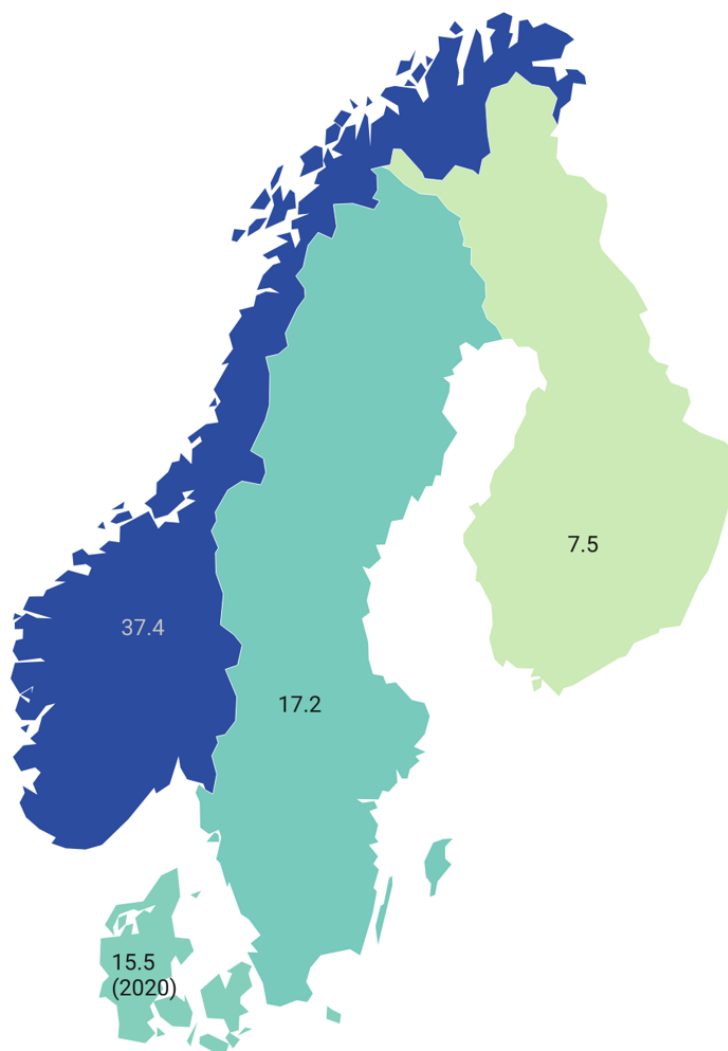


Assessment of Norwegian mobile revenues in a Nordic context – 2022

Total mobile service revenue per GB incl. M2M after purchase power adjustment, 1H 2021 [PPP NOK]



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1. Executive summary

This analysis is commissioned by Kommunal- og distriktsdepartementet (KDD). It provides a one-year-later update of the revenue, usage and pricing parts of the original analysis "Assessment of Norwegian mobile revenues in a Nordic context", dated 22 December 2020¹.

A multitude of metrics are used – always compared between the same four Nordic markets: Norway, Denmark, Sweden and Finland. The analysis shows why these markets form a near-perfect peer group.

Regulator data shows that the Norwegian revenue per mobile subscription – after purchase parity adjustment – is about as high as Finland's but significantly higher than Denmark's and Sweden's. The average data usage is however higher in Denmark, Sweden and, especially, Finland.

To give a sense of the current pricing of data-rich plans, the analysis compares 81 plans with unlimited data or a bucket of at least 30 GB per month. After having adjusted for purchasing power, Norway generally has higher prices, but some prices have come down (or data buckets have been increased) which means that Norwegian plans now can compete on price with some Swedish plans. The Norwegian unlimited plans are still more restricted than in the rest of the Nordics, though.

Telenor and Telia Norway again have the highest EBITDA margins in the Nordics, so high OPEX isn't behind the higher mobile revenue in their case. Ice continues to have the lowest EBITDA margin in the Nordics although it has increased significantly in 2021 following the new national roaming agreement with Telia.

Norwegian operators use more on CAPEX than the median Nordic operator. This is particularly true for Ice which again invests the most in relation to its revenue. Since the EBITDA-CAPEX (~cash flow) margins of Telenor and Telia Norway are higher than the median, the companies can well afford its current level of CAPEX. Ice's situation is different with the highest OPEX and the highest CAPEX in relation to revenue.

Norway has the lowest mobile data usage in the Nordics, but after three years with the slowest growth rate, Norway didn't have the slowest growth rate in the first half of 2021. Norway still has the unfavourable (from a consumer point of view) combination of high revenue² yet lowest usage per subscription, though.

The speeds when using mobile data in Norway is however higher than in the other three countries. As mobile speed depends on the traffic load, Norway's low mobile data usage helps on speed. It is also an indication of that Norwegian operators have invested in capacity not fully utilised. With a wider take on mobile network quality – not just speed – the mobile network experience in Norway is still great, but Denmark and Finland are higher ranked than Norway.

The analysis shows that the Norwegian mobile market is uniquely concentrated although the concentration index HHI decreased in 2020.

This updated analysis doesn't repeat the full root cause analysis of the original analysis, but establishes the key finding: After adjustment for purchasing power, the Norwegian mobile revenue per GB is higher than in Denmark, Sweden and Finland and the most likely root cause is the market concentration.

¹ The report can be downloaded from <https://www.regjeringen.no/no/dokumentarkiv/regjeringen-solberg/aktuelt-regjeringen-solberg/kmd/nyheterKMD/2021/ny-rapport-viser-at-konkurransen-i-mobilmarkedene-ma-bli-bedre/id2843838/>

² After adjustment for purchase power

2. Background

This analysis is commissioned by Kommunal- og distriktsdepartementet (KDD). It provides a one-year-later update of the revenue, usage and pricing parts of the first analysis “Assessment of Norwegian mobile revenues in a Nordic context”, dated 22 December 2020³ which was written to support Kommunal- og moderniseringsdepartementet’s⁴ white paper to the Norwegian Parliament covering electronic communications issued 9 April 2021⁵.

Some of the root cause assessment in the original analysis – on e.g. population, population density and size of the mobile site infrastructure – has not been updated as these numbers essentially have not changed in a year.

³ The report can be downloaded from <https://www.regjeringen.no/no/dokumentarkiv/regjeringen-solberg/aktuelt-regjeringen-solberg/kmd/nyheterKMD/2021/ny-rapport-viser-at-konkurransen-i-mobilmarkedene-ma-bli-bedre/id2843838/>

⁴ The ministry changed name from Kommunal- og moderniseringsdepartementet to Kommunal- og distriktsdepartementet 1 Jan 2022

⁵ <https://www.regjeringen.no/no/dokumenter/meld.-st.-28-20202021/id2842784/>

3. Peer group

Just like in the original analysis, the peer group consists of the four Nordic countries **Norway, Denmark, Sweden and Finland**. As argued in that analysis, these four countries form a near-perfect international peer group. All metrics will always⁶ be compared between these four countries to allow the reader to understand how one metric may affect another metric.

Below are some high level indicators to show why Norway, Denmark, Sweden and Finland most often are comparable.

	Norway	Denmark	Sweden	Finland
Mobile				
High smartphone penetration	>90%	>90%	>90%	>90%
High data-only (mbb) penetration	5%	14%	10%	23%
High mobile data traffic [GB per SIM per month]	7,5	12,8	12,3	32,6
High contract share of mobile subscriber base	92%	98%	80%	93%
Low/medium mobile churn [per year]	15-25%	20-30%	15-25%	15-25%
Subsidy/instalment model in mobile equipment sales	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
World-class mobile network quality	Yes	Yes	Yes	Yes
High 4G population coverage	>99% Except Ice 94% if excl. national roaming	>99%	>99% Except '3' 93% June 2021	>99%
Commercial 5G	3 of 3 operators Fast rollout on a mixture of spectrum bands. Telia with 31% population coverage by end of 2021, Telenor following. Ice launched 5G in Oslo by end of 2021.	4 of 4 operators Early nationwide rollout (95% of population by mid-2021) on 700 MHz from TDC. Other operators accelerated rollout in 2021, rather focused on 3.5 GHz.	4 of 4 operators Limited rollout on 3.5 GHz and 700 MHz, likely as a consequence of the delay in the 3.5 GHz auction	3 of 3 operators Large rollout (60-70% of population by the end of 2021) on 3.5 GHz and 700 MHz from all three
Mobile active network sharing	No	Yes TT-Netværket between Telenor & Telia for 2G, 3G, 4G & 5G	Yes SUNAB between Tele2 & Telia for 3G; 3GIS between Telenor & '3' for 3G; Net4Mobility between Tele2 & Telenor for 2G, 4G & 5G	Yes Suomen Yhteisverkko between Telia & DNA for 2G, 3G, 4G & 5G (Northeast half of Finland)

⁶ On a few occasions, regulatory data with sufficient break-down isn't available, leaving out that metric for the country in question

Fixed				
High fiber share of fixed broadband base	63%	40%	76%	58%
Medium cable modem share of fixed broadband base	24%	34%	17%	27%
High average Netflix speed [Mbit/s]	3,6 tier 1	3,6 tier 1	3,6 tier 1	3,4 tier 2
Fixed-mobile convergent offers	Light =combine, get more	Light =combine, get more	Light =combine, get more	No

Figure 1. Comparison of some high-level business drivers in Norway, Denmark, Sweden and Finland⁷ [source: Tefficient]

Although many market parameters are similar in these four countries, the **purchasing power** differs. Norway has a higher purchasing power than the other three Nordic countries.

In the original analysis, all revenue and pricing diagrams were therefore produced in two versions:

- A comparison in NOK *without* adjustment for purchasing power
- A comparison in NOK *with* adjustment for purchasing power

Although purchasing power parity (PPP) is calculated on a generic basket of goods and services – not specifically for mobile services – and therefore should be regarded as indicative, the original analysis showed that the revenue and pricing differences were visible and the conclusions similar also after adjustment for purchasing power. To make this updated analysis more compact and easier to read, the comparisons are therefore done **with adjustment for purchasing power only**⁸.

The input parameters for the PPP adjustment are shown in Figure 2 below.

	GDP per capita, international USD (purchase power parity) 2019	GDP per capita, international USD (purchase power parity) 2020	GDP per capita, international USD (purchase power parity) 2021 (prel.)	Purchase power parity adjustment to Norwegian level, 2021 (prel.)
Norway	65899	65841	69859	1
Denmark	59833	59136	63405	0,9076
Sweden	55656	54480	57425	0,8220
Finland	50738	49806	53084	0,7599

Figure 2. Comparison of purchase parity adjusted GDP per capita (international USD) in Norway, Denmark, Sweden and Finland 2019, 2020 and 2021 (prel.) and the PPP adjustment used for 2021 [source: IMF]

⁷ Subscriber and usage figures for Norway, Sweden and Finland are for June 2021, for Denmark for December 2020 as the regulator Energistyrelsen will not report 1H 2021 data

⁸ KDD has access to a data file without adjustment for purchasing power

An introduction to PPP is given in the box below⁹.

Measuring economic activity in a country is difficult, since ‘the economy’ is a complex system with lots of moving parts. A common way to deal with this is to focus on aggregate indicators, such as total national output: “the monetary value of all goods and services produced within a country (or region) in a specific time period”. That’s what economists call the Gross Domestic Product (GDP).

GDP is measured using prevailing national prices to estimate the value of output. In other words, GDP is calculated using local currency units. This means that in order to make meaningful cross-country comparisons, it is necessary to translate figures into a common currency – i.e. use a consistent ‘unit of measure’.

One option is to simply translate all national figures into one common currency (for instance, US dollars) using exchange rates from currency markets. But because market exchange rates do not always reflect the different price levels between countries, economists often opt for a different alternative. They create a hypothetical currency, called ‘international dollars’, and use this as a common unit of measure. **The idea is that a given amount of international dollars should buy roughly the same amount – and quality – of goods and services in any country.**

The exchange rates used to translate monetary values in local currencies into ‘international dollars’ (int-\$) are the ‘purchasing power parity conversion rates’ (also called PPP conversion factors).

⁹ From Our World in Data: <https://ourworldindata.org/what-are-ppps>

4. Observed data issues

Denmark's telecom regulator, Energistyrelsen, has decided not to issue its usual telecom market statistics for the first half of 2021¹⁰. The frequency of its statistics has previously always been half-yearly. This means that the Danish regulatory data is 6 months older than that of Norway, Sweden and Finland in this analysis.

¹⁰ Open "Telestatistik", see text under the "Næste telestatistik" header <https://ens.dk/ansvarsomraader/telepolitik/tal-paa-teleomraadet>

5. Mobile ARPU per country

We have used regulator data from the four national regulatory agencies Nkom, Energistyrelsen, PTS and Traficom to calculate the average service revenue per mobile subscription¹¹ per month – normally referred to as **ARPU** within the industry. Figure 3 below shows the ARPU including *all* mobile subscriptions – regular, data-only (mbb) and M2M/IoT subscriptions. The ARPUs of the other three countries have first been recalculated into NOK¹² then into purchasing power parity NOK (PPP NOK).

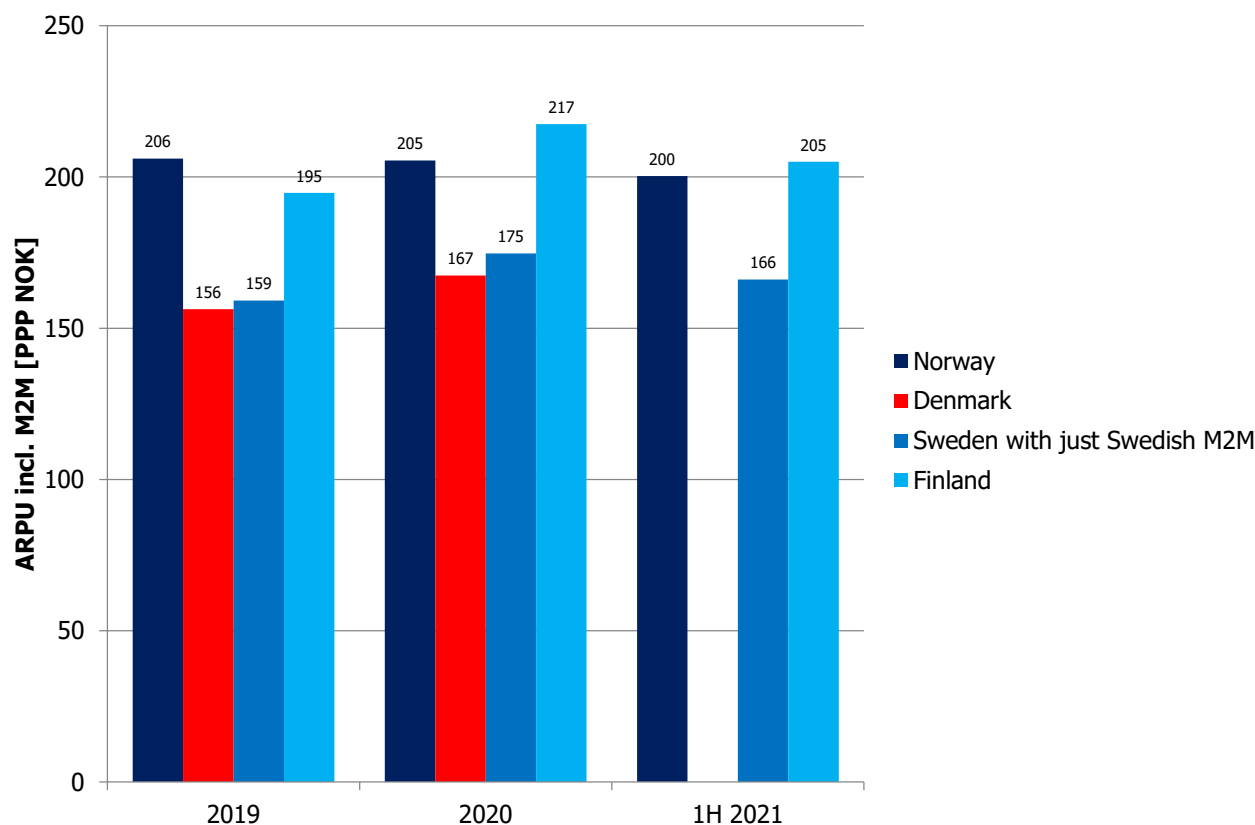


Figure 3. Comparison of PPP mobile ARPU incl. M2M in Norway, Denmark, Sweden and Finland 2019, 2020 and 1H 2021 [source: Nkom, Energistyrelsen, PTS, Traficom, IMF, operator reports for 1H 2021 for Finland as Traficom does not report revenue half-yearly]. Denmark is missing for 1H 2021 as Energistyrelsen will not report 1H 2021 data.

Norway's mobile ARPU was **200 NOK** in the first half of 2021, slightly less than in 2019 (206 NOK) and 2020 (205 NOK). In PPP terms, Finland had a higher mobile ARPU than Norway in 2020 and in 1H 2021 whereas Sweden and Denmark (based on data up to 2020) had significantly lower PPP ARPU.

The Norwegian revenue per mobile subscription including M2M is, after compensation for differences in purchasing power, about as high as Finland's but significantly higher than Denmark's and Sweden's.

¹¹ Average number of subscriptions in the period calculated as Average(number of subscriptions at the start of the period; number of subscriptions at the end of the period)

¹² Using the average of the daily currency rates for the period in question as reported by ECB

The ARPU levels are generally quite stable in the Nordics although it might appear as if the ARPU grew in 2020 in Denmark, Sweden and Finland. This is however mainly a consequence of the weakening of the NOK against the other currencies during 2020, see the Euro (EUR) example in Figure 4. As the Danish krone (DKK) is tied to the EUR, the curve looks very similar vs. DKK.

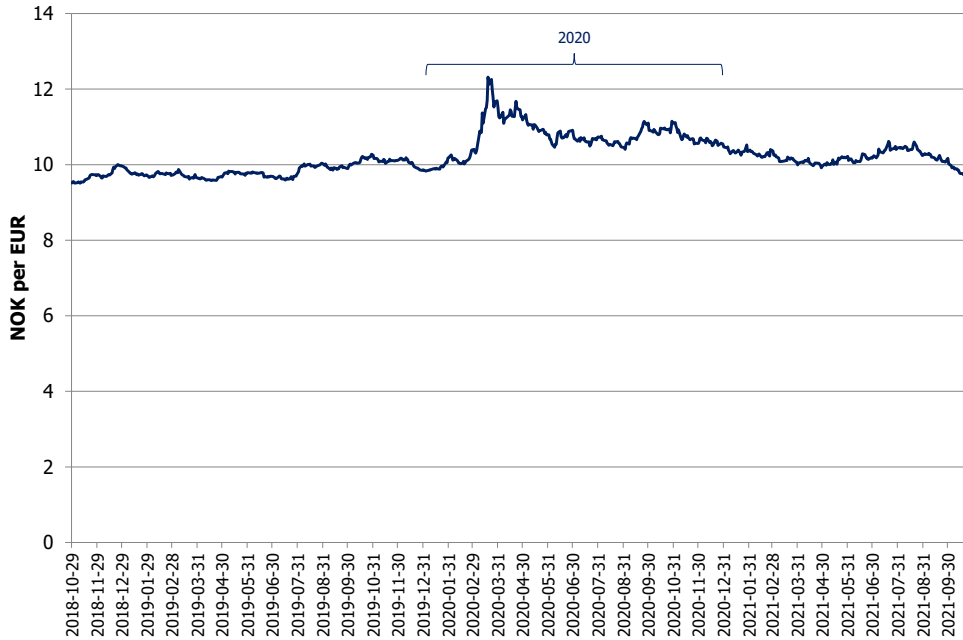


Figure 4. Development of the daily exchange rate between NOK and EUR over a three year period [source: ECB]

Also vs. the Swedish krona (SEK), the NOK weakened during 2020.

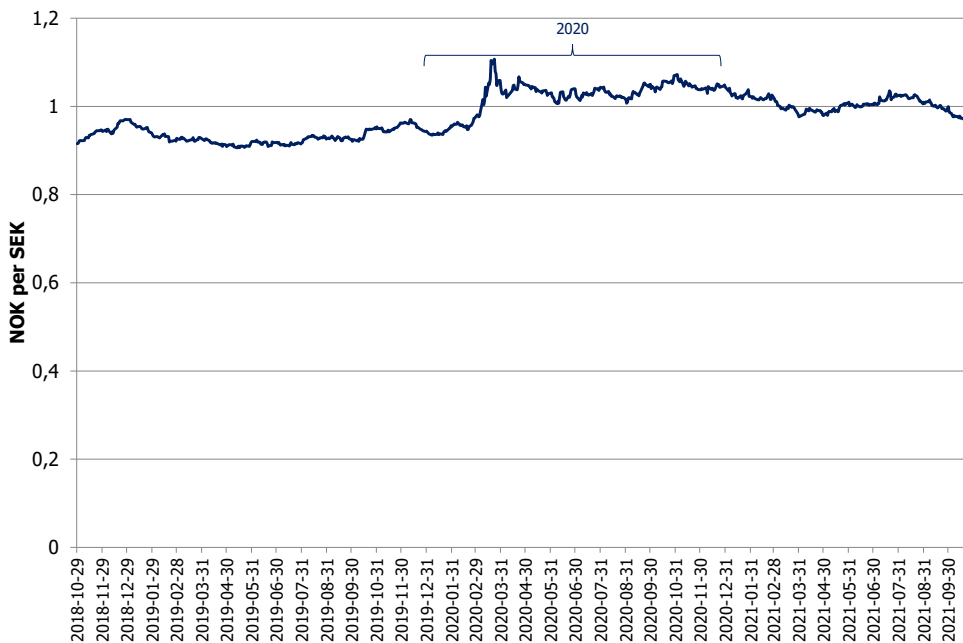


Figure 5. Development of the daily exchange rate between NOK and SEK over a three year period [source: ECB]

In the original analysis, we had an issue with the large number of international M2M SIMs (mainly from Telenor Connexion) being homebased in Sweden. In this update, there's sufficient historical data on Sweden-only M2M SIMs to exclude the previous "Sweden with also international M2M" category from our graphs, making them less complex and more comparable.

Although a step forward, we would ideally like to exclude M2M entirely from our analysis as it represents a very different segment of the mobile market than the human-focussed volume business. In the regulator reporting of Denmark and Finland, M2M revenues¹³ are however not broken out from the total mobile service revenues and can't therefore be excluded.

Figure 6 compares the PPP mobile ARPU **excluding M2M** (with Denmark and Finland indicated including M2M). Norway's ARPU level of **273 NOK** in 1H 2021 has increased slightly since 2019 and 2020 and is significantly (31%) higher than the level of Sweden – 208 PPP NOK in 1H 2021.

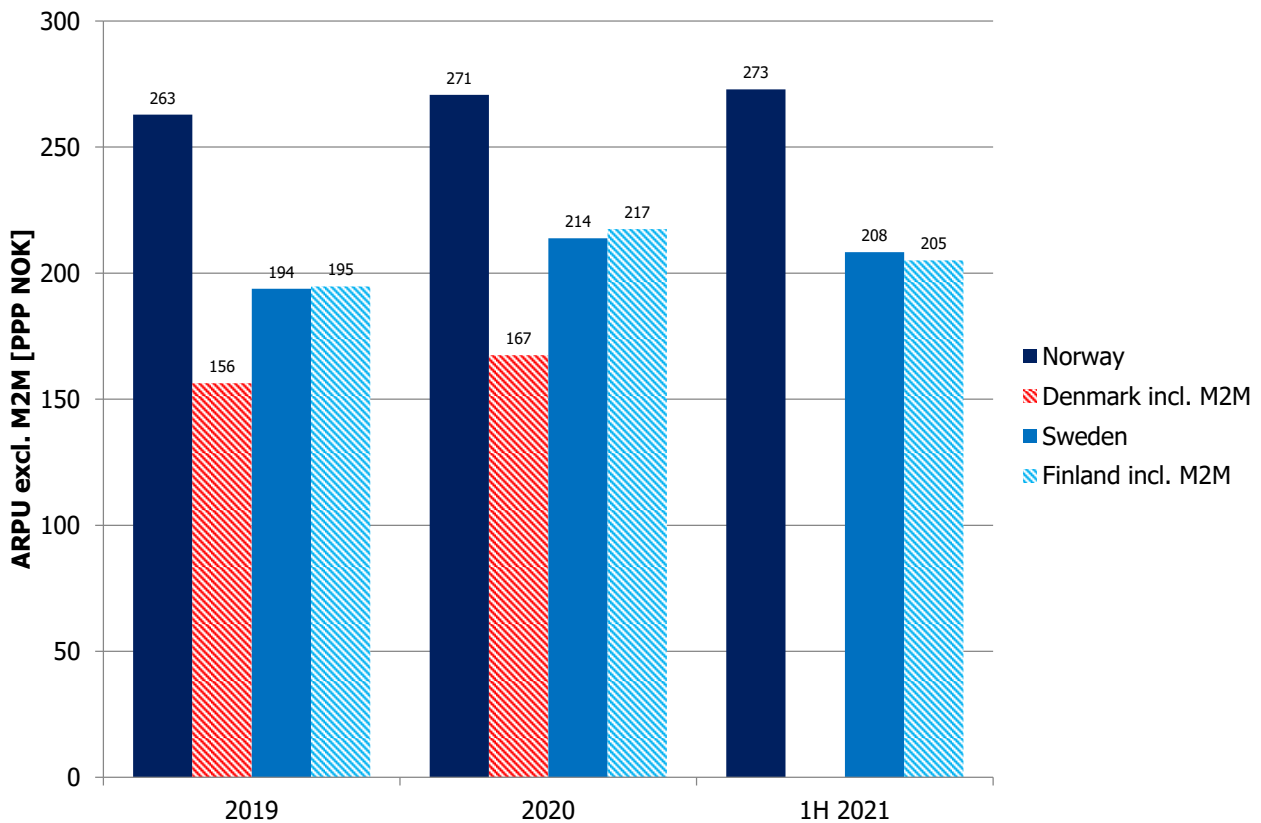


Figure 6. Comparison of PPP mobile ARPU excl. M2M in Norway and Sweden 2019, 2020 and 1H 2021. The Danish and Finnish regulators do not break out M2M revenues so ARPU excl. M2M can't be calculated for Denmark and Finland [source: Nkom, Energistyrelsen, PTS, Traficom, IMF, operator reports for 1H 2021 for Finland as Traficom does not report revenue half-yearly]. Denmark is missing for 1H 2021 as Energistyrelsen will not report 1H 2021 data.

The Norwegian revenue per mobile subscription excluding M2M is, after compensation for differences in purchasing power, significantly (31%) higher than Sweden's.

¹³ M2M SIM numbers are broken out, though

6. Comparison between mobile ARPU and mobile data usage per country

The previous section showed that the Norwegian ARPU often, but not always, is the highest. In this section we compare the ARPU levels with the mobile data usage to give an idea of how much data mobile subscribers consume for that ARPU. It's an attempt to assess the value for money¹⁴.

Figure 7 compares the mobile data usage per subscription including M2M between our four countries. Finland is the world leader¹⁵ in average mobile data usage and totally dominates over the other Nordic countries with an average of 27.3 GB used per subscription per month in 1H 2021.

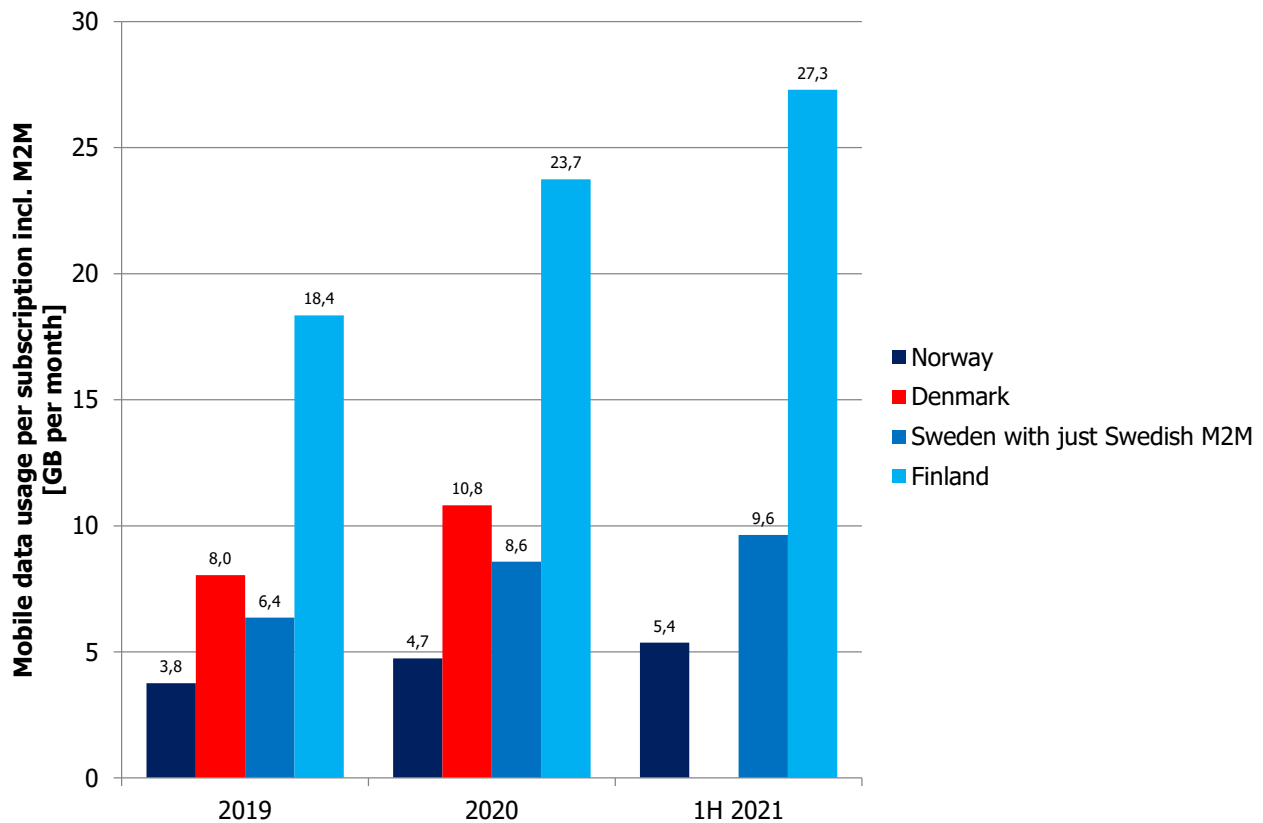


Figure 7. Average mobile data usage per mobile subscription including M2M for Norway, Denmark, Sweden and Finland 2019, 2020 and 1H 2021 [source: Nkom, Energistyrelsen, PTS, Traficom, compiled by Tefficient]. Denmark is missing for 1H 2021 as Energistyrelsen will not report 1H 2021 data.

¹⁴ Although mobile data isn't the only mobile service, most mobile plans sold in the Nordics come with unlimited call minutes and SMS – in contrast to mobile data which outside of Finland most often is limited. This could suggest that operators and their customers assign more value to mobile data.

¹⁵ <https://tefficient.com/back-to-normal-or-will-5g-push-the-envelope/>

The average mobile data usage of Norway was 5.4 GB per subscription per month in 1H 2021 – significantly lower than Finland obviously, but also much lower than Sweden and Denmark (in 2020).

Figure 8 below compares the mobile data usage per subscription *excluding* M2M¹⁶. Finland is still the world leader in average mobile data usage and totally dominates over the other Nordic countries with an average of 32.6 GB used per subscription per month in 1H 2021.

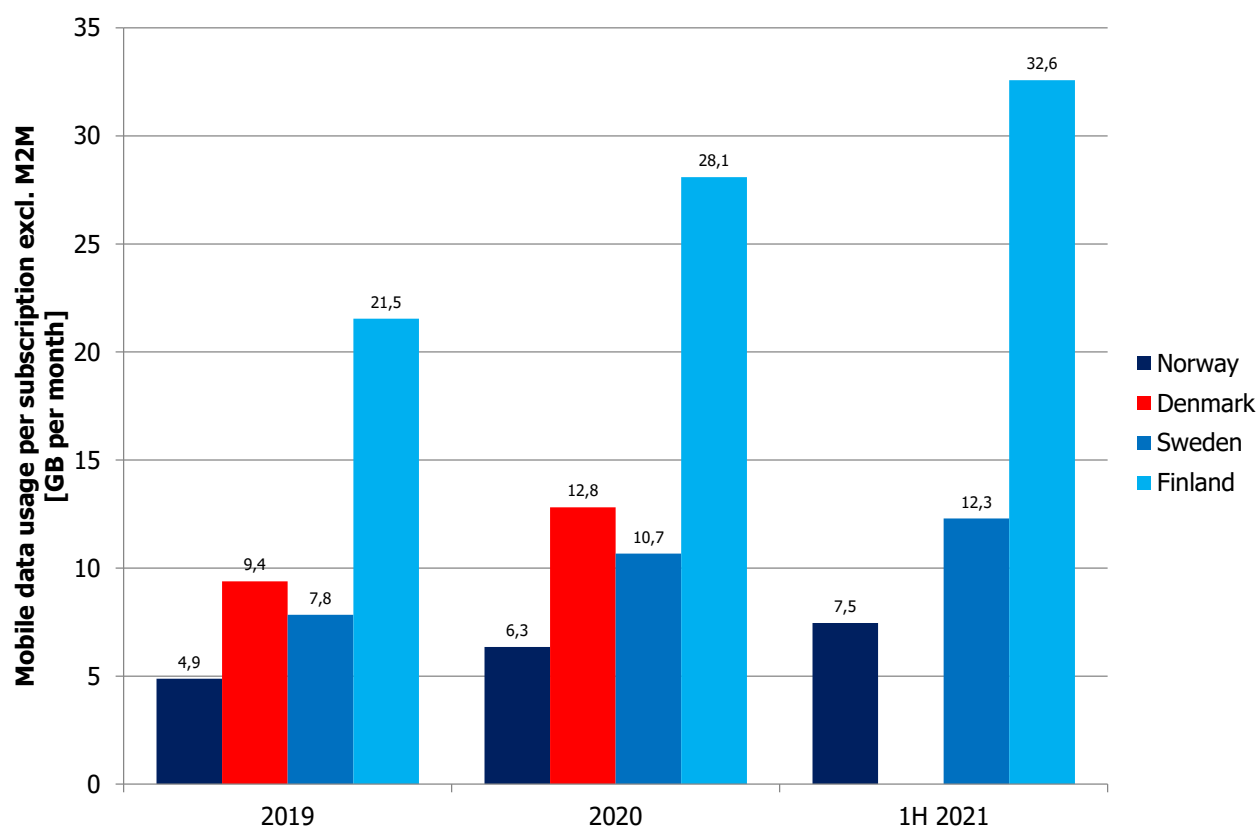


Figure 8. Average mobile data usage per mobile subscription excluding M2M for Norway, Denmark, Sweden and Finland 2019, 2020 and 1H 2021 [source: Nkom, Energistyrelsen, PTS, Traficom, compiled by Tefficient]. Denmark is missing for 1H 2021 as Energistyrelsen will not report 1H 2021 data.

When excluding M2M, the average mobile data usage of Norway was 7.5 GB per subscription per month in 1H 2021 – again significantly lower than Finland, but also much lower than Sweden and Denmark (in 2020).

In 2018, 2019 and 2020, Norway had the slowest growth in mobile data usage of the four countries, leading to that the gap in mobile data usage increased further. Maybe 2021 will represent a trend shift, though: In the first half of 2021, the mobile data usage in Norway grew almost as fast as in Sweden and much faster than in Finland.

¹⁶ Denmark and Finland aren't separating out the M2M data traffic (Norway and Sweden do) but from the Norwegian and Swedish data it's clear that the M2M data traffic is very small compared to the overall data traffic – 0.6% in Norway and 0.4% in Sweden in 1H 2021. We have therefore assumed that the M2M traffic in Denmark and Finland is zero rather than excluding the countries from this metric.

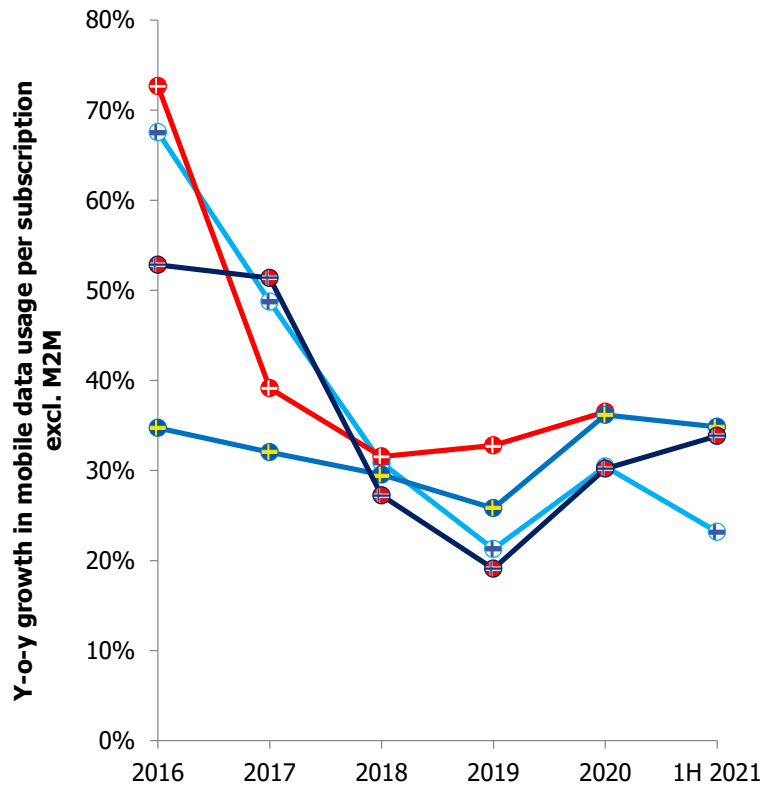


Figure 9. Y-o-y development in mobile data usage per mobile subscription excluding M2M for Norway, Denmark, Sweden and Finland 2016-1H 2021 [source: Nkom, Energistyrelsen, PTS, Traficom, compiled by Tefficient]. Denmark is missing for 1H 2021 as Energistyrelsen will not report 1H 2021 data.

Could Norway’s low mobile data usage and slow historical growth have something to do with the cost of mobile data? To assess this, we have calculated the **total mobile service revenue per consumed GB**¹⁷.

¹⁷ The reason why we use the total mobile service revenue, not just the mobile service revenue associated with mobile data, is the way mobile plans are packaged today – with a typically unlimited amount of minutes and text messages and a limited or unlimited number of GBs. With this, there is no way to separate the total service revenue into voice, messaging and data.

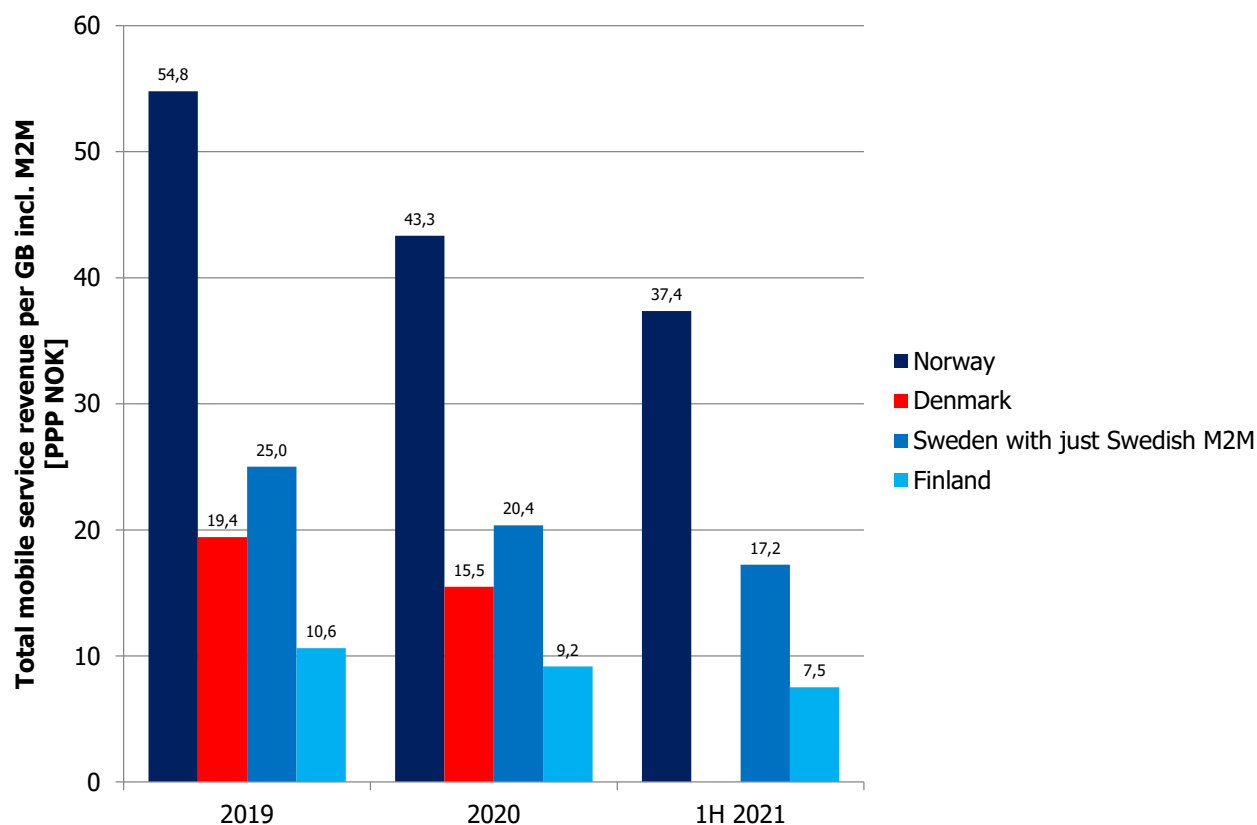


Figure 10. Total mobile service revenue in PPP NOK per consumed GB including M2M for Norway, Denmark, Sweden and Finland 2019, 2020 and 1H 2021 [source: Nkom, Energistyrelsen, PTS, Traficom, IMF, operator reports for 1H 2021 for Finland as Traficom does not report revenue half-yearly, compiled by Tefficient]. Denmark is missing for 1H 2021 as Energistyrelsen will not report 1H 2021 data.

Figure 10 shows the figures if including M2M. The PPP adjusted revenue per GB in Norway was 2.8 times higher than in Denmark in 2020, 2.2 times higher than in Sweden in 1H 2021 and 5.0 times higher than in Finland in 1H 2021. Two factors are behind this: 1) The higher PPP ARPU in Norway, see section 5, 2) The lower mobile data usage in Norway, see this section.

Excluding the M2M SIMs from the calculation doesn't change the graph much.

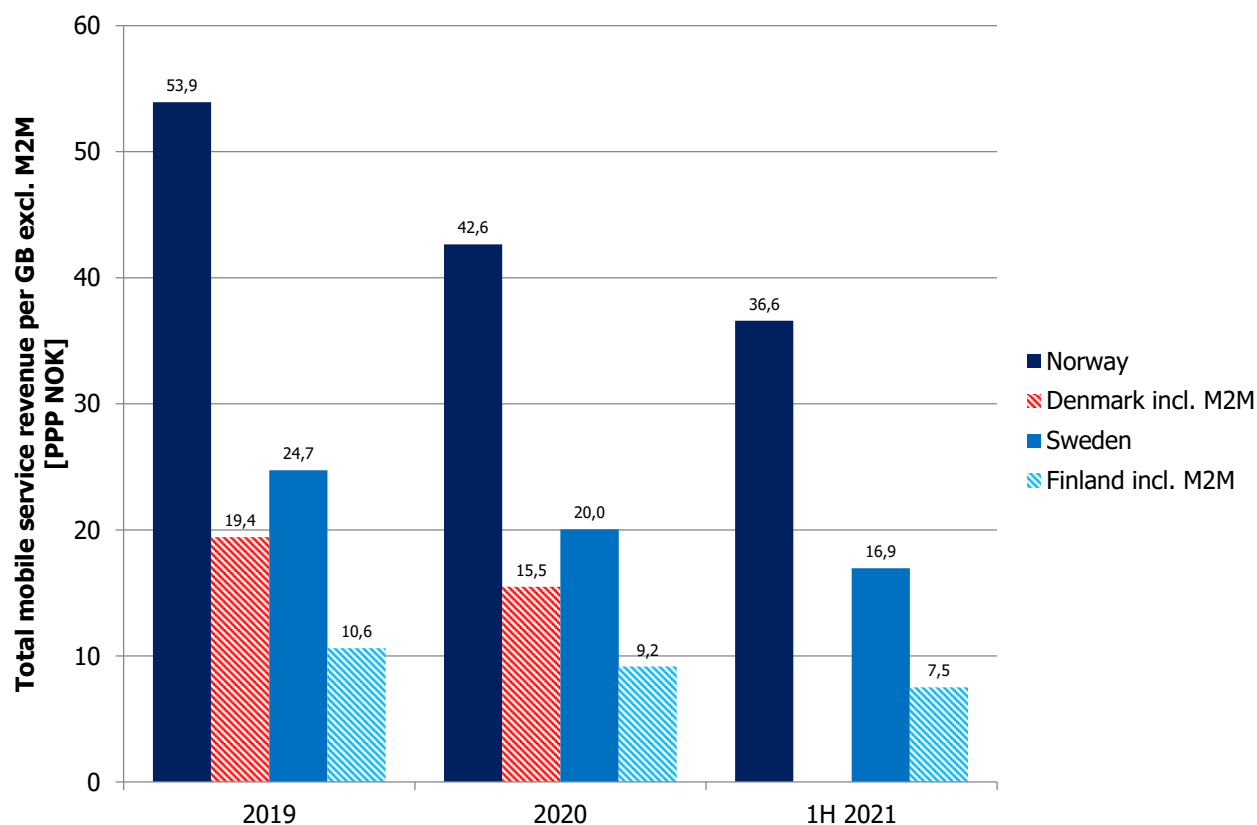


Figure 11. Total mobile service revenue in PPP NOK per consumed GB excluding M2M for Norway and Sweden 2019, 2020 and 1H 2021. The Danish and Finnish regulators do not break out M2M revenues so revenue excl. M2M can't be calculated for Denmark and Finland [source: Nkom, Energistyrelsen, PTS, Traficom, IMF, operator reports for 1H 2021 for Finland as Traficom does not report revenue half-yearly, compiled by Tefficient]. Denmark is missing for 1H 2021 as Energistyrelsen will not report 1H 2021 data.

The PPP adjusted revenue per GB in Norway was still 2.2 times higher than in Sweden in 1H 2021. Low usage and high revenue seem to go hand in hand.

The total mobile service revenue per consumed GB is, after compensation for differences in purchasing power, 2.2-5.0 times higher in Norway than in the other Nordic countries. It's likely that the high revenue per GB hampers the Norwegian usage.

The following graphs compare how much mobile subscribers **get for what they pay**. We are simply comparing the ARPU from section 5 with the average mobile data usage from this section. First a graph where M2M is included:

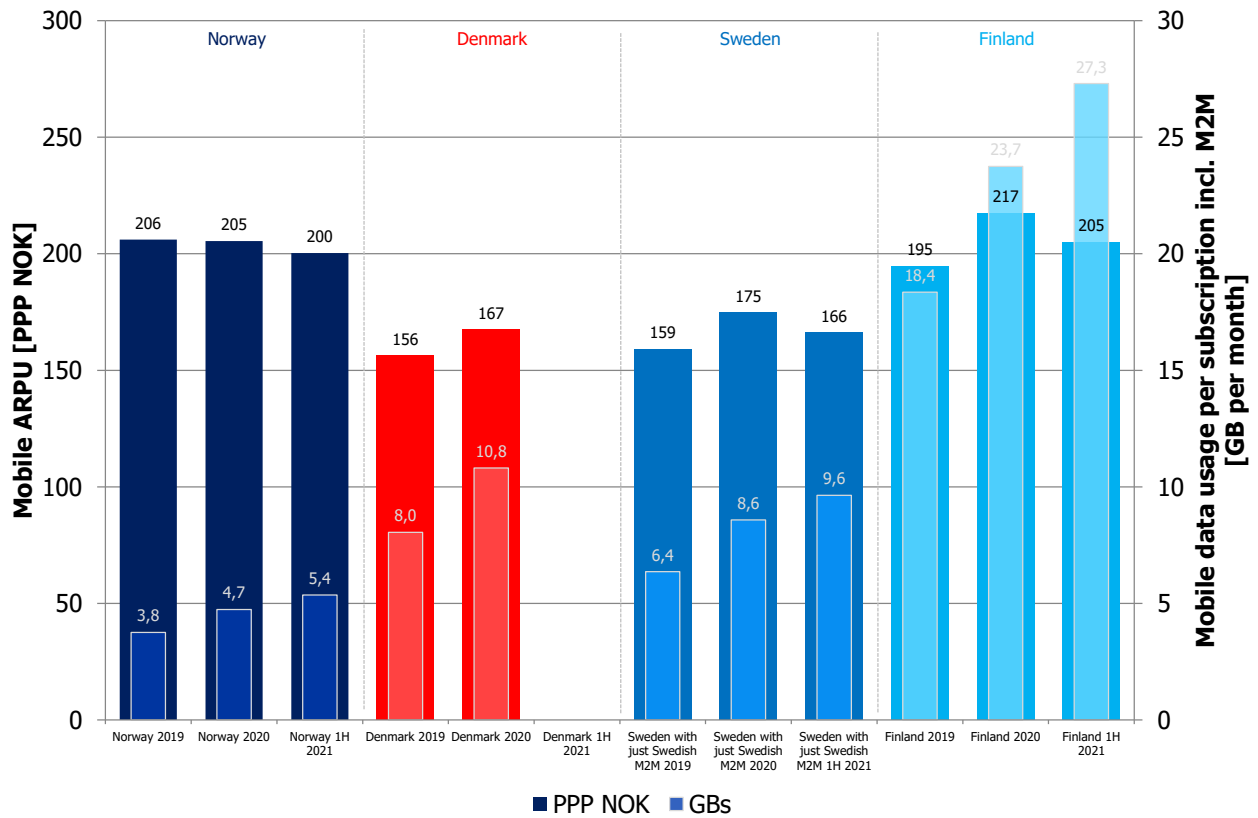


Figure 12. PPP ARPU per mobile subscription including M2M vs. the average mobile data usage per subscription including M2M for Norway, Denmark, Sweden and Finland 2019, 2020 and 1H 2021 [source: Nkom, Energistyrelsen, PTS, Traficom, IMF, operator reports for 1H 2021 for Finland as Traficom does not report revenue half-yearly, compiled by Tefficient]. Denmark is missing for 1H 2021 as Energistyrelsen will not report 1H 2021 data.

Norway’s PPP ARPU is the second highest after Finland, but Norway’s average mobile data usage is the lowest.

If excluding M2M from Figure 12 we get Figure 13.

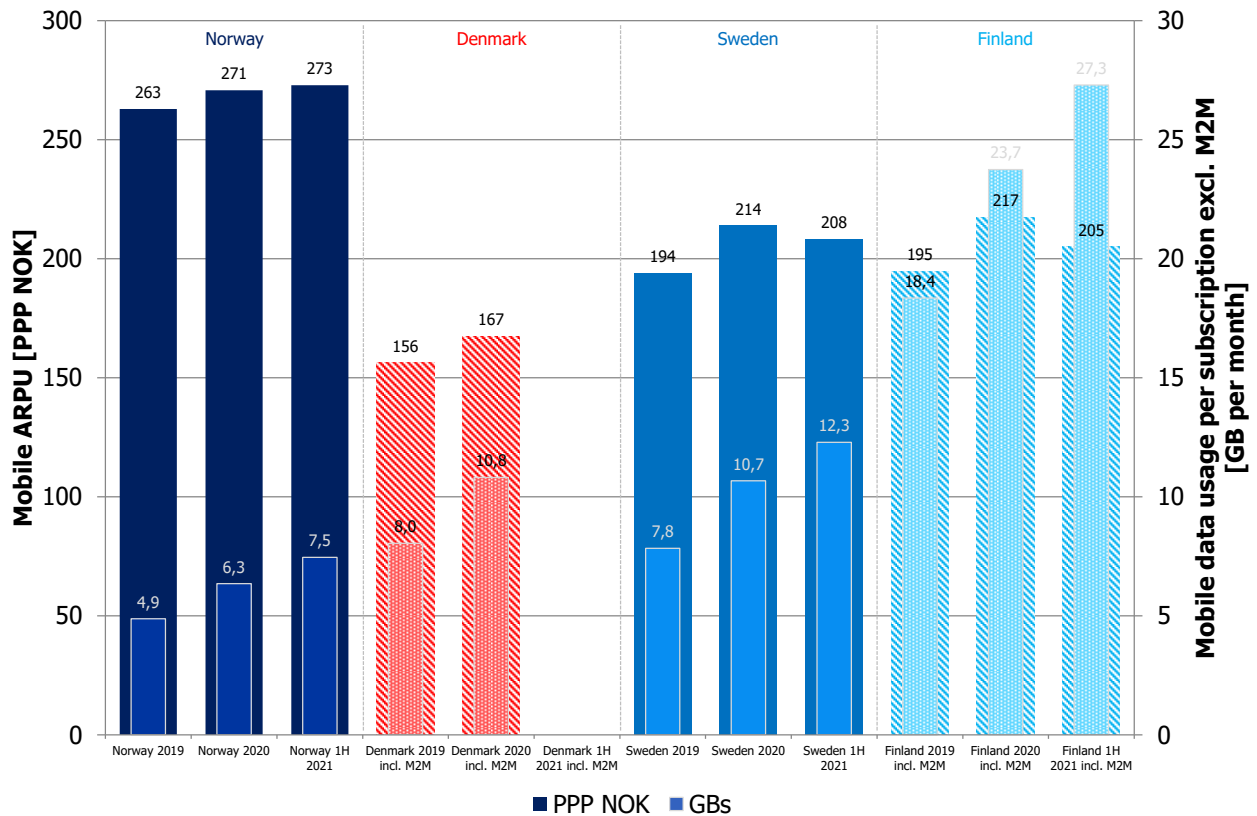


Figure 13. PPP ARPU per mobile subscription excluding M2M vs. the average mobile data usage per subscription excluding M2M for Norway and Sweden 2019, 2020 and 1H 2021. The Danish and Finnish regulators do not break out M2M revenues so ARPU excl. M2M can't be calculated for Denmark and Finland [source: Nkom, Energistyrelsen, PTS, Traficom, IMF, operator reports for 1H 2021 for Finland as Traficom does not report revenue half-yearly, compiled by Tefficient]. Denmark is missing for 1H 2021 as Energistyrelsen will not report 1H 2021 data.

In comparison to Sweden, Norway's PPP ARPU is much higher, but the average mobile data usage is still lower.

After compensation for differences in purchasing power, the Finnish ARPU is somewhat higher than the Norwegian ARPU. The Finnish data usage is however 5.1 times higher. Compared to Denmark and Sweden, Norwegian PPP ARPU is higher although Norwegian data usage is lower. If data volume is what defines value, then Norwegian mobile subscribers have made the worst deal in these Nordic markets.

7. Mobile ARPU per reporting operator

Regulatory data has the benefit of being defined in the same way for all providers in a market, but has the drawback of being relatively infrequently reported and published with a certain delay. Depending on regulator and type of data, it is not always possible to break it out per operator.

Figure 14 below shows the mobile ARPU as reported by the 14 MNOs in our four markets – translated into NOK and with PPP adjustment.

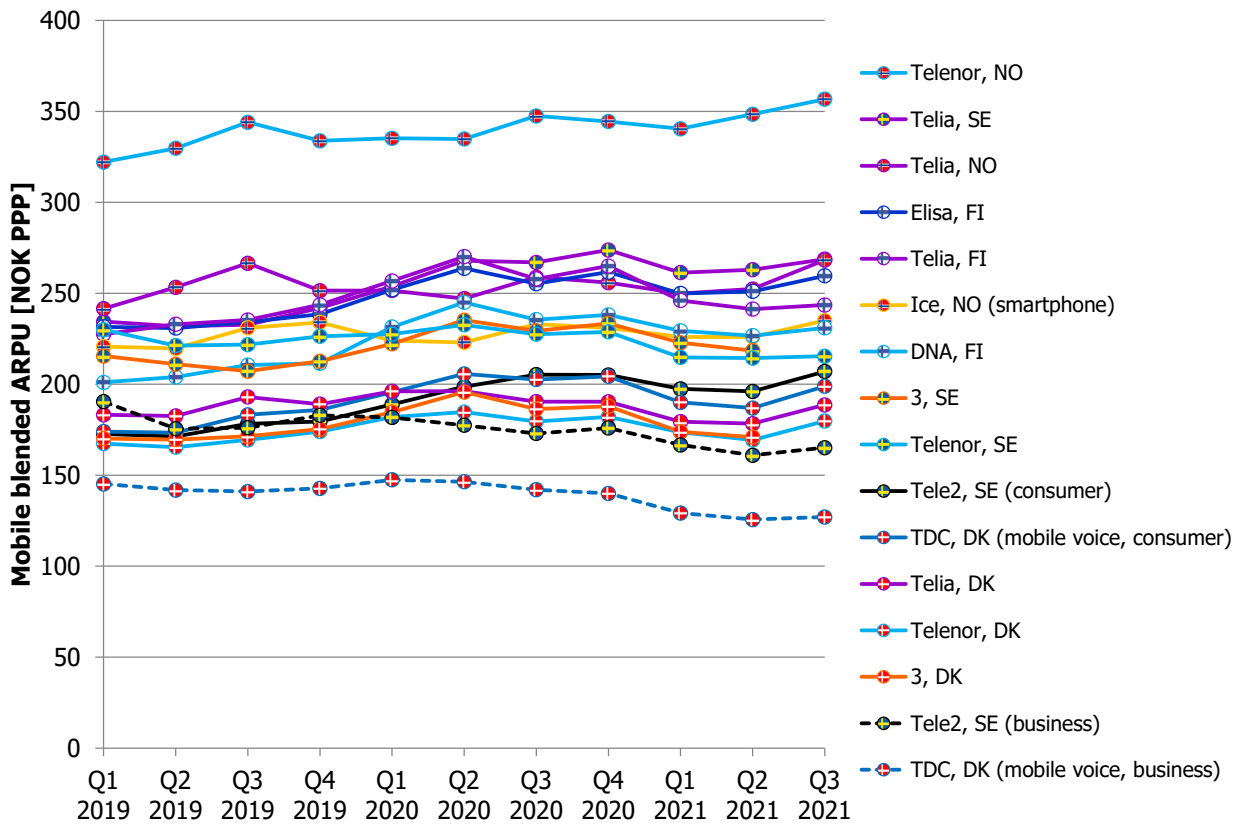


Figure 14. PPP ARPU per mobile subscription excluding M2M for the 14 operators (MNOs) in Norway, Denmark, Sweden and Finland per quarter from Q1 2019 to Q3 2021 [source: operator reports, IMF, compiled by Tefficient]. 3's ARPU is reported every six months, hence missing for Q3 2021. Tele2 doesn't report one blended ARPU number, but split between consumer and business. Same for TDC which also excludes data-only subscriptions from its reported mobile voice ARPU.

The definitions of what is included in the reported mobile ARPU can differ somewhat between the operators, but as a general rule, M2M is excluded. Figure 14 shows the blended PPP ARPU including both postpaid and prepaid subscriptions.

There's one operator with significantly higher ARPU: **Telenor Norway**. Its Q3 2021 ARPU of **357 NOK** is 33% higher than the operator with the second highest mobile PPP ARPU, Telia Sweden. In a local Norwegian context, Telenor's ARPU is 33% higher than Telia Norway's and 52% higher than Ice's smartphone ARPU. Most operators in Sweden and Denmark still have lower PPP ARPU than that of Ice.

Danish operators are generally having the lowest ARPU levels after compensation for difference in purchasing power.

After compensation for differences in purchasing power, Telenor Norway has a uniquely high mobile ARPU, 33% higher than any other operator. The other two Norwegian operators, Telia and Ice, have much lower ARPU than Telenor but still often higher than operators in Sweden and Denmark in PPP terms.

8. Pricing comparison: Mobile plans with much mobile data

It is relatively straight-forward to compare advertised prices on mobile plans between operators and between markets, but we would like to warn against concluding solely based on such analysis as it's not representative for what mobile customers actually *pay*. It shows how much mobile customers *could pay*.

In the Nordics, only about 15-30% of mobile customers actually switch mobile provider during a year. 70-85% of mobile customers are not. Many of these are subscribing to mobile plans that are different compared to those that presently are marketed and sold. As there is ongoing price erosion¹⁸ and data bucket inflation¹⁹ in the Nordics, most customers that are on old plans **pay more for their usage than they could have** would they have been on a new plan.

Hence, we favour comparing the revenues derived from mobile users – as we just did when comparing ARPU – as opposed to comparing price points. But to balance this analysis, we have done an almost complete²⁰ market scan of the pricing of *data-rich* (defined as 30 GB or more) mobile plans in our four countries.

To differentiate, operators use e.g. different policies, service bundling tactics, inclusive services, family discounts, youth discounts and fixed-mobile bundling discounts. To make this comparison as like-for-like as possible, we have applied the following criteria:

- Only *consumer* prices considered – including VAT
- Only plans with *unlimited* voice and messaging and stipulated levels of EU roaming²¹ considered
- Time limited discounts – like first three months for half price – *not* considered
- Age based discounts *not* considered
- Fixed-mobile bundling discounts *not* considered
- Energy-mobile bundling discounts *not* considered
- Family discounts *not* considered
- Binding contracts – for example 24 months – *not* considered
- Premium plans that include content – for example with several streaming services for an additional fee – *not* considered unless the content part can't be deselected

Figure 15 compares a total of **81 data-rich plans** across our four markets. The vertical axis shows the monthly price – recalculated into PPP NOK²². The horizontal axis shows the size of the *full speed data bucket*. Plans with an unlimited²³ full-speed mobile data allowance are shown at the ∞ symbol.

¹⁸ When providers lower the price of a plan for new customers

¹⁹ When providers include more data volume for new customers without changing the price

²⁰ All MNOs are covered if full. The most prominent sub-brands (if any) of each MNO are covered too. Also larger MVNOs that are strong in data-rich plans are covered.

²¹ The data volume is typically following EU's stipulated minimum level defined by the total monthly price of a plan

²² Using the actual exchange rate for the same day, 28 December 2021, and the annual PPP conversion according to the latest IMF stats

²³ Unlimited means 1000 GB with most Danish operators and with Ice's Data Frihet. With most Swedish operators, the user will have to answer an SMS after having used a certain amount of data in a day (in Telenor's case e.g. 20 GB) to continue to use data.

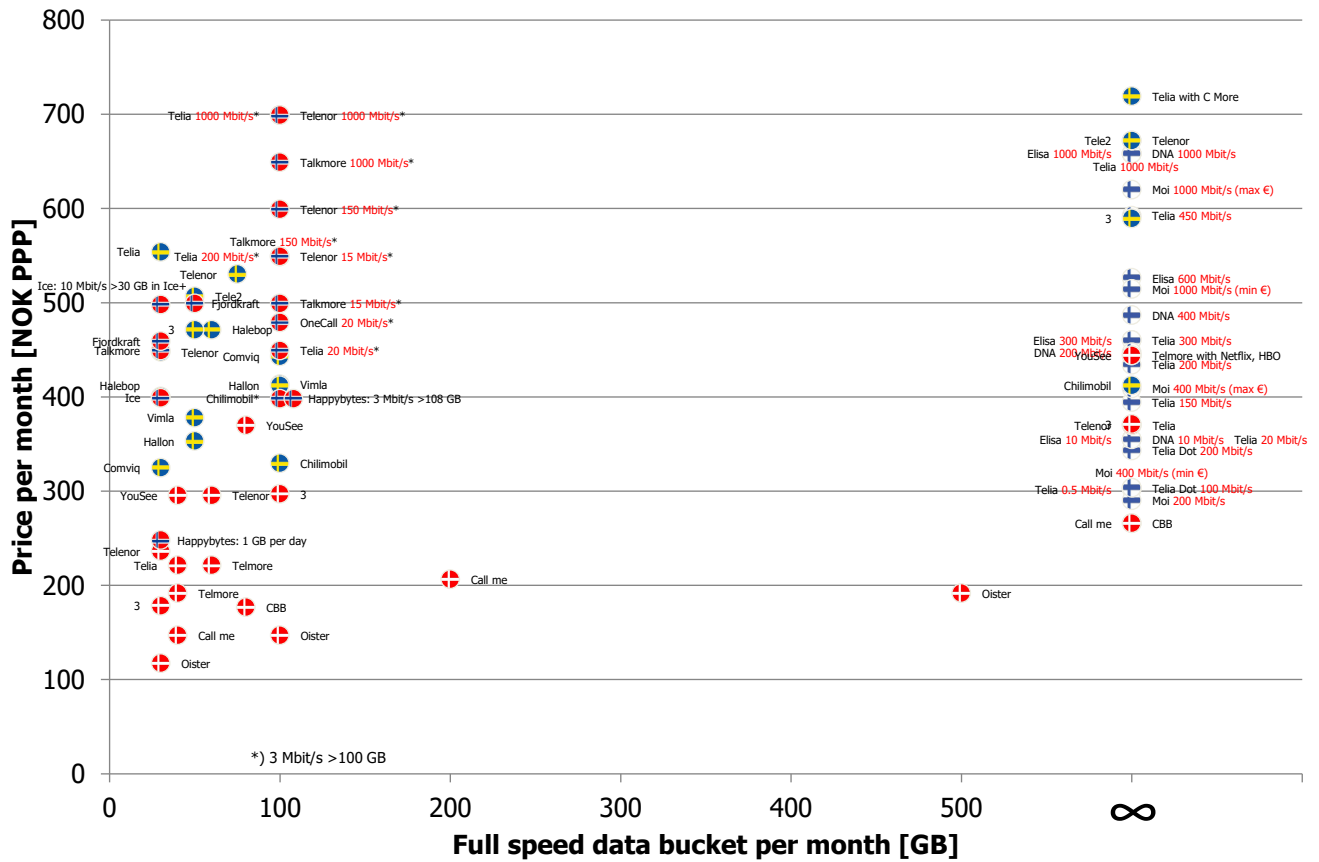


Figure 15. Comparison of the purchase parity pricing of data-rich (>30 GB) mobile plans with unlimited voice & messaging across main MNO brands, most secondary MNO brands and a few selected MVNO brands in Norway, Denmark, Sweden and Finland 28 December 2021²⁴ ²⁵ [source: Individual webpages of the mobile brands, IMF, compiled by Tefficient]

There is yet no mobile plan in Norway which grants the customer an unlimited amount of *full speed* data. At present, most plans marketed as unlimited in Norway will throttle the speed to **3 Mbit/s** when 100 GB of mobile data has been consumed in a month²⁶.

This throttling-beyond-a-bucket policy for unlimited is unique for Norway – in the other three Nordic markets there is no speed degradation after a certain bucket. Finland has since long applied **speed-based tiered pricing**, i.e. you do not pay for the amount of data you consume, but for the maximum download speed. That speed limit applies from the first to the last byte in a month. Telenor and later Telia have recently

²⁴ Ice launched a new subscription, iceMax, 12 January 2022. It has unlimited mobile data and a max speed of 25 Mbit/s (3 Mbit/s after 100 GB). It's 499 NOK per month but not shown in the graph as it didn't exist 28 December 2021.

²⁵ Chilimobil launched a new subscription 27 January 2022 with unlimited mobile data and a max speed of 10 Mbit/s (3 Mbit/s after 100 GB). It's 349 NOK per month, i.e. 50 NOK lower than Chilimobil's previous unlimited mobile data plan (which still is available) but not shown in the graph as it didn't exist 28 December 2021

²⁶ Ice, the third MNO in Norway, offers an add-on (Data Frihet) to most of its bucket plans allowing 1000 GB of extra data in a month, but throttled to 10 Mbit/s, as long as that extra data is consumed in Ice's own network (Ice+) and not through national roaming on Telia's network. In the graphs we have plotted both the price for the 30 GB full-speed plan *without* Data Frihet and the price for the 30 GB full-speed plan *with* Data Frihet. Happybytes, a Norwegian MVNO, throttles to 3 Mbit/s after 108 GB (as opposed to 100 GB for all others).

(June 2020 and October 2021) launched similar speed-based tiers as options to bucket plans in Norway. For users consuming less than 100 GB of data in a month, these plans will be experienced as the Finnish plans, but since the Finnish plans aren't throttled to 3 Mbit/s after 100 GB, they offer a better experience for users with high data usage.

Norwegian plans are positioned in the upper left part of Figure 15. This means that the Norwegian plans are more expensive, also after purchase power adjustment, than many of the Danish, Swedish and Finnish plans. As mentioned, Norwegian unlimited plans are more restrictive in policy as they are alone in throttling speeds when a certain bucket has been consumed.

Since most customers won't experience it, one could turn a blind eye to this difference in policy. To do that, we have in Figure 16 grouped all plans with *100 GB or more* to the right in the graph.

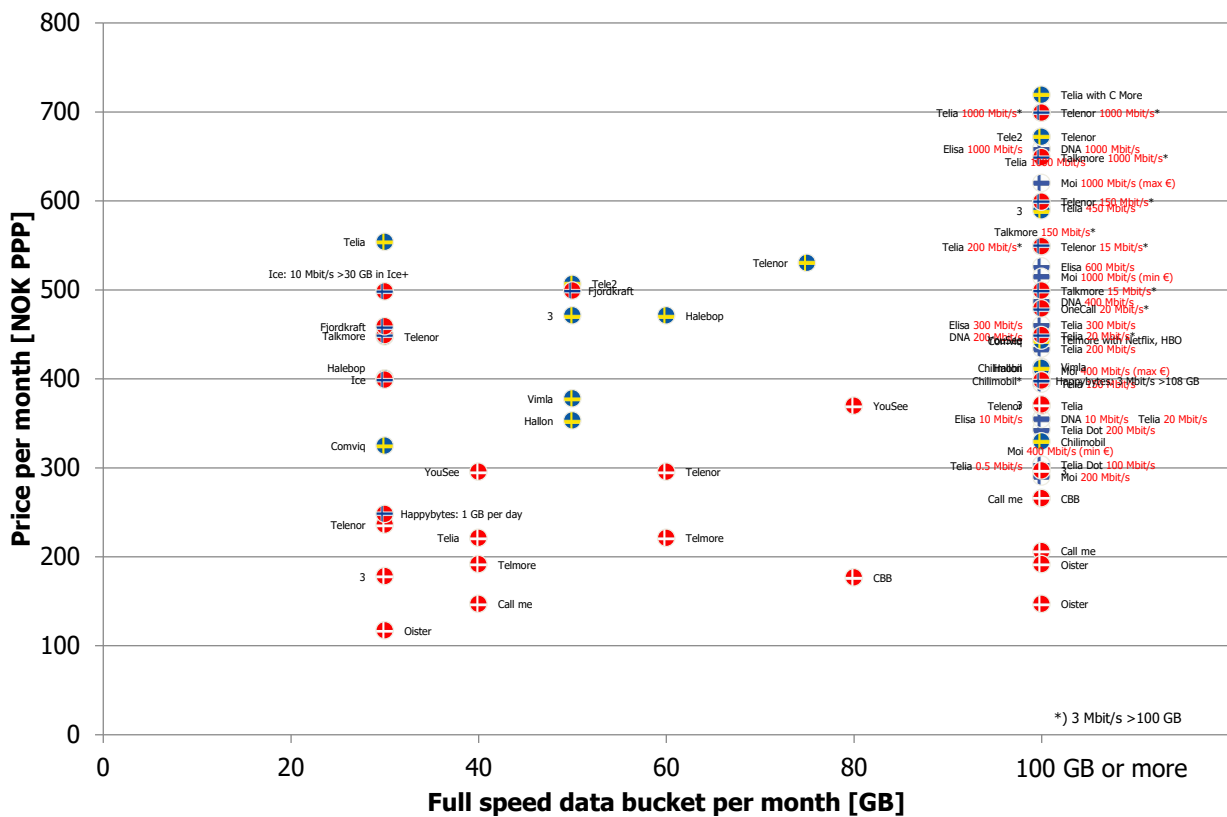


Figure 16. Comparison of the purchase parity pricing of data-rich (>30 GB) mobile plans with unlimited voice & messaging across main MNO brands, most secondary MNO brands and a few selected MVNO brands in Norway, Denmark, Sweden and Finland 28 December 2021²⁷ [source: Individual webpages of the mobile brands, IMF, compiled by Tefficient]

The most premium up to 1000 Mbit/s plans (still throttled to 3 Mbit/s after 100 GB) with unlimited data volume in Norway are 699 NOK per month. The same offer is available from Telenor and Telia. In PPP terms, there's just one more expensive plan in the other three countries, the 719 NOK PPP unlimited plan from

²⁷ Ice launched a new subscription, iceMax, 12 January 2022. It has unlimited mobile data and a max speed of 25 Mbit/s (3 Mbit/s after 100 GB). It's 499 NOK per month but not shown in the graph as it didn't exist 28 December 2021.

Telia Sweden. That plan however includes the streaming service C More²⁸ and doesn't slow down after 100 GB in a month.

Denmark is providing the most affordable data-rich plans in the Nordics – cluttered in the lower part of the chart. The cheapest unlimited plans are also Danish – from Telia's Call me and from Telenor's CBB brands: 266 NOK PPP. 3's Oister brand offers a 500 GB plan for less than that, 192 NOK PPP.

The chart is also showing that there is nothing but unlimited plans in **Finland**. As said, what Finnish mobile customers pay for is how *fast* they want the access to be (at best). For the same NOK PPP, Finnish plans offer significantly higher speeds compared to the speed-tiered plans of Telenor and Telia Norway. To give an example, 449 NOK PPP buys a plan limited to 20 Mbit/s (throttled to 3 Mbit/s after 100 GB) from Telia Norway. For a similar PPP amount, a Finnish mobile customer gets 200 or 300 Mbit/s (without throttling beyond 100 GB).

Sweden generally has more expensive plans than Denmark and Finland. This is particularly true for unlimited plans which all come without speed limitations. There is one exception to the expensive pricing though and that's **Chilimobil** Sweden. Chilimobil is an MVNO on 3's network in Sweden and offers unlimited for just 412 NOK PPP – whereas the others start at 590 NOK PPP.

Chilimobil is originally Norwegian and in its home market it offers unlimited²⁹ as MVNO on Telia's network for 398 NOK PPP. **Happybytes**, another MVNO, also offers it for 398 NOK PPP with a slightly more relaxed policy on throttling as the 3 Mbit/s speed limit applies after 108 GB, not 100 GB. These two MVNOs have during 2021 lowered their price on their unlimited plans from 469/468 NOK and when comparing to our initial analysis one year ago, it's clear that the Norwegian prices generally have come down – or buckets been increased.

With purchase power adjustment, **Norwegian 30-50 GB plans can compete on price with some Swedish plans** (but not with Danish). This is primarily explained by the positions of Happybytes³⁰ and Ice.

If not considering the 100/108 GB full speed limitation, Norwegian unlimited plans could also compete on price with Swedish unlimited plans (again not with Danish plans, though). Compared to Finland, the Norwegian plans with unlimited data volume are more expensive (in PPP terms) than the Finnish plans – since they offer higher speeds and no throttling beyond 100 GB per month. Chilimobil and Happybytes provide the best value for money in the Norwegian unlimited segment.

After compensation for differences in purchasing power, Norwegian 30-50 GB plans can compete on price with some Swedish plans. Would it not be for the 100/108 GB full speed limitation, Norwegian unlimited plans could also compete on price with Swedish unlimited plans. For the same speed, Norwegian unlimited plans are more expensive and more restrictive than the Finnish unlimited plans. Denmark is providing the most affordable data-rich plans in the Nordics. Compared to the initial analysis one year ago, the pricing position of Norway is less extreme.

²⁸ C More is owned and operated by Telia

²⁹ 3 Mbit/s after 100 GB per month

³⁰ Happybytes "1 GB per day" plan is generously interpreted as 30 GB per month here. In order to get 30 GB during a month, a user will have to have the same 1 GB usage each day, something that isn't fully realistic.

We however started this section warning against concluding solely based on current pricing. Few customers are today on the plans currently offered. The ARPU is representative of what mobile customers actually *pay* and should be given more weight in a balanced conclusion, see section 13.

9. EBITDA margin per reporting operator

In section 5, 6 and 7, we concluded that Norwegian operators generally enjoy high ARPU although mobile data usage is low. Does this trickle down to high profitability too?

First we will look at what remains of revenue after having paid recurring OPEX: The adjusted EBITDA (earnings before interest, tax, depreciation and amortisation). The adjusted EBITDA margins of all mobile operators in Norway, Denmark, Sweden and Finland are shown in Figure 17.

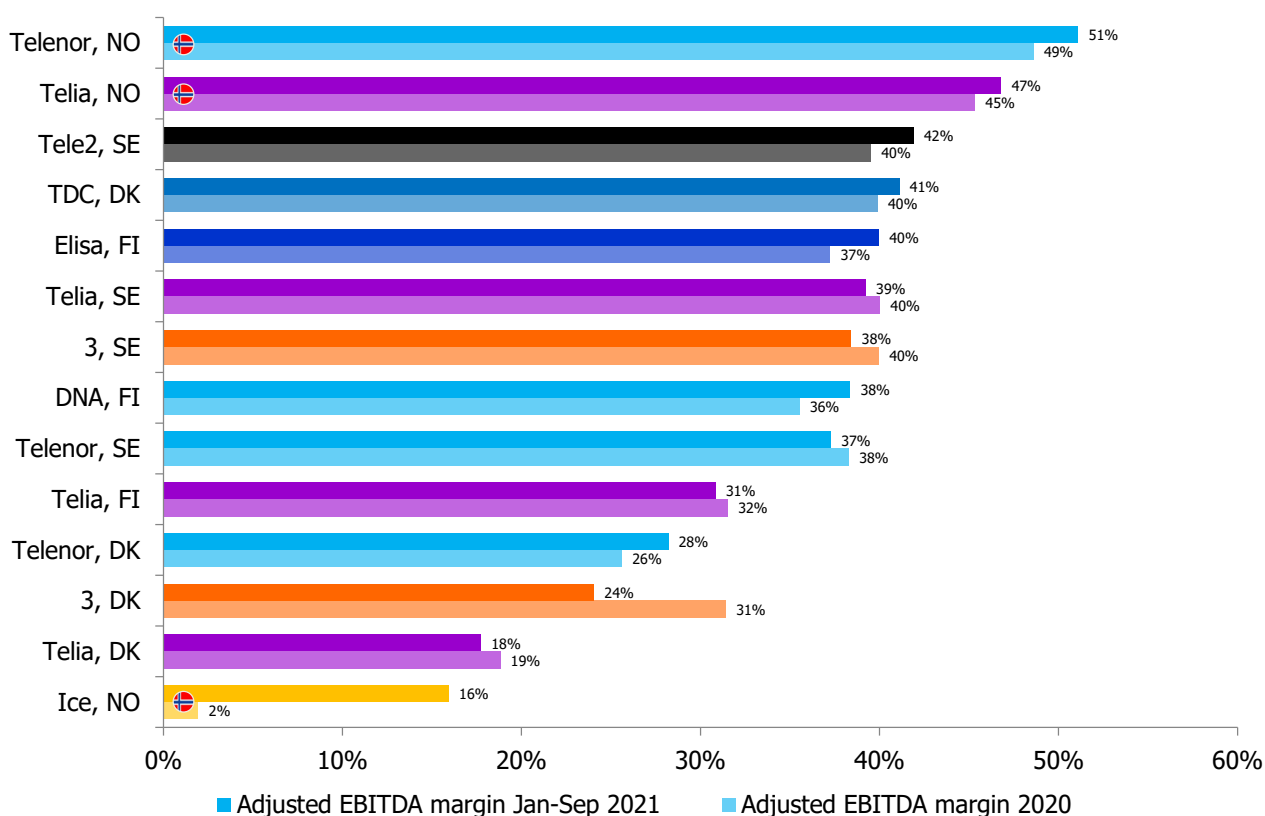


Figure 17. Adjusted EBITDA margin for all operators (MNOs) in Norway, Denmark, Sweden and Finland 2020 and Jan-Sep 2021. Note that operators report their EBITDA for their complete business which most often is wider than just mobile; three operators are pure mobile: 3 Sweden, 3 Denmark and Ice [source: operator reports, compiled by Tefficient]

The two established Norwegian operators, **Telenor** and **Telia**, have the highest adjusted EBITDA margins in these four countries. This is true both for the full year of 2020 as for the first nine months of 2021. In contrast, the third Norwegian operator, **Ice**, has the lowest adjusted EBITDA margin.

That Telenor and Telia Norway have the strongest adjusted EBITDA margins is an indication of 1) that their revenue is unusually high, or, 2) that their OPEX is unusually low, or, 3) both. Ice's position is a result of weaker revenue per customer (ARPU) and higher OPEX. In 2020, Ice's national roaming costs³¹ represented 21% of Ice's total revenue³². The new national roaming agreement Ice made with Telia following the new

³¹ Ice uses Telia's network outside of its own network's coverage area

³² Source: Ice's financial reporting, calculated by Tefficient

Market-15 regulation from Nkom lowered that cost item significantly for Ice from January 2021. In the first nine months of 2021, it represented 9% of Ice's total revenue³³.

Concluding on Figure 17, it is very unlikely that Telenor or Telia could have so high Networks OPEX that it would dominate their total OPEX – if they had, their adjusted EBITDA margins wouldn't be best in class.

Neither Telenor Norway nor Telia Norway has a problem with high OPEX. If so, their EBITDA margins wouldn't be best in class. Ice continues to have the lowest EBITDA margin although it has increased significantly in 2021 following the new national roaming agreement with Telia.

³³ In part, the lower cost is also explained by continued rollout of Ice's own network

10. EBITDA-CAPEX (cash flow approximation) margin per reporting operator

There are other costs than OPEX, though. We also need to take CAPEX into account. Figure 18 compares the CAPEX to revenue ratios for our operators. **Ice** is by far the operator in the Nordics that invests the most given the revenues at hand – 31% in the first nine months of 2021.

3 Scandinavia (figures not broken down for Sweden and Denmark respectively) has, according to figures reported by its 40% owner Investor AB, upped its CAPEX significantly in 2021 to a level of 28% of revenues.

TDC in Denmark is currently, under new ownership, rolling out fibre networks at a high speed and used a high 26% of its revenues on CAPEX in the first nine months of 2021. **Telenor** Norway invested 20% of its revenues in 2020 and in the first nine months of 2021. **Telia** Norway is also investing a bit more than what is common in the Nordics; 20% of revenues in the first nine months of 2021. A majority of these investments are likely in fibre rather than in mobile networks³⁴. But there is some merit in the claim that **Norwegian operators invest more**.

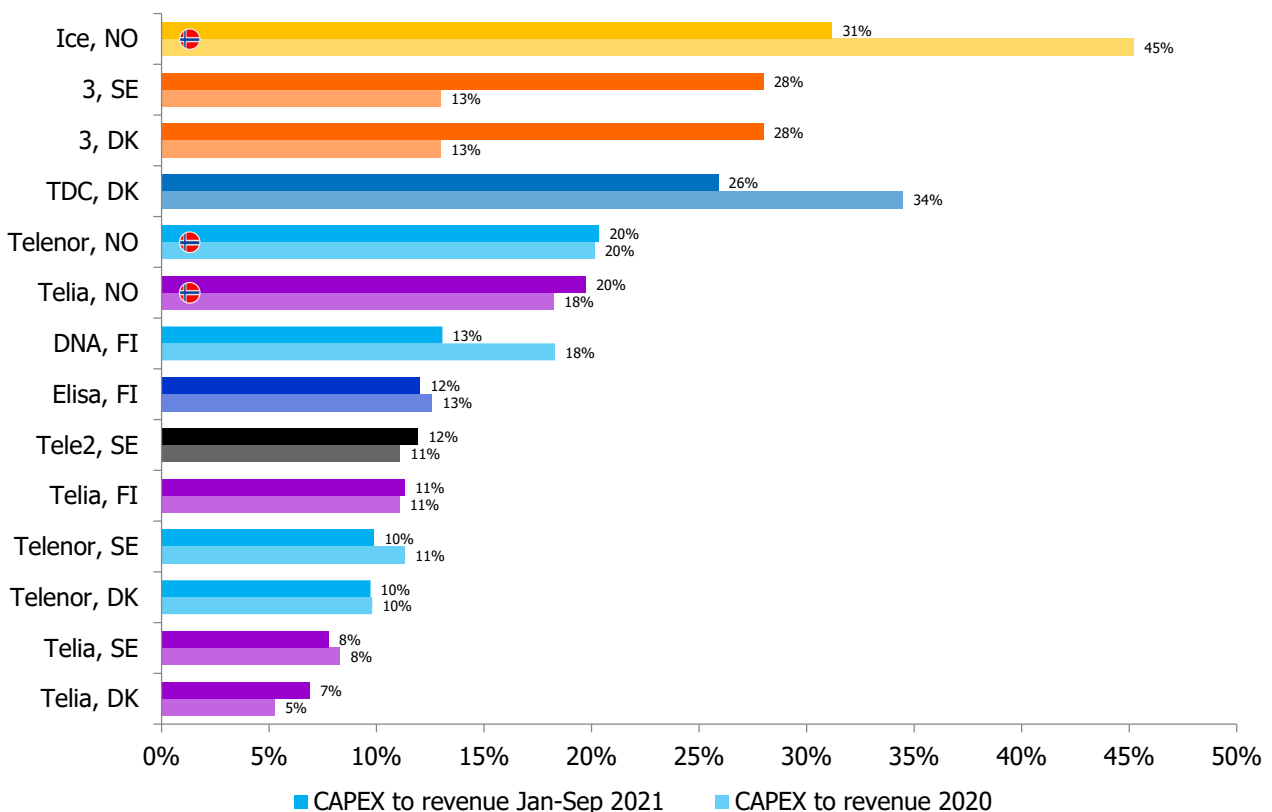


Figure 18. CAPEX to revenue for all mobile operators in Norway, Denmark, Sweden and Finland. Note that operators report their CAPEX for their complete business which most often is wider than just mobile; three operators are pure mobile: 3 Sweden, 3 Denmark and Ice. 3 doesn't separate its CAPEX reporting between Sweden and Denmark, hence the same percentage [source: operator reports, compiled by Tefficient]

³⁴ In the period 2016-2020, the investments in mobile networks in Norway were 7.7 BNOK but the investments in fibre networks were more than three times higher; 26 BNOK: <https://www.nkom.no/aktuelt/nytt-ar-med-hoye-investeringer-gir-rekordstor-fibervekst-i-norge>

Norwegian operators all invest more – as share of total revenue – than the median Nordic operator.

Does the generally high CAPEX in Norway then destroy the cash flow of the operators? Here we make an approximation when subtracting the CAPEX from the EBITDA and calling it the cash flow margin. It shows what remains of revenue after having paid recurring OPEX and CAPEX.

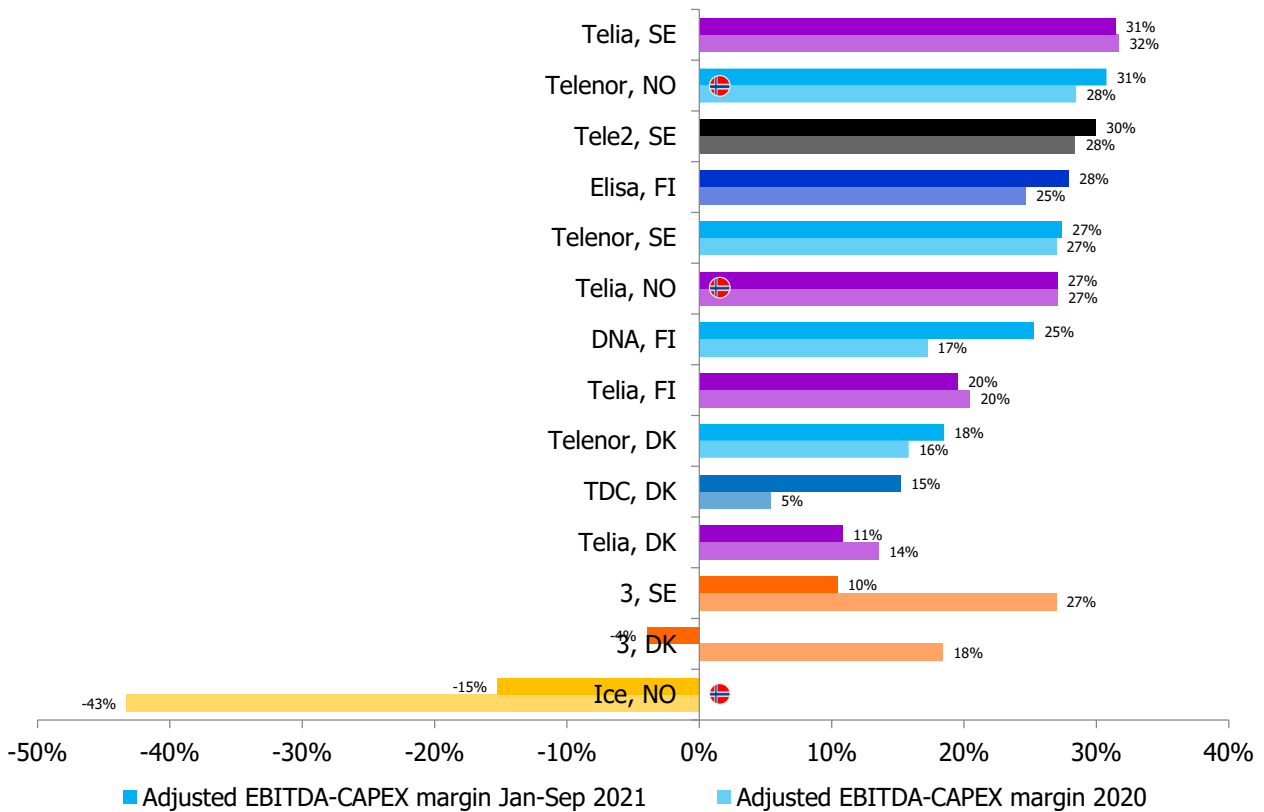


Figure 19. Adjusted EBITDA margin for all mobile operators in Norway, Denmark, Sweden and Finland. Note that operators report their EBITDA and CAPEX for their complete business which most often is wider than just mobile; three operators are pure mobile: 3 Sweden, 3 Denmark and Ice [source: operator reports, compiled by Tefficient]

Since **Telenor Norway’s** and **Telia Norway’s** CAPEX levels are higher than the median of the four markets, Telenor and Telia are no longer holding the number 1 and 2 positions after having deducted also CAPEX. They are still well positioned as number 2 and 6, though. **Ice** had a negative EBITDA-CAPEX margin but it’s much less negative in the first nine months of 2021 than in 2020. There are two reasons to the improvement: 1) A higher EBITDA margin as shown in Figure 17, 2) A lower CAPEX to revenue ratio as shown in Figure 18.

Neither Telenor Norway nor Telia Norway has a problem with high OPEX+CAPEX. If so, their EBITDA-CAPEX margins wouldn’t be higher than the median Nordic operator. The situation for Ice is different – Ice’s revenues cover its OPEX but when adding its high CAPEX, EBITDA-CAPEX becomes negative. The situation improved in 2021, though.

11. Market concentration and HHI per country

As shown in section 7, Telenor Norway's mobile ARPU is uniquely high not just in a Nordic perspective, but in Norway. This, together with a leading market share in subscriptions, results in a solid market share in revenue, see Figure 20. It shows the distribution of mobile service revenue in Norway between the three MNOs Telenor, Telia and Ice – and other (non-MNO) providers.

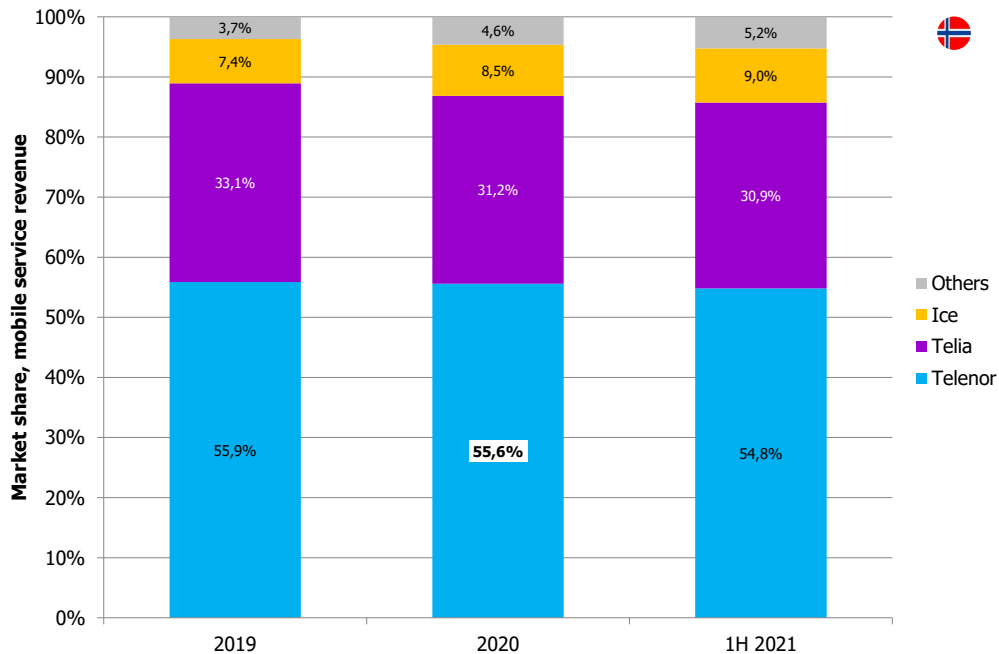


Figure 20. Market share in mobile service revenue, Norway [source: Nkom]

Since we won't have regulatory revenue data for Denmark and Finland for 1H 2021, we highlight 2020 as our comparison baseline. In that year, Telenor had a revenue market share of **55.6%** in Norway. It is slowly on its way down as Ice and 'Others' take market share – noticeably more at the expense of Telia rather than of Telenor.

Denmark's mobile service revenue distribution is shown below.

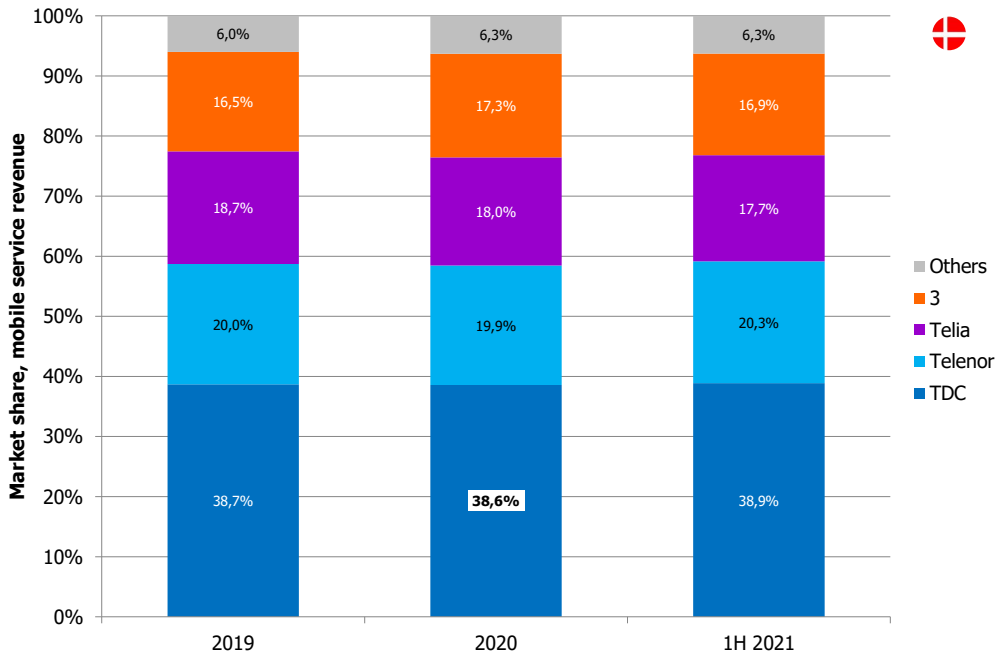


Figure 21. Market share in mobile service revenue, Denmark [source: Erhvervsstyrelsen for 2019 and 2020 – for 1H 2021 operator reports as Erhvervsstyrelsen only reports revenue annually; 50% of 'others' revenue in 2020 assumed for 1H 2021 as no reporting available]

Denmark has four MNOs and the incumbent operator TDC has a more limited market share than in Norway; **38.6%** in 2020. The graph for Sweden follows below.

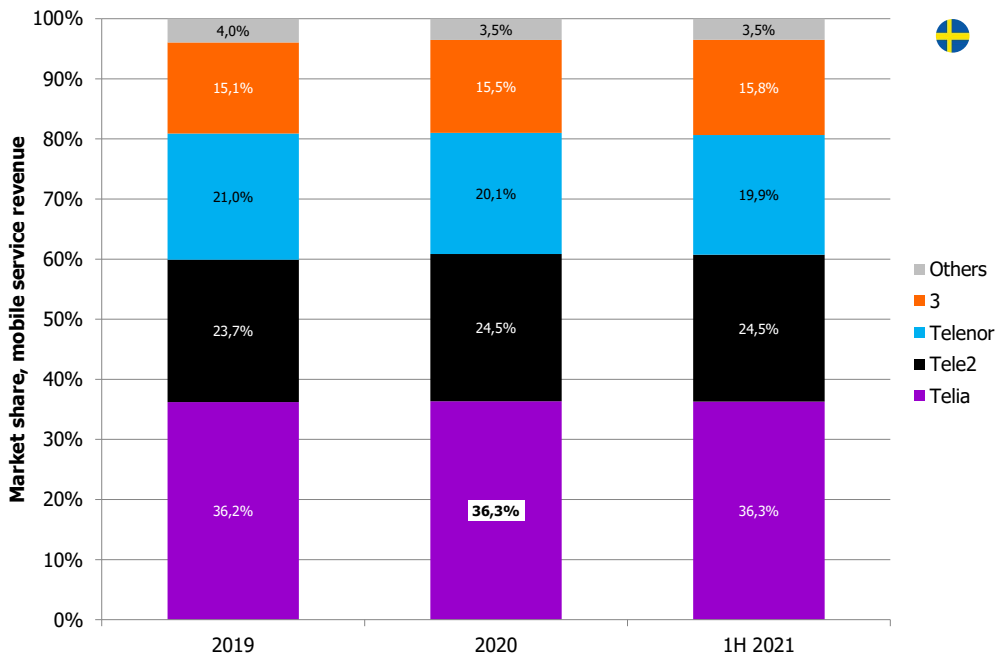


Figure 22. Market share in mobile service revenue, Sweden [source: PTS]

The incumbent in Sweden, Telia, had a **36.3%** revenue market share in 2020.

Finally the graph for Finland:

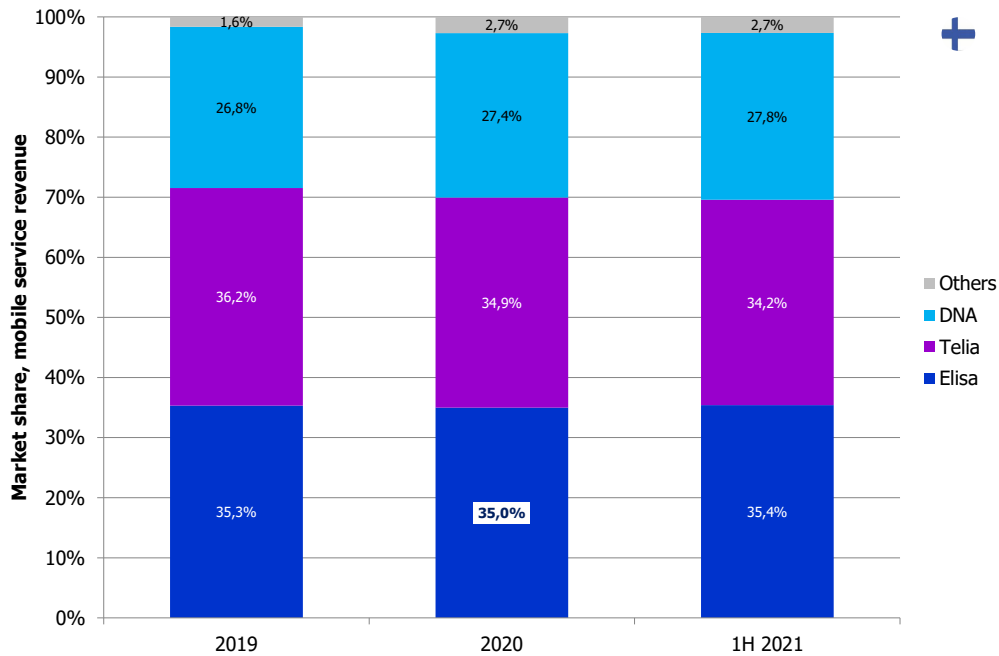


Figure 23. Market share in mobile service revenue, Finland [source: Traficom for 2019 and 2020 – for 1H 2021 operator reports as Traficom only reports revenue annually; 50% of ‘others’ revenue in 2020 assumed for 1H 2021 as no reporting available]

The largest operator in Finland³⁵ in 2020, Elisa, had a **35.0%** market share in 2020.

The table below summarises the market shares of the incumbent in each other markets – and calculates the concentration index HHI for the individual mobile markets as a whole.

What is HHI?

The Herfindahl-Hirschman Index is a simple and widely applied economic concept that often is used in regulation and antitrust matters. It is defined as the sum of the squares of the market shares of the companies competing in a market. A monopoly would thus get an index of $100^2 = 10000$ which is the maximum value and depicts a fully concentrated market.

Where the line should be drawn between a moderately concentrated and a highly concentrated market is obviously debatable but the U.S. Department of Justice has in its [merger guidelines](#) that a HHI value above 2500 should be considered highly concentrated.

The mobile business, with its limited number of licences, is often having higher HHI values than 2500, though.

In the table 2020 is used as that is the latest data point for which regulator data is fully available.

³⁵ Elisa here assumed as the Finnish incumbent as it had the largest revenue market share in 2020. Unlike the other markets, Finland has not had a nationwide incumbent as the fixed networks rather were local monopolies.

	Revenue market share of incumbent MNO 2020	Herfindahl-Hirschman Index (HHI) 2020 [0-10000] ³⁶
Norway (3 MNOs)	55.6%	4162 (-120)
Denmark (4 MNOs)	38.6%	2545 (-13)
Sweden (4 MNOs)	36.3%	2579 (+21)
Finland (3 MNOs)	35.0%	3202 (-78)

Figure 24. Comparison of incumbent market shares in mobile service revenue, Norway, Denmark, Sweden and Finland – as well as HHI for the whole mobile market, 2020 (change from 2019 within parentheses) [source: Nkom, Energistyrelsen, PTS, Traficom, compiled by Tefficient]

The Norwegian mobile market is **uniquely concentrated**. This is true both when comparing the revenue market share of the incumbent as well as when comparing the HHI. The HHI has though decreased 120 points since 2019.

The fact that Norway only has three MNOs doesn't explain this; Finland too has three MNOs and although the Finnish HHI is a bit higher than in Denmark and Sweden that is mainly due to 'Others' being very limited in Finland. When looking at the revenue market share of the largest operator, Elisa had 35.0% in 2020, a number lower than the incumbents in Denmark and Sweden.

Of the HHI for Norway, Telenor's contribution is **74%** (3092 of 4162 HHI points). In comparison TDC's contribution to the Danish HHI is 59%, Telia's 51% to the Swedish HHI and Elisa's 38% to the Finnish HHI.

The Norwegian mobile market is uniquely concentrated. It is not just explained by the number of MNOs. Telenor's market share explains 74% of Norway's HHI.

³⁶ 'Others' is treated as one which increases HHI a bit in all markets

12. Comparison of the mobile network experience

We have seen that Norwegian operators enjoy high revenue although the data usage is low – and that Telenor and Telia have good cash flow margins albeit having invested more than what's typical. Does this result in a great mobile network experience that would contribute to the perception of value for money?

If we start with data from the American crowdsourcing company **Ookla Speedtest**, we can see that the Norwegian networks continuously deliver median download speeds that are about 30-50 Mbit/s faster than the other three markets. **Norway is the country in the world with the second highest median download speed**³⁷ in November 2021.

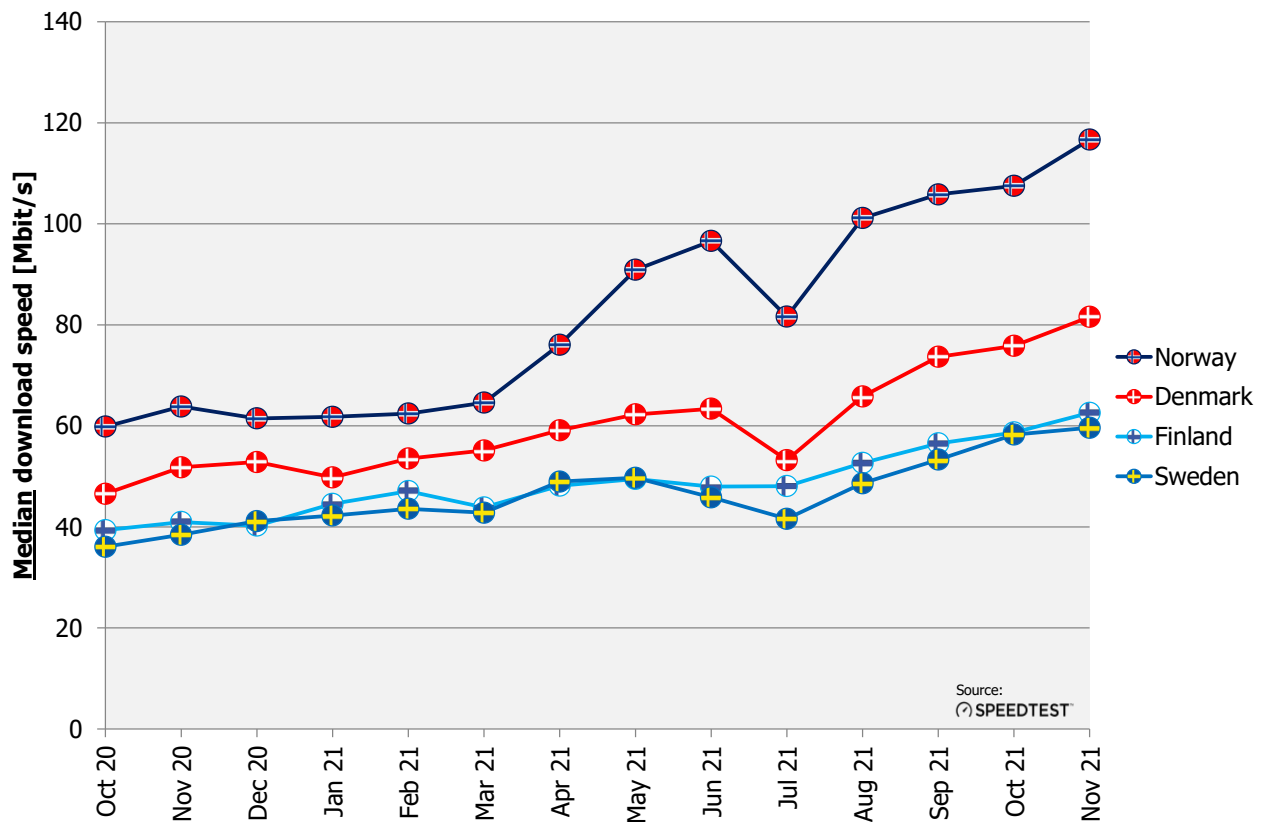


Figure 25. Median mobile broadband download speed for Norway, Denmark, Sweden and Finland per month Oct 2020-Nov 2021 [source: Ookla Speedtest]

When interpreting Figure 25, it's important to remember that 80% of non-M2M subscriptions in June 2021 were **unlimited and charged based on speed tiers**³⁸ in Finland. The average Finnish mobile speed can therefore be curbed by customers not willing to pay more for speed. Finnish operators have generally come the furthest with its **5G** rollout compared to Norway, Denmark and Sweden – but as 5G speeds cost extra in Finland, customers need to be convinced to pay more – for a new device, but *also* for a new subscription.

³⁷ <https://www.speedtest.net/global-index>

³⁸ Telenor Norway has introduced a similar approach with its new 'Next' plans in June 2020, Telia Norway in October 2021. Unlike in Finland, these are though offered as options to traditional bucket plans whereas Finnish operators only offer speed-tiered unlimited plans.

The 5G introductions in Norway, Denmark and Sweden have generally been done so that existing customers *automatically* get access to 5G; the only thing they need is a new device.

Another important point to make is that mobile networks **share the existing capacity** between the users of a cell. If there is much demand for data, the speed per user will be slower. If there is little demand, the speed per user will be higher. Operators can improve the user experience by adding more capacity.

Since Norway has the lowest mobile data usage in the Nordics, the average speeds will be higher – if the capacity is the same – than in the other three markets. It is relatively simpler for Norway to win a speed award because of the lower mobile data usage. On top of this, Norwegian operators could of course have deployed more capacity³⁹ – but that can't be assessed based on crowdsourced network performance test.

Other crowdsourced tests take other factors than just speed into account. The Canadian company **Tutela** has defined what they call *excellent consistent quality* as:

- >5 Mbit/s download throughput
- >1.5 Mbit/s upload throughput
- <50 ms latency
- <30 ms jitter
- <1% packet loss

Based on that, Tutela ranked 100 countries⁴⁰:

³⁹ The higher CAPEX of Norwegian operators could suggest that

⁴⁰ <https://www.tutela.com/blog/global-mobile-experience-2021>

The % of tests where a mobile connection was good enough for the most demanding popular apps (including HD video group calls and 1080p video streaming)

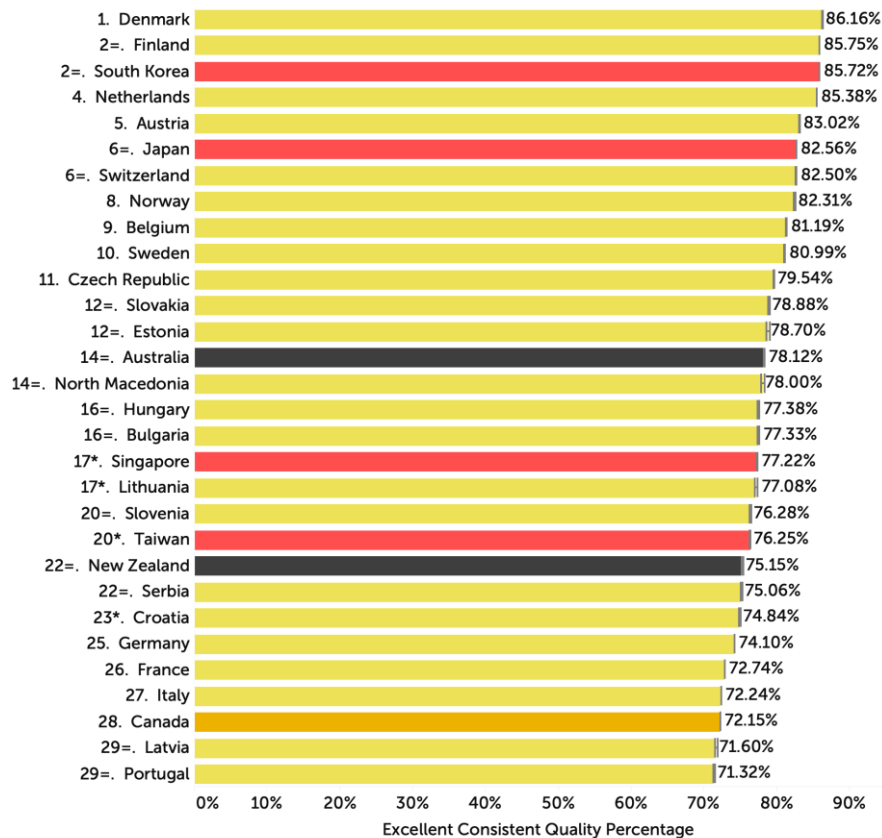


Figure 26. Top 30 countries with regards to Excellent Consistent Quality Percentage Aug 2020-Aug 2021 [source: Tutela]

Here **Denmark** is ranked as the first country in the world, followed by Finland on a shared second place. **Norway is ranked as number eight** and Sweden number ten. The high ranking of all our four markets is evidence for that the Nordics generally have world-class mobile networks, but in Tutela's aggregated data Norway's high download speed isn't sufficient for a top spot. Instead, Denmark and Finland, two countries with lower download speeds, take the two top spots.

Tutela is also showing the top 30 operators in excellent consistent quality percentage.

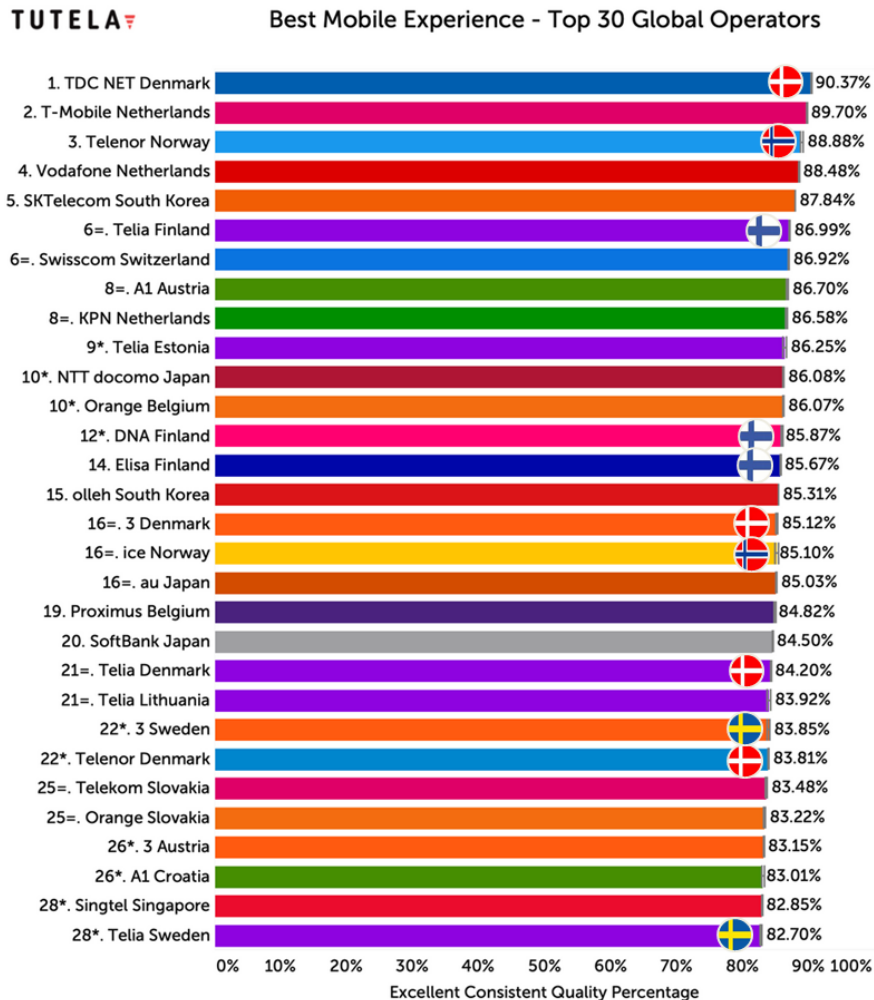


Figure 27. Top 30 operators with regards to Excellent Consistent Quality Percentage Aug 2020-Aug 2021 [source: Tutela, flags added by Tefficient]

Eleven of our fourteen operators are on the global top 30 list. **TDC** in Denmark is ranked as number one globally and the other three Danish operators also make it to the top 30 list.

Telenor Norway is ranked very high as number 3. Ice is on the top 30 list, but not Telia Norway.

In Finland, all three operators are on top the top 30 list with Telia highest ranked as a shared number 6. Sweden only has two operators on the top 30 list, 3 and Telia, whereas Tele2 and Telenor are out of the list.

Let's finally turn to the British crowdsourcing specialist **Opensignal**. It has recently issued **5G** Experience Reports for Norway⁴¹ and Finland⁴² (but not for Denmark and Sweden). As the data is from the same time period (1 Aug-29 Oct 2021), we have put together some of their key stats in charts that allow a direct comparison between Norway and Finland, see Figure 28 and Figure 29.

⁴¹ <https://www.opensignal.com/reports/2021/12/norway/mobile-network-experience-5g>

⁴² <https://www.opensignal.com/reports/2021/12/finland/mobile-network-experience-5g>

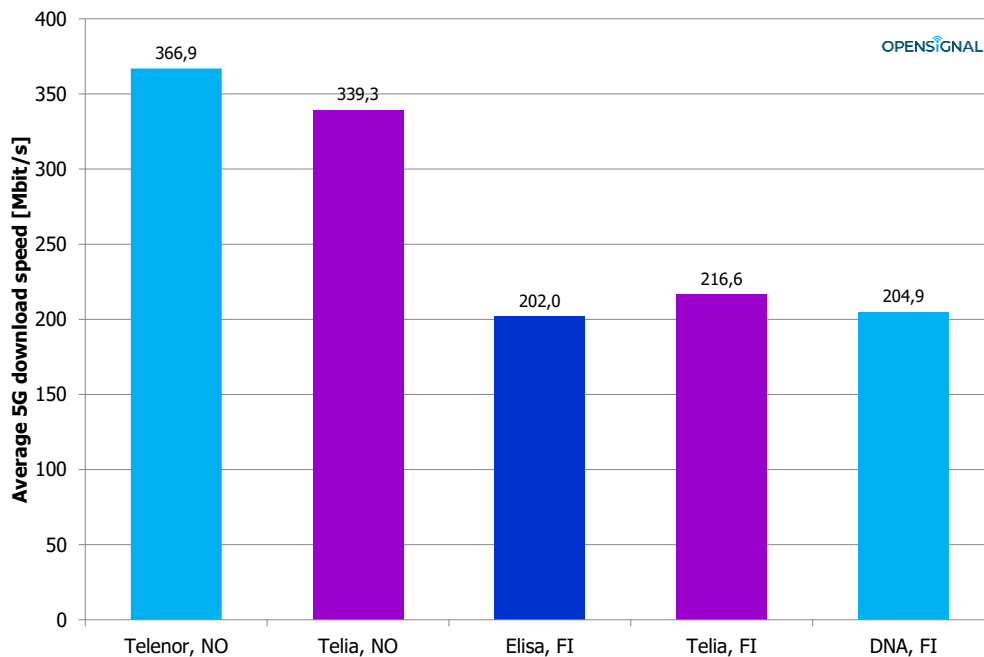


Figure 28. Average 5G download speed Aug-Oct 2021 [source: Opensignal, compiled by Tefficient]

The customers of Finnish operators averagely experience download speeds of about 200 Mbit/s on 5G whereas the customers of the two Norwegian operators with 5G in this time period⁴³ experienced much higher average 5G speeds; around 340-370 Mbit/s. Although these figures are for 5G only, it resonates with the difference seen in Ookla data (Figure 25). Rather than technical reasons, part of the answer to why the Finnish experience is slower is likely to be found in the speed-tiered pricing of mobile plans in Finland.

If instead comparing the 5G availability⁴⁴, we see a different picture.

⁴³ Ice had not yet launched 5G when this data was gathered

⁴⁴ 5G Availability shows the proportion of time Opensignal users with a 5G device and subscription have a 5G connection
<https://www.opensignal.com/methodology-overview>

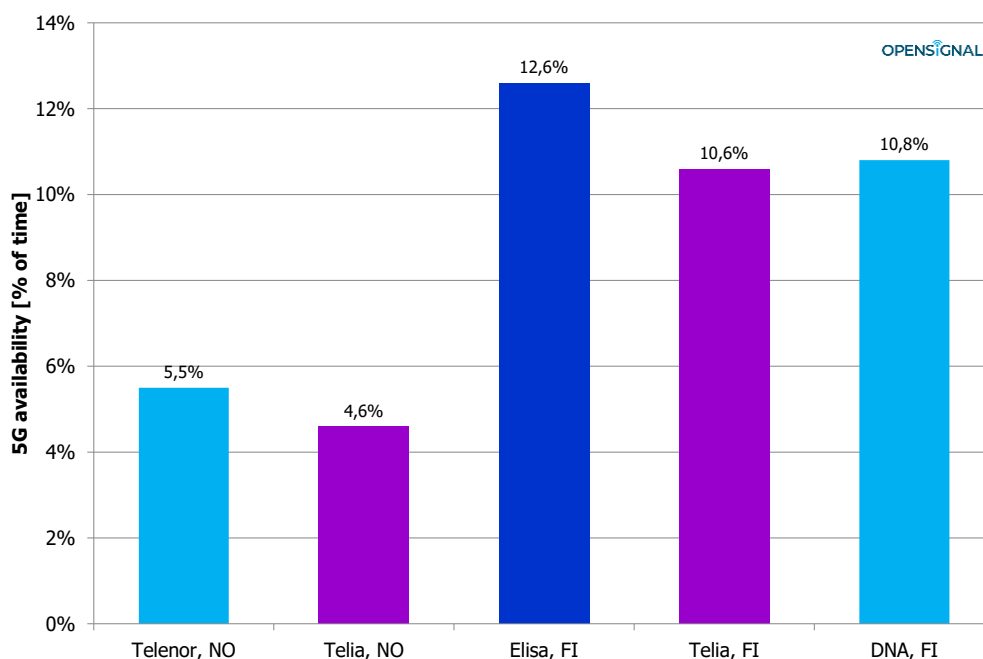


Figure 29. 5G availability Aug-Oct 2021 [source: Opensignal, compiled by Tefficient]

It's logical that the customers of the Finnish operators experience a higher 5G availability: The Finnish operators started to rollout 5G before the rest of the Nordics and have also reported roughly twice the population coverage than the Norwegian operator so far having reporting it, Telia⁴⁵.

Norway is generally – and also on 5G – providing a faster download speed on its networks than other Nordic countries. Low mobile data usage contributes to this. It is also likely that Norwegian operators have invested in capacity currently not fully utilised. With regards to excellent consistent quality, Denmark and Finland are however higher ranked than Norway. Telenor stands out positively in Norway. The mobile network experience in Norway is great, but doesn't explain Norway's higher PPP ARPU – as the experience is equally good in the other countries.

⁴⁵ Telia Norway reported 31%, Elisa 70%, DNA 64% and Telia Finland 53% in the fourth quarter of 2021. This is population coverage outdoors at the home doorstep. Opensignal's 5G availability values generally become much lower as most usage actually happens indoors where 5G coverage typically today still is inferior to 4G.

13. Summary and conclusion

This analysis is a one-year-later update of key parts in an original analysis, dated 22 December 2020. Although numbers have changed, it establishes the findings from last year. A few smaller trend shifts can be observed, though:

- Norwegian mobile data usage is still low, but Norway's **usage growth rate** is no longer the slowest.
- **Prices on data-rich plans** – especially from challenger providers – have come down in Norway and the size of buckets on traditional plans has been increased. It has not yet had any effect on ARPU, though.
- The **market concentration** is still high in Norway, but decreased faster than in the other countries.

The findings of the analysis are:

Market ARPU, PPP

- Including M2M: Norway's ARPU is about as high as Finland's but significantly higher than Denmark's and Sweden's.
- Excluding M2M: Norway's ARPU is significantly (31%) higher than Sweden's (no comparison to Denmark and Finland possible).

Total mobile service revenue per consumed GB, PPP

- 2.2-5.0 times higher in Norway than in the other Nordic countries.
- Likely that the high revenue per GB hampers the Norwegian usage.

Mobile data usage vs. market ARPU, PPP

- Norway's ARPU is somewhat lower than Finland's, but the Finnish data usage is 5.1 times higher than Norway's.
- Norway's ARPU is higher than Denmark's and Sweden's, but the Norwegian data usage is lower
- If data volume is what defines value, Norwegian mobile subscribers receive the lowest value in these Nordic markets.
- After three years with the slowest usage growth rate, Norway didn't have the slowest growth rate in the first half of 2021.

Operator ARPU, PPP

- Telenor Norway has a uniquely high mobile ARPU, 33% higher than any other operator.
- The other two Norwegian operators, Telia and Ice, have much lower ARPU than Telenor but still often higher than operators in Sweden and Denmark in PPP terms.

Pricing of data-rich plans, PPP

- Norwegian 30-50 GB plans can compete on price with some Swedish plans.
- Would it not be for the Norwegian 100/108 GB full speed limitation, Norwegian unlimited plans could also compete on price with Swedish unlimited plans.

- For the same speed, Norwegian unlimited plans are more expensive and more restrictive than the Finnish unlimited plans.
- Denmark is providing the most affordable data-rich plans in the Nordics.
- Compared to the initial analysis one year ago, the pricing position of Norway is less extreme. Prices on data-rich plans – especially from challenger providers – have come down and the size of buckets on traditional plans has been increased.

EBITDA

- Neither Telenor Norway nor Telia Norway has a problem with high OPEX. If so, their EBITDA margins wouldn't be best in class.
- Ice continues to have the lowest EBITDA margin in the Nordics although it has increased significantly in 2021 following the new national roaming agreement with Telia.

CAPEX

- Norwegian operators all invest more – as share of total revenue – than the median Nordic operator.

Cash flow approximation (EBITDA-CAPEX)

- Neither Telenor Norway nor Telia Norway has a problem with high OPEX+CAPEX. If so, their EBITDA-CAPEX margins wouldn't be higher than the median Nordic operator.
- The situation for Ice is different – Ice's revenues cover its OPEX but when adding its high CAPEX, EBITDA-CAPEX becomes negative. The situation improved in 2021, though.

Market concentration

- The Norwegian mobile market is uniquely concentrated. In 2020, the market concentration index (HHI) however decreased faster than in the other countries.
- Norway's high HHI isn't just explained by the number of MNOs. Telenor's market share explains 74% of Norway's HHI.

Mobile network experience

- Norway is generally – and also on 5G – providing a faster download speed on its networks than other Nordic countries. Low mobile data usage contributes to this. It is also likely that Norwegian operators have invested in capacity currently not fully utilised.
- With regards to excellent consistent quality, Denmark and Finland are however higher ranked than Norway. Telenor stands out positively in Norway.
- The mobile network experience in Norway is great, but doesn't explain Norway's higher PPP ARPU – as the experience, on average, is equally good in the other countries.

This updated analysis doesn't repeat the full root cause analysis of the original analysis, but establishes the key finding: **After adjustment for purchasing power, the Norwegian mobile revenue per GB is higher than in Denmark, Sweden and Finland and the most likely root cause is the higher market concentration in Norway.**

Norway's market concentration did however decrease somewhat during 2020. As outlined in the start of this section, Norwegian prices were coming down and the data usage growth increased.