaging has not been a success in the United States to the same degree. The average American mobile subscriber sends just seven messages a month (Economist, 2003a, 2003b).

The aim of the paper is to examine the relationship between economic theories of bandwagon effects and the Norwegian mobile providers' management of the SMS market. We narrow the focus on the problem of getting the SMS bandwagon rolling. What are the key factors influencing the success of SMS in general, and in Norway in particular? What has been the role of the regulation authorities? What have the operators and the regulator learned from the SMS phenomenon before the launch of new services such as MMS[1] and 3rd generations mobile systems (3G)?

We emphasize two features that we believe have been crucial to the SMS success. The first is low prices on text-messaging relative to the mobile phone call charges for low-end tariffs. Expensive mobile voice may force price sensitive users to use text messaging as a substitute. The fact that talk is cheap can also be used as an explanation of the low usage of text messaging in the United States compared to Europe. The second key feature is the high degree of interlinking with respect to functionality and pricing. In contrast to mobile phone calls, text message pricing does not depend on which provider the receiver subscribes to. SMS interlinking quality has been high in most European countries, again contrary to the US market, where this feature is quite new.

[1] Multimedia Messaging Services.

The development in the SMS market suggests that it is important that the regulator does not interfere too much. *Ex post* constraints on revenue will reduce incentives to innovate. In the SMS market the absence of regulations and *ex ante* superfluous functionality have ended up as *ex post* major successful services. This suggests that the regulator should be very careful when designing regulation regimes in bandwagon markets.

The article is organized as follows: In the first section we briefly discuss key variables in order to manage the start-up problem of a bandwagon service. In the second section we give the short story of the SMS. In the third section we give a brief overview of the Norwegian market structure. In the fourth section we analyse key underlying factors of the SMS bandwagon. Finally, we summarize which lessons that should be learnt from the SMS story by the market players and the regulators.

Bandwagon theory

Bandwagon effects (or network effects) take place when the benefits to any individual consumer of a product or a system increase with the number of other users. Telephony, E-mail and SMS are prominent examples of products exhibited by strong network effects.[2]

Let us illustrate the implications of network effects by the following example, which is based on Shapiro and Varian (1998b). Suppose that there are 1000 people in the market for a given service, and let v be the reservation price for person v, where $v=1,\ldots,1000$. The price is p and the number of users that value the service at a price higher than p is $1000-p$. In a traditional market we will then have a downward-sloping demand curve as shown in the left panel of Figure 1. In a competitive market with constant marginal costs equal to c there will be a unique equilibrium with $p=c$ and quantity equal to $n = \hat{n}$. Suppose, however, that we consider bandwagon (network) services like text messages where the benefit to each user increases with the number of other users. Assume that the benefit for person v of the service is vn, where n is the number of users. By combining $p=vn$ and $n=1000-v$ the demand curve can then be written as $p = n(1000 - n)$. The right panel of Figure 1 illustrates this demand curve graphically, and we see that it has a shape fundamentally different from the traditional demand curve since the first part of it is upward sloping.

[2] See Economides and Himmelberg, (1994) for a discussion of critical mass and market structure.

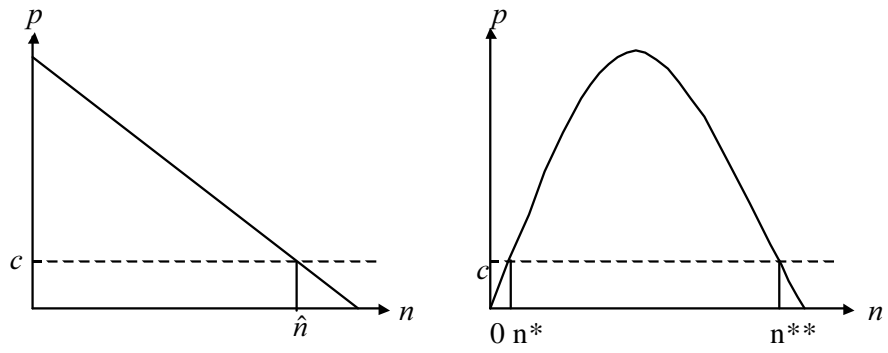

Figure 1: Demand in a traditional market (left-hand side panel) and in a market with bandwagon effects (right-hand side panel)

The first few consumers that connect to the network have a low willingness to pay simply because they have few people to communicate with. However, the willingness to pay increases as more consumers are connected to the network. This is what gives rise to the upward sloping part of the demand curve in the figure. Nonetheless, the figure shows that the marginal willingness to pay decreases if a sufficiently large number of consumers is connected to the network. The reason for this is that those that value the service most, i.e. have the highest v, are already connected to the network.

The bandwagon market depicted in the right panel of Figure 2 has three possible equilibria; two stable ones and one unstable. If no one connects to the network ($n=0$) the willingness to pay is equal to zero, $p=0$. This will typically be the result if the potential users do not expect the system to take off. On the other hand, if a large number of consumers enter the system we end up at $n=n^{**}$ and $p^*=c$. Consequently, we have two stable equilibria; $n=0$ and $n=n^{**}$. The equilibrium in between, denoted n^*, is unstable. The significance of n^* is that it marks a point of critical mass in the sense that once the market size is barely above n^*, the willingness to pay is higher than the price and new customers enter until we have reached n^{**}[3]. These n^{**} consumers (except the last one) experience a strict welfare gain from consuming the service. The equilibrium at $n=0$ is thus inferior from a welfare point of view. Each consumer that enters the network imposes a positive externality on the others, since she increases the value

[3] Economides and Himmelberg (1994) utilize a slightly different definition of critical mass, i.e "the smallest network size that can be sustained in equilibrium". This is the market size at the maximum point of the demand curve in the right panel of figure 1.

of the system. The problem is that no single consumer has any incentive to enter the network unless she expects others to do the same.

What determines whether the network will reach a critical mass; i.e. a point to the right of n^*, where the system grows and becomes a success? Penetration pricing may be one tool. Low prices when a new bandwagon service is launched obviously make it easier to achieve a critical mass. A second tool, and probably at least as important for the providers who try to manage the bandwagon, is the strategy with respect to the degree of interlinking. By interlinking we think of whether the customers enjoy bandwagon effects with respect to all other customers (high degree of interlinking), or only to the customers subscribing to the same provider (no interlinking). Hereafter we follow Rohlfs (2001) and let the term interlinking cover both direct network effects (demand side economies of scale) and complementary bandwagon effects (demand side economies of scope).[4]

The short story of SMS

The Short Message Service (SMS) enables the users to send and receive messages from their mobile phones, and was the first mobile data service to become a mass-market success in Europe.[5] SMS is a non-proprietary standard that was developed in the early 1990s by the cross industry forum GSM Association, and the SMS standard was part of the GSM standard.[6] The initial application was to send voice mail notifications from the network operators to their subscribers. The initial purpose also explains the limited functionality and capacity of SMS. An SMS message can only contain up to 160 characters.[7]

Even if the initial purpose of the SMS standard was to send messages to the subscribers, the initial standard allowed for messages to be sent from a mobile handset. Therefore, the SMS standard allowed for interactive services. The initially "superfluous" ability to send messages from mobile handsets has formed the basis for the killer-application person-to-person SMS. However, the mass usage of person-to-person SMS only occurred in the late 90's. From the

[4] Analyses of telecommunications usually use the term interconnection to refer to direct network effects, while complementary bandwagon effects interlinking relates to the degree of compatibility.

[5] In Japan the DoCoMo's I-mode service has been a big success since the introduction in 1999.

[6] Global System for Mobile (GSM).

[7] To overcome these problems the handset producers have included new features to improve the user interface with respect to typing messages, such as the option to store pre-defined message templates, dictionaries and predictive text, and special keyboards.

mid-1990s GSM phones launched on the market incorporated text-editing software, and mobile providers also began to put two-way capability into their networks. When we discuss the role of the regulation authorities in the infancy of SMS it is interesting to note that in the developing process of the GSM standard the providers actually had the incentives to include the flexibility for future service innovation by including "superfluous" abilities such as mobile originated SMS.

SMS may be divided into two categories:

- **Person-to-person SMS** (P2P), or mobile originated SMS, which enables mobile users to send short text messages from their mobile handsets to other mobile phone users. In the production of **P2P SMS** only the mobile operators and the users are involved.
- **Information SMS,** which enables the mobile users to buy different types of information and content services using SMS. Examples are downloading ringtones and logos, alerts (e.g. goal alerts), quizzes and games, SMS voting (who should leave "Big-Brother" tonight?), and paying for movies, web-content, parking, and so forth. Information SMS is typically provided by a separate content provider who buys SMS distribution and billing as inputs from the mobile operators. Hence, Information SMS involves more players than P2P SMS.

Information SMS is commonly described as Premium SMS, but we find the term premium somewhat misleading given the fact that P2P SMS is by far the more popular and revenue generating category.

The Norwegian market

Since 1993 there have been two facility-based mobile operators in Norway, NetCom and Telenor, each of them operating a GSM network. At the end of 1999 the first virtual operator (Sense Communications); i.e. an operator who buys network access from the mobile network operator and provides mobile services to end users, appeared in Telenor's network. Over the next few years several virtual operators (VOs) connected to the network of both Telenor and NetCom[8]. In 2002 the market share of Telenor, NetCom and the VOs was 59.7%, 28.7% and 11.7 %, respectively (Source: The Norwegian Post and Telecommunication Authority, (PT)).

[8] VOs in Telenor's network in 2003 included, among others, Tele 2, Song and Chess, while You, PGOne, and Sense are major virtual operators in NetCom's network. Sense switched to NetCom after buying the NetCom VO Site Communication in 2002.

In addition to the mobile operators, the major type of players in the mobile market is the providers of Information SMSs. The providers of Information SMS may be divided into large content providers (Cellus, Mobilnett, Inpoc, Popit, Maxsms) who have their own interlinking agreements (usually called Content Provider Agreement (CPA)) with NetCom and Telenor, and smaller content providers who buy interlinking from SMS aggregators (e.g. Carrot and Teletopia). The SMS aggregators then have interlinking agreements (CPA agreements) with NetCom and Telenor.

Figure 2 shows the development of mobile originated SMSs in the network of the largest mobile operator, Telenor. The development of SMS usage in NetCom's network resembles that of Telenor. Clearly, some time during 1998 the market size reached a point that triggered explosive growth.

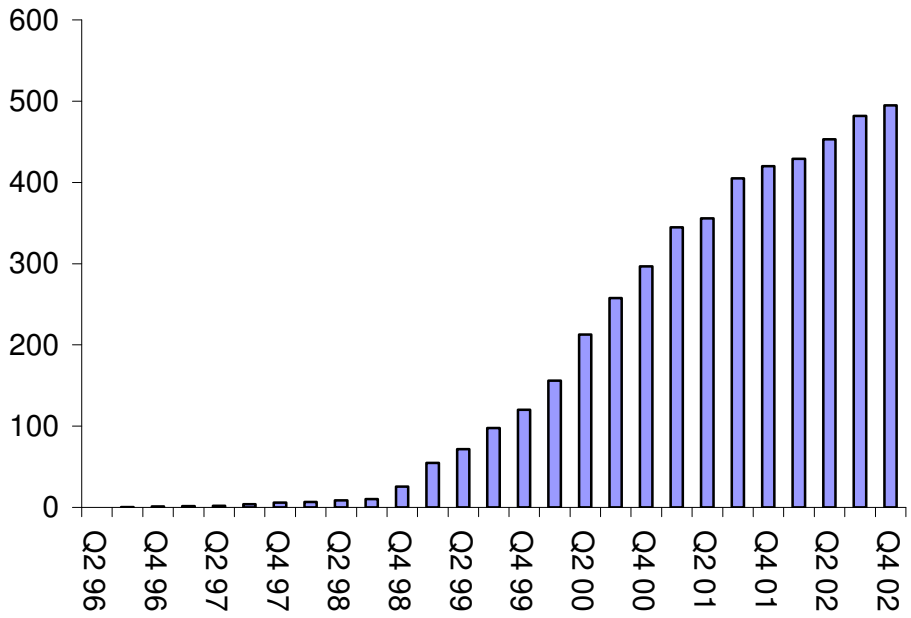

Figure 2. Number of mobile originated SMS (in Millions) in Telenor's network (Q2 1996 - Q4 2002). Source: Telenor

Underneath the take-off of P2P SMS depicted above is a rapid growth in mobile subscribers. Both Telenor and Netcom reported record-breaking increases in the sale of mobile subscriptions during 1997-1999. Of the new subscribers, more than 50% chose the pre-paid subscription type that was first introduced in the second (NetCom) and third (Telenor) quarters of 1997. Interestingly, at the beginning, the pre-paid customers could not send SMS - this feature was first introduced in the fourth quarter of 1998.

However, the growth in mobile subscribers cannot explain the Norwegian SMS success. The market penetration and usage of mobile calls are high in Norway, but not significantly higher than in other Scandinavian countries when we consider the penetration of GSM subscription (see Figure 3).

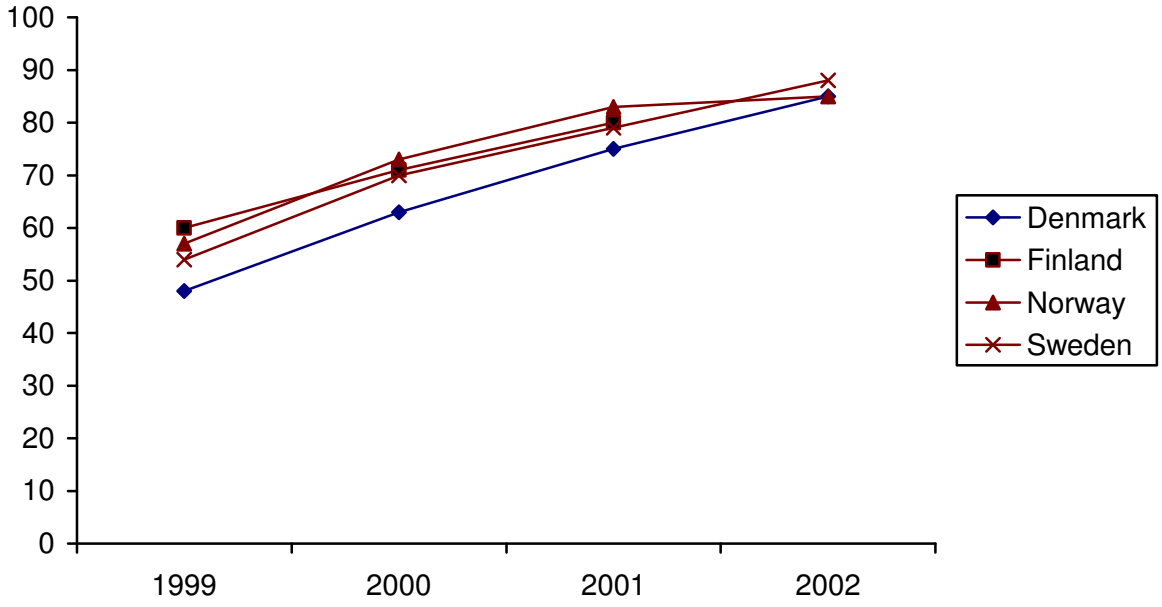

Figure 3: Penetration rates of GSM subscriptions. Source: Ministry of Transport and Communications Finland, The National Post and Telecom Agency (Sweden), The National IT and Telecom Agency (Denmark), Norwegian Post and Telecommunication Authority.

In contrast, the usage of P2P SMS in Norway is much higher than in the other Scandinavian countries, as illustrated in Figure 4

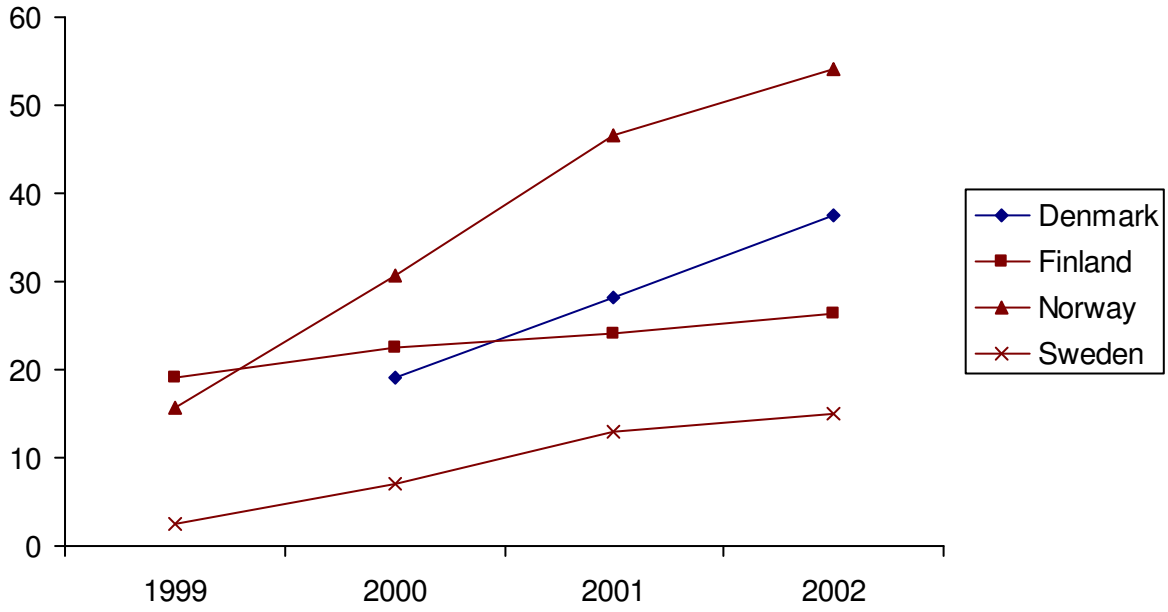

Figure 4: SMS usage per GSM subscriber. Source: Ministry of Transport and Communications Finland, The National Post and Telecom Agency (Sweden), The National IT and Telecom Agency (Denmark), Norwegian Post and Telecommunication Authority.

Basic features underlying the Norwegian SMS bandwagon

We will now discuss some key features of the Norwegian SMS success with a particular emphasis on the features that probably made the start-up problem easier to overcome: The simple and cheap charging, the high degree of interlinking and, finally, the hands-off role of regulatory authorities.

Pricing: Simple and cheap in contrast to mobile calls

Prior to 2000 the regular price of a P2P SMS was 1.50 NOK for both NetCom and Telenor subscribers[9]. In a short period following the introduction of SMS to the pre-paid subscribers at the end of 1998 Telenor offered SMS for free to these customers. At the same time the price per minute for calls during the daytime (Monday to Friday 07-18) for the pre-paid customers was 7 NOK. The same per minute price also applied for the post-paid low-end tariffs. In retrospect, one may wonder whether this seemingly extremely effective penetration pricing, see figure 2, was a case of good luck or a deliberate marketing strategy to trigger the bandwagon effect.

[9] In the first quarter of 2000 both operators lowered the SMS prices in general, and also started to differentiate SMS prices between subscription types.

Nevertheless, the combination of cheap, or free, SMS and high per minute prices on mobile phone calls is probably a key factor of the SMS success. The latter feature, high prices on mobile phone calls, was particularly important to the new customer groups that entered the mobile markets in the late 1990s. As stated above, a large part of these customers bought prepaid cards or other low-end tariffs (with low fixed fee and high price per minute for mobile phone calls). Teenagers, for instance, then apprehended that they could communicate much cheaper by SMS than by making phone calls.

The mobile providers typically bundle SMS with their GSM subscription (both for post-paid and pre-paid tariffs) such that all GSM mobile users have the ability to use SMS. Hence, the customers can send SMS only from their GSM provider, and rivals cannot offer SMS services without offering GSM subscriptions too. While mobile voice is charged per minute, SMS is charged per message. In contrast to what we have seen for mobile voice telephony, SMS was offered with an extremely simple pricing model to end-users. The price per minute of mobile phone calls differs a lot between high-end and low-end tariffs. In the daytime the price per minute has been up to 10 times higher for pre-paid cards than for the high-end tariffs. The regular unit price of SMS, however, was for the most part independent of the type of mobile subscription in the take-off period prior to 2000.

The motivation for the price differences in mobile phone calls is obviously versioning, i.e. the providers want to prevent customers with a high willingness to pay (typically business customers) from switching to low-end tariffs such as pre-paid cards.[10] One problem for the providers with this versioning strategy was that the low-end subscribers made few calls (they mostly received calls). However, when we narrow the focus to SMS, the pricing strategy of mobile phone calls most probably stimulated the use of SMS by the new customers using the low-end tariffs such as pre-paid cards. The main tool to attract these new customer groups, such as teenagers, was handset subsidizing and introduction of tariffs with a low monthly fee (or no monthly fee, as for prepaid cards). But in order to prevent the highly profitable business customers to switch to these new tariffs (such as prepaid cards), the operators were forced to include very high per-minute price on phone calls in these tariffs. Hence, even if the entry fee with prepaid cards was low, the price per "amusement" (phone call) was high. In this context, SMS was an optimal tool for the providers. SMS had been available to business customers for several years, but they did not send messages to any significant degree. Hence, low SMS charges would not be a temptation for the business customers. Therefore, the

[10] See Shapiro and Varian (1998) for an informal discussion of versioning.

providers did not need to fear revenue cannibalization by using low SMS prices as bait in their offers of prepaid cards and other types of low-end tariffs.

It may be a paradox that the awkward interface of SMS prevents the use of the service by the first generation mobile users, but the fact that the first generation mobile users (the business customers) did not value the SMS opportunity made SMS particularly suitable to the next generation of mobile users. There was no cannibalization problem, and furthermore, teenagers probably had lower learning costs than the first generation mobile users.

The simple and cheap pricing of SMS before the bandwagon take-off seems to have been one important reason for the huge success. Even if the operators did not have a clear strategy for the SMS introduction, they quickly started with marketing campaigns after observing that new customer groups such as teenagers used the previously "sleeping" functionality. In 1999, the operators in the Norwegian market tried to attract new pre-paid customers with introduction offers whereby new customers were given a specific amount of messages for free or at reduced prices for a given period. Northstream (2002) argues that these marketing campaigns were an important reason for SMS being used more in Norway than in Sweden.

If the text messaging take-off was caused by the fact that price sensitive teenagers found it less expensive to use text rather than voice, there is no value added for the consumers except the cost reduction. In fact, American analysts use this as an explanation to the difference between Europe and America. The reason for the low American usage of text messaging is that talk is cheap (Economist, 2003a, 2003b). However, even if this effect was an important explanation to the SMS take-off, text messaging is now used in a lot of situations where phone calls are not a substitute. For instance, P2P SMS is used when the sender or the receiver cannot talk. Moreover, phone calls are not a substitute for the majority of the services offered in the Information SMS market. Finally, the youth image and the growth of a specialised language to overcome the interface limitations gave SMS a cult status (Ovum, 2002).

Interlinking

The first feature to note with respect to interlinking in the SMS market is the existence of a non-proprietary industry standard on how a message is sent from one mobile phone to another. The alternative would have been several proprietary standards where providers compete for dominance. The feature of a common industry standard has obviously been an

important one for the success. The consumers and the non-strategic market players, such as small providers of information SMS, need not fear that they are choosing the wrong standard (the loser in the case of a standard war).

The common technical standard formed the basis for interlinking in the SMS market. However, in order to have a high degree of interlinking from the customer's perspective, bilateral agreements between the providers need to be implemented. As to direct network effects, the degree of interlinking in the P2P SMS market depends on whether the suppliers have interconnection agreements ensuring that people can send messages regardless of which operator the recipient subscribes to.

With respect to P2P SMS, a complete degree of national interlinking has been agreed on in most European markets, and in Norway NetCom and Telenor have had P2P interconnection agreements since the fourth quarter of 1996. The number of SMSs increased by about 30% in Telenor's network immediately after this agreement, see figure 2. Interconnection agreements on P2P SMS are easy to implement as long as the providers have the incentives to do so. The high degree of interlinking is important for the rapidly growing use of SMS since each SMS user enjoys the bandwagon benefits with respect to both NetCom's and Telenor's subscribers. A high degree of interlinking in this respect makes it easier to reach a critical mass. The degree of interlinking perceived by the end-users is enhanced by the fact that the end-user charges do not depend on whether the message is terminated off-net or on-net. When P2P SMS is considered as a substitute for mobile phone calls, this feature is particularly important. While the providers set the same price for off-net and on-net P2P SMS, at the time of SMS introduction, mobile voice was charged a higher price when the call was terminated off-net than when the call was terminated on-net. Hence, while the customers had to check whether the receiver was connected to the same provider or not in order to know the price per minute, this was not necessary for SMS.

Another dimension of P2P SMS interlinking is the interface between mobile handsets and the networks. Since 1995 all mobile handset manufactures have integrated the SMS standard such that all GSM phones are capable of sending and receiving messages. Hence, when the users first learnt about SMS, they were able to start using SMS themselves right away. This was an advantage for SMS compared to other mobile services such WAP and MMS. In the latter case, consumers may want to wait and see in order to avoid spending money on a service that no one uses. Both WAP and MMS, at the time of introduction to the market, required the majority of customers to buy a new mobile handset.

In contrast to the high degree of P2P SMS interlinking in Europe, the degree of interlinking has been low in the United States. The feature of sending messages between different networks was not implemented until the middle of 2002. Furthermore, not all handsets sold in the United States support two-way texting, and the feature of sending SMS is not included in standard subscriptions but must be bought as an additional service (Economist, 2002a). In our opinion, a low degree of interlinking is probably a more important explanation of the low American usage of SMS than cheap phone calls, as discussed above.

Interlinking with respect to Information SMS is more complicated than P2P interlinking. The mobile network operators need to agree on how to allocate the numbers. It is important for the content provider to have the same number from all the mobile operators to facilitate marketing to the whole set of users. One of the most important Information SMS services has been TV-related text-messaging where viewers vote and send comments. For such services it is important that the providers offer common shortcodes (four-digit numbers) for all subscribers. NetCom and Telenor offered common shortcodes from 2000, while common shortcodes were not offered before 2002 in the majority of other European countries. Common shortcodes have probably been the most important factor for the take-off of TV-related SMS (Economist, 2002).

A key feature of the Norwegian market is that NetCom and Telenor in general agreed on a high degree of interlinking for Information SMS. In April 2000 the two mobile network operators launched what was to a large extent a common Information SMS concept, Content Provider Access (CPA), with a very similar wholesale pricing and technical interface towards SMS content providers and SMS aggregators. Hence, the degree of cooperation on interlinking of Information SMS has been high in Norway compared to other European markets. An interlinking concept of Information SMS in Sweden was launched more than a year later than in Norway (Northstream, 2002).

The cooperation between NetCom and Telenor also increased the product range available to the content providers. This was primarily due to the principle of “Reversed Billing” that was applied from the launch in Norway in 2000. “Reversed billing” enables the operators to charge the customer for messages sent from the content provider to the customer. In contrast, the Calling Party Pay (CPP) principle is typically used for phone calls. The “Reversed billing” principle gives the content providers the possibility to offer subscription services such as goal alerts, whereby the content provider sends the subscriber a message when his favourite team scores. The subscriber is then charged for every such message he receives. In contrast,

without “Reversed billing”, subscription services cannot be launched (the customer needs to send a message “to ask” whether his team has scored). In the Swedish market reversed billing was not launched until late 2002.

Another difference between the Norwegian and the Swedish market is the high degree of transparency with respect to mobile operators’ wholesale offers to content providers and SMS aggregators in Norway. By several analysts, e.g. Northstream (2002), the high degree of interlinking and transparency in the interplay between mobile operators and content providers has been seen as a key feature of the high usage of Information SMS in Norway. We agree that the high degree of interlinking achieved through the cooperation between NetCom and Telenor probably implied that there was a larger pie to be shared by the mobile operators, the content providers and the customers. However, each operator has monopoly with respect to giving the content provider access to its subscribers. In order to gain access to Telenor’s customers, a content provider needs an agreement with Telenor, and, similarly, the content provider needs an agreement with NetCom in order to reach NetCom’s customers. Hence, an agreement with NetCom is not a substitute for an agreement with Telenor for the content provider and NetCom and Telenor do not compete for SMS content providers and aggregators who want to offer Information SMS. In the absence of such competition, the content providers and aggregators may fear that the mobile operators capture the lion’s share of the total pie. This may limit the content providers’ incentives to enter the market. Hence, it is unclear whether the cooperation between NetCom and Telenor on wholesale pricing and interface conditions has reduced the start-up problem or not.

As mentioned above, almost all mobile handsets since 1995 have integrated the SMS standard needed to offer P2P SMS. In contrast, the foundation for the Information SMS market was laid by Nokia’s proprietary standard Smart Messaging introduced in 1997 (Ovum, 2002). The main feature in this context is that Smart Messaging opens for downloading logos and ringtones. This was the start of the Information SMS market since Nokia allowed third parties to start offering logos and ringtones to customers with Nokia handsets. Since Smart Messaging was a proprietary technology, only Nokia phones could access these services from the content providers. Later the operators implemented gateways (ensured interlinking) such that other handsets than Nokia could access Smart Messaging content. However, the initial low degree of interlinking with other handsets than Nokia had given Nokia an advantage, and in that period Nokia did significantly better than their main rival Ericsson. Proprietary standards by the handset producers implied that almost all ringtones offered by content

providers were available only to customers with Nokia handsets. In the Scandinavian countries Nokia became an almost dominant supplier of handsets, in particular to prepaid customers. Obviously, it is hard to figure out to what extent proprietary standards for ringtones were decisive for this evolvement.

Regulation

When we discuss the role of the sector-specific regulation authorities (PT), we need to make a distinction between their *ex ante* hands-off approach in the infancy of the market and their more active role after SMS became a success.

The operators considered SMS a data service and therefore, in their opinion, SMS should not be regulated through the Open Network Provision (ONP) obligations. In the infancy of the market there was no attempt from PT to use any form of remedy towards NetCom or Telenor with respect to P2P SMS. Moreover, neither PT nor the competition authorities have intervened in the strong cooperation between NetCom and Telenor on pricing and interlinking in the wholesale market of Information SMS. As discussed above, the coordination of the structure of wholesale prices to content providers may have a negative effect on the content providers and the end-user prices. However, analysts such as Northstream (2002) argue that the cooperation on quality and wholesale pricing as well as the transparency in wholesale offering have benefited the content providers. However it is well known that such transparency may be a tool to practise tacit collusion. As Northstream (2002) notes, PT has encouraged the cooperation initiatives. It is interesting to note that several analysts, including PT, consider the cooperation on wholesale pricing, a practise that probably should have been banned according to the Norwegian competition law, as one of the key features behind the Information SMS take-off in Norway.

The hands-off approach used in the infancy has changed after the bandwagon started. PT has obligated Telenor to offer P2P SMS as a wholesale service to the independent firm Teletopia. Hence, Telenor is forced to unbundle the P2P SMS service from the mobile subscription. Until now customers have had the opportunity to send P2P SMS only from their mobile telephony provider. Telenor and NetCom have been critical to this and argue that the wholesale unbundling and wholesale price regulation of P2P SMS will have negative effects on their investments and innovation incentives. To what extent this *ex post* approach influenced the market players in the early period of SMS obviously depends on whether the

players expected this type of intervention to happen. On the one hand, if the intervention was expected, the providers would have internalised the effects. On the other hand, if they did not expect *ex post* intervention, the regulation has not had any influence on the introduction of SMS. However, in the latter case, we would expect the providers to internalise the effect of *ex-post* regulation of services that become a success when they consider investing in new services such as MMS and 3rd generation mobile systems (UMTS). The potential negative effects on *ex-post* regulation of services that are successful are comprehensively discussed by Hausman (1997, 2002).

Lessons from the SMS bandwagon

The success of SMS is often described as unexpected due to the awkward user-interface. You need to punch 55 digits in order to ask your friend out for a drink. Besides this, the introduction of SMS could be used as a textbook on how to get the bandwagon rolling. We have emphasized two features in particular. The first is low prices on text messaging relative to the mobile phone call charges for low-end tariffs. Expensive mobile voice may force price sensitive users to use text messaging as a substitute. The fact that talk is cheap has also been used as an explanation for the low usage of text messaging in the United States.

The second key feature is the high degree of interlinking both with respect to functionality and to pricing. In contrast to mobile phone calls, text message pricing does not depend on which provider the recipient subscribes to. P2P SMS interlinking quality has been high in most European markets, while P2P SMS interlinking has just recently been partly achieved in the United States. The most significant difference between Norway and the other Scandinavian countries is in information SMS interlinking, where the Norwegian operators cooperated to achieve complete interlinking through common shortcodes, transparency, and almost identical wholesale pricing long before the other European markets. Several other countries have now adopted the Norwegian business model for information SMS.

It is a question whether this was a case of good luck or a conscious strategy? One striking feature is the lack of attention on text messaging in its infancy. In 1999 the providers' attention was on WAP rather than SMS in all European markets, including Norway. The fact that providers did not expect much money to be at stake could have created an environment where it was easier to agree on a high degree of interlinking in several dimensions. Moreover, it might also be easier for the providers to share revenue with non-strategic players, such as

small content providers, when they expected the total pie to be limited. WAP became a flop partly because the providers were reluctant to share revenue with the non-strategic content providers.

The role of sector-specific regulation will probably be important with respect to the providers' incentive to include flexibility and functionality that may be considered superfluous when the initial standard is designed. It will usually be costly to include more options and flexibility, and whether firms wish to spend money and effort on *ex-ante* uncertain abilities depends on to what extent they *ex post* can capture the gains from a success. The story of SMS and WAP shows that it is hard to *ex ante* pick killer applications. *Ex post* WAP has been a flop and the operators have lost a lot of money, while SMS has been a formidable success. Recently we have seen indications of a more active role for the regulator with respect to the SMS market. If this implies that the regulation regime constrains the gains from an *ex post* success without compensating if services become unsuccessful, it will probably provide disincentives for providers to invest in order to solve start-up problems and to incur flexibility through *ex ante* superfluous abilities.

A tempting general lesson to be learnt here is that in the early development of a new market, it is important that the regulator does not interfere too much. Only when the market is mature and the critical level for the bandwagon effect is reached, can possible revenue and competition regulation be welfare improving. In a dynamic setting this might however be problematic, since expectations of *ex post* constraints on revenue will reduce incentives to innovate. In the SMS market we saw that the absence of regulations and *ex ante* superfluous functionality ended up as *ex post* major successful services. This suggests that the regulator should be very careful when designing regulation regimes in bandwagon markets.

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