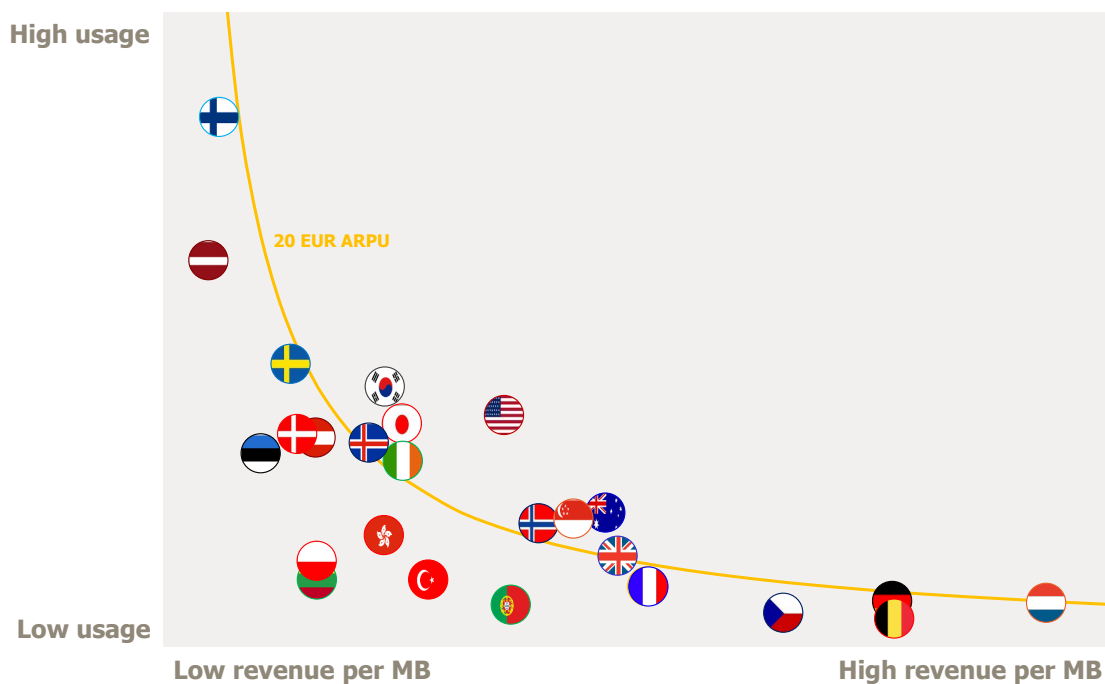


## Industry analysis #3 2016 – final version

**USA, Latvia and Finland combine:****High mobile data usage with fast growth**

This is tefficient's 13<sup>th</sup> public analysis on the development of mobile data usage and effective revenue per Mbyte – in its final version.

Data usage continued to grow, but the growth rate varied between markets. Certain Asian markets – Singapore, Hong Kong and, to some extent, Japan – showed signs of saturation whereas some European markets like Portugal and Germany couldn't grow as fast as other low usage countries. In contrast, Latvia, USA, Poland and Finland demonstrated a rapidly increasing appetite for mobile data.

The effective revenue per Mbyte matters: In Finland, average usage was 12x that of the Netherlands – where operators effectively charged 15x more for a megabyte than in Finland.

## The average Finnish SIM card used 5 GB per month in 2015

Figure 1 shows the development of mobile data usage for 27 countries where regulators<sup>1</sup> report mobile data traffic.

The top countries of the world based on FY 2015 stats were **Finland, Latvia, Sweden, Korea, USA** and **Japan**. In 2015, USA, Australia, Norway and Hong Kong all joined the gigabyte club for the first time.

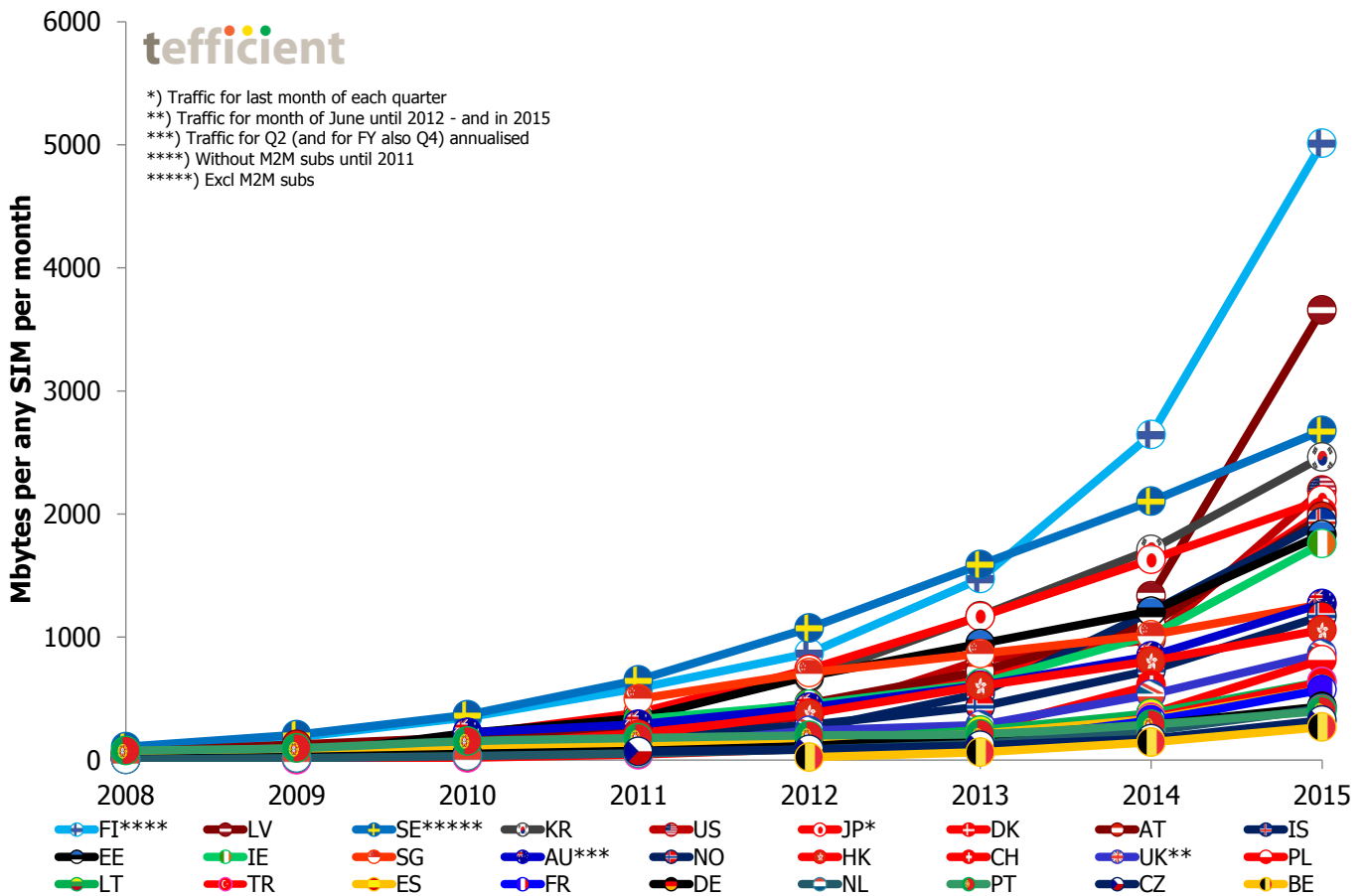


Figure 1. Development of mobile data usage per any SIM per country



With **5 GB** per month per any SIM, **Finland** continued to lead the world in usage. 45% of the Finnish SIMs (incl. M2M) had **unlimited data** in December 2015: Monetisation in Finland is effectively based on throughput tiers and not on volume.

**Latvia** emerged as the new number 2 with 3.7 GB. Reasonably priced unlimited data offers were introduced in 2014-2015 and have quickly gained popularity. Unlike Finland, Latvia is not yet dominated by unlimited, but the impact of the unlimited offers on the mobile data consumption is still obvious. Also other operators

<sup>1</sup> Exception: USA, where data is from industry body CTIA

in other markets offer unlimited – e.g. Swisscom, Salt and Sunrise in Switzerland, Sprint and T-Mobile in USA, '3' in the UK and '3' in Austria – but Finland is still the only market which can be said to be de facto unlimited.

**Sweden** was number 3 with 2.7 GB per month and **Korea** number 4 with 2.5 GB. **USA**, which had a disappointing usage growth of just 20% in 2014 made a strong comeback in 2015 (from <1 GB to 2.2 GB), passing **Japan** (2.1 GB). **Denmark** (2.0 GB), **Austria** (2.0 GB) and **Iceland** (1.9 GB) follows.


 **Belgium** continued to have the lowest average mobile data usage – 268 MB – of our studied 27 countries. **Czech Republic** was number 2 from the bottom. The **Netherlands** passed **Portugal** – a country which back in 2008-2009 was a leader in mobile data usage. In these four countries, public **Wi-Fi** is widely available via hot- and homespots<sup>2</sup> – not only provided by cablecos like **Telenet, Ziggo, NOS** and **UPC** but in Belgium, the Netherlands and Portugal also by the incumbents **Proximus, KPN** and **MEO**.

Table 1 shows the list of countries for where FY 2015 data is available.

Position	Country	Mbytes per any SIM and month 2015	Mbytes per any SIM and month 2014
1	Finland	5012	2644
2	Latvia	3657	1334
3	Sweden	2678	2104
4	Korea	2463	1711
5	USA	2193	979
6	Japan	2113	1631
		March+June+September+December figures times 3	March+June+September+December figures times 3
7	Denmark	2015	1117
8	Austria	1980	1106
9	Iceland	1932	1205
10	Estonia	1832	1209
11	Ireland	1760	1014
12	Australia	1271	847
		Q to December+Q to June times 2. Download only, but data over satellite on the other hand included.	Q to December+Q to June times 2. Download only, but data over satellite on the other hand included.
13	Singapore	1265	1017
14	Norway	1170	731
15	Hong Kong	1057	806
16	UK	863	534
		Month of June 2015 times 12	
17	Poland	815	379
17	Lithuania	637	380
18	Turkey	637	348
19	Spain	573	333
20	France	572	325
21	Germany	435	289
22	Netherlands	417	239
23	Portugal	399	290
24	Czech Republic	323	172
		Preliminary	
25	Belgium	268	145

Table 1. Mobile data usage per any SIM and month – values visualised in Figure 1

<sup>2</sup> Using the home modems of customers to transmit dual SSIDs: One private for the home and one public for guests and passers-by

## Operator top list – for the first time with a Finnish No 1

As shown, Finland is the country with the highest average mobile data usage per any SIM in the world. But in our previous analyses, it hasn't actually been a Finnish operator (but a Swedish) that has been top of the world. This has now changed: **DNA** from Finland has the customers with the highest average mobile data usage, followed by **Elisa**:

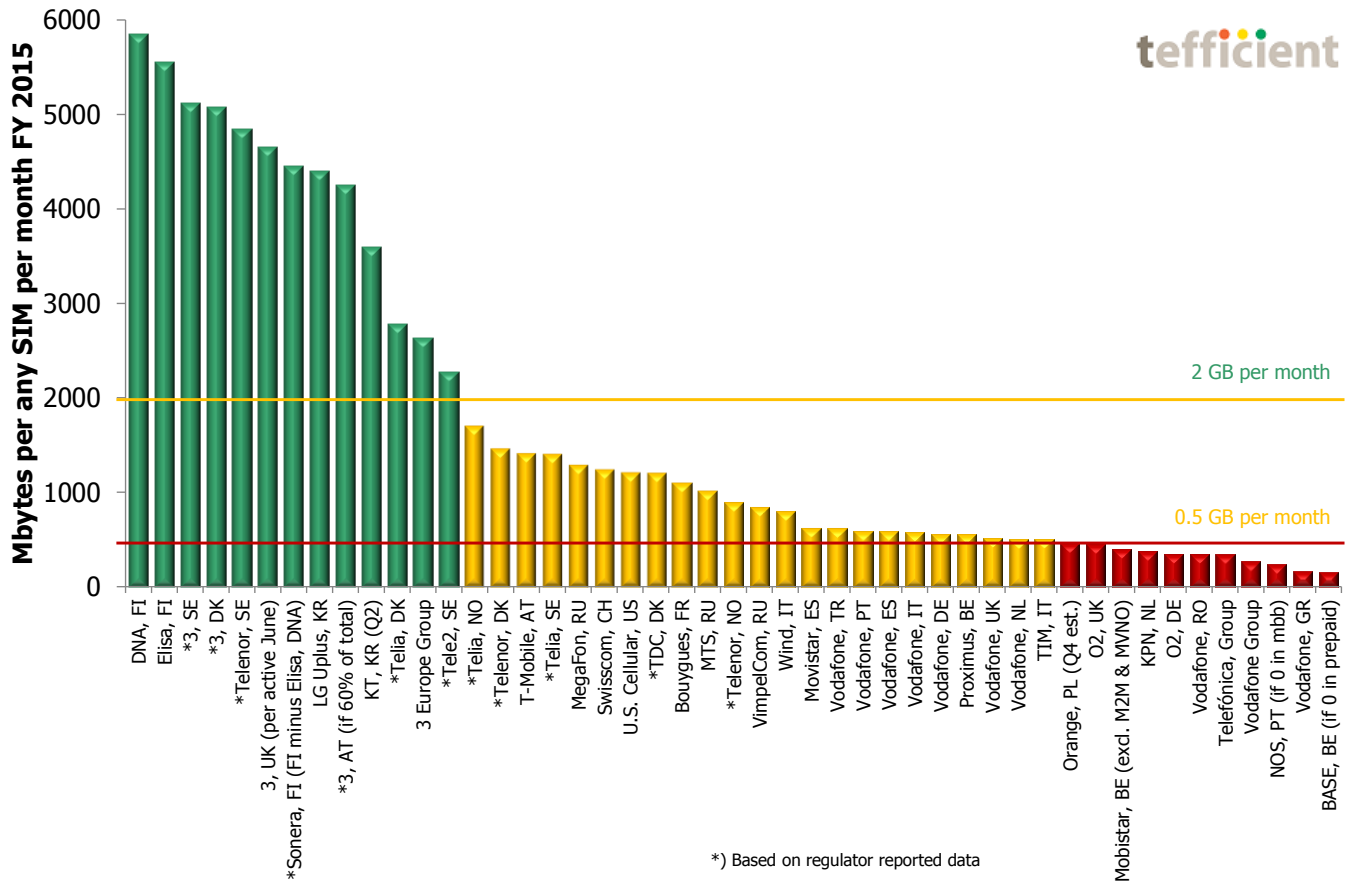


Figure 2. Mobile data usage per any SIM and month – for reporting operators (or where the regulator reports it)

### Green tier > 2 GB

**DNA** With **5.9 GB** per any SIM and month in 2015, **DNA** was the reporting operator with the highest mobile data usage in the world. Unlimited data plans – where price is determined by the chosen speed tier (up to 21, 50 or 300 Mbit/s) – dominate DNA's consumer offer. In 2015, DNA's total traffic grew 73% – slower than the Finnish total.



DNA's competitor **Elisa** had a stronger development in total data traffic in 2015 – up 95% – but with an average monthly usage per SIM of **5.6 GB**, Elisa was still behind DNA. Like DNA, Elisa's

consumer offer is dominated by unlimited data plans – with more granularity in the speed tiers (up to 0.25, 21, 50, 100 or 300 Mbit/s).



With **5.1 GB** per any SIM and month in 2015, **3 Sweden** was number three. 30% of 3's SIM cards were data-only and these averagely used 11.9 GB per month which obviously lifted the average. Having said that, 3's voice-also subscriptions also had a high average use: 2.3 GB per month.

In position 4 we find **3 Denmark** – also with 5.1 GB. Note that also **3 UK** and **3 Austria** (and in fact the whole group of 3 Europe) are highly ranked in Figure 2.



**Telenor Sweden** – once the number 1 operator – lost ground relative to 3 Sweden and to operators from other countries in 2015. Telenor's total traffic was actually in decline the second half of 2015 if compared to the first half. An average data usage of 4.8 GB per month is still high, though.

### Amber tier >0,5 GB <2 GB

The three major Russian operators – **MegaFon, MTS, VimpelCom** – were all in this tier, with MegaFon in the lead. The only reporting US operator, **U.S. Cellular**, was also in this tier. Almost all of **Vodafone's** operations are to be found here.

### Red tier <0,5 GB

Some large European operators like **O2 Germany, KPN** and **O2 UK** were still below 500 Mbyte per any SIM and month in 2015 – alongside reporting operators from low-usage countries like Belgium and Portugal.

**Low usage = high growth? Not that simple.**

When operators implement tighter control over mobile data usage – through controlled bucket sizes or increased prices – the growth of the mobile data usage is of course affected.

Looking at Figure 3 – which compares the usage level with its 2014 to 2015 development – we can see two corners of the chart with atypical behaviour: **Finland, Latvia** and **USA** (upper right), represents one. The Finnish mobile data usage grew **90%** in spite of the world’s highest data usage. Is this where the rest of the world would be if mobile data was unlimited?



In the US, data usage growth was even faster – **124%**. Since none of the largest four US operators report data traffic there’s little guidance on where it came from, but bucket sizes have generally been expanded in 2015. Another driver might be **zero-rating**; T-Mobile introduced and expanded on its **Binge On** proposition in 2015. It allows customers on mid-priced plans to consume video from a large number of providers without any data being deducted from their buckets. In January 2016, AT&T re-introduced unlimited smartphone data in combination with TV from DirecTV or U-verse. It hasn’t affected these 2015 numbers, but could mean that mobile data usage will show strong growth in the USA also in 2016.

The fastest growth was in Latvia: **174%**. As mentioned, the recent introduction of unlimited offers is a key explanation – combined with a fast rollout of 4G networks.

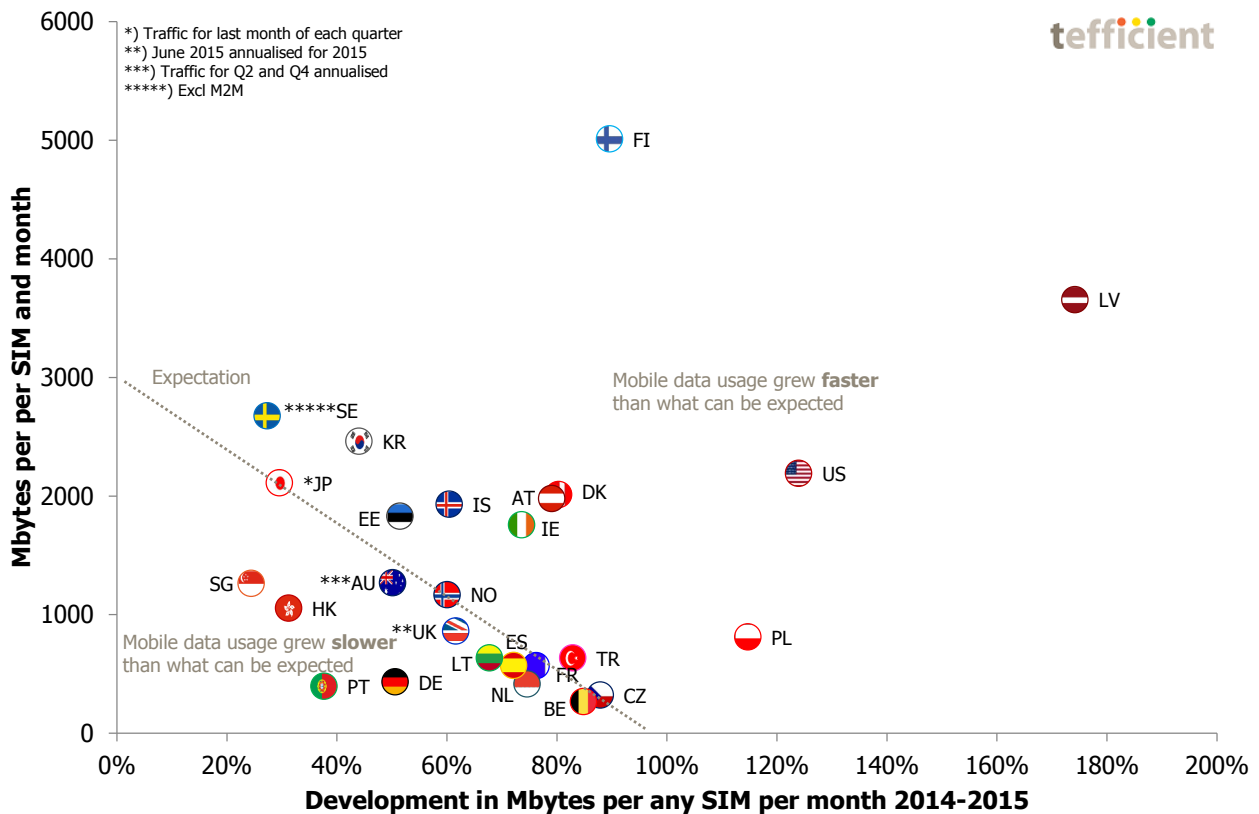


Figure 3. Mobile data usage vs. its development from 2014

The other atypical corner is represented by **Portugal, Singapore, Hong Kong** and **Germany** – lower left. In Singapore and Hong Kong we observe signs of saturation: Mobile data usage only grew 24% (Singapore) and 31% (Hong Kong). The explanation to the low growth rate in Singapore and Hong Kong is to be found in operators’ ambition to earn more on mobile data – while they at the same time build large Wi-Fi networks to offload cellular traffic. This doesn’t mean that paid traffic is substituted by free traffic; many of these operators are charging for Wi-Fi.

When it comes to Portugal and Germany it’s hardly saturation which explains the low usage growth – since usage is so low. **Portugal** has had a weak development in mobile data usage for a long time. In their case it’s driven by fewer data-only subscriptions – and even if data-only just represented 3.4% of the SIMs in December, 65% of the mobile data traffic was still carried by these SIMs. There’s not much wrong with Portugal’s smartphone penetration – Vodafone reported 59.4% for March 2016 – but the Portuguese simply seem to avoid using mobile data on their smartphones. As mentioned, Wi-Fi plays a role here.

We will in an upcoming graph show that German operators have very high effective revenue per Mbyte (albeit not the highest) which more than anything else explains **Germany’s** weak usage development in 2015. It should be a disturbing fact for the European Commission that in 2014 approved a merger between O2 and E-plus, leaving Europe’s largest market with just three mobile operators. The consolidation happened in October 2014.

In Figure 4, we have ranked the mobile data usage development in 2015 (i.e. the x-axis from Figure 3).

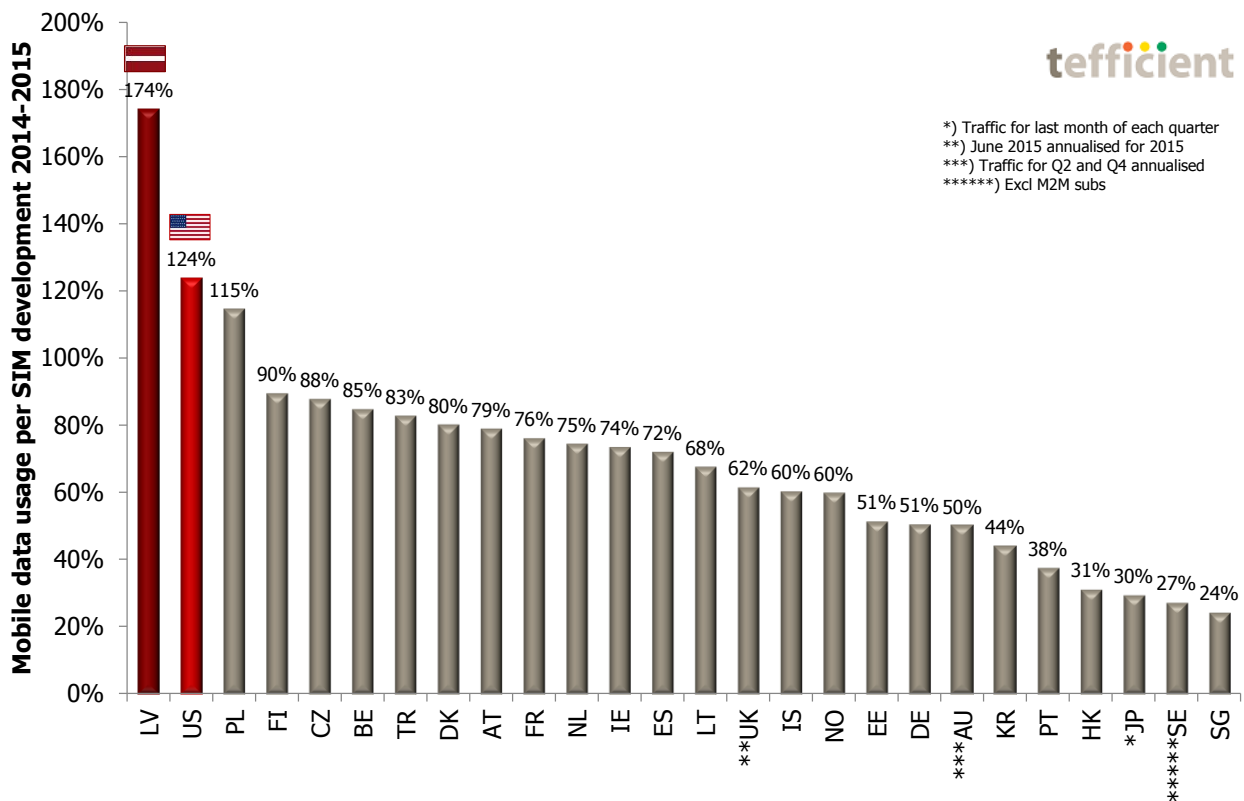


Figure 4. Mobile data usage development 2014-2015

**Latvia** leads with an astonishing 174% usage growth in 2015 while the number of SIMs fell with 1%. **USA** follows with 124% usage growth. Since the number of SIMs in the US grew 6% in 2015, the total data traffic grew even faster – 138%. **Poland** had 115% usage growth while the number of SIMs decreased 2%.

**Finland** – in spite of the world’s highest usage already in 2014 – follows with **90%**. The total traffic grew 93% with a modest SIM base growth of less than 2%.

Average usage in **Czech Republic, Belgium, Turkey** and **Denmark** grew more than 80%.

**Sweden** is now in the bottom of the growth ranking together with the mature Asian markets **Singapore, Japan** and **Hong Kong**.



## Is data-only important for usage?

The bigger the screen, the higher the data consumption – right? Figure 5 gives 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 20% of SIMs being data-only, **Finland** has the highest data usage in the world. **Australia** is, however, at 19% with just 1.3 GB per SIM and month, but seems to be the exception.

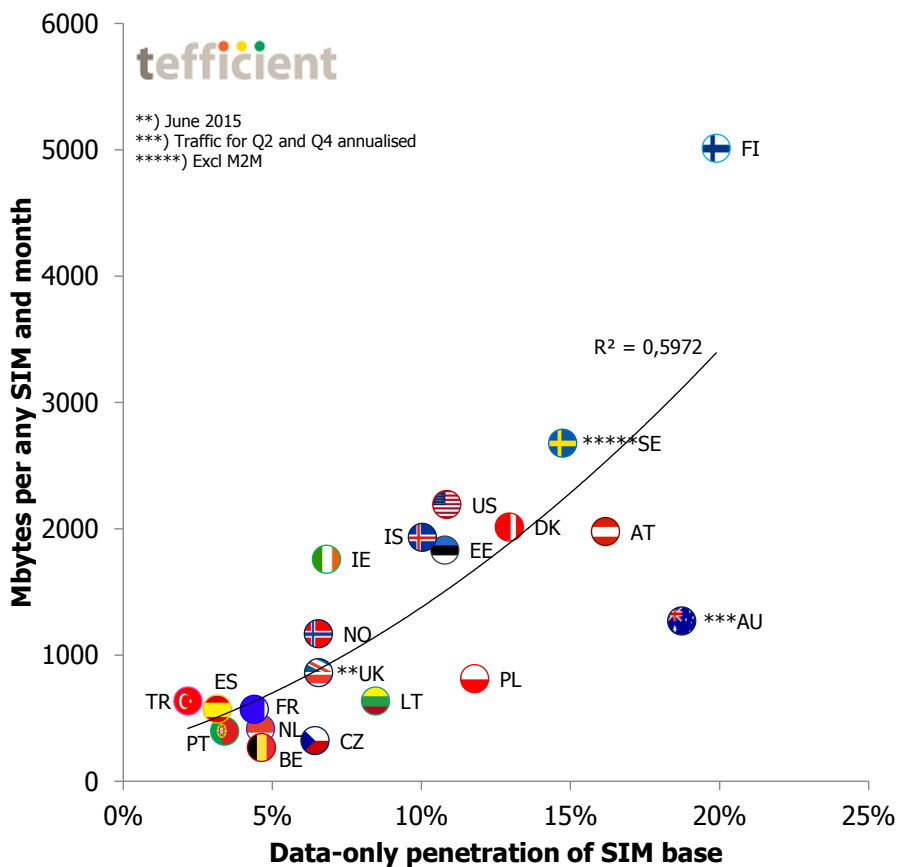


Figure 5. Mobile data usage vs. data-only penetration

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 around 500 Mbyte per month. It would make sense for someone in these markets to start addressing and monetise the data-only segment soon.

### 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 6 below.

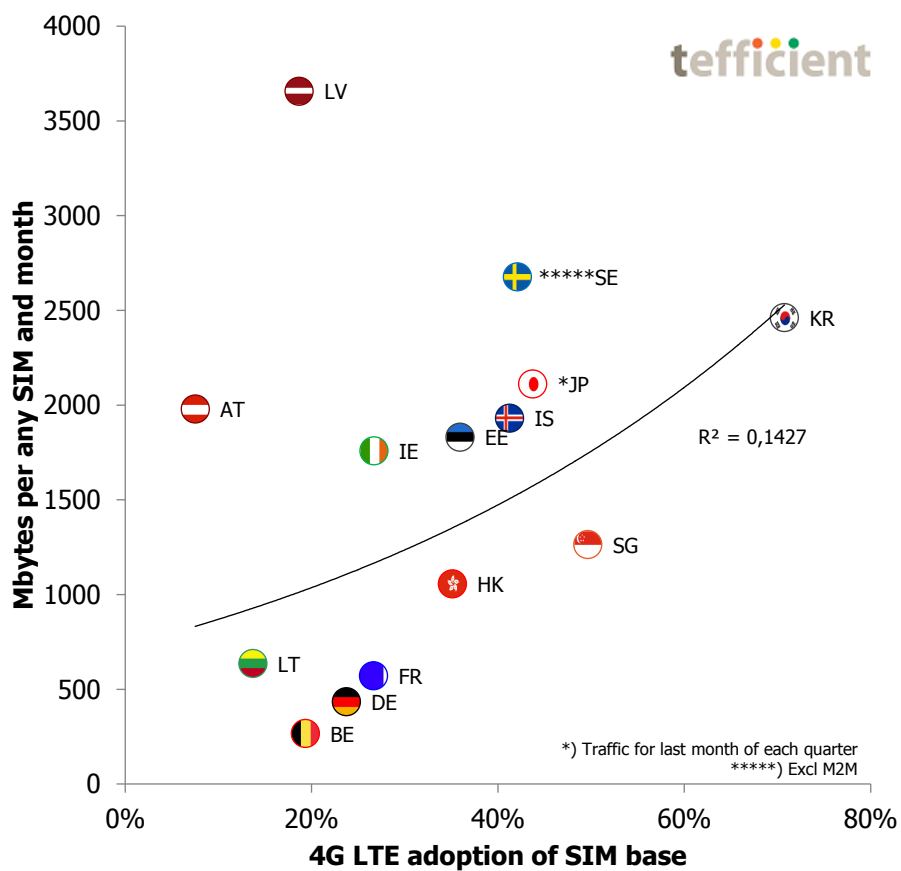


Figure 6. Mobile data usage vs. 4G LTE adoption

Austria, Latvia and Ireland have high data usage without particularly high 4G LTE adoption. Belgium, Germany and France are all having higher 4G LTE adoption than Austria and Latvia, but still much lower data usage.

Table 2 shows the few countries that currently break out the 4G LTE *traffic* in their reporting:

Country	4G LTE adoption of SIM base	4G LTE share of data traffic
Korea	70.7%	97.2%
Denmark	n/a	58.3%
Sweden	42.1%	57.3%
Netherlands	n/a	58.7%

Table 2. 4G LTE adoption of SIM base vs. 4G LTE share of traffic

The sample is small, but suggests that 4G LTE SIMs in general carry a disproportionately high share of the data traffic. It both Korea and Sweden, 4G LTE SIMs generated **1.4x** the traffic of any SIM. That factor isn't much if compared to data-only, though: In Sweden a data-only SIM generated **3.8x** the traffic of any SIM, in Iceland 15x, in Portugal 19x – but in France just 1.6x.

Figure 6 might still suggest that 4G LTE adoption – too – is a factor that explains data usage. But the correlation is very weak. Note that Finland is missing out in Figure 6 (since 4G LTE SIMs aren't reported). We believe that the 4G LTE adoption in Finland is below 40%. Having also Finland (with 5 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

Finally to the chart which many readers find the most interesting. Figure 7 plots the *total* mobile service revenue per Mbyte<sup>3</sup> against the average mobile data usage per country.

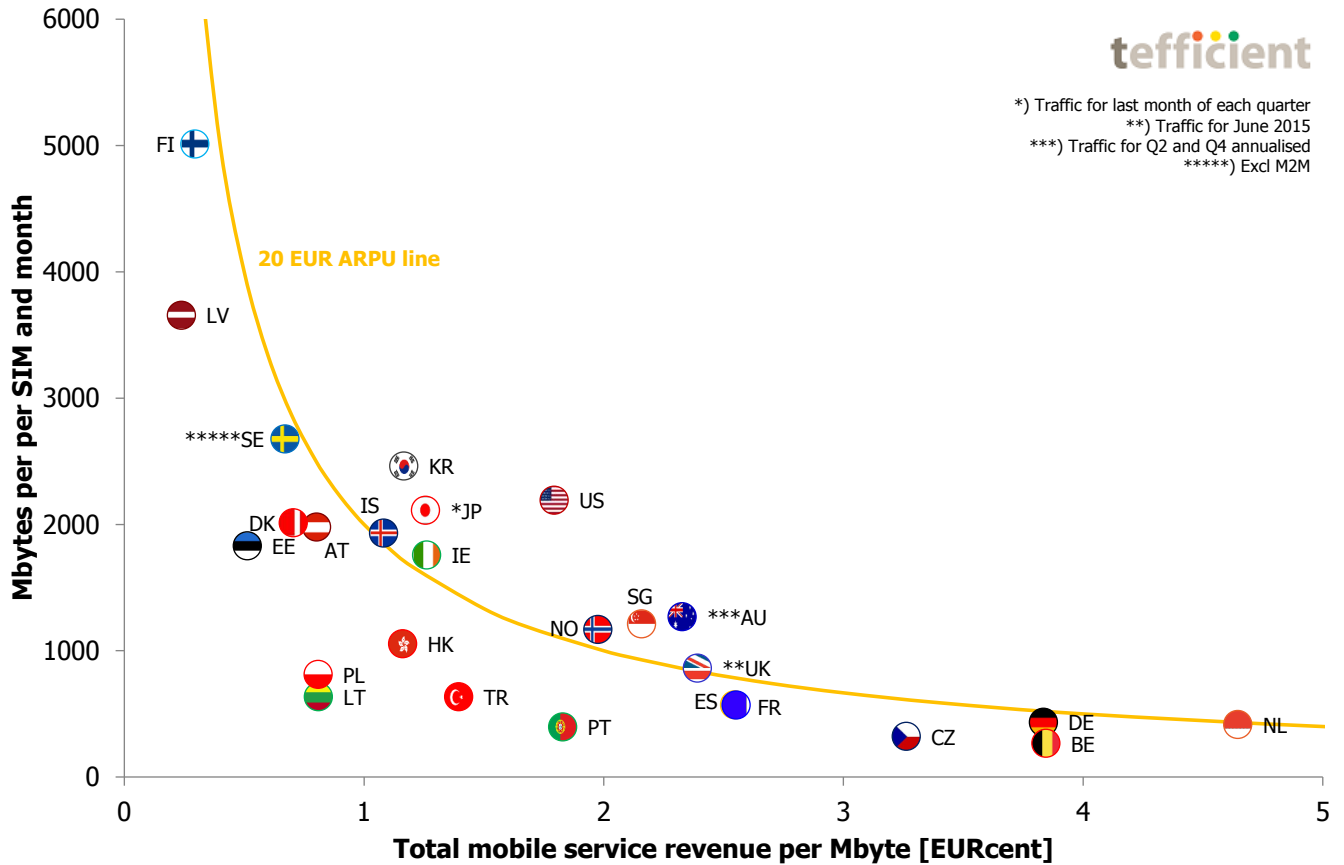


Figure 7. Comparing total mobile service revenue per Mbyte with mobile data usage

The amber line isn't a trend line – it's showing 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. USA had the highest ARPU (39 EUR) and Lithuania the lowest (5 EUR).

**Netherlands** had, also in 2015, the highest effective revenue per Mbyte – **15 times** higher than in **Finland** that had the lowest. Also **Germany** and **Belgium** have very high effective revenues per Mbyte.

Based on Figure 7 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 Mbyte – which increases usage**. At least if customers can use big buckets on data-only devices; see Figure 5.

<sup>3</sup> 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

## Conclusion

It is the operators in **Finland, Latvia, Sweden, Korea, USA** and **Japan** (in that order) that have the customers with the highest mobile data usage in the world. Two Finnish operators – DNA and Elisa – now top the operator ranking.

In most markets, usage continues to grow at high speed; the average usage growth was **70%** in 2015 compared to 2014. **Latvia** tops with 174%.

At the same time **Singapore, Sweden, Japan, Hong Kong** and **Portugal** show significantly slower usage growth – in Singapore's case just 24%.

With a monetisation model predominantly based on data volume, it is tempting for operators to make sure that every Mbyte costs and brings in good margin by keeping bucket sizes down and prices up. Customers aren't without alternatives, though. Cablecos are e.g. providing their customers with access to **public Wi-Fi** and free-to-use Wi-Fi calling apps in most of our studied markets. In addition, there are a few **Wi-Fi first** services being introduced for mobile – like Republic Wireless or Google's Project Fi.

The strong revenue and EBITDA growth figures reported by Finnish operators could suggest that it was wrong to walk away from the unlimited model elsewhere – at least when unlimited comes with a price premium. But regardless of the model we believe operators need to **become more generous when it comes to bucket sizes** – also on lower price points – to avoid that their customers develop a Wi-Fi first behaviour. Alternatively, if mobile data is seen as too expensive to produce in significant volumes, incorporate the operator's own public Wi-Fi as an integral, but not necessarily free, element in every mobile data plan.