

Industry analysis #5 2016 – updated version

Mobile data 1H 2016

Unlimited pushes data usage to new heights

This is tefficient's 14th public analysis on the development and drivers of mobile data usage.

The usage continued to grow in 2016, but the growth rates varied much between markets. Singapore, Japan, Hong Kong and Hungary grew the slowest whereas Lithuania, Turkey, Austria and Korea grew the fastest.

In Lithuania, Austria and Korea, premium unlimited plans were gradually introduced in 2014 and 2015 and the effect on data usage has been similar to what our previous analyses identified for Finland and Latvia.

The data usage top list for January-September 2016 is dominated by operators that offer unlimited: The world leader DNA from Finland had an average usage per SIM of 9.9 GB per month.

High penetration of data-only SIMs explains high data usage to a greater extent than 4G LTE.

But the effective revenue per GB matters most: In Finland, average usage was 13x that of the Netherlands – where operators effectively charged 14x more for a gigabyte than in Finland. Other expensive mobile data countries are Canada, Belgium, Germany and Czech Republic.



The average Finnish SIM used more than 7 GB per month in 1H 2016

Figure 1 shows the development of mobile data usage for 32 countries where regulators¹ report mobile data traffic.

The top countries of the world based on 1H 2016 stats were **Finland, Korea, Sweden, Austria** and **Denmark** (which hides Austria ["AT"] in Figure 1). Based on full year 2015 stats, Latvia and USA would most likely also be top-ranked, but regulators in these countries don't report half-yearly stats.

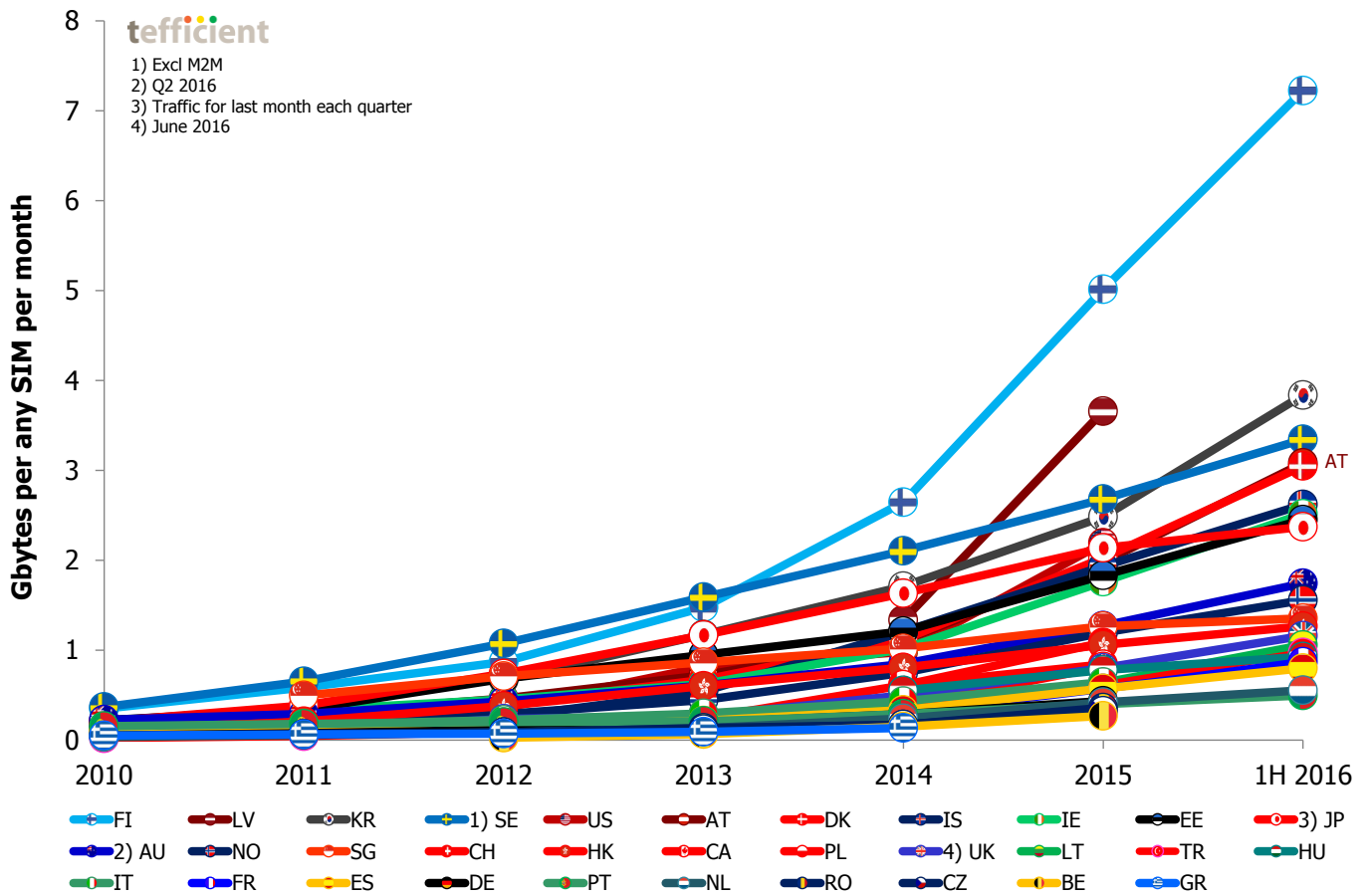


Figure 1. Development of mobile data usage per any SIM per country



With **7.2 GB** per month per any SIM, **Finland** continued to lead the world in usage. 47% of all Finnish SIMs (incl. M2M) had **unlimited data volume** in June 2016: Monetisation in Finland is effectively based on throughput tiers and not on volume.

¹ Exception: USA, where data is from industry body CTIA

Korea passed Sweden in 2016 and is, based on available statistics for the first half, number two in the world with **3.8 GB** per SIM and month. The Korean operators started to introduce premium unlimited plans in April 2014, see Figure 2.

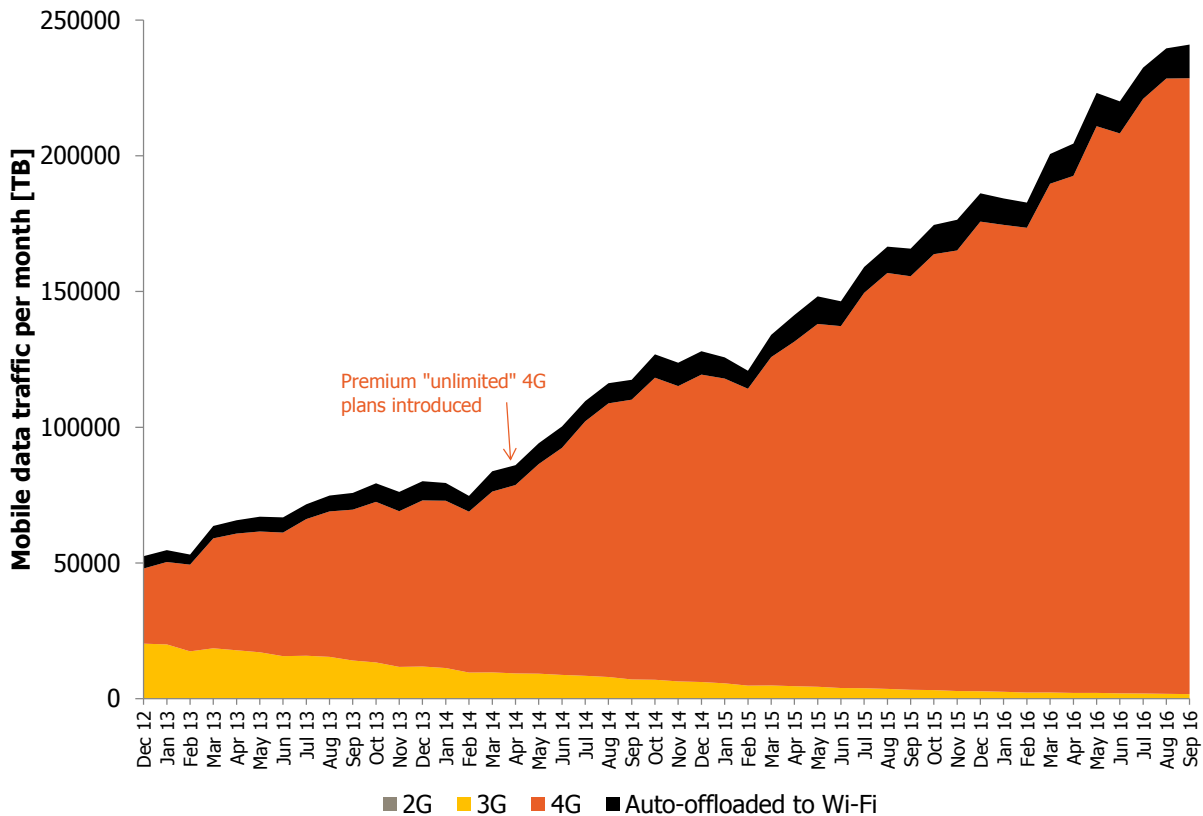


Figure 2. Development of mobile data traffic in South Korea before and after the introduction of unlimited plans

Albeit premium, these unlimited plans aren't without limits: Once the full-speed data allowance has been consumed, the throughput is **throttled** to a few Mbit/s (exact speed depends on plan). Even with this throttling, the effect on the mobile data traffic in Korea was immediately visible, see the arrow in Figure 2. The mobile data traffic growth accelerated immediately after the introduction of these unlimited plans.

Another fast-moving country is fourth-ranked **Austria**. Usage grew 56% from full year 2015 to the first half of 2016. The three operators A1, T-Mobile and 3 (see picture to the right) are now all offering unlimited data volume – where the price depends on the throughput tier – in combination with home modems.

In contrast to Korea, where the focus is on handset data, the Austrian use case is **fixed network substitution**. Noticeably, the Austrian incumbent, A1, is also offering this.

| Hui Flat 10 | Hui Flat 30 | Hui Flat 50 | Hui Flat 150 |
|--|---|---|---|
| 18 € / Monat | 25 € / Monat | 35 € / Monat | 45 € / Monat |
| Unlimitiertes Datenvolumen | Unlimitiertes Datenvolumen | Unlimitiertes Datenvolumen | Unlimitiertes Datenvolumen |
| bis zu 10 Mbit/s. Download 4 Mbit/s. Upload | bis zu 30 Mbit/s. Download 10 Mbit/s. Upload inklusive LTE* | bis zu 50 Mbit/s. Download 20 Mbit/s. Upload inklusive LTE* | bis zu 150 Mbit/s. Down- 50 Mbit/s. Upload inklusive LTE* |



Also fifth-ranked **Denmark** is fast-moving. The usage per SIM grew 50% from full year 2015 to first half 2016 with 4G LTE taking the lion's share – we'll come back to that. Denmark doesn't have plans with unlimited data volumes, but the data buckets are generally very generous in Denmark, especially considering Denmark's low prices. 99 DKK (13 EUR) is e.g. giving 15 GB of data to smartphone customers of 3's sub-brand Oister.



A third example of the unlimited mobile data volume trend is **Lithuania**. Although not as highly ranked as Finland, Korea and Austria, the country had an impressive growth in the average data usage of **66%** between full year 2015 and the first half of 2016; the highest of all countries.

The picture to the left shows the example of **Bite**: For 26.85 EUR, a postpaid

customer can get **unlimited data volume** – limited to the handset. The two capped plans shown (15 and 7 GB) are, however, to some extent also unlimited, though: Customers will get a number of services, including Facebook, zero-rated for a period of six months.

As addressed in the [2015 version](#) of this analysis, reasonably priced plans with unlimited data volume have also affected the mobile data usage in countries like Latvia, Switzerland, USA and the UK.

The countries with the lowest mobile data usage are **Greece, Belgium, Czech Republic, Romania, the Netherlands, Portugal** and **Germany** – see the zoom-in in Figure 3. With the exception of Portugal and the Netherlands, no 2016 stats exist for these countries, but it can be safely assumed that they remain in the backwaters of Europe. Later in this analysis we will show that the high operator revenue per gigabyte plays an important role in explaining this – at least in Belgium, Czech Republic, the Netherlands and Germany.

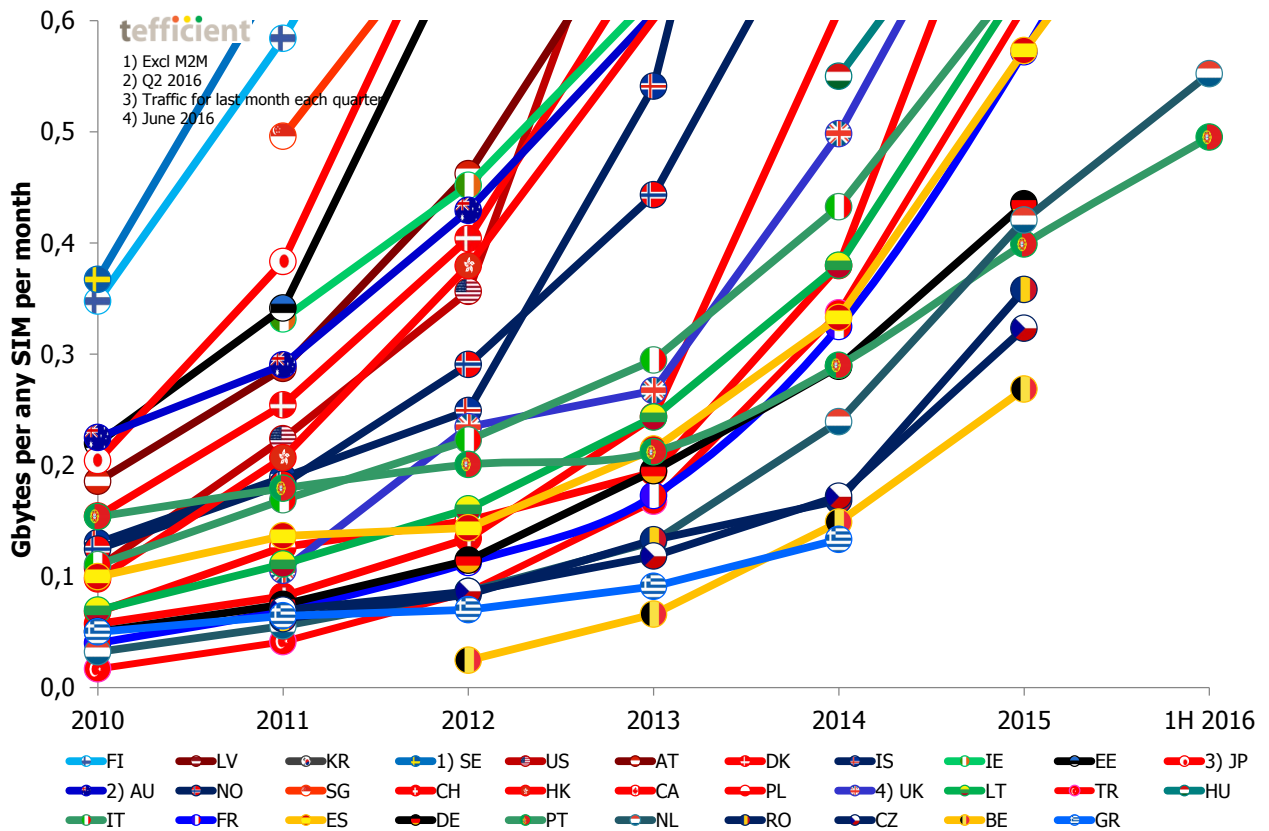


Figure 3. Development of mobile data usage per any SIM per country – zoom-in on lowest usage countries

Even though usage levels are low, Figure 3 shows that there is growth in mobile data usage also in the lower usage countries. Countries like **Lithuania**, **Turkey** and **France** show an increasing appetite for mobile data.

But Figure 4 shows that the growth rates in many cases aren't sufficient to close the gap on higher data usage countries.

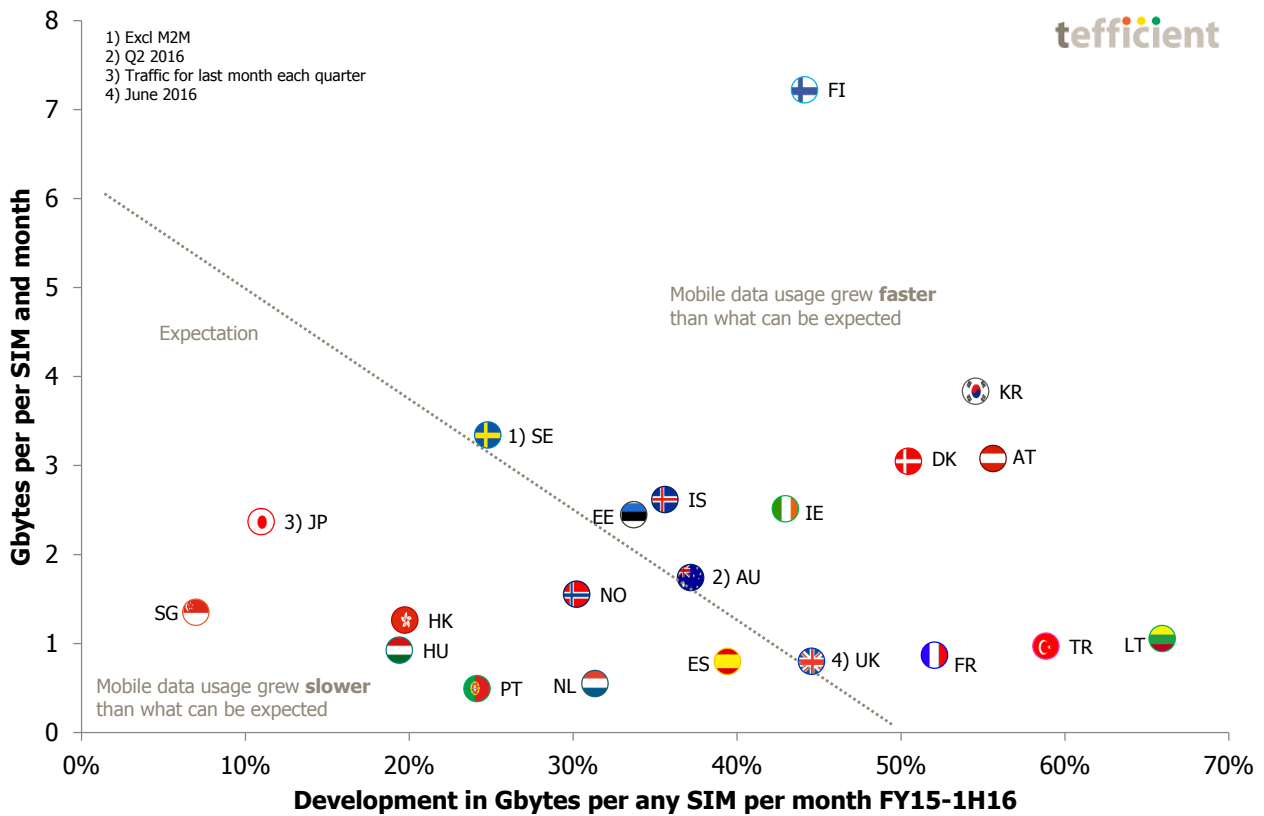


Figure 4. Mobile data usage vs. its development from full year 2015

Hungary and Portugal – alongside Singapore and Hong Kong – all demonstrated low growth rates in 1H 2016 even though data usage was low. In contrast, highest usage countries Finland and Korea had high usage growth, leaving the lower usage countries yet more behind.

Wi-Fi In previous analyses we have explained some of the low usage/low growth positions with **public Wi-Fi**. It's no longer obvious that Wi-Fi has that much of an impact. Countries where operators have embraced Wi-Fi can be found anywhere in Figure 4. The Korean operators are e.g. some of the most profound users of operator Wi-Fi, each having built hundred of thousands public Wi-Fi hotspots. The black area of Figure 2 is also showing that the absolute level of mobile traffic that is auto-offloaded to Wi-Fi by the operators is increasing. In spite of currently auto-offloading as much mobile data to Wi-Fi as the whole mobile traffic of Norway (about 12000 TB per month), Figure 4 shows that Korea has a very fast growth in mobile data usage.

Before finding other explanations, we will take a closer look at the data usage of individual operators.

The customers of DNA top the world; used 10 GB per month

Our analysis showed that Finland is the country with the highest average mobile data usage per any SIM. Figure 5 ranks the reporting or reported operators of the world. To be as updated as possible, the usage is in most cases shown for the nine month period January-September 2016. Since not all operators or regulators report quarterly, the period can occasionally be shorter.

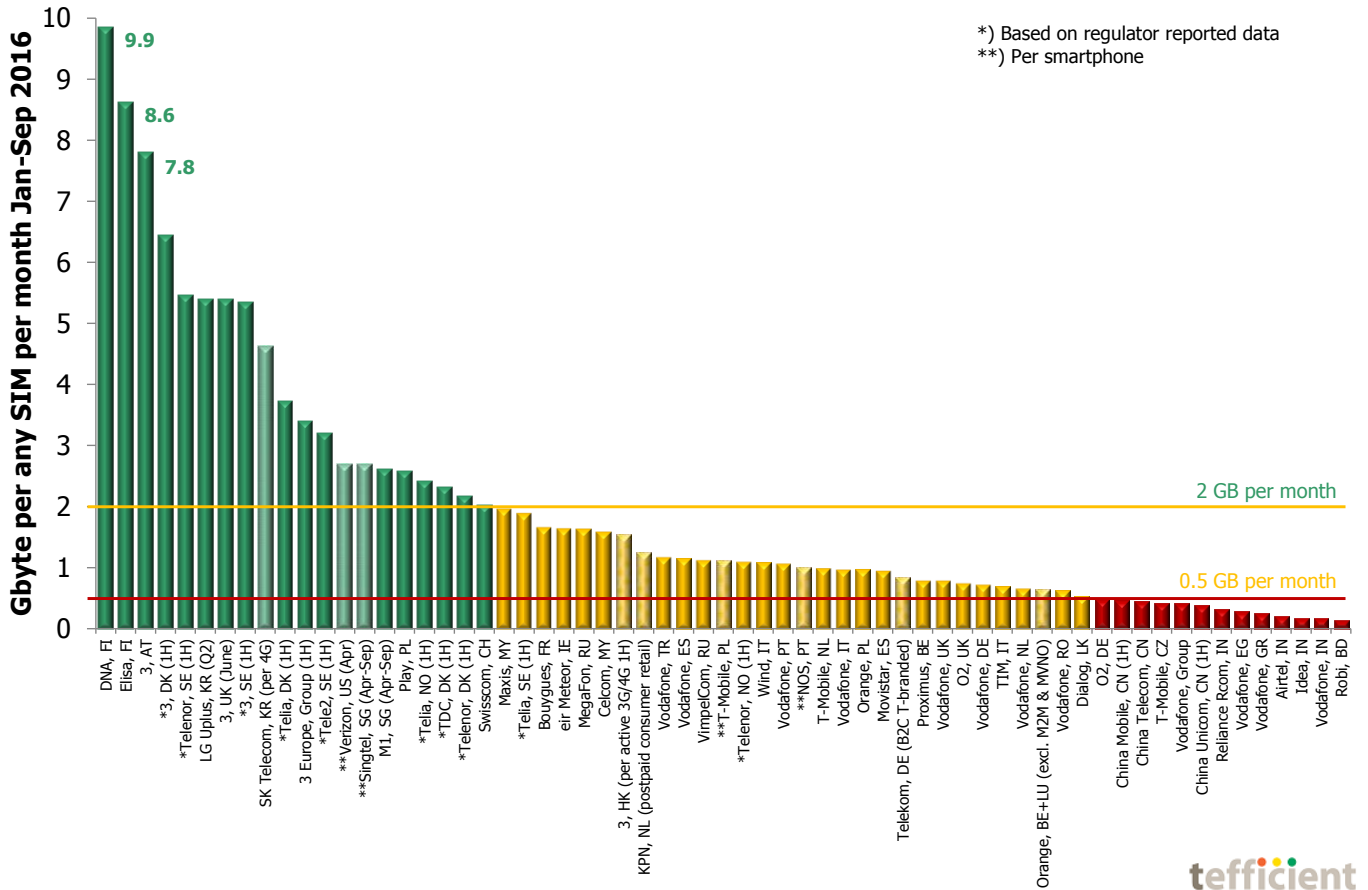


Figure 5. Mobile data usage per any SIM and month – for reporting operators (or where the regulator reports it)

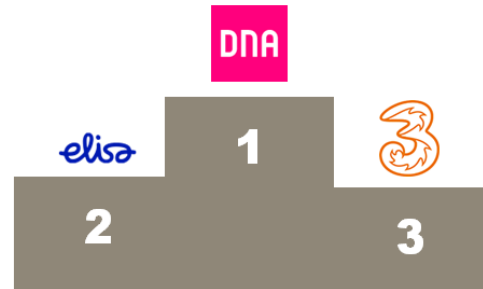
Figure 5 shows three tiers:

- >2 GB per SIM and month
- >0,5 GB per SIM and month
- <0,5 GB per SIM and month

In the **red tier**, we find operators in maturing markets like **India, Egypt, China** and **Bangladesh** – alongside a few European laggards in Greece, Czech Republic and Germany.

In the other end of the scale – in the **green tier** – we find the operators who have the most data happy customers of the world:

DNA With **9.9 GB** per any SIM and month during the January-September period, **DNA** was the reporting operator with the highest mobile data usage in the world. Postpaid unlimited data plans – where price is determined by the chosen speed tier (e.g. up to 21, 50 or 300 Mbit/s) – dominate DNA’s consumer offer. DNA won also our 2015 analysis, but has in 2016 increased the distance to the world number 2:



elisa DNA’s competitor **Elisa** had an average monthly usage per SIM of **8.6 GB** for the first nine months of 2016. Like DNA, Elisa’s consumer offer is dominated by postpaid unlimited data plans where the “up to” speed determines the price. Both DNA and Elisa allow customers to tether their auxiliary devices to the smartphone subscription.

3 Austria emerges as the #3 of the world of reporting operators. During the January-September period, 3’s average SIM consumed **7.8 GB** per month. As already mentioned, 3 (and its competitors) provide Austria with fixed line substituting modems. Also the smartphone plans of 3 come with high data allowances, though – albeit not unlimited.

The remaining seven positions of the top ten are held by other operators offering unlimited data: **LG Uplus**, **3 UK**, **SK Telecom** – and half of the Danish and Swedish operators: **3** Denmark, **Telenor** Sweden, **3** Sweden and **Telia** Denmark.

Is data-only important for usage?

The bigger the screen, the higher the data consumption – right? Figure 6 gives strong support for this.

Generally speaking, countries with a high penetration of **data-only SIMs** – sitting in e.g. tablets, PCs, modems – have much higher data usage than countries with a low data-only penetration. With 19.3% of SIMs being data-only, **Finland** has the highest data usage in the world. **Australia** is, however, at 18.5% with just 1.7 GB per SIM and month, but seems to be an exception.

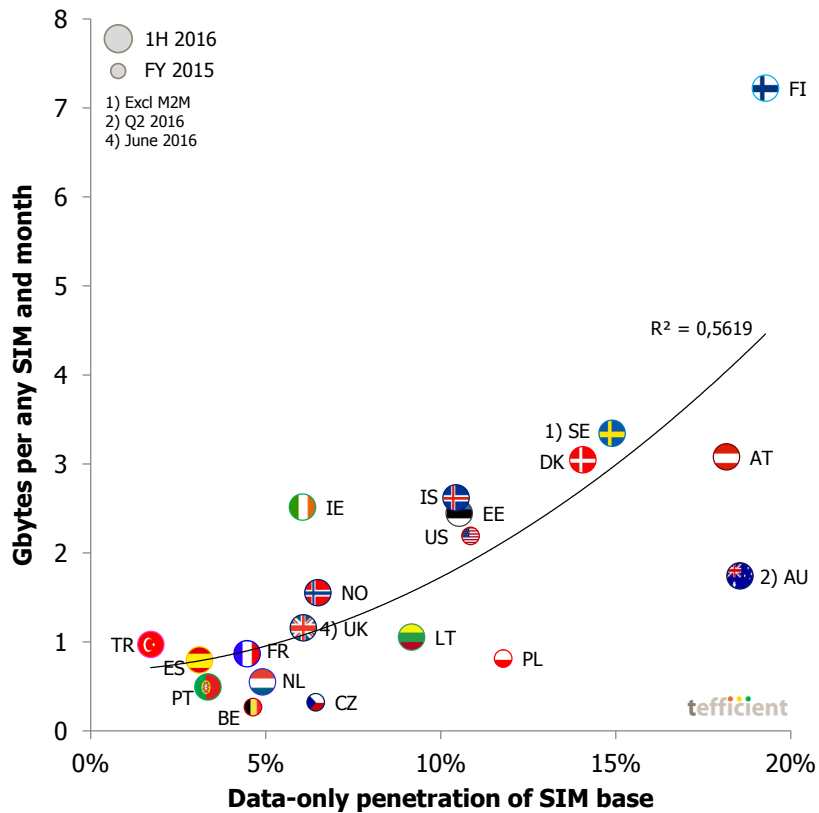


Figure 6. Mobile data usage vs. data-only penetration

If looking at the bottom-left corner we note that countries without a developed data-only market – **Turkey, Spain, Portugal, France, the Netherlands and Belgium** – all experience average usage below 1 GB per month. To grow, it would make sense for someone in these markets to start addressing and monetise the data-only segment.

Is 4G LTE adoption important for usage?

Three things are required to be an active 4G LTE customer:

1. A 4G LTE capable device
2. A subscription that supports 4G LTE
3. 4G LTE coverage

Maybe because of this complexity, few regulators report 4G LTE adoption. An attempt to correlate it with data usage is still done in Figure 7 below.

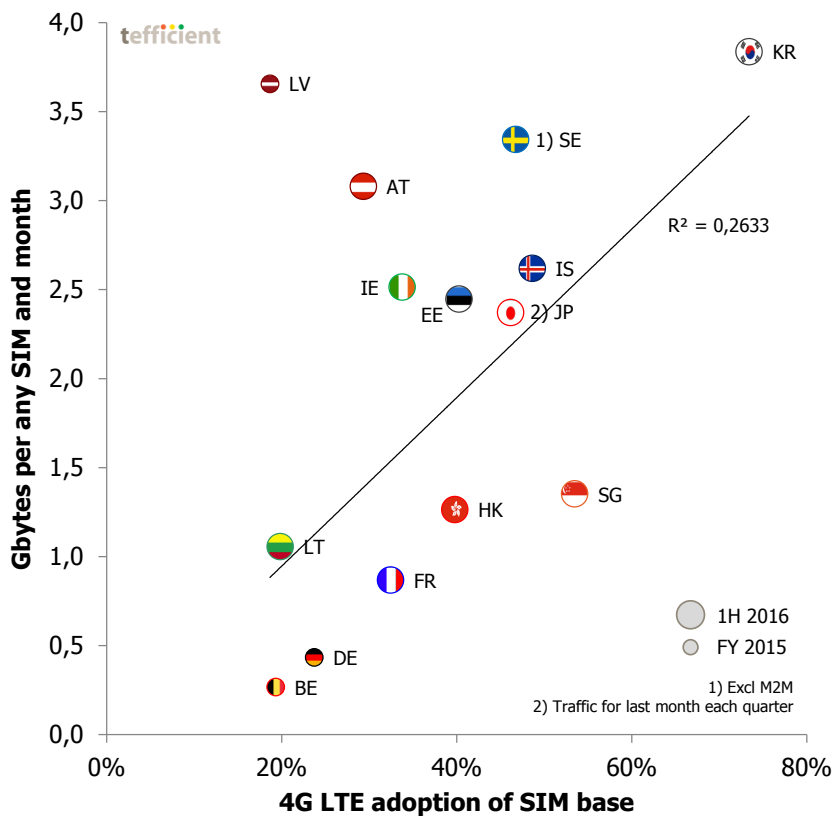


Figure 7. Mobile data usage vs. 4G LTE adoption

The R^2 value is – compared to the data-only graph – much lower. Korea is an example of that high 4G LTE adoption drives high data usage, but Latvia had an almost as high data usage in 2015 with a much lower 4G LTE adoption.

Figure 8 shows the few countries that currently break out the 4G LTE *traffic* in their reporting:

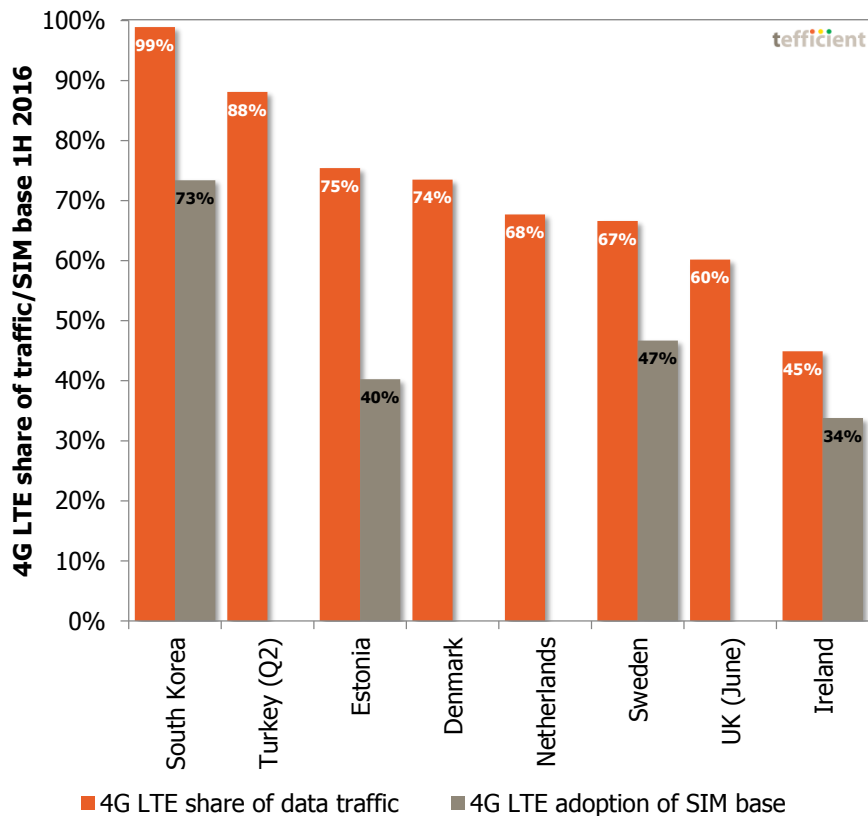


Figure 8. 4G LTE share of traffic – where reported. 4G LTE share of SIM as comparison – where available.

The sample is small, but suggests that 4G LTE SIMs in general carry a disproportionately high share of the data traffic:

- In Korea a 4G LTE SIM generated **1.3x** the traffic of any SIM
- In Estonia **1.9x**
- In Sweden **1.4x**
- In Ireland **1.3x**

That factor isn't much if compared to data-only, though: In Sweden a data-only SIM generated **3.3x** the traffic of any SIM, in Iceland 5.5x, in Portugal 16.8x – but in France just 1.2x.

Figure 7 might still suggest that 4G LTE adoption – too – is a factor that explains data usage. But the correlation is weak. Note that Finland is missing out in Figure 7 (since 4G LTE SIMs aren't reported). We believe that the 4G LTE adoption in Finland isn't above 40%. Having also Finland (with 7 GB per month) in the graph would make the correlation yet weaker.

Data-only adoption is a far more important driver of high data usage than 4G LTE adoption

Effective revenue per Mbyte vs. usage

Now to the chart which tends to trigger the interest of policy makers. Figure 9 plots the *total* mobile service revenue per gigabyte² against the average mobile data usage per country.

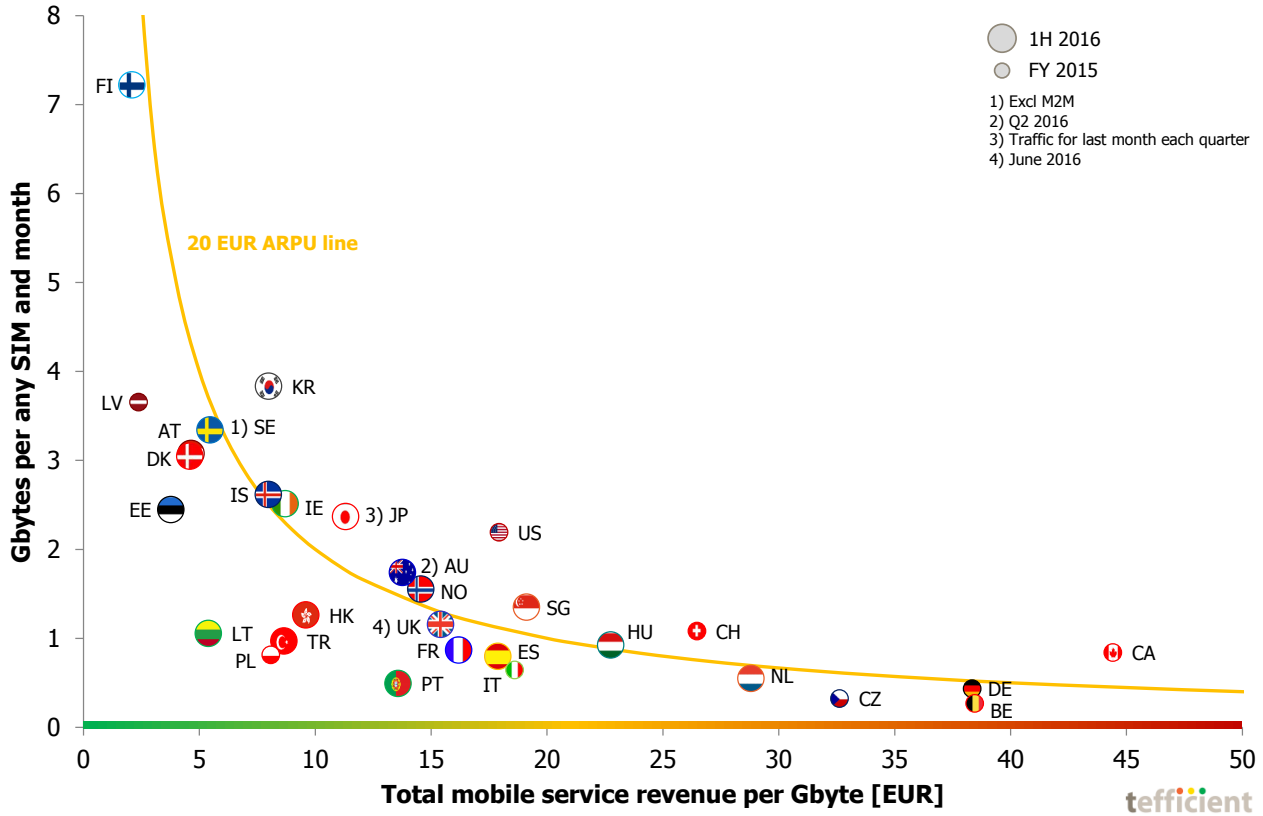


Figure 9. Comparing total mobile service revenue per Gbyte with mobile data usage

The amber line shows where **20 EUR of ARPU** is earned. Countries below it had an ARPU lower than 20 EUR; countries above an ARPU higher than 20 EUR.

If we just compare the countries for which 1H 2016 data is available, the **Netherlands** had the highest effective revenue per Gbyte – **14x** higher than the country with the lowest revenue – Finland. Based on 2015 data, also **Canada, Belgium, Germany** and **Czech Republic** had high effective revenue per Gbyte.

Looking at Figure 9 we can conclude – as in all our previous analyses on this topic – that the key explanation for high mobile data usage is low effective revenue per Mbyte: **Bigger data buckets lead to lower revenue per Gbyte – which increases usage**. At least when customers can use those big buckets also on data-only devices; see Figure 6.

² Attributing zero value to voice and messaging – which is also how most mature operators have priced service bundles when voice and messaging are unlimited, but data capped on volume

Figure 10 is a new variant of the traditional revenue per Gbyte chart – it plots the usage against the average revenue per any SIM, i.e. the ARPU.

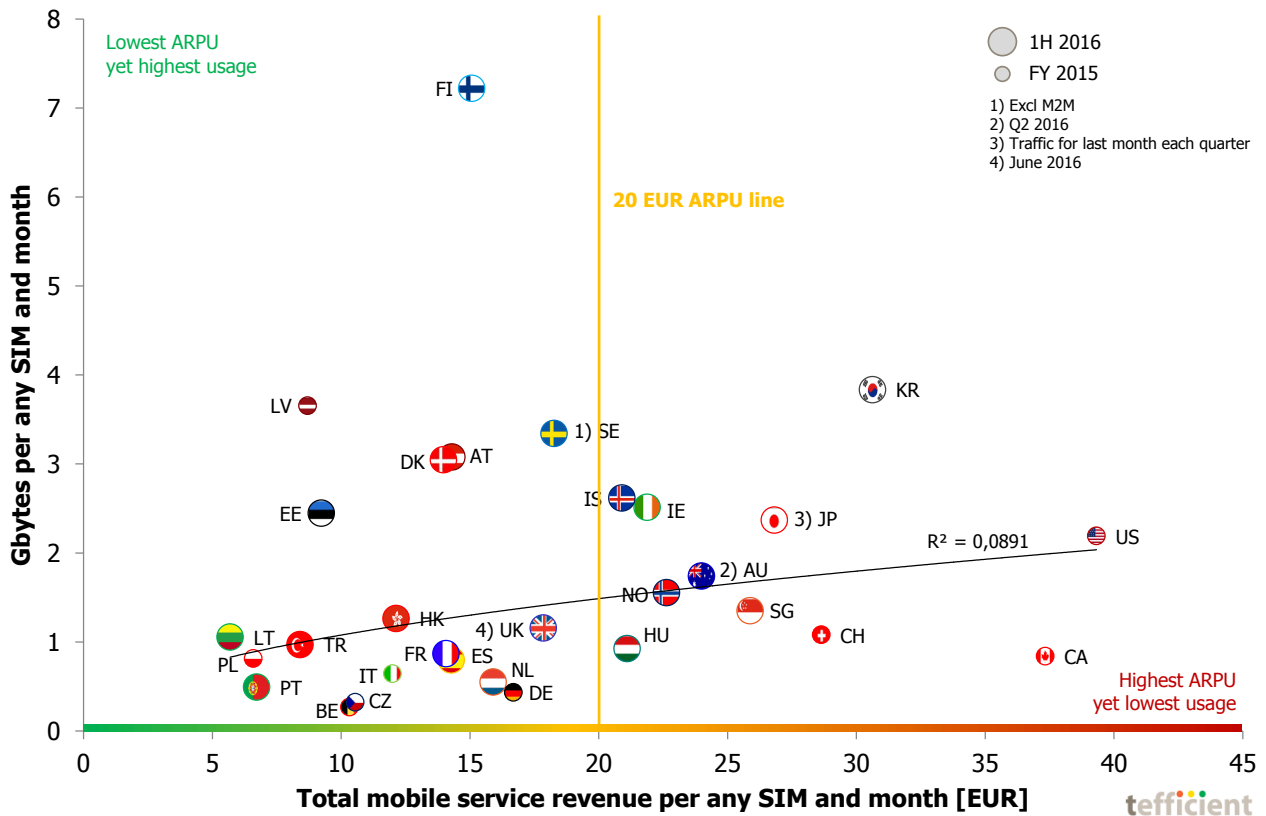


Figure 10. Comparing total mobile service revenue per SIM with mobile data usage

USA had the highest ARPU – 39 EUR in 2015 – and Lithuania the lowest; 6 EUR in 1H 2016. It would perhaps be logical to think that the higher the ARPU, the higher the usage – a customer who pays more also gets more – and even though the regression line is showing such a weak trend, the adherence to the line is very poor. It's therefore correct to say that there's no or weak correlation between a country's data usage and ARPU.

Finland and **Canada** represent the two opposites in Figure 10: The average Finnish mobile user pays much less than the average Canadian user – but is still able to consume much more data.

The world's largest mobile data carriers

Figure 5 concluded that DNA of Finland has the customers with the highest average data usage of the world – 9.9 GB per month. But there are operators with significantly larger customer bases than DNA. Figure 11 ranks the reporting or reported operators of the world according to the total traffic carried between January and September 2016³. The graph is truncated below 90 petabyte.

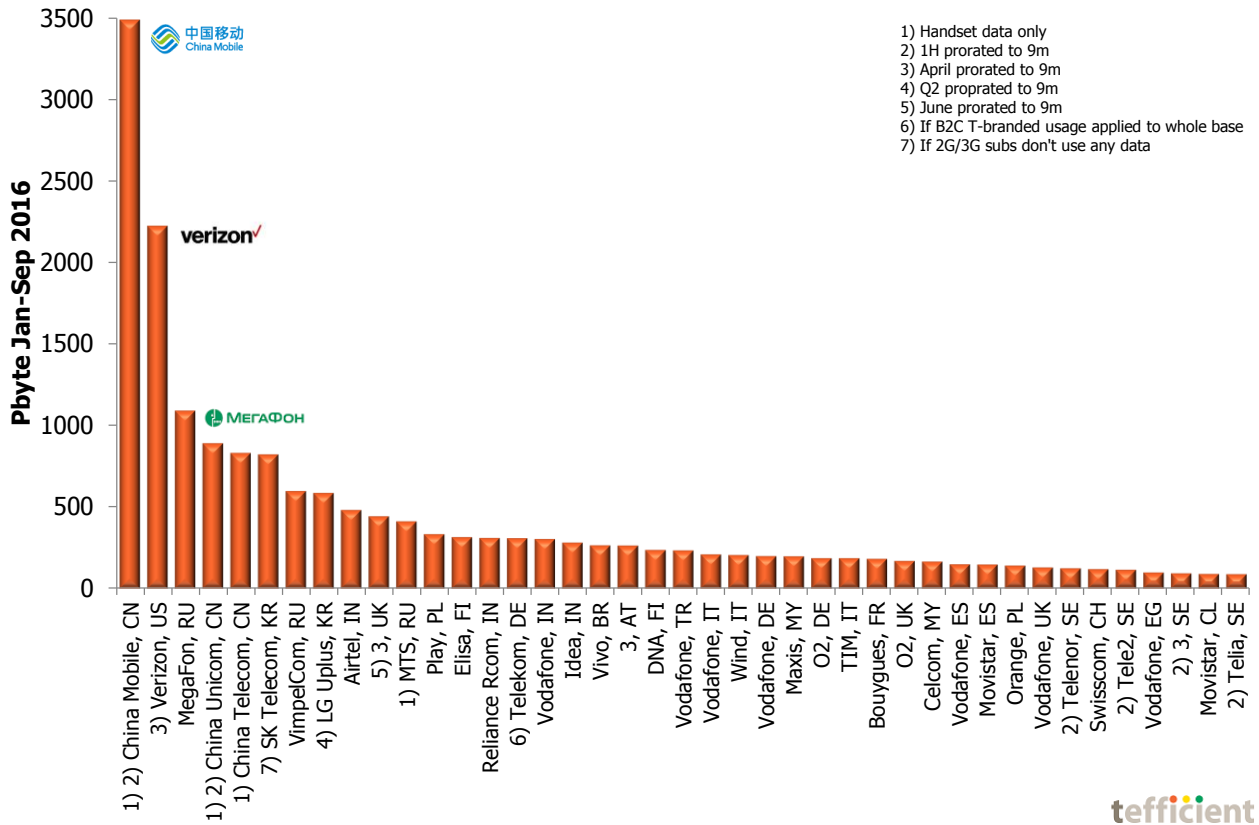


Figure 11. Mobile data traffic – for reporting operators (or where the regulator reports it)

It shouldn't surprise anybody that it is **China Mobile** – with 840 million mobile subscriptions – that leads the world when it comes to petabytes carried. Even though China Mobile only reports mobile data traffic originating from handsets, it is by far the largest data carrier even though Figure 5 showed that China Mobile's average usage per SIM was lower than 0.5 GB per month.

Based on a usage figure given for April, **Verizon**, the US market leader, comes in as number two of reporting or reported operators. The Russian runner-up, **MegaFon**, is number 3.

³ If only a shorter period is reported: Prorated to nine months. Operators with less than 90 Petabyte are not shown in the graph to improve readability.

Korean operators are also ranked high – alongside other Chinese, other Russian and the largest Indian operator, Airtel.

The operator with the largest customer base in Europe – **O2** Germany with 44 million subscriptions – is only ranked as number 25, behind much smaller European operators like 3 UK (#10), Play Poland (#12), Elisa Finland (#13), 3 Austria (#19) and DNA Finland (#20).

Conclusion

Mobile data usage is still growing in all of the countries covered by this analysis. One could expect that the fastest growth – relative to the usage level – would be seen in low usage countries. On the contrary, our analysis finds that **growth is faster** in higher usage countries where operators have introduced **unlimited (or very generous) mobile data propositions**.

Even though the truly unlimited plan doesn't exist – operators limit throughput, tethering, video resolution, time or even volume – the **notion of unlimited** is obviously sufficient for mobile users to change gear when it comes to data consumption. The Korean case is a good example: A high mobile data usage country that started to use even more data when operators introduced premium-priced plans with unlimited data volume – even though throttled to a few Mbit/s after the cap. Noticeably this benefitted operator Wi-Fi as well: The mobile data that is auto-offloaded to Wi-Fi by the Korean operators has never been larger.



Finland – where half of all SIMs have unlimited data – continues to lead the world in mobile data usage. The Finnish operator **DNA** is the operator in the world with the highest average usage – 9.9 GB per month.

Our usage vs. revenue per Gbyte chart shows a significant spread in the revenue operators effectively earn per Gbyte. The most expensive mobile data countries are **Canada, Belgium, Germany, Czech Republic** and the **Netherlands** and – as a consequence – mobile users in these countries are using very little mobile data. The average consumption in Finland is **13x** that of the Netherlands.

The revenue per Gbyte is lowest in **Finland, Latvia, Estonia, Denmark, Austria, Lithuania** and **Sweden**. Our analysis shows that low revenue per Gbyte is the primary driver for high mobile data usage. A high adoption of data-only SIMs is another driver whereas 4G LTE adoption only has a weak correlation with data usage.

It is tempting for operators to make sure that every Gbyte costs and brings in good margin by keeping bucket sizes down and prices up. This leads to a downwards spiral where operators alienate customers, though – to find that their mobile behaviour becomes more and more Wi-Fi centric. Since customer loyalty is what matters most to business results today – and the churn risk is elevated every time a customer runs out of data – the operators in the countries with high revenue per Gbyte need to **become more generous with mobile data**.

Is mobile data seen as too expensive to produce in significant volumes? Then incorporate operator Wi-Fi as an integral, but not necessarily free, element in every mobile data plan.

International telco competitiveness specialist providing operators and suppliers with analysis, benchmarks and go-to-market preparation. Expertise in quad-play, data monetisation, customer loyalty, Nonstop Retention®, mobile video, Wi-Fi business models and high margin equipment sales.

www.tefficient.com