Competition and regulation in the Nordic mobile markets

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1 Introduction

At a meeting of Nordic director generals on 7 November 2005, a decision was made to initiate a project intended to look at the development and regulation of the mobile markets in the Nordic countries. The purpose of the project is to gain a better understanding of developments in the Nordic mobile markets and the use of regulatory remedies. In a market where the various national regulatory authorities (NRAs) meet the same Nordic operators it is useful to understand different measures and benefit from the experience from employing various remedies. The main objective of the effort was to identify similarities and differences in regulation as well as the development of competition in the Nordic mobile markets. For that reason, the report is primarily descriptive and contains only overall analyses.

All five Nordic NRAs contributed to the report. The following individuals from the NRAs participated in the project:

NPT (Norway): Mette Husøy (project head), Jan Gerhard Rødal and Haakon Sandven

FICORA (Finland): Mika Enäjärvi and Tuomas Haanperä

PTS (Sweden): Fredrik Blomström

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The first part of the report is a summary of the work, followed by a chapter containing more detailed information on each of the five Nordic countries.

2 Summary

2.1 The mobile market in general

For the last twenty years, mobile telephony, along with the Internet, has been the technology that has most dramatically transformed the telecommunications sector. Mobile communications started as a premium service offering voice transmission with mobility. As the service became more widely available, mobile telephony challenged the notion of a natural monopoly within the sector, prompting a wave of regulatory changes that has profoundly altered the market structure of the entire telecommunications industry. The key variable for the development of the industry is radio spectrum, a scarce resource that could be used for other purposes. Technological innovation, such as the introduction of cellular technology and subsequent switch from analogue to digital transmission, has helped to make the spectrum constraint less severe. Moreover, technological innovation also helped to extend cellular mobile telecommunications into higher frequency bands of the radio spectrum, bands that previously had not been feasible for carrying mobile telecommunications services. On the supply side, relaxing the spectrum constraint permitted an increase in the number of operators in the market, with beneficial effects on service quality and prices for users.

The EU's new regulatory framework for electronic communication was adopted in 2002. The framework is meant to lay the groundwork for harmonising regulation in the EU/EEA, reduce entry barriers and facilitate sustainable competition for the good of users. The Commission has issued a list of the product markets it deems relevant in the markets for electronic communication. In this report we have focused on two of these markets:

Market 15: Access and call origination (MO) on mobile networks. This market includes voice and SMS[1] on 2G and 3G networks.

Market 16: Voice call termination (MT) on an individual mobile network. The market comprises voice call termination on a mobile network and interconnection products and services necessary for the handling of incoming traffic.

A mobile operator can offer mobile services to end users either by producing the service on its own mobile network or by purchasing all or part of the service from a mobile network operator (MNO). In the case of national roaming (NR) an MNO purchases access to mobile networks in areas where the MNO itself does not have geographical coverage. Access to NR is typically important in the establishment phase of a new MNO. A mobile virtual network operator (MVNO) purchases radio access from an MNO and produces the rest of the mobile service itself. A service provider (SP) purchases basic mobile services from an MNO and resells the service in its own brand.

In this report, we shall try to compare the development of competition in the Nordic mobile markets by comparing the changes in, and level of, retail prices and market concentration. Although this may provide an indication of the differences between the Nordic countries, it does not provide an exact measurement of the development of competition.

2.2 The individual countries

The total value of the Nordic mobile market for 2005 was approximately EUR 7.7 billion. As of 2005 the total number of subscriptions was approximately 25 million.

2.2.1 Denmark

The total value of the Dannish mobile market for 2005 was EUR 1.95 billion[2]. For 2005 the total number of subscriptions was 5,478,246.

Operator	Year of launch	Technology	Market share (subscribers)	Revenue
TDC Mobil	1982	NMT, GSM 900/1800, UMTS	41.3 %[3]	N/A
Sonofon	1992	GSM 900/1800, UMTS	23.5 %[4]	N/A
TeliaSonera Danmark	1998 (Orange)	GSM 900/1800, UMTS	21.0 %	N/A
Hi3G Denmark	2003	UMTS	2.1 %	N/A
Tele2	2000	MVNO	4.0 %	N/A
SPs	-	-	8.4 %	N/A

In Denmark four to five MNOs have been operating in the market since 1998. In addition to these undertakings, there is also an MVNO (2000) in Denmark. The mobile market in

[1] In the Danish decision on market 15 SMS is not included in the market definition.

[2] Includes numbers for pager and mobile services.

[3] Including market share of 10.2 % for SP Telmore, a 100 % owned subsidiary.

[4] Including market share of 4.2 % for SP CBB Mobil, a 100 % owned subsidiary.

Denmark is also characterised by the existence of a large number of SPs. Consolidation has taken place, most notable being the merger of the two MNOs Telia and Orange and the acquisition of the two largest SPs by MNOs.

There have not been price controls in the mobile market in Denmark, but TDC and Sonofon have until recently had obligations to give access to their mobile networks for SPs, to cost based prices.

The large number of networks contributed to the fact that independent service providers were offered access on competitive terms. Price basket comparisons show that the Danish price level is the lowest in the Nordic countries. Compared with the other Nordic countries, the Danish mobile market is the least concentrated.

2.2.2 Finland

The total value of the Finnish mobile market for 2005 was EUR 2.1 billion. As of 31 December 2005 the total number of subscriptions was 5.2 million.

The value of the market rose until 2004; in 2005 operators' revenue streams were decreasing. The market has grown in terms of volume due to declining mobile to mobile prices and the high level of substitution from fixed to mobile. Voice has migrated from the fixed to mobile networks faster than in many other countries. At the end of 2005, approximately 47 per cent all persons aged 15 - 74 used a mobile phone exclusively.

In Finland there are currently three nationwide MNOs, as well as one local MNO (Ålands Mobiltelefon (ÅMT)) in the Åland Islands. The Finnish market was duopolistic and a rather mature market in terms of penetration when Finnet[5] (the third nationwide MNO) set up operations in 2000. After 2001 the number of independent SPs and MVNOs increased notably. After the number portability regulation came into force in 2003, SPs and MVNOs, who offered low price subscriptions that require self service over the Internet, gained substantial market share. Number of SPs and MVNOs and their market share has recently fallen as the largest of them have been acquired by the MNOs.

Operator	Year of launch	Technology	Market share (subscribers)	Revenue
TeliaSonera	1991	GSM 900/1800, UMTS	48 %	EUR 1,070 million
Elisa Oyj	1991	GSM 900/1800, UMTS	35 %	EUR 740 million
Finnet Verkot	2000	GSM 900/1800, UMTS	15 %	EUR 290 million
ÅMT	1994	GSM 900/1800, UMTS	0 %[6]	N.A.
SP/MVNO	1998		2 %	N.A.

Access to mobile networks has not been subject to direct regulation in Finland, but the state authorities have encouraged MNOs to negotiate agreements with SPs. Before 2005 there were no price controls on MT traffic from fixed to mobile networks.

[5] Finnet Verkot Oy has recently changed name to DNA Verkot Oy

[6] Local in the Åland Islands. ÅMT's share of Finland's mobile customers remained under 1 %, but in the Åland Islands the corresponding market share is over 55 **%.**

2.2.3 Iceland

In 2005, total revenues from mobile operation in Iceland were approximately EUR 0.16 billion and had increased approximately 12 % from 2004 but the growth has been declining in recent years. As of 31 December 2005 the total number of subscriptions was 284,521 (GSM) and 19,480 (NMT)

In Iceland there are only two MNOs that offer national GSM services. Iceland is the last Nordic country to still operate NMT. The market has remained fairly concentrated, and one merger between two MNOs has taken place. One of the two MNO above has recently established a subsidiary to operate as a SP in Iceland..

Operator	Year of launch	Technology	Market share (subscribers)	Revenue
Síminn	1986	NMT 450	100 %	EUR 104 million
	1994	GSM 900/1800	65 %	
Og Vodafone	1998[7]	GSM 900/1800	35 %	EUR 56 million
IMC Island[8]	2002	GSM 1800	0 %	EUR 0 million

From 2002 and until today there has been a duopoly market structure in Iceland with stable market shares. Retail prices are the highest of the Nordic countries, and Iceland is the only Nordic country to witness an increase in charges in recent years.

2.2.4 Norway

In 2005 the total mobile market in Norway was EUR 1.71 billion. Although there is still growth in terms of revenue, the rate of growth is now falling. As of 31 December 2005 the total number of subscriptions was 4.9 million. Up to and including 2004, average revenue per user (ARPU) rose in Norway. During 2005, ARPU fell by around 2 per cent.

Operator	Year of launch	Technology	Market share (subscribers)	Revenue
Telenor	1994	GSM 900/1800, UMTS	57.4 %	EUR 930 million
NetCom	1993	GSM 900/1800, UMTS	23.5 %	EUR 470 million
Teletopia	2003	GSM 1800	< 0.1 %	N.A.
Tele2	2002	MVNO	6.1 %	EUR 100 million
SPs	2000-		12.9 %	EUR 210 million

[7] Reflects launch of services of Tal, which merged with Islandssími in 2002 and then was restructured as Og fjarskipti in 2003. Og fjarskipti concluded an agreement with the Vodafone group to use their brand name Og Vodafone

[8] IMC Island is a MNO but does not offer national mobile services in Iceland. The company's operations are based primarily on its international roaming service for foreign users.

Since 1993 two GSM networks have existed in Norway with licences requiring nationwide rollout. There has been a considerable number of SPs in the market since 2000, and the first MVNO launched its services in 2002. The market share of independent SPs has recently fallen since the largest SP was acquired by a MNO. Since 1998, several operators have been awarded licences to build mobile networks in the GSM 900/1800 and UMTS bands. In Norway there is available spectrum for both GSM 1800 and UMTS.

Norway is the only Nordic country that has imposed price controls on access to mobile networks.

The presence of SPs/MVNOs has resulted in a relatively high level of competition among the operators in the retail market. Even though SPs have gained market share the market has remained relatively concentrated. Despite falling retail prices the general price level is high compared with Denmark, Sweden and Finland.

NPT has identified a number of potential and actual competition problems in the wholesale market for access and call origination on public mobile telephone networks and in the markets for voice call termination on mobile networks[9].

2.2.5 Sweden

In 2005, the market for mobile telecommunication services saw revenue of EUR 1.79 billion. As of 31 December 2005 the total number of subscriptions was 9.1 million. In recent years, Swedish operators have generally enjoyed an operating profit margin of 40-50 %[10] from their mobile businesses.

Operator	Year of launch	Technology	Market share (subscribers)	Revenue
TeliaSonera	1992 (GSM)	NMT, GSM 900/1800, UMTS	43 %	N/A
Tele2	1992	GSM 900/1800, UMTS	35 %	N/A
Telenor/Vodafone[11]	2003/1992	GSM 900/1800, UMTS	17 %	N.A.
Hi3G	2003	UMTS	3 %	N/A
Spring Mobil / Swefour	2004	GSM 900/1800	-	N/A
SPs	1999-		2 %	N/A

In view of the fact that for a long time, Sweden has had three major mobile operators with relatively stable market shares among them, PTS has repeatedly found the market to be characterised by an oligopolistic structure. Since the entry of Djuice (2003) and Hi3G (2003), the mobile market has undergone a change towards clear price competition in the retail market. Despite the fact that Sweden has long had independent SPs, they have not had any major impact on the competitive situation.

[9] See www.npt.no

[10] based on TeliaSonera's and Tele2's official reports

[11] Telenor announced its purchase of Vodafone Sverige at the end of 2005 and has begun migrating its MVNO customers on Tele2's network to its own. The MVNO business operated under the Djuice brand.

2.3 Market developments in the Nordic countries

The figure below provides an overview of the number of MNOs that offer national services in the Nordic mobile markets. MNOs that offer services in portions of the market are not included.

The Nordic mobile market has witnessed consolidation through mergers and acquisitions. There have been both intra-country mergers as well as cross-border acquisitions (Telia-Sonera, Telenor-Vodafone). In addition, the largest SPs/MVNOs in Norway, Denmark and Finland have been acquired by MNOs.

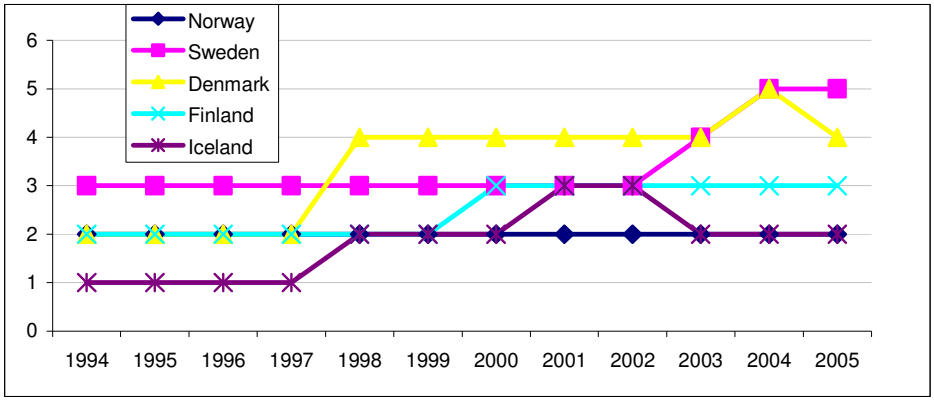


Figure 1 Changes in the number of MNOs.

Several of the large operators (former incumbents in addition to Tele2) have established themselves as MNOs or MVNOs in many of the Nordic countries. In Sweden, Norway and Denmark three of the MNOs/MVNOs are "Nordic operators"; in Finland there is one "Nordic operator".

2.3.1 Retail market

The figure below shows the growth in the number of mobile subscriptions relative to the population (mobile penetration) in the Nordic countries. According to the figure, developments have been similar in the Nordic markets, and penetration, in terms of subscriptions, today is over 100 % in all these countries.

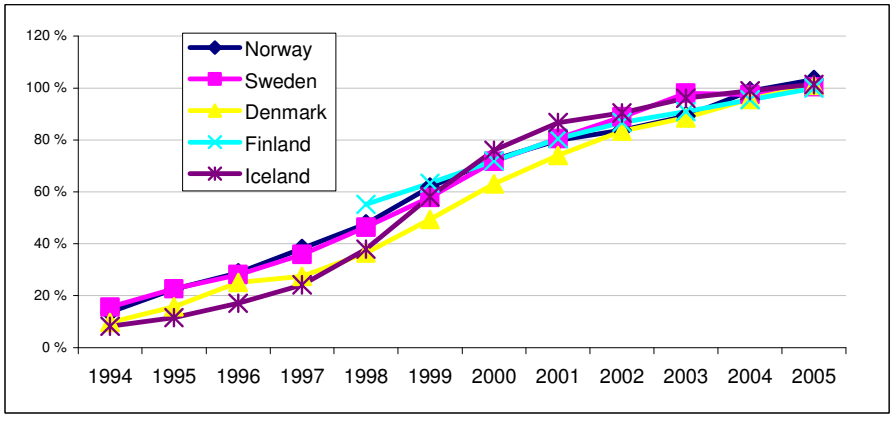


Figure 2 Mobile penetration [12]

[12] *2005 figures for Iceland are as of the first six months.*

The high penetration may result in fewer new market entrants, since it may be more profitable to invest in immature markets.

Traffic volume

The figures below show the number of traffic minutes and SMS text messages per customer per year. Traffic is still growing in the Nordic countries, indicating that the mobile market continues to be a growth market with regard to traffic.

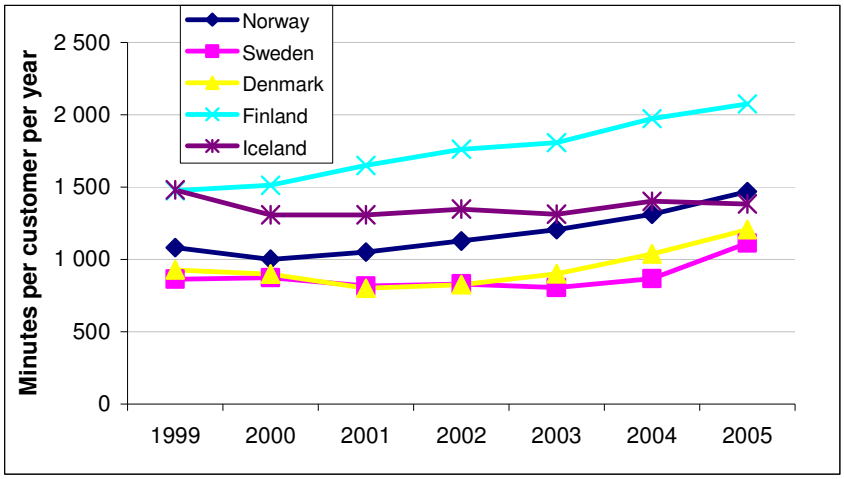


Figure 3 Number of traffic minutes per customer per year.

Finland has the highest total traffic volume per customer. A larger percentage of total telecom traffic is carried over the mobile networks in Finland than in the other Nordic countries. About 47 per cent of residential customers in Finland have substituted fixed-line subscription with mobile-only communications which may be because traffic from the fixed network to mobile networks has not been subject to price controls thereby increasing the prices of calls from fixed line subscriptions to mobile subscriptions.

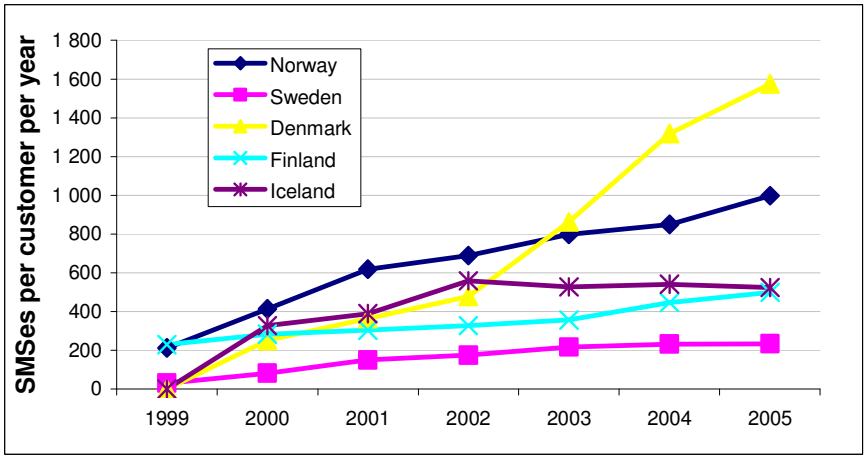


Figure 4 Number of text messages per customer per year.

In Denmark there has been a dramatic rise in the number of text messages per customer starting in 2002, likely because of low SMS charges and because a certain number of free text messages have been included in the subscription charges. Sweden has the lowest use of text messaging per customer, which may be because SMS charges have generally been higher in Sweden than in the other Nordic countries.

Retail prices

The figure below shows a comparison of retail prices for mobile communication for a "normal" user, taken from an international price comparison carried out by Teligen[13]. The price level and changes in prices may provide an indication of the development of competition in the market. In this report, the price comparison is used to compare the development of competition in the retail markets for mobile communication in the Nordic region.

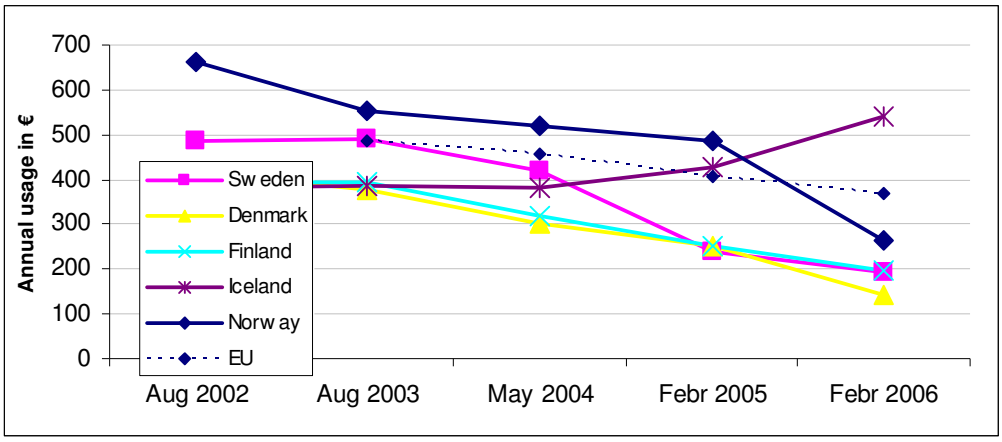


Figure 5 Changes in the price of typical normal usage.

With the exception of Iceland, retail charges have fallen in the Nordic countries. In recent years, Denmark has had the lowest charges, whereas except for the past year, Norway[14] has had the highest. Transparency in the retail market is increasing, due among other things to the introduction of flat rates.

The overall volumes of mobile traffic have been increasing in all Nordic countries. Volumes have been increasing even when markets are mature in terms of penetration, which indicates relatively strong price elasticity of demand. This is particularly true for Denmark, Finland and Norway, where there is an evident relationship between the traffic volumes per customer and the drop in prices. From the operators' point of view, the demand elasticity has not, however, been strong enough to compensate for the fall in prices in the countries with efficient competition in the retail market.

In addition to market conditions and structural differences, legislation and regulation have affected competitive conditions in the end user market. The cost of switching between operators has an impact on the level of competition. The consumers' ability to switch operators is conditioned on the availability of number portability and the nature of the subscription, i.e., on whether there is a lock-in period or subsidy of handsets and/or whether the subscriptions are pre-paid.

Except in Finland, it has been common in the Nordic mobile markets to bundle subscriptions with handsets. In Finland the prohibition against subsidising handsets was in 2006 removed

[13] Teligen obtains price information on the two least expensive subscriptions from the two largest operators in each country and calculates annual total costs according to a defined call pattern. The figures are not adjusted for purchasing power.

[14] For Norway's part, there may appear to be dramatic fall in retail prices in the past year. As a response to market developments last year, Telenor Mobil and NetCom have launched low-price subscriptions that require self-service over the Internet. Even though a tiny portion of the total customer base has this type of subscription, they represent two of the four price plans included in the price comparison.

for handsets used for 3G. In Iceland, the MNOs have stopped subsidising handsets of their own accord.

As a consequence of subsidising handsets, lock-in periods have been common. In Denmark a maximum lock-in of six months is permitted, and in Norway a maximum of twelve months lock-in period for consumers. In Sweden, six-to-twenty-four-month lock-in periods have been common. Until recently, lock-in periods have not been common in Finland, while lock-in periods are no longer being used in Iceland.

Number portability

The figure below shows changes in the number of ported mobile numbers relative to the number of mobile subscribers in the Nordic countries. Number portability was introduced in Norway, Sweden and Denmark in 2001, in Finland in 2003 and in Iceland in 2004. There are no significant differences in the wholesale charges related to number porting between the Nordic countries.

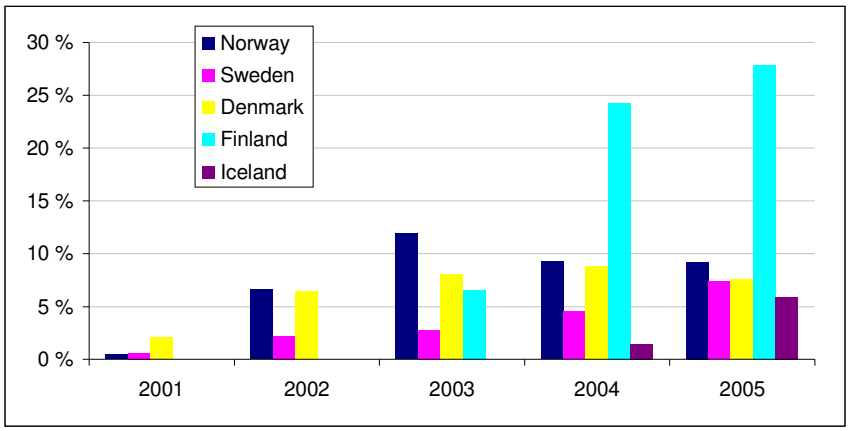


Figure 6 Percentage of ported numbers

Finland has witnessed a markedly higher number of portings than the other Nordic countries. One explanation may be that number portability was introduced later in Finland than in Norway, Sweden and Denmark, and at a time when competition in the market was intensifying. In addition, the prohibition against subsidising handsets in Finland has meant that lock-in periods were not common.

Although Sweden has seen a lower percentage of portings than Norway, Denmark and Finland, the percentage rose sharply once competition in the Swedish market intensified.

Number portability is a key factor to stimulating competition in the mobile market as it lowers end users switching costs.

2.3.2 Wholesale markets

There are several actual and potential entry barriers in the mobile market that can limit new entrants, such as high fixed costs and access to spectrum. In markets that are as mature as the Nordic mobile markets, costs will be particularly relevant.

Since spectrum is a limited resource, the number of licences that can be granted for rolling out mobile networks is also limited. Depending on the national frequency plan, the total number of licences for building mobile networks may vary. The costs of rolling out nationwide mobile networks may vary from country to country because of variations in available spectrum, geography, demographics and population density.

Spectrum allocations can have extensive effects on operators' cost structures, incentives and thereby the competition in general[15]. As the amount of spectrum in use has an effect on operators' incentives and ability to roll out networks with comparable costs to other operators, an imbalanced amount of spectrum has an impact on operators' competitive positions in the mobile market. Spectrum scarcity has been of particular interest mainly in Finland and Sweden,. With recent regulatory decisions in Finland regarding the assignment first of P-GSM and later E-GSM bands, the distribution of GSM spectrum among operators in that country has been made more balanced.

When licensing GSM spectrum, all Nordic countries employed a "beauty contest" mechanism. Denmark was the only Nordic country to auction UMTS licenses when in the first phase of UMTS spectrum assignments the other countries still used beauty contests. In some of the Nordic countries there is still available spectrum in the GSM 1800 band.

Mobile access/Market 15

Sustainable competition at the retail level appears to require infrastructure competition and/or sustainable competition at the wholesale level. To achieve competition in the mobile market, access to mobile networks (NR, MVNOs, SPs and co-location) have been key remedies. NR and co-location may be used as remedies to stimulate infrastructure competition. MVNO and SP access are remedies for stimulating competition in the retail market, but may also be remedies for encouraging infrastructure competition as rungs on a "ladder of investment".

When sustainable competition exists at the wholesale level, MNOs will compete to offer access to their mobile networks to obtain a greater share of the total traffic for their own mobile networks. In Denmark and in Finland, competition at the wholesale level intensified when a "late entry" entered the market. The same has not been the case in Sweden, which may be because Hi3G has not had a nationwide mobile network until now. When competition at the wholesale level is insufficient, regulation of access to mobile networks can stimulate increased competition.

The table below sums up regulation of access to mobile networks in the Nordic countries. The first part of the table shows regulation under the old regulatory framework and the other part sums up regulation under the new framework. Grey fields represent regulation.

	Old regulatory framework						**New regulatory framework**						
	NR		MVNO		SP		SMP	NR		MVNO		SP	
	AR	PR	AR	PR	AR	PR		AR	PR	AR	PR	AR	PR
Denmark													
Finland													
Iceland													
Norway													
Sweden													

Figure 7 Regulation of access to mobile networks

NR = National Roaming, MVNO = Mobile Virtual Network Operator, SP = Service Provider, AR = Access Regulation, PR = Price Regulation

[15] The spectrum divisions in Nordic countries can be found in Annex 1.

All the Nordic countries had a form of regulation of NR in licences or in the old regulatory framework. In Finland and in Iceland, general access to mobile networks was not regulated under the old framework. Norway was the only country where access to mobile networks (NR and SP) was subject to price controls.

Market power in Market 15 can arise at two stages: First, a network operator may deny access to its network on reasonable terms. Since entry to the mobile market is constrained by the limited amount of available spectrum, the MNO's network is considered to be an essential facility for market entry. Second, MNOs might be in the position to use market power on SPs already operating on their network. This is mainly due to the lock-in effect caused by high switching costs at the wholesale level.

Switching costs in the access market derive from a number of sources. In the standard service provider business model the MNO owns the SIM cards used by the end-users of the service provider. In this model the independent service providers operating on a mobile network are relatively tied to the wholesale network operator.

The MVNO business model gives the service provider notably higher buyer power, since an MVNO has control over its own core network and SIM cards. An MVNO may also be able to allocate its traffic onto more than one MNO's networks without a substantial impact on end users.

Denmark (2006), Finland (2004) and Sweden (2005) have not found operators with SMP in Market 15. In Norway (2006), Telenor has SMP in Market 15, and an access obligation for co-location, NR and MVNO have been imposed on it, with an obligation of cost orientation for NR and co-location. In Iceland PTA has submitted its market analysis to ESA on 28th of August 2006 where Síminn was found to have SMP in Market 15 with an access obligation and price regulation for NR, MVNO, SP and co-location. The decisions were appealed in Denmark, Norway and Finland.

Sweden, Finland, Norway and Iceland have NR for GSM. In Sweden and Denmark, NR is used for UMTS. In the period 1998 – 2000 the first SP agreements were concluded in Finland, Denmark, Sweden and Norway. In Denmark the first MVNO agreement was signed in 2000. In Norway and Sweden there have been MVNOs in the market since 2003, in Finland since 2004.

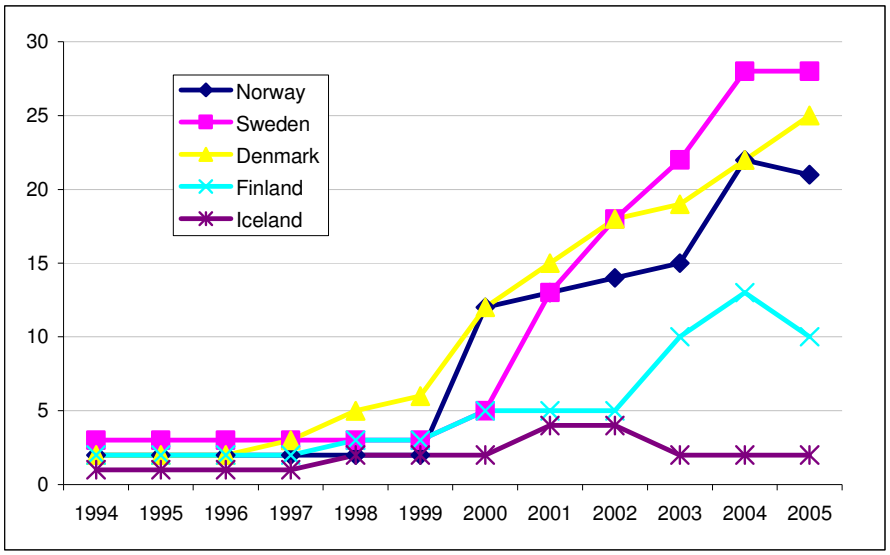


Figure 8 Change in the number of operators per country.

The figure above provide an overview of the total number of operators (MNO, MVNO and SP) that offer national services in the Nordic mobile markets. There has been a steady increase in the number of operators after the first SP agreements were concluded. Since 2004 there has been a drop in the number of operators and a consolidation in the markets. In several of the countries, the largest SPs/MVNOs have been bought up by MNOs, and in Denmark and in Iceland, two MNOs have merged. One independent SP was in operation in Iceland 2001-2002 which departured following the merger in 2002 .

The figure below shows the changes in market concentration in the mobile markets based on the Herfindahl-Hirschmann Index (HHI[16]). This index may provide an indication of the development of competition in the mobile markets. It is common to use 0.18 as the threshold for what can be called "effective competition". The figure shows that the countries that have the most MNOs and thus the keenest infrastructure competition have the lowest market concentration.

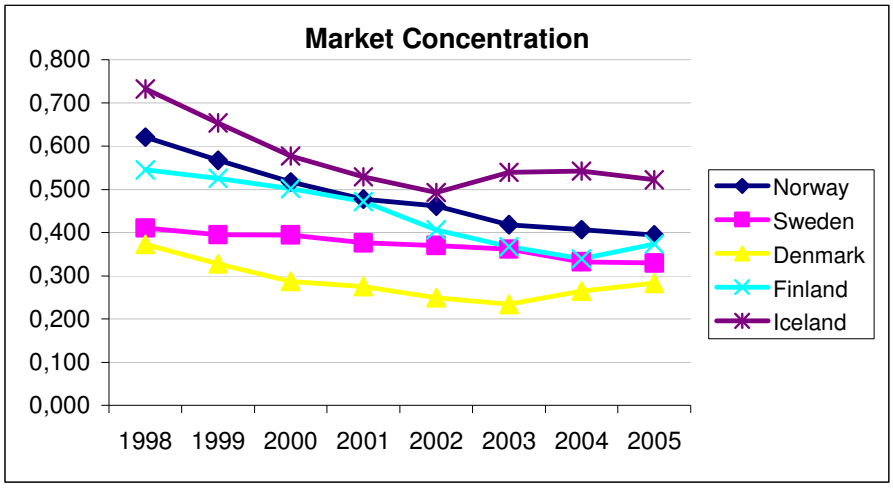


Figure 9 Market concentration[17].

Denmark has the lowest concentration according to the HHI. Denmark has had four MNOs since 1998, and since 2000 an obligation for MNOs to grant requests for SP/MVNO access. This access has not been subject to price controls. In Denmark there is competition in both the retail and wholesale markets. This may indicate that four nationwide mobile networks provide the basis for functioning competition.

Sweden has had three nationwide mobile networks since 1992. Up until 2002, the mobile market could be characterised as an oligopolistic market. Even if there was regulation of access to mobile network in Sweden, it had little effect without corresponding price controls. It was not until 2003, after Djuice concluded an MVNO agreement with Tele2 and Hi3G entered the market as a UMTS MNO, that the mobile market began a trend towards more

[16] The HHI is defined as the sum of the squares of the market shares of the operators in a market. With numerous operators with equal market shares, the index is low; with an absolute monopoly, it is high. In calculating the HHI each operator's market share is used. In this instance, each MNO's market share and an aggregate market share for SPs have been used.

[17] Figures for acquired SPs/MVNOs are included in the market shares of the MNOs that have acquired the SPs/MVNOs, with the exception of Telia's purchase of Chess , which does not go into effect until 2006.

intense price competition in the retail market. Experience from Sweden may indicate that three nationwide MNOs are not necessarily sufficient for attaining functioning competition.

In Finland there were two nationwide mobile networks up until 2000, and the market could be characterised as a duopoly. All agreements concerning access to mobile networks have been negotiated on a commercial basis. In 2000 a third MNO entered the market, which has resulted in increased competition in the retail and wholesale markets. This may indicate that the entry of a well-capitalised MNO into a mature market ("late entry") may be of considerable importance for the development of competition in that market. The new MNO needs to compete on price to build an adequate customer base, which may result in price pressure in both the wholesale and retail markets.

If one compares developments in the mobile markets in Sweden and Finland, it may appear that sustainable competition may exist in a market with three or four network operators. Late entry of a well-capitalised MNO, which in a mature market needs to compete on price to win market share ("late entry"), seems to matter more for the development of competition than whether there are three or four network operators.

Norway has just two nationwide mobile operators, and NPT has found that Telenor has significant market power in Market 15 and that despite many years' access regulation and price controls there is no effective competition in this market. In Iceland there are two nationwide mobile networks[18], and competition problems have been identified in this market.

Even though it appears that three or four nationwide mobile networks may form the basis for sustainable competition in the mobile market, due *inter alia* to geography and population density it may not be possible, from an economic point of view, to establish more nationwide mobile networks. Access to mobile networks will therefore be key.

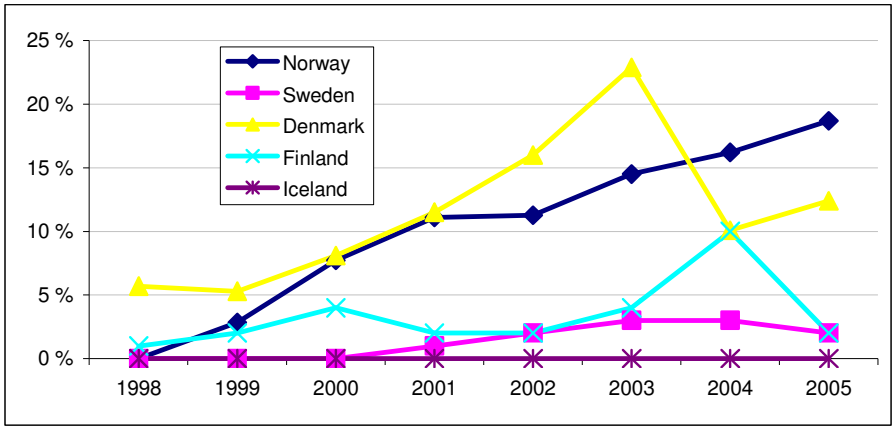


Figure 10 Changes in market share measured in the number of customers of SPs and MVNOs in the aggregate[19].

The figure above shows changes in the aggregate market share for SPs/MVNOs. MVNOs/SPs have had the highest total market share in Denmark, but this has dropped dramatically since

[18] The former incumbent mobile network reaches 98% of the population in Iceland and other national mobile network reaches 83% where 98% density is reached with national roaming

[19] Market share for independent SPs/MVNOs. DK: Telmore and CBB calls not included from 2004, FIN: Saunalahti and ACN not included from 2005/2004. Norway: Chess will not be included from 2006

2003 owing to consolidation in the market. The agreements are based on commercial negotiations and not regulation.

With four MNOs, it appears that competition functions at the wholesale level as well. MVNOs/SPs have been very important for the emergence of competition in the retail market in Denmark and Finland. The entry of the third MNO in the finnish market resulted in keener competition at the wholesale level. The agreements are based on commercial terms. It may appear that the MNOs in Denmark and Finland have an incentive to conclude agreements for access to mobile networks in order to boost traffic on their own networks, and this has resulted in competition at the wholesale level.

Despite the fact that Sweden has had SPs in the mobile market for several years, this has had little impact on competition in the retail market. There is still no sustainable competition at the wholesale level. In the absence of price controls, PTS has not been able to ensure SPs competitive terms. The entry of Hi3G has so far not resulted in keener competition at the wholesale level, which may be because Hi3G has not had a nationwide mobile network until now.

The market share of SPs/MVNOs is highest in Norway. Access for SPs has been regulated in Norway, and NPT has issued a decision (in 2002) ordering a price reduction for SP access. SPs/MVNOs have resulted in stiffer competition in the retail market.

Access to MVNOs/SPs may appear to have a positive impact on developments in the competitive situation in the retail market. However, the experience in Sweden shows that in the absence of competition at the wholesale level, price controls may also be needed.

Mobile termination/Market 16

The core problem in the mobile termination market is that there is no substitute for terminating a call on a specific network. One could argue that if this market were characterised by effective competition, the possibility for an operator to charge higher termination tariffs than its competitors (for a homogeneous product like voice call termination) would lead to a significant drop in volume and ultimately a loss of revenue.

SMP and remedies

The figure below illustrates the number of operators active in each country under the old regulatory framework (OF) and new regulatory framework (NF), whether they were deemed to have SMP in the market for mobile termination and the remedies that were applicable.

In all these countries it is evident that fewer operators were deemed to have SMP under the old framework (10) than under the new framework (21 = all). This might be due to late entry for some operators, i.e., they were not active under the old framework. However, the most likely explanation for this fact is that the definition of the market for mobile voice call termination under the new framework differs so that each operator controlling the access to its end customers is regarded to have a market share of 100 % (i.e., a monopoly) on its own network. All these countries have, under the new framework, designated all operators as having SMP except IMC Iceland. This conclusion was based on the firm's limited operations in Iceland, its very small number of customers, low traffic volume, price levels, lack of economies of scale and scope, as well as countervailing buying power by its wholesale customers.

Country	OPERATOR (MNO/MVNO)	SMP		Year of SMP		Interconnection		Non-discrimination		Transparency		Price Controls		Accounting Separation	
		OF	NF	OF	NF	OF	NF	OF	NF	OF	NF	OF	NF	OF	NF
SWE	TeliaSonera	X	X	98	04	X	X	X	X	X	X	H	L	X	X
	Tele2		X		04	X	X		X		X		L		X
	Vodafone		X		04	X	X		X		X		L		X
	Hi3G		X		04		X		X		X		FR		X
	Djuice[20] (+)		X		04		X		X		X		FR		X
NO	Telenor	X	X	98	05	X	X	X	X	X	X	H	PC	X	X
	NetCom	X	X	03	05	X	X	X	X	X	X	H	PC	X	X
	Tele2 (+)		X		05		X		X		X				
	Teletopia		X		05		X		X		X				
DK	TDC	X	X	00	06	X	X	X	X	X	X		B	X	
	Sonofon	X	X	00	06	X	X	X	X	X	X		B	X	
	TeliaSonera		X		06		X		X		X		B		
	Hi3G		X		06		X		X		X				
	Tele2 (+)		X		06		X		X		X				
FIN	Sonera	X	X	97	04	X	X	X	X	X	X	CC/H	CC/H	X	X
	Elisa	X	X	97	04	X	X	X	X	X	X	CC/H	CC/H	X	X
	Finnet		X		05*		X		X		X		CC/H		X
	Ålands MT	X	X	97	04	X	X	X	X	X	X	CC/H		X	
ICE	Síminn	X	X	99	06	X	X	X	X		X	H	B	X	X
	Og Vodafone	X	X	03	06	X	X	X	X		X	H	B		X
	IMC Iceland														

Figur 11 Regulation of mobiletermination

***(+)** = MVNO; **OF** = Old framework; **NF** = New framework; **H** = Cost orientation based on historic cost; **L** = Cost orientation based on LRIC; **FR** = Fair & reasonable price; **PC** = Price cap; **B** = Benchmark / Best practice; **CC** = Cost orientation based on current cost*

[20] Telenor announced an acquisition of Vodafone Sweden late 2005 and have started to migrate Djuice (Telenor brand) customers to their own network

Under the old framework, similar remedies were applied to the SMP operators in each country (symmetric regulation). However, there were some discrepancies between the countries. For example, no price controls were imposed in Denmark, and in Finland only the charges for mobile-to-mobile traffic were regulated, and not traffic from fixed to mobile. Finland and Sweden have had "soft regulation" for termination charges for non-SMP operators. Even though a symmetric *regulation* was applied, it did not mean that symmetric *prices* were applied (e.g., in Norway and Sweden).

Under the new framework, Norway and Denmark have chosen not to subject all SMP operators to price controls (asymmetric regulation), whereas Sweden and Iceland have imposed similar remedies on all SMP operators (cost orientation and fair and reasonable tariffs). The reason for not imposing price controls in these countries is basically that new entrants are small and often very dependent on access to national roaming from established operators, for instance. Under the new framework, there is a greater possibility for each country to impose asymmetric regulation, since under the old regulatory framework symmetric regulation was in most cases directly mandated by national legislation.

As can be seen from the table above, a number of different price control methodologies are employed in the various countries.

Sweden: Under the new framework, all operators are subject to price controls; however only the early established operators have an obligation to apply cost-orientated tariffs according to LRIC. Others have an obligation to apply a fair and reasonable tariff. PTS did not include specified tariffs in its SMP decisions, i.e., the actual levels to be applied are left for the regulatory authority to decide.

Norway: Under the new framework only Telenor and NetCom are subject to price controls, according to a price cap method at levels set by NPT.

Denmark: Under the new framework, TDC, Sonofon and TeliaSonera are subject to price controls according to a best-practice pricing method. Hi3G and Tele2 have no such obligation. NITA determined the price level for mobile termination rates in its SMP decisions.

Finland: Under the new framework all operators except Ålands Mobiltelefon are subject to price controls[21], according to a combined current-and-historic-cost-based model. FICORA did not include specified tariffs in its SMP decisions, i.e., the actual levels to be applied are determined on a case by case basis.

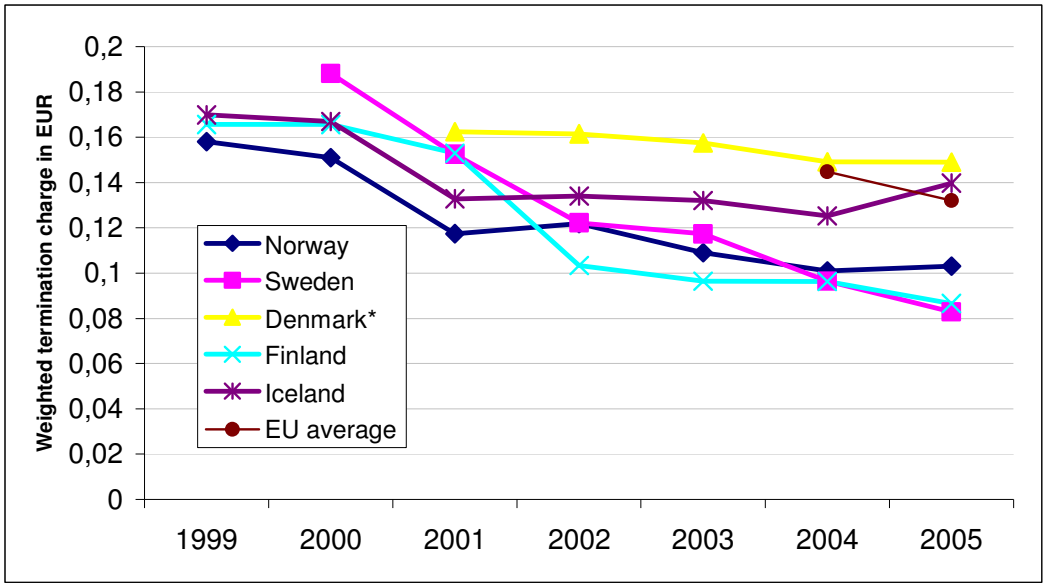
Iceland: Under the new framework both Síminn and Og Vodafone are to be subject to price controls according to a benchmark method. PTA determined the price level for mobile termination charges.

Actions

Under the old framework, the various NRAs intervened and made decisions concerning charges for terminating traffic, except for Denmark, which did not have price controls under the old framework. This has led to a significant decrease in charges over the years. Thus, with the exception of Iceland and Denmark, in 2005 all Nordic countries were below the EU average tariff for mobile termination.

[21] Finnet's SMP status and remedies came into force on 28 October 2005 when The Finnish Supreme Administrative Court handed down its final decision. FICORA has given new decision on Market 16 on 22 June 2006.

The figure below shows changes in the average termination charge (in euro) in the Nordic countries, weighted with regard to operator market share.



Figur 12 Weighted termination charges in euro[22].

The termination charge for Finland shows the regulated termination charge, i.e., the average termination charge for Finland does not include the charge from fixed to mobile networks (which does not go via carrier selection). In that case, it would have resulted in a higher average for mobile termination charge for Finland.

Termination charges have declined or stabilised in recent years. The increase in the termination charge for Iceland since 2004 is primarily a result of changes in the exchange rate. The termination charge in Denmark is over 50 % higher than the charges in Norway, Sweden and Finland, which is because termination charges have not been regulated in Denmark.

Appeals process

The appeal processes have played an important role in the effectiveness of regulation in all Nordic countries, and appeals can take several years. In some cases, the lengthy appeal process has led to regulatory uncertainty among the operators. Appealing decisions and the long time for hearing appeals have proved to be one of the the biggest problems related to the introduction of the new regulation. The majority of the decisions in the mobile markets are appealed.

Denmark and Iceland have appointed dedicated appeals boards. In Norway, the Ministry of Transport and Communications is the appeal body. In Finland and Sweden the administrative court is the appeals body: in Sweden there are up to three instances for hearing appeals, whereas Finland has a single-instance process.

Recent cases from Finland and Sweden, where appeals have taken up to three to five years, underscore the fact that the current systems create a high degree of regulatory uncertainty.

[22] ***The figures regarding Denmark is based on a three minute call in peak time. In 2006 the termination price has fallen to about 0,11 euro. The EU average is from July 2004/ 2005.***

3 Denmark

3.1 The mobile market in general

Operator	Year of launch	Technology	Market share (subscribers)	Revenue
TDC Mobil	1982	NMT, GSM 900/1800, UMTS	41.3 %[23]	N/A
Sonofon	1992	GSM 900/1800, UMTS	23.5 %[24]	N/A
TeliaSonera Danmark	1998 (Orange)	GSM 900/1800, UMTS	21.0 %	N/A
Hi3G Denmark	2003	UMTS	2.1 %	N/A
Tele2	2000	MVNO	4,0 %	N/A
SPs	-	-	8,4 %	N/A

In 2005 the total market was DKK 14,527 billion[25], and the total number of subscriptions was 5,455,520.

In Denmark four to five MNOs have been operating in the market since 1998. In addition to these companies, there is also an MVNO (2000). The mobile market in Denmark is characterized by a large number of SPs. Consolidation has taken place, most notable being the merger of the two MNOs Telia and Orange and the acquisition of the two largest SPs by MNOs.

There have not been price controls in the mobile market in Denmark, but TDC and Sonofon have until recently had obligations to give access to their mobile networks for SPs to cost based prices.

The large number of networks contributed to the fact that independent service providers were offered access on competitive terms.Price basket comparisons show that the Danish price level is the lowest in the Nordic countries. Compared with the other Nordic countries, the Danish mobile market is less concentrated.

The competition problems in the mobile market in Denmark involve *inter alia* the limited number of licences for operating mobile networks. Licences were awarded to four providers of GSM mobile telephony and four providers of 3G mobile telephony. Until the summer of 2004, all the available licences for mobile telephony were divided among five operators. With the merger of TeliaSonera and Orange, the number of operators fell to four. The merger also meant that one 3G licence became available. The licence was won by SONOFON, which was the only bidder at the auction. In the coming period it is also expected that one GSM licence and one DCS licence will be made available. These licences may possibly be acquired by one or more new operators, so that in principle the number of operators may rise to five or six.

In Denmark there are subscriptions as well as pre-paid calling cards. Around one subscription in five is based on a card where the user pays in advance for airtime (pre-paid), whereas the

[23] Including market share of 10.2 % for SP Telmore, a 100 % owned subsidiary.

[24] Including market share of 4.2 % for SP CBB Mobil, a 100 % owned subsidiary.

[25] Including numbers for mobile- and paging services

remainder are either post-paid or something in-between, where the user pays in advance, but where minimum usage is required and it is possible to pay for usage afterward for a period. (Telmore is the largest of these operators, with a market share of about 10%).

Danish telecommunication legislation previously regulated subscription lock-ins only, including indirect lock-ins. The provision regarding subscription lock-ins means that a telecoms operator may lock a consumer into an agreement for a service for six months at the most. In summer 2005 this provision was supplemented by a provision on maximum lock-in periods for using SIM locks or the like in mobile telephones. This provision entails that when selling or leasing mobile telephones, a telecoms operator or dealer must allow the telephone to be unlocked after a maximum of six months calculated from the beginning of the subscription period, enabling it then to be used with another mobile operator.

In 2001, end users were allowed to keep their subscriber numbers when switching operators in the area of public mobile communication. Since then, number portability has been very popular in Denmark. Thus, in 2005, over 400,000 subscriber numbers were ported in the mobile area. The charge for porting is not regulated and depends on the type of transaction selected. For porting individual numbers, the receiving mobile operator pays DKK 72.00 per number. The same charge also pertains to fixed network operators. The operator releasing the number may not charge payment from the end user**.**

3.2 Access to mobile networks / Market 15

Previously, the Danish mobile market did not have any form of price controls.

As SMP undertakings, TDC and SONOFON have been subject to an obligation to meet all reasonable requests for concluding or amending interconnection agreements in the mobile market, including agreements for service provider access and agreements to exchange traffic.

All operators of mobile communication networks have been obliged to meet all reasonable requests for concluding or amending national roaming agreements.

In February 2006, the National IT and Telecom Agency (NITA) issued its final decisions in Market 15. The decision will enter into force on 1 September 2006. The mobile operator Hi3G has appealed the decision. The appeal is currently being heard by the Telecommunications Complaints Board.

The conclusion of the analysis: Since there is effective competition in the market, no undertaking in the market is designated as having SMP. Obligations imposed until now will be removed. For example, TDC and SONOFON are no longer obliged to provide access to SPs to their networks. Finally, no MNO is obliged to conclude NR agreements with other undertakings. Nonetheless, NR will still be possible, but the terms will be according to commercial negotiations between the companies.

3.3 Mobile termination / Market 16

In the period 2001-2005, the mobile termination area was generally characterised by an extremely modest fall in wholesale termination charges. In addition, there have been relatively small differences in price changes among undertakings in the individual termination markets. Seen relative to the more marked drop in mobile tariffs in the retail market, this clearly indicates a lack of price competition in mobile termination in Denmark.

As SMP operators, TDC and SONOFON are obliged to provide interconnection access in the area of mobile to all interested parties on terms and conditions pursuant to obligations.

- An obligation to meet all reasonable requests for concluding or amending agreements for interconnection in the mobile market, including agreements for service provider access and agreements on exchange of traffic.
- An obligation to provide access to interconnection on objective, transparent and non-discriminatory terms.
- An obligation to make all necessary information available to undertakings considering concluding agreements on exchanging traffic, including call termination on mobile networks.
- An obligation to set up internal "interconnection interfaces" for its own divisions', subsidiaries' and the like's purchase of interconnection services.
- An obligation to implement accounting separation of a number of specified business areas.
- An obligation to submit all interconnection agreements in the mobile area to the National IT and Telecom Agency, which is making the agreements available to the public.

Prior to the New Framework the mobile market in Denmark has not been subject to price controls. This is because the application of price controls requires the undertaking to have SMP in the fixed and mobile markets together. None of the mobile network operators have had this status.

In January 2006, the National IT and Telecom Agency (NITA) issued its final decisions in Market 16. The National IT and Telecom Agency's decisions have been appealed and are currently being heard by the Telecommunications Complaints Board.

The conclusion of the analysis: There is no effective competition in the undertakings' respective wholesale markets for termination of traffic on individual mobile networks. TDC, TeliaSonera, SONOFON, Tele2 and Hi3G are designated as undertakings with SMP in Market 16.

Market definition: Market 16 includes voice call termination on 2G as well 3G networks. SMS is not covered by the market definition.

The decisions impose on the undertakings obligations of non-discrimination, transparency, and reference offer as well as to enable other operators to deliver traffic on reasonable terms for termination on the network of the undertaking concerned. In addition, price controls are imposed on the three large undertakings in the market, TDC, TeliaSonera and SONOFON. According to the decision, the so-called mobile termination charge is to be gradually lowered over two years by about one-third. A comparison with comparable charges in Norway, Sweden and Finland has shown that Danish mobile operators charge excessive prices for relaying calls from other undertakings' customers to customers on their own networks. The current mobile termination charge of DKK 0.94-0.96 per minute will be reduced to DKK 0.84 in 2006, DKK 0.72 in 2007 and DKK 0.62 in 2008. In all, this is a price drop of around 35 per cent.

In the assessment of the National IT and Telecom Agency, Hi3G's and Tele2's pricing will be disciplined by the pricing of the other mobile operators, so that price controls on these two undertakings is unnecessary. Nevertheless, the Agency will follow developments at Hi3G and Tele2 and if necessary impose price controls on them as well.

3.4 Appeals process

A decision issued by the National IT and Telecom Agency may be appealed to the Telecommunications Complaints Board. The decisions of the Board cannot be brought before

another administrative authority, but they can be brought before the courts. Thus, decisions of the Board can be brought before the High Court no later than eight weeks after the decision has been notified to the appellant concerned. The Board has three months to reach a decision.

4 Finland

4.1 The mobile market in general

The total value of the Finnish mobile market in 2005 was EUR 2.1 billion. As of 31 December 2005 the total number of subscriptions was 5.2 million. The value of the Finnish mobile market rose until 2004; in 2005 operators' revenue streams were decreasing. The market continues to grow in terms of volume, which is due to the high level of substitution from fixed to mobile and falling mobile to mobile prices. Voice has migrated from the fixed to mobile networks faster than in many other countries. At the end of 2005, approximately 47 per cent of all persons aged 15 - 74 used a mobile phone exclusively.

All agreements concerning access to mobile networks have been made on a commercial basis. Terminating traffic from fixed to mobile networks has not been regulated in Finland. As of 1 March 2005, the fixed-to-mobile traffic originated by using prefix code or carrier pre-selection has fallen under regulation.

Operator	Year of launch	Technology	Market share (subscribers)	Revenue
TeliaSonera	1991	GSM 900/1800, UMTS	48 %	EUR 1,070 million
Elisa Oyj	1991	GSM 900/1800, UMTS	35 %	EUR 740 million
Finnet Verkot	2000	GSM 900/1800, UMTS	15 %	EUR 290 million
ÅMT	1994	GSM 900/1800, UMTS	0 %[26]	N.A.
SP/MVNO	1998		2 %	N.A.

In Finland there are currently three nationwide mobile network operators, plus Ålands Mobiltelefon (ÅMT) in the Åland Islands. The Finnish market was duopolistic and a rather mature market in terms of penetration when Finnet (the third MNO) set up operations in 2000.

The first independent SP began operations on Sonera's network in 1998. After 2000 the number of independent SPs and MVNOs also increased notably. The most important independent SPs and MVNOs, based on the number of customers, have been ACN (2003) and Saunalahti (2000), who operated in Sonera's network. At its peak ACN had approximately 250,000 - 300,000 subscriptions. ACN's operations in the Finnish market ceased in 2004. Its subscribers went over to TeliaSonera. Saunalahti was an SP on Sonera's network until 2004. Since then, Saunalahti changed its operations, becoming an MVNO (2004), which since then has also operated on Elisa's network. Elisa purchased Saunalahti in autumn 2005. The number of independent SPs and MVNOs and their market shares has recently fallen as the largest SPs and MVNOs have been acquired by MNOs.

The Finnish market has always been characterised by a relatively large percentage of post-paid subscriptions and a prohibition against handset subsidisation. Operators used mobile subscriptions to subsidise other products (for example digital cameras, DVD players etc.).

26 Local in the Åland Islands. ÅMT's share of Finland's mobile customers remained under 1 %, but in the Åland Islands the corresponding market share is over 55 %.

Usually consumers had to sign lock-in agreements in order to receive these products. Although the length of the lock-in agreement varies, it has usually been between 6 to 12 months. A change in the law that went into effect on 1 April 2006 permits lock-ins between handsets and subscriptions other than those that can be used on GSM networks only. As part of these lock-ins, an operator may oblige a consumer to sign a subscription agreement for a maximum of two years. Most of these offers also include a SIM-lock.

After the implementation of number portability in 2003, the market has been characterised by high churn rates. Operators introduced flat-rate and self-service subscriptions. The prohibition against handset subsidisation and the increasing prevalence of flat-rate subscriptions have led to comparable call charges.

In Finland number porting rates have been notably higher than in other nordic countries and Finland appears to be the only country where number portability has been the key to competition. Since 2003 consumers switching costs have been low; the prohibition of handset subsidisation has evidently reduced the number of lock-in agreements and made it easier for customers to switch operators. Operators have also implemented various practices to make the change of service provider as easy as possible. For example, a subscriber can change operators by SMS or on the Internet. The maximum time for the entire number porting process is five days. Compared to other Nordic countries the share of prepaid customers is particularly low in Finland. Prepaid subscriptions are generally more constrained with regard to number porting and a high percentage of prepaid subscriptions decreases the volume of ported numbers.

4.2 Access to mobile networks / Market 15

There has not been general access regulation in Finland. According to former legislation MNOs having SMP have however been obliged to offer all SPs operating in their network a possibility to open, control and switch of their customers subscriptions. While there has not been direct access regulation the state authorities have encouraged MNOs to conclude agreements with SPs. All contracts between operators have been made on a commercial basis. Both FICORA and the Finnish Competition Authority have investigated cases concerning access to mobile networks. Authorities have found no SMP or single or joint dominance in the access market.

2G MNOs are obliged to negotiate on national roaming with any operator that holds a 3G network licence. In practice this has not been applied. Because GSM operators hold all 3G licenses.

Under the old regulatory framework MNOs with SMP have been obliged to provide carrier selection even for international calls originating from a mobile telephone. The ability to choose a service provider for international calls has affected competition on the retail market for international calls. Under the old regulatory framework originating traffic from mobile networks has been subject to price regulation when a call is made to, for example, service numbers and national business numbers.

New regulatory framework: On 13 October 2004, FICORA issued a decision in which it did not designate any operator as having SMP in Market 15. The decision was based on the following factors: 1) SPs and MVNOs have successfully concluded agreements on a commercial basis with each of the three MNOs. 2) The MNOs have had incentives to sell capacity to SPs and MVNOs, and there was no capacity limitations . 3) SPs and MVNOs have had the ability to switch network operators, and at least the most important of them appeared to have considerable bargaining power vis-à-vis the MNOs.

Finnet appealed the decision. The appeal is being heard by the Supreme Administrative Court. The Supreme Administrative Court has made a petition for a prejudicial judgment from the European Court of Justice.

4.3 Mobile termination / Market 16

Old regulatory framework: In 1997,The Ministry of Transport and Communications issued a decision designating Sonera and Elisa as having SMP in the Finnish mobile market. This SMP status pertained to all mobile communication. Undertakings with SMP are obliged to meet all reasonable requests for interconnection and to ensure that interconnection charges are public, sufficiently specified and are reasonably proportional to the cost of producing the service. In addition, the undertakings with SMP are obliged to use a specific accounting system.

In Finland calls terminating from fixed networks to mobile networks have traditionally not been subject to price regulation. According to so called "segment pricing", the operator on the fixed network sets one charge for the call from the connection on the fixed network to the point of interconnection, and the mobile services operator defines a separate customer charge for the mobile portion of the call. The tariff that the mobile services operator charges was not included in the regulation. For incoming traffic, the pricing obligation of MNOs did not include communication from a fixed local network to a mobile network or services within that network.

The first decision regarding interconnection charges on mobile networks was issued in April 2001, when FICORA found that TeliaSonera's charges were not cost-oriented. The Helsinki Administrative Court (HAC) handed down a decision in 2002 upholding FICORA's decision. In 2004, the Supreme Administrative Court handed down a decision denying TeliaSonera's appeal. Following the decision of the Supreme Administrative Court, FICORA encouraged the operators to negotiate, and they agreed on the size of these charges in May 2005. Operators found agreements on these charges in May 2005.

New regulatory framework: FICORA issued decisions designating all mobile network operators in Finland (Elisa Abp, Finnet Verkot Oy and Sonera Mobile Networks Oy as well as Ålands Mobiltelefon Ab in the Åland Islands) as having SMP in Market 16 on 6 February 2004[27] and revised the decisions on 22 June 2006. SMP was found for all the three nationally operating MNOs. The main criteria for SMP were: high market share, lack of countervailing buying power, control over the network and horizontal integration and lack of actual and potential competition.

In its SMP decisions FICORA emphasised that regulation ought to be symmetric in terms of SMP positions designated and remedies imposed for three nationally operating MNOs. The following obligations were imposed on Sonera Mobile Networks, Elisa and Finnet:

- An interconnection obligation,
- An obligation to publish delivery terms and tariff information,
- Obligations concerning pricing and other terms (obligation to set cost-oriented and non-discriminatory charges),

[27] All operators appealed FICORA's decisions on SMP to the Supreme Administrative Court. In a ruling dated 28 October 2005, the Supreme Administrative Court overturned FICORA's decisions. Although the Court approved FICORA's market definition, it considered that the decisions did not adequately and in sufficient detail analyse all the factors that should be taken into account when determining whether each of the MNOs has SMP. The Court ruled that such a determination should take into account not only market share but also several other factors provided as examples in paragraph 78 of the Commission Guidelines for market analyses and the determination of significant

- An obligation to use cost-accounting procedures,
- An obligation of accounting separation.

The telecommunications operators are responsible for ensuring that the regulated products are priced in accordance with the law. FICORA is not determining tariffs in advance, but the operators set their own charges. The Agency will monitor on a case-by-case basis whether the charges are cost-oriented. FICORA will evaluate this pricing on the basis of the cost data the operators submit. The tariffs' cost-orientation will be judged with the aid of the fully allocated cost (FAC) model. Capital costs will primarily be determined using the current cost accounting (CCA) method and operating costs using the historic cost accounting (HCA) method. On the network, capital employed is to be calculated on the basis of current costs. FICORA is now developing a method for determining tariffs' cost-orientation intended to be as transparent as possible for all parties. Locally operating Ålands Mobiltelefon is not subject to cost-orientation, cost accounting and accounting separation obligations.

Legislation concerning calls terminating from fixed to mobile changed from 1 March 2005. According to the amendment terminating traffic from fixed networks to mobile networks has to be priced separately, if the connection was dialled with a carrier selection code or carrier pre-selection. This means that the obligations concerning pricing of terminating traffic does pertain to all incoming traffic from a fixed network to a mobile network when the call is made by using carrier selection code or carrier pre-selection. By the end of 2005, nearly 50 % of calls from the fixed network to mobile telephones were made using carrier pre-selection. The termination charges for such calls are not regulated. If carrier selection code or carrier pre-selection is not used the mobile service operator continues to set the charge for the mobile portion of the call. In this case the charge is not covered by the regulation.

4.4 Appeals process

Decisions based on analyses done by FICORA on its own initiative may be appealed to an administrative court. After the Communications Market Act entered into force in 2003, FICORA's decisions on SMP and decisions on financial civil cases based on a request for action could be appealed directly to the Supreme Administrative Court. Previously the appeals process had two levels.

Hearing appeals brought before the Supreme Administrative Court takes about one to two years. If the appeal is first heard by a lower administrative court, the process takes a year to eighteen months longer.

5 Iceland

5.1 The mobile market in general

In 2005, total revenues from mobile operation in Iceland were approximately ISK 12.5 billion and had increased approximately 12 % from 2004 but the growth has been declining in recent years. As of 31 December 2005 the total number of subscriptions was 284,521 (GSM) and 19,480 (NMT).

Operator	Year of launch	Technology	Market share (subscribers)	Revenue
Síminn	1986	NMT 450	100 %	ISK 8.1 billion
	1994	GSM 900/1800	65 %	
Og Vodafone	1998[28]	GSM 900/1800	35 %	ISK 4.4 billion
IMC Island	2002	GSM 1800	0 %	ISK 0.0 billion

In Iceland there are only two MNOs that offer national GSM services. From 2002 until today there has been a duopoly market structure in Iceland with stable market shares. Retail prices are the highest of the Nordic countries, and Iceland is the only Nordic country to witness an increase in charges in recent years. The market has remained fairly concentrated. Iceland is the last Nordic country to still operate NMT (Síminn plans to stop offering NMT 450 services by the end of 2007).

Og fjarskipti Ltd., later named Og Vodafone, was founded in 2003 with the merger of two MNOs (Íslandssími and Tal). The company also has a roaming agreement with Síminn.

IMC Iceland Ltd. has offered local mobile services in Akureyri since July 2002. The company's operations are based primarily on its international roaming service for foreign users. IMC has concluded an international roaming agreement with Og Vodafone to offer its customers services throughout most of the country.

New potential entrants face high barriers to entry, and no MVNO has yet succeeded in operating in the Iceland mobile market. Íslandssimi concluded an SP agreement with Tæknival Ltd. under the BT GSM brand in 2001. The company exited the market following the merger of Tal and Islandssími in 2002. On 1 April 2006 Og Vodafone launched a subsidiary named Sko to operate as an SP in Iceland.

Both pre-paid and post-paid subscriptions are available in Iceland. Both offer their customers benefits in the form of free on-net calls and text messages to specific numbers or a certain amount of free minutes and text messages on their own network. No cost is associated with starting a new subscription in Iceland, and no lock-in period is required. Síminn has recently stopped subsidising GSM phones in exchange for a lock-in period. Now no operators in Iceland use lock-in periods.

Number portability for GSM was implemented in Iceland on 1 October 2004. The overall figures for number porting in 2005 amounted to approximately 6,3 % of all Icelandic GSM subscriptions (pre paid and post paid).

5.2 Access to mobile networks / Market 15

Síminn (1999) and Og Vodafone (2003) were designated as having SMP in the market for mobile networks and services.

NR is the only type of wholesale service offered in Iceland. A decision dated 10 November 2003 ordered Síminn to offer NR to Og Vodafone in selected areas where according to PTA calculations it is not considered economically efficient for Og Vodafone to roll out new networks. The parties concluded on the price of NR through direct negotiations.

[28] Reflects launch of services of Tal which merged with Islandssími in 2002 and then restructured as Og fjarskipti in 2003. Later Og fjarskipti concluded an agreement with the Vodafone group to use their brand name Og Vodafone

The market analysis for Market 15 has been submitted to ESA on 28th of August 2006.

The market analysis concluded that Síminn has single dominance in Market 15. The main market failure in Market 15 is the lack of access for SPs and MVNOs to MNO's mobile networks and insufficient competition among existing operators.

The remedies that PTA intends to impose on Síminn for access and call origination on the GSM and NMT 450 networks are as follows:

- The operator shall meet all reasonable requests for wholesale access (SP, MVNO or NR) to its GSM network and for the resale of NMT services.
- The operator shall guarantee non-discrimination
- Síminn's access charges shall be transparent, and the company is obliged to publish reference offers for access.
- Síminn is obliged to implement accounting separation.
- PTA shall continue to impose price controls for national roaming and includes price controls for MVNO and SP access.

GSM networks: Access charges for subscription resale and VPNs shall be based on retail-minus, with the difference between the retail and wholesale price at least 25% for subscription resale and 35% for VPNs. National roaming charges shall be based on historic cost accounting, if the parties cannot agree on a price. If these remedies do not succeed as planned, PTA intends to order Síminn to apply the LRIC model or other appropriate cost accounting model to determine access charges.

NMT networks: Access charges for subscription resale shall be based on retail-minus, with the difference between retail and wholesale charges at least 20%.

5.3 Mobile termination / Market 16

Síminn was designated as having SMP in the interconnection market in 1999 and Og Vodafone in 2003. The following obligations shall be imposed on MNOs with SMP:

- To meet all reasonable requests for access to points of interconnection, including points of interconnection other than those offered to the majority of users.
- To guarantee non-discrimination with respect to the interconnection that they offer and provide companies that are considering interconnection access with all necessary information regarding both interconnection and the technological requirements.
- For operators' interconnection charges to be transparent and based on the cost of network establishment and operation, as well as provide a reasonable return on capital employed on the basis of the cost accounting system to be implemented.

In July 1998, the MT charges between Tal and Síminn were the same. In March 2000 Tal and Síminn reduced their charges voluntarily by the same amount and again in January 2001 maintaining the same MT charge between Síminn, Tal and Íslandssími until December 2001 when Íslandssími raised its charges and then again in March 2002. Tal had already raised its charges in January 2002. However, Síminn voluntarily reduced its price in late 2001 and then again in response to a PTA ruling dated 1 June 2003, when PTA ordered a 15% reduction of Síminn's termination charge based on a cost analysis. At the same time no actions were taken against Og Vodafone's MT charge, based on PTA historic cost accounting analysis. In the end of 2005 Og Vodafone's MT charge was approximately 36% higher than Síminn's.

The market analysis for Market 16 was submitted to ESA on 2 June 2006.

PTA has defined the following markets in its market analysis document for Market 16:

- all voice call termination on Síminn's GSM mobile network;

- all voice call termination on Síminn's NMT mobile network;
- all voice call termination on Og Vodafone's GSM mobile network.

Both Síminn and Og Vodafone have SMP in Market 16. PTA intends to impose on Síminn and Og Vodafone the following obligations:

- To provide access to voice call termination
- Transparency
- Non-discrimination
- Accounting separation
- Price controls. These are to be based initially on a price comparison, where the lowest charges in comparable markets are used as a criterion. PTA aims at adopting an LRIC cost accounting model within two years.

PTA intends to impose the following obligations on Síminn regarding termination on that undertaking's NMT network:

- To provide access to voice call termination
- Non-discrimination
- The obligation not to raise current prices for voice call termination on the NMT network.

5.4 Appeals process

The Minister of Communications nominates three persons to serve as the appeals body in Iceland. The appeals body has eight weeks to issue a final decision on operators' appeals of a previous PTA decision.

6 Norway

6.1 The mobile market in general

In 2005 the total mobile market was NOK 13.7 billion. Although revenue continues to grow, the rate of growth is now falling. As of 31 December 2005 the total number of subscriptions was 4.9 million. Up to and including 2004, average revenue per user (ARPU) rose in Norway. During 2005, ARPU fell by around 2 per cent.

Operator	Year of launch	Technology	Market share (subscribers)	Revenue
Telenor	1994	GSM 900/1800, UMTS	57.4 %	NOK 7.45 billion
NetCom	1993	GSM 900/1800, UMTS	23.5 %	NOK 3.79 billion
Teletopia	2003	GSM 1800	< 0.1 %	N.A.
Tele2	2002	MVNO	6.1 %	NOK 0.82 billion
SPs	2000-		12.9 %	NOK 1.65 billion

Since 1993 there have been two nationwide mobile networks in Norway. At the network level, Telenor Mobil has approximately 70 % market share and NetCom approximately 30 %. Since 1998, several operators have been awarded licences to build mobile networks in the GSM 900/1800 and UMTS bands. Teletopia has rolled out a GSM network with coverage limited to the Oslo area and has concluded an NR agreement with Telenor. Network Norway has a

licence for GSM 900 and Hi3G for UMTS. So far these two undertakings have not built mobile networks. Nordisk Mobiltelefon is currently rolling out its CDMA 450 network.

The first SP agreement was concluded in 1999 between Telenor and Sense, and more SPs quickly entered the market. NPT's decision (2002) ordering a reduction in wholesale charges for service provider access resulted in a further increase in the number of SPs. Today there are just under twenty independent service providers in the Norwegian mobile market. The largest SP (Chess/Sense) was acquired by TeliaSonera in 2005.

In 2002 the first MVNO agreement was concluded between Tele2 and Telenor, based on commercial terms. At the end of 2003, Tele2 launched services based on the MVNO agreement. TDC and Ventelo signed MVNO agreements with Telenor in 2005.

Since 1998, Norway has had technology-neutral regulation, according to which access obligations and obligations of cost-oriented charges were imposed on operators with significant market power in the mobile market just as in the fixed network market. Norway was the only Nordic country with price controls on access to the mobile network.

The price trend provides some indication that there have been periods of relatively high intensity of competition between operators in the retail market. One chief reason for this is that a relatively large number of operators with access to Telenor's and NetCom's mobile networks (SPs and MVNOs) offer services in the retail market and have led the way in pushing retail prices down. In recent years neither Telenor nor NetCom have been price leaders. Despite falling retail prices the general price level is high compared with Denmark, Sweden and Finland.

The share of pre-paid subscriptions in Norway peaked in 1999 (45 per cent), and fell to 37 per cent in 2005. Several undertakings also offer pre-paid low-price subscriptions where airtime is topped up via the Internet and not by using traditional pre-paid cards. Traditionally it has been common to sell mobile subscriptions bundled with handsets, subsidising the handsets in exchange for a lock-in period. Recently, operators that sell subscriptions only have entered the market, but handsets are still the major market driver. The consumer affairs authorities have issued a decision limiting the lock-in period for consumers to a maximum of 12 months.

Number portability for mobile subscriptions was introduced in Norway on 1 November 2001. The regulations require that it take no more than 5-7 working days from ordering to porting and that the actual porting do not involve downtime. Several providers have jointly established a company (NRDN) that is the central database for number porting in Norway. In May 2006, 46,520 mobile numbers were ported to another operator.

6.2 Access to mobile networks / Market 15

Since 1998, Telenor and NetCom had SMP in the market for GSM mobile telephony. This meant that both undertakings were obliged to meet all reasonable requests for access to the public mobile communications network. They were obliged to offer access at cost-oriented prices and to prepare and publish a reference offer.

National roaming: There has been a general obligation to provide access to NR where an MNO does not have its own comparable geographical coverage. The first licence that did not require the rollout of a nationwide network, thus entitling the holder to national roaming was awarded in 1998. Telenor and Teletopia concluded an agreement on national roaming in 2004.

Access to MVNOs: In 1998, NPT issued a decision ordering Telenor to conclude an MVNO agreement with Sense. The decision was appealed by Telenor, and the Ministry of Transport and Communications suspended the decision. Owing to Sense's bankruptcy, the appeals case was dropped. In 1999, the Storting decided that there should be no obligation to provide

access to MVNOs. In 2003 the Storting reconsidered and decided that access to MVNOs should be provided. This was not implemented until the introduction of the Electronic Communications Act in 2003. In 2002 Tele2 and Telenor negotiated a mutual MVNO agreement on commercial terms. Telenor subsequently signed MVNO agreements with TDC and Ventelo in 2005.

Service Providers: An outcome of the Sense MVNO case and the way it was dealt with politically was Telenor's launch in 1999 of a reference offer to service providers, with NetCom following suit in 2000. On 7 October 2002, NPT issued a decision ordering Telenor to reduce its charges to SPs by at least 25 %. This decision also limited Telenor's ability to charge for moving customers off Telenor's network and the length of lock-in periods. The decision increased SPs' margins and is assumed to have been crucial for SPs' ability to compete in the retail market.

On 23 January 2006, the Norwegian Post and Telecommunications Authority issued a decision on Market 15. NPT found that there is no effective competition in Market 15 in Norway and that Telenor has SMP in this market. Telenor appealed the decision. Although the appeal is not settled, the decision has entered into force.

NPT identified a number of potential and actual competition problems in the market. It would be very expensive to duplicate Telenor Mobil's and NetCom's networks. Significant fixed costs for rolling out mobile networks together with a relatively small demand due to low population density and few inhabitants are likely to make their economies of scale substantial. In Norway there is available spectrum for both GSM 1800 and UMTS. The limited interest shown at the last auctions of GSM and UTMS frequencies, along with the fact that two of the four UMTS licences that were offered in 2000 have been returned, may also indicate that substantial entry barriers exist at the network level in the mobile communications market. Telenor Mobil's very high market share on the network level and strong position in the retail market, the relatively high entry barriers at the network level and lack of competition for forms of access other than SPs, provide strong indications that there is no effective competition between the existing providers in the market.

The market is covered by Principle 3 in NPT's remedies document, i.e., NPT will work to facilitate long-term infrastructure-based competition.

- A general access obligation has been imposed on Telenor whereby it must meet all reasonable requests for access to and call origination on its mobile network. Requests for co-location, MVNO access and NR will normally be regarded as being reasonable.
- Telenor must prepare cost accounts for national roaming.
- Telenor must implement accounting separation between its network operations and its internal service provider operations for its mobile business in Norway.
- Telenor must prepare reference offers for NR, co-location and MVNO access.
- Telenor has been ordered not to discriminate between internal and external operations and between external operators in respect of price and other terms.
- Co-location and NR must be provided at cost-oriented prices.

Access regulations and price controls on access for service providers have been lifted. NetCom no longer has SMP status and is no longer being regulated in this market.

6.3 Mobile termination / Market 16

In the mobile area there has been a general obligation to meet reasonable requests for interconnection. Telenor Mobil has had SMP since 1998 and NetCom since 2003[29]. SMP operators have been obliged to meet all reasonable requests for interconnection at cost-oriented prices in addition to implementing a cost accounting system and publishing a reference offer for interconnection.

Since 1996 there has been a substantial reduction in interconnection charges. The initial price reduction was likely because the operators made use of opportunities for arbitrage owing to the differences in termination charges on mobile networks between traffic from abroad and from Norway by rerouting mobile traffic via foreign countries (refiling). In recent years, price reductions have been driven by regulation. In May 2001, NPT issued a decision ordering Telenor to reduce its charges. NetCom did not lower its termination charges accordingly. This meant that the difference between Telenor Mobil's and NetCom's termination charges widened. The operators also lowered their prices voluntarily, though under regulatory pressure, several times after the decision.

On 19 September 2005, the Norwegian Post and Telecommunications Authority issued a decision in Market 16 designating Telenor ASA, NetCom as, Tele2 Norge AS (MVNO) and Teletopia Mobile Communications AS as having SMP in Market 16. Telenor and NetCom appealed the decision. A final decision was made by the Ministry of Transport and Communications on 20 April 2006, which upheld NPT's decision.

The markets cover termination of voice calls on 2G and 3G networks, including virtual mobile networks. Termination of text messages is not covered by the markets.

All SMP operators must meet reasonable requests for interconnection in the form of termination, provide access on non-discriminatory terms, conclude negotiations on entering into or amending agreements on termination without undue delay and prepare a reference offer for interconnection.

In addition, the following is imposed on Telenor and NetCom:

- a price cap for termination calculated as a weighted average of various price elements (charge per call, peak and off-peak per-minute charges etc.). The basis for determining the price cap is regulatory accounts for the previous year. From 1 July 2006 until the implementation of an LRIC model or any new decision, Telenor's maximum per-minute termination charge is to be NOK 0.65 and NetCom's maximum per-minute termination charge is to be NOK 0.91.
- cost-oriented charges for interconnection to mobile networks (registration charge, primary system access etc.).
- implementing a cost accounting system for voice call termination on mobile networks.

During 2006, NPT will be developing an LRIC model for voice call termination on mobile networks. The model cannot be implemented for the regulation until after 1 January 2007.

[29] *Although a decision was also issued in March 1998 designating NetCom as having S*MP *in this market, it was overturned by the Ministry of Transport and Communications in November 1999. In 2001 NPT considered that NetCom did not have S*MP *in this market, whereas in 2003, NPT issued a decision designating NetCom as also having S*MP *in the overall national interconnection market.*

6.4 Appeals process

The Ministry of Transport and Communications is the appeals body and its decisions in appeals cases are final. Previously Norway had a two-level appeals process: the Norwegian Telecommunications Regulatory Authority Complaints and Advisory Board and the Ministry of Labour and Government Administration or the Ministry of Transport and Communications. All decisions may be brought before the ordinary courts. Until now, this avenue for appeal has not been followed.

Under the old regulations, the time spent from decision until the final ruling on an appeal varied from six to seventeen months, with an average of ten months.

Guidelines have been laid down for time limits on hearing appeals of decisions issued pursuant to the Electronic Communications Act. NPT must submit an appeal with its recommendation to the Ministry of Transport and Communications no later than two months after receiving that appeal. The Ministry must rule on the appeal no later than two months after NPT has submitted it.

7 Sweden

7.1 The mobile market in general

In 2005, the market for mobile telecommunication services saw revenue of SEK 16,613 billion. As of 31 December 2005 the total number of subscriptions was 9.1 million. In general, Swedish operators have had an operating profit margin of 40-50 %[30] from their mobile businesses in recent years.

Operator	Year of launch	Technology	Market share (subscribers)	Revenue
TeliaSonera	1992 (GSM)	NMT, GSM 900/1800, UMTS	43 %	N/A
Tele2	1992	GSM 900/1800, UMTS	35 %	N/A
Telenor/Vodafone	2003/1992	GSM 900/1800, UMTS	17 %	N/A
Hi3G	2003	UMTS	3 %	N/A
Spring Mobil / Swefour	2004	GSM 900/1800	-	N/A
SPs	1999-		2 %	N/A

Since 1992 there have been three GSM operators with national coverage in Sweden. In recent years there were three important entries into the Swedish market for mobile telecommunications services. The undertaking Hi3G Access AB (Hi3G) with the 3 brand obtained a UMTS licence at the end of 2000. Telenor Mobile Sverige AS, under the brand Djuice, concluded an agreement for MVNO access to Tele2's network. However, at the beginning of 2006, Telenor purchased Vodafone Sverige, which in practice meant that Djuice subscribers will migrate from Tele2's to Telenor's network. In 2002, Spring Mobil was awarded spectrum in the GSM band and established services in the business segment. In addition, in February 2005, following an auction, Nordisk Mobiltelefon A/S won a national licence for digital mobile telephony in the 450 MHz band. Orange has withdrawn from its

[30] based on TeliaSonera's and Tele2's official reports

venture in Sweden, its UMTS spectrum reverting to PTS. Tele2 and TeliaSonera have jointly formed a UMTS network company, SULAB, which now holds the original Tele2 licence.

In view of the fact that for a long time Sweden has had three major mobile operators with relatively stable market shares among them, PTS has repeatedly found that the market has been characterised by an oligopolistic structure. Despite the fact that Sweden has long had independent SPs, they have not had any major impact on the competitive situation. They have never achieved any significant market share, which they claim is due to the wholesale terms offered them, which have made it impossible for them to compete on an equal footing.

Since the entry of Djuice (2003) and Hi3G (2003), the mobile market has undergone a change towards clear price competition in the retail market. Despite the fact that these two operators have had a positive impact on developments, it must be said that their entry into the market has occurred at a time when the market was for all intents saturated. In general this has meant that they are forced to price themselves into the market to capture market share. It is therefore important to watch this situation as it develops.

In 2002 the number of pre-paid subscriptions passed the number of post-paid for the first time, representing at the end of 2003 57 % of all subscriptions. This share then fell to 51 % by the end of 2005.

Ordinarily operators have been choosing to subsidise handsets for customers with a lock-in period as a condition. This lock-in period could range from six to twenty-four months, with twelve to eighteen months as the most common. Later a number of operators have chosen to launch handsets at a discounted price “without a lock-in period”. However, these agreements have a minimum cancellation period that is normally three months.

Since 2001 it has been possible for consumers to switch operators while keeping their old mobile number. Even though the actual number of portings is relatively low, portings have risen sharply since their introduction and today a large percentage of consumers are aware of number portability. In 2005, 661,791 mobile numbers were ported, corresponding to about seven per cent of the total number of mobile subscriptions in Sweden.

7.2 Access to mobile networks / Market 15

Access to network capacity: A regulation from 2000 required an MNO to meet requests on access to network capacity on market terms for providing mobile telecommunications services insofar as the MNO had available capacity on its network. PTS did not have the authority to resolve disputes by stipulating the terms for access.

National roaming: With the awarding of UMTS licences, PTS regarded the introduction of NR obligations as necessary. At the same time, a rule was introduced to the effect that the right to NR lapses after the licensee requesting NR has held its licence for seven years at the most. Agreements for NR have been concluded between operators in the market. Although there have been disputes and difficulties regarding NR, PTS has not been authorised to set the terms for such access, i.e., the agreements were concluded on a commercial basis.

During the years regulation of this market has been in force, PTS has found that in practice it was relatively toothless with regard to making available network capacity and NR. This was in view of the fact that the terms the mobile operators were to apply had been defined as market terms, the outcome of which was that PTS could not step in and prescribe a specific level of access.

On 15 September 2005 PTS issued its final decision on Market 15. In its analysis of the market PTS found that there are certain problems where SPs and MVNOs have reported that they have been having difficulty signing agreements with the MNOs on competitive terms.

Since retail price competition intensified in 2004, certain SPs found that the wholesale prices they were charged in certain circumstances were higher than what the MNOs offered their own end customers, which is why in practice it was impossible for them to offer competitive terms to end customers.

Despite the fact that PTS identified historical problems, the authority saw that the existing network owners competed with one another and chose therefore at this juncture not to step in and regulate a market that shows incipient dynamism. PTS points out, however, that this development will be watched closely to ensure sustainable competition in the market.

7.3 Mobile termination / Market 16

Pursuant to the Telecommunications Act, there was a general interconnection obligation for mobile network operators. As the only MNO with SMP, TeliaSonera was obliged *inter alia* to have cost-oriented interconnection charges, publish its terms for interconnection, apply non-discriminatory terms, submit interconnection agreements to PTS and implement accounting separation for interconnection.

The other operators were obliged to charge market prices for termination on their mobile networks.

For a number of years, PTS has been overseeing compliance and has issued orders regarding mobile termination charges. An initial order for TeliaSonera in May 1999 resulted in a lowering of the average termination charge. Then on several different occasions PTS ordered the undertaking to lower the charges in question. The most recent in the series of orders within the framework of the old Telecommunications Act was issued in January 2002. TeliaSonera then voluntarily lowered its termination charges.

PTS's initial order for TeliaSonera to lower its termination charges was followed by a corresponding voluntary lowering by Tele2 and Vodafone (then Europolitan). However, PTS's subsequent orders to lower TeliaSonera's termination charges did not lead to corresponding cuts by Tele2 and Vodafone, whose termination charges have thus been substantially higher than TeliaSonera's. Also the prices that Hi3G and Djuice have been charging for terminating traffic have been substantially higher than TeliaSonera's.

On 6 July 2004, PTS issued decisions designating TeliaSonera, Tele2, Vodafone, Hi3G and Telenor/Djuice as having SMP in Market 16. The decisions entered into force on the decision date, and even though all the decisions have been appealed, the court of first instance, the county administrative court, has not granted a suspension, which means that PTS may oversee compliance.

The following obligations have been imposed on SMP operators:

OBLIGATIONS	Telia Sonera	Tele2	Vodafone	Hi3G	Djuice
Interconnection	X	X	X	X	X
Direct billing	X	X	X	X	X
Direct connection	X	X	X		
LRIC-price	X	X	X		
Fair and reasonable price				X	X
Non-discrimination	X	X	X	X	X
Accounting separation	X	X	X	X	X
Reference offer	X	X	X	X	X

Price controls have also been imposed on all operators, whereby cost-oriented pricing has been imposed on the three major operators, and Hi3G and Djuice have been directed to charge fair and reasonable prices. By fair and reasonable prices PTS means a price that at the maximum is at the level of the LRIC-based price. Hi3G has also been given until July 2007 to adapt its termination charge to the regulated level. PTS chose not to impose a cost-orientation obligation according to LRIC on the smaller operators, since this was regarded as disproportionately burdensome on them.

Along with the operators/industry, PTS has developed a cost model based on LRIC. PTS has decided that a transitional period of four years shall apply for gradually approaching the LRIC price. The model is constantly being updated. The current price recommendation was published on 29 June 2006:

For the LRIC-regulated operators (as of 1 July 2006):

- 2006: SEK 0.6394
- 2007: SEK 0.5425

For Hi3G (as of 1 July 2006):

- 2006: SEK 0.7732
- 2007: SEK 0.5425

PTS's decisions on obligations and subsequent oversight regarding the termination charges applied by TeliaSonera, Vodafone and Tele2 resulted in these three operators lowering their termination charges on average to SEK 0.80 per minute in January 2005.

However, on 9 February 2005, following appeals by Tele2 and Vodafone, the administrative court of appeal suspended PTS's orders until further notice. The rationale for the suspension is that PTS's LRIC model, on which the orders are based, has not been tested in court.

The administrative court of appeal's suspension order has resulted in Tele2 and Vodafone raising their termination charges to SEK 0.99 and SEK 1.35 per minute, respectively, while TeliaSonera continues to charge SEK 0.80 per minute[31].

7.4 Appeals process

PTS' decisions may be appealed to an administrative court. The administrative courts comprise three instances: the county administrative court, the administrative court of appeal and the Supreme Administrative Court. However, for appeals to the administrative court of appeal and the Supreme Administrative Court, leave to appeal is required.

As an indication of the time the process takes, however, it may be mentioned that there are several SMP decisions issued in 2004 that have yet to be decided by the first instance. The number of cases received by the county administrative court in the years 2000-2005 are: 2000: 26, 2001: 7, 2002: 25, 2003: 17, 2004: 60, 2005: 63.

[31] Based on Skanova's price list for connected transiting effective 1 July 2006

Annex 1

Termination charges

Below are figures illustrating the changes in termination charges per operator for each of the Nordic countries. For Norway, Finland and Iceland we have figures for each of the network operators, while the figures for Denmark and Sweden are averages.

Norway

The figure shows changes in euro for the MNOs Telenor and NetCom, as well as for Tele2, which is an MVNO. Although Teletopia also has its own network, it is so small that we have chosen not to include it.

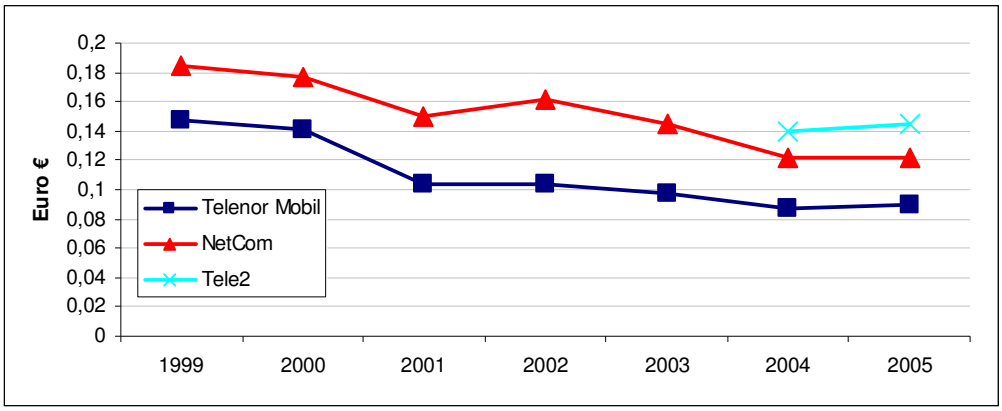


Figure 13 Termination prices in Norway 1999-2005.

Finland

The figure shows the changes in termination charges in euro.

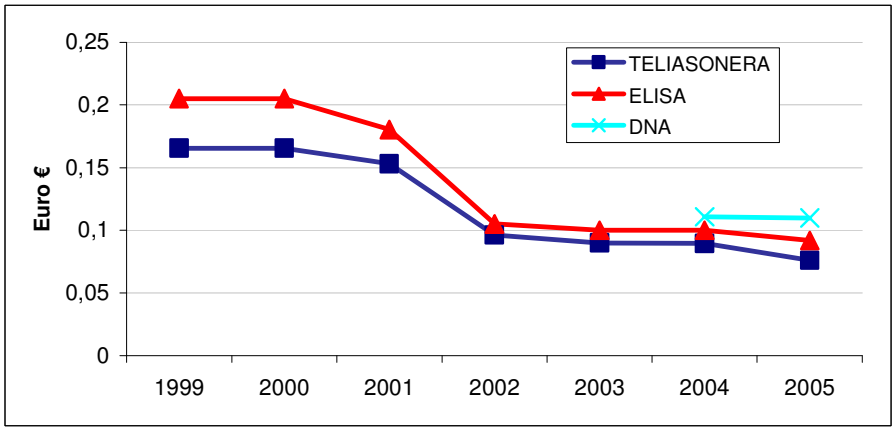


Figure 14 Termination prices in Finland 1999-2005.

Iceland

The figure shows the changes in termination charges in euro.

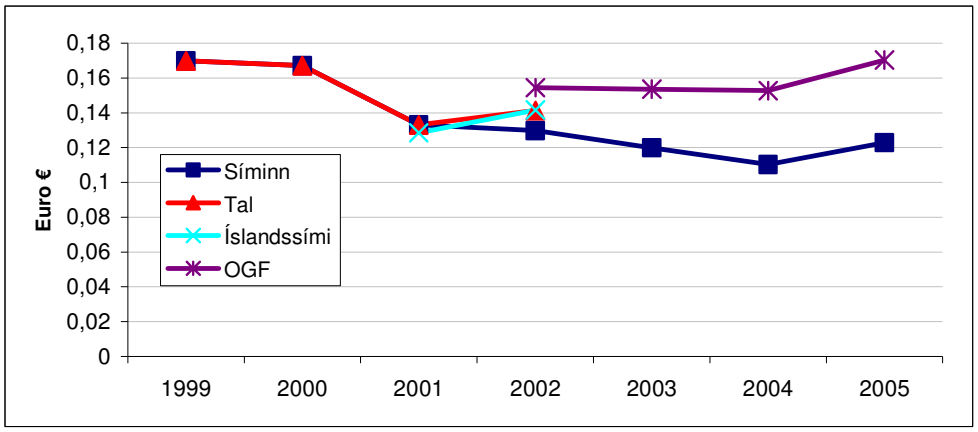


Figure 15 Termination prices in Iceland 1999-2005.

Termination charges in Iceland have been stable in Icelandic krona since march 2002 apart from a 15% average decrease in Síminn´s charges on 1 June 2003 according to PTA´s decision. The increase in the termination charge in 2005 is primarily a result of changes in the exchange rate.

Denmark

The figure shows the change in average termination charge based on a one-minute peak time call. Termination charges per operator are available only for 2006 (See table below).

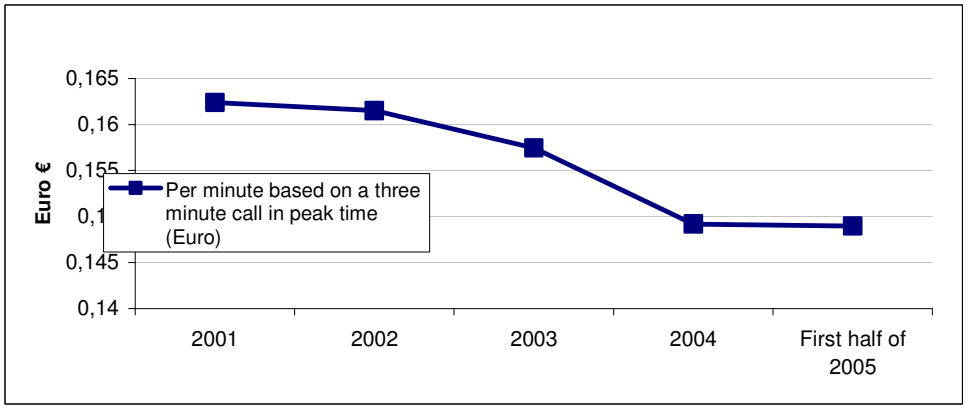


Figure 16 Termination prices in Denmark 1999-2005

The table below shows the regulated termination charges:

2006	DKK	EUR
TDC	0.84	0.109
SONOFON	0.84	0.109
Telia	0.84	0.109
Tele2	0.895	0.116
Hi3G	1.04	0.135

Sweden

The figures for Sweden show the change in calculated average termination charge, calculated as total termination revenue divided by termination minutes.

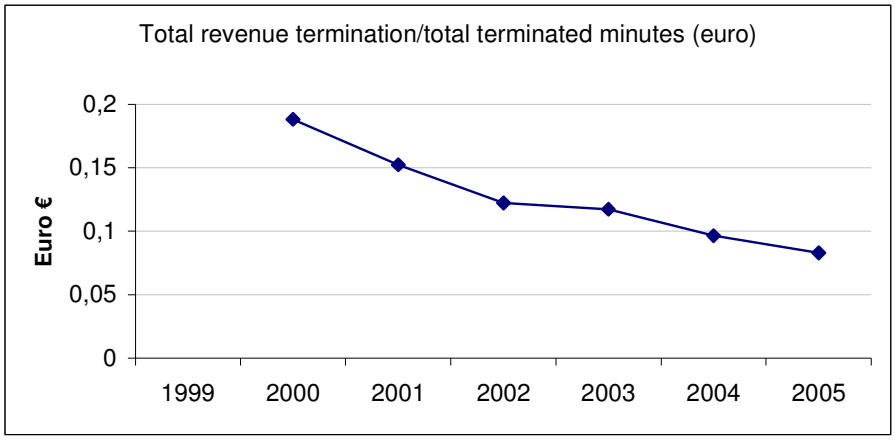


Figure 17 Revenue per minute Sweden 1999-2005.

The table below shows the recommended termination charges per operator as of July 2006 according to current regulation:

Operator	SEK	EUR
TeliaSonera	0,6394	0,069
Tele2	0,6394	0,069
Telenor	0,6394	0,069
Hi3G	0,7732	0,083
Spring Mobil	Not regulated	Not regulated

MNOs and mobile access services

The table below lists the number of MNOs in the Nordic countries and the number of MNOs that offer the various mobile access products.

Norway	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Number of MNOs	2	2	2	2	2	2	2	2	2
Of which: MNOs offering national roaming	-	-	-	-	-	-	-	1	1
Of which: MNOs offering MVNO	-	-	-	-	-	1	1	1	1
Of which: MNOs offering wholesale	-	-	-	2	2	2	2	2	2
Sweden									
Number of MNOs	3	3	3	3	3	3	4	5	5
Of which: MNOs offering national roaming	-	-	-	-	1	1	1	2	2
Of which: MNOs offering MVNO	-	-	-	-	-	-	1	1	1
Of which: MNOs offering wholesale	-	-	-	1	3	3	3	3	3
Finland									
Number of national MNOs*	2*	2	2	3	3	3	3	3	3
Of which: MNOs offering national roaming*	1	1	1	2	2	2	2	2	2
Of which: MNOs offering MVNO	-	-	-	-	-	-	-	1	2
Of which: MNOs offering wholesale	-	-	-	-	-	-	3	3	3
Iceland									
Number of active national MNOs	1	2	2	2	3	3	2	2	2
Of which: MNOs offering national roaming		1	1	1	1	1	1	1	1
Of which: MNOs offering MVNO	-	-	-	-	-	-	-	-	-
Of which: MNOs offering wholesale	-	-	-	-	1	1	-	-	-
Denmark									
Number of MNOs	2	4	4	4	4	4	4	5	4
Of which: MNOs offering national roaming	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
Of which: MNOs offering MVNO	-	-	-	1	1	1	1	1	1
Of which: MNOs offering wholesale	N/A	N/A	N/A	N/A	N/A	N/A	3	3	3

Figure 18 Number of operators in the Nordic mobile markets. [32]

[32] *Ålands Mobiltelefon (ÅMT), which has its own network only in the Åland Islands. ÅMT's situation differs from the other MNOs, and is not counted as a national MNO in this table. ÅMT offers national roaming to two MNOs operating on the mainland. National roaming on the mainland is also offered for ÅMT by one of the Finnish MNOs.

Spectrum assignments			
Country / Operator	**GSM 900**	**GSM 1800**	**UMTS**
Sweden			
TeliaSonera	36	115	4*
Tele 2	36	105	4*
Telenor**	36	92	4
Spring Mobil	34	15	
Hi3G			4
NMT			
Norway			
NetCom	73	84	3
Telenor Mobil	73	51	3
Møller/Network Norway	24		
Teletopia		33	
Hi3G			3
NMT			
Denmark			
SONOFON	45	97	7
TDC	45	133	7
TeliaSonera	74	144	7
Hi3G			7
Iceland			
Síminn	69	50	
Og Vodafone	50	149	
IMC Ísland		14	
Finland			
TeliaSonera	49	94	3
Elisa	49	79	3
DNA Verkot	46	74	3
*Joint 3G company			
**Former Vodafone			

Spectrum assignments (in number of channels) in Nordic countries

Source: (NRAs, ERO)