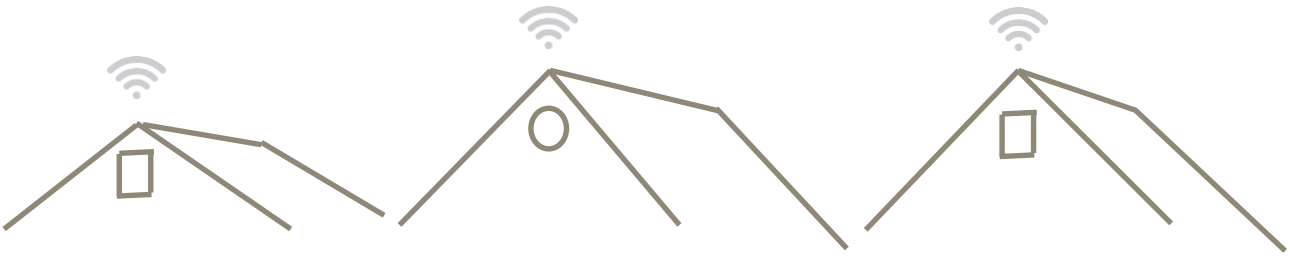
tefficient

Industry analysis #1 2018

Mobile data – full year 2017

Unlimited moves the needle – but it's when mobile addresses slow fixed internet that something happens



This is tefficient's 19th public analysis of the development and drivers of mobile data.

Mobile data usage is still growing in all of the 36 countries covered by this analysis. But the growth rates are very different and so are the usage levels. Unlimited moves the needle. Finland tops the charts in usage – but it's India that leads the growth league.

Data-only is a very important driver of usage. Austria is now the clear world leader in fixed-line substitution.

In Korea, the share of data traffic on 4G has now effectively reached 100% with a 4G penetration of 80%. The country is ready for 5G.

A prerequisite for continued data usage growth is that the total revenue per gigabyte is low. This is not the case in Greece, Canada and Belgium. The total revenue per gigabyte there is roughly 20 times higher than in Finland and more than 35 times higher than in India.

In this analysis we again use the Christmas tree visualisation to identify the countries where the more-for-more initiatives of operators buck the general more-for-less trend.

Data usage continues to grow – also where it's high

Figure 1 shows the development of mobile data usage for 36 countries where regulators[1] report mobile data traffic. The usage is shown per SIM per month – and in Figure 1 we are including all[2] SIMs, also M2M/IoT SIMs.

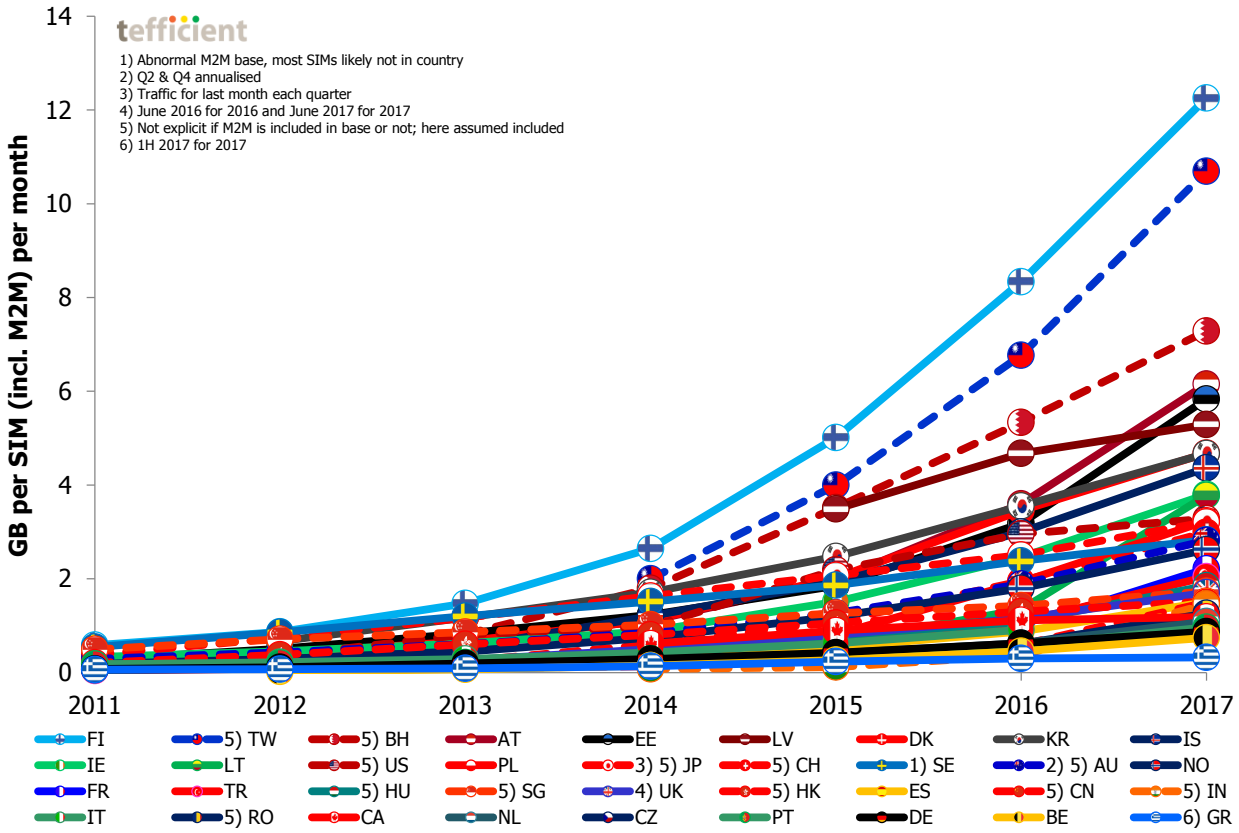


Figure 1. Development of mobile data usage per SIM (incl. M2M) per month

Starting from the top of the chart, **Finland** and **Taiwan** are still holding the number one and two positions in the world when it comes to mobile data usage. The average Finnish SIM card carried 12.3 GB of data per month in 2017. **56%** of the Finnish SIMs had **unlimited data volume** in December 2017.

The average Taiwanese SIM carried 10.7 GB per month. Unlimited is behind Taiwan's usage development as well, but it's not known how large share of the base that currently have it. The Taiwanese operators have tried to cool off the market by attempting to move the unlimited price points upwards while discontinuing unlimited for customers that have run out of binding, but the discipline doesn't seem to be there as the usage grew with 58% in 2017.

[1] Exception: USA, where the data is from the industry body CTIA and Switzerland & Canada where the input data is from OECD's broadband portal (said to originate from the regulators)

[2] All SIMs in a market included; even the SIMs that used no or little data. We think this provides a better comparison than usage per 'mobile broadband subscription' even if it lowers the average mobile data usage numbers somewhat.

We have added **Bahrain** to our analysis and the small Gulf state becomes the new number three in our analysis. Also here, unlimited is behind. During 2017, Bahrain's operators however removed most of the unlimited offers and the usage consequently just grew with 36%.

Austria's mobile data usage is continuing to develop quickly. **Fixed-line substitution** is a major driver of the development, fuelled by Austria's weak position within fast fixed broadband and fibre to the homes. But **Estonia**'s average data usage grew even faster – 83% – and the country emerges as the new number 5 of the world. Two of the three Estonian operators offer unlimited.

For the first time, our analysis also contains a comparison of the mobile data usage per SIM *excluding M2M*. As the M2M SIMs typically carry significantly less traffic than the regular SIMs, this makes the usage figures look higher, see Figure 2.

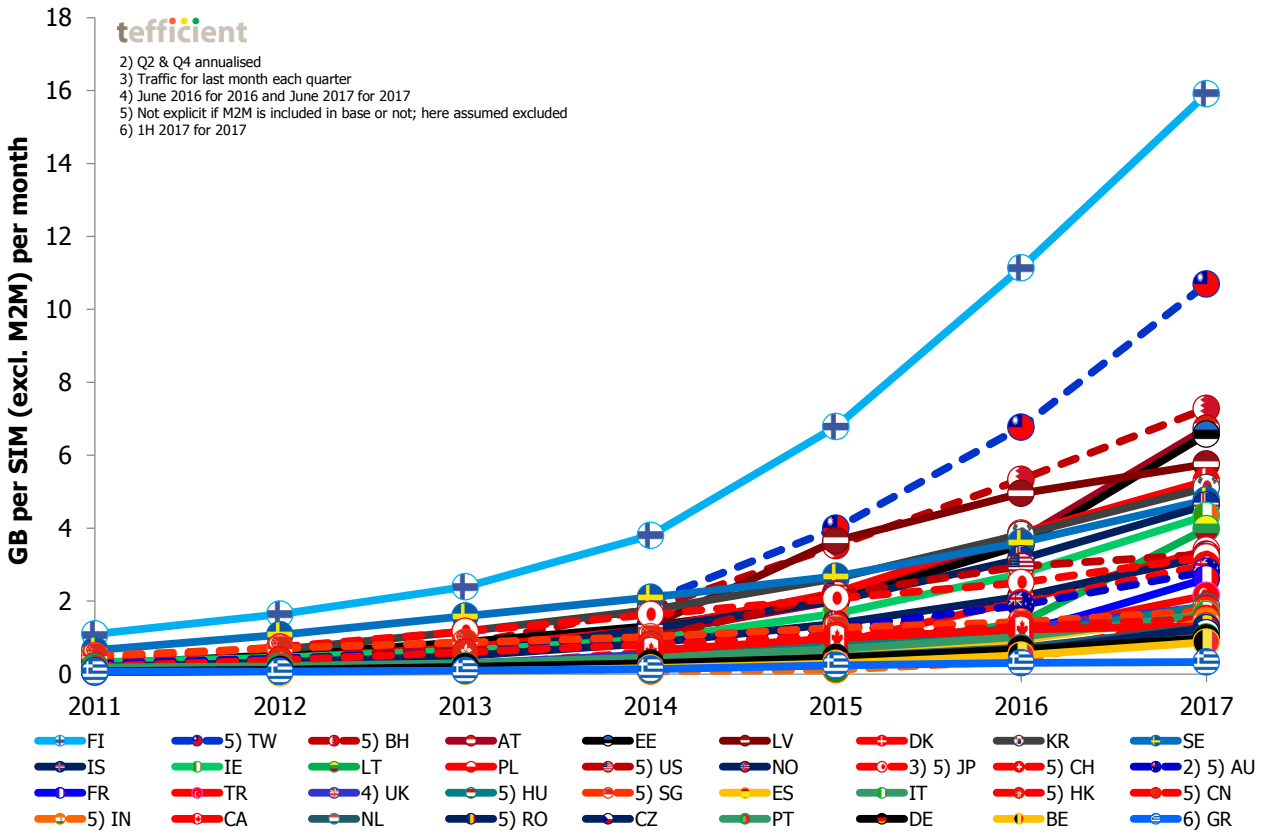


Figure 2. Development of mobile data usage per SIM (excl. M2M) per month

Since only a fraction of the countries separate out the data traffic associated with M2M SIMs in their reporting, the assumption for most of the countries in Figure 2 is that the M2M data usage is zero. This is of course not correct and as we expect M2M/IoT SIMs to carry significantly more traffic in future, we think that Figure 1 provides the most accurate comparison. For a number of countries [marked with '5)' and with dotted lines], the number of M2M SIMs isn't explicitly reported.

The top five countries – **Finland**, **Taiwan**, **Bahrain**, **Austria** and **Estonia** – are the same five as in Figure 1. Finland leads with an average usage per non-M2M SIM of **15.9 GB** per month. **64%** of the Finnish non-M2M SIMs had **unlimited data volume** in December 2017.

The legends of Figure 1 and Figure 2 show the ranking of the 36 studied countries. But since it's difficult to spot them all, Figure 3 and 4 show the ranking based on 2017 data. First including M2M:

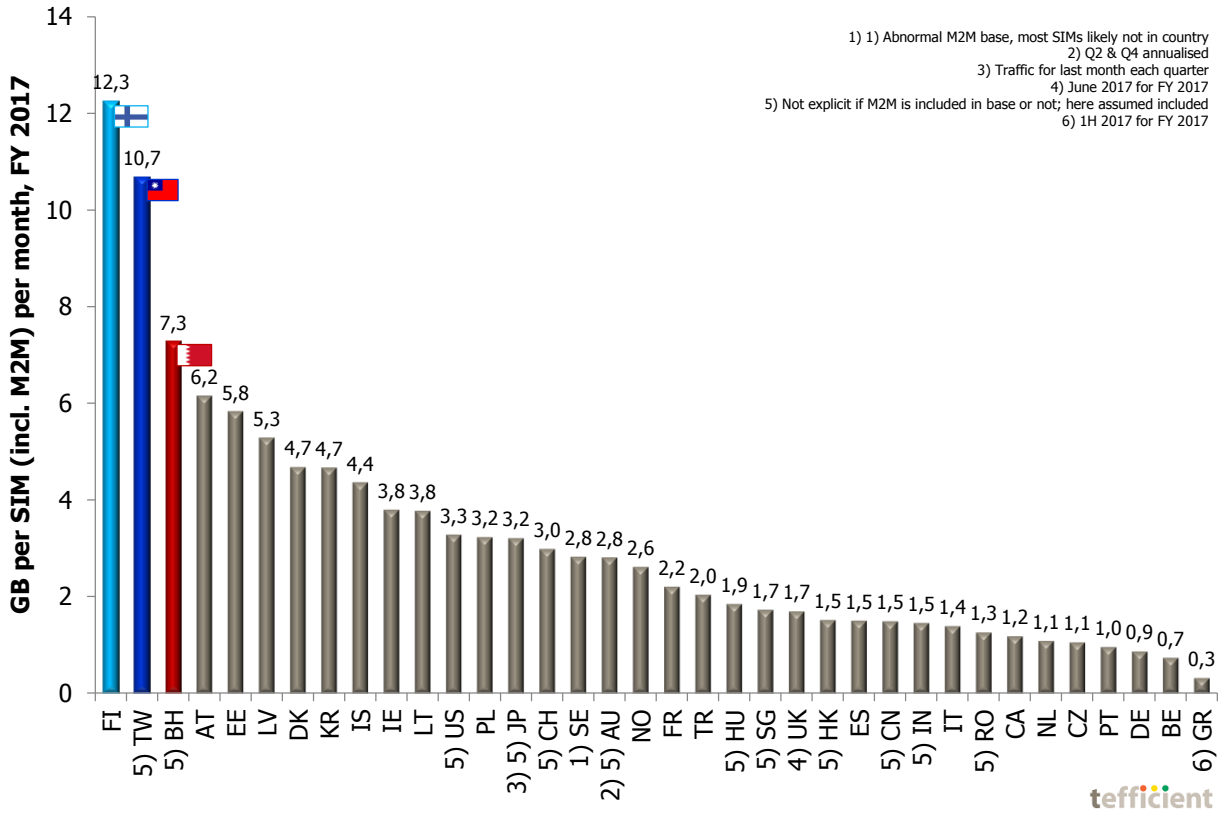


Figure 3. Mobile data usage per SIM (incl. M2M) per month, 2017

And in Figure 4 excluding M2M:

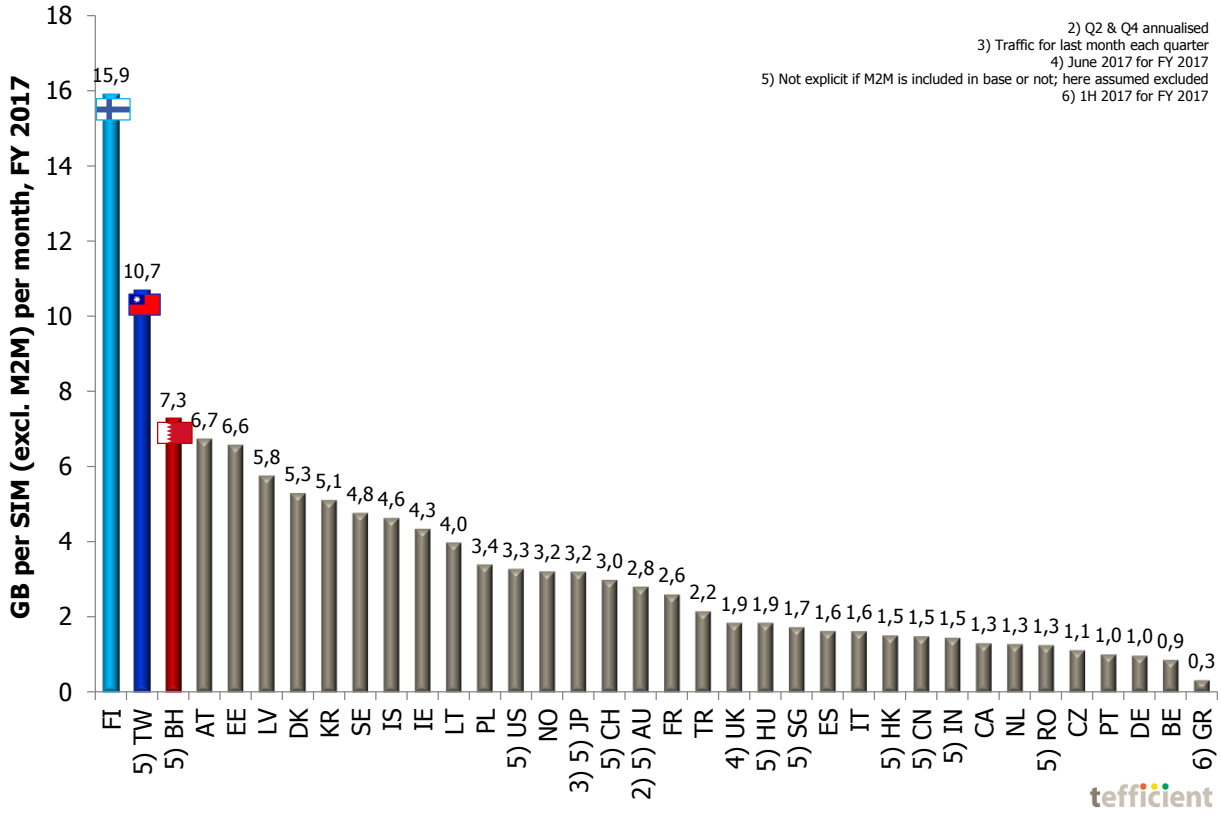


Figure 4. Mobile data usage per SIM (excl. M2M) per month, 2017

The countries with the lowest data usage in both Figure 3 and Figure 4 are **Greece**[3], **Belgium** and **Germany**. The usage levels in these countries are now much lower than the two maturing markets **China** and **India**. Figure 5 is a zoom-in of Figure 1 and shows how quickly the mobile data usage growth has been in China and India.

[3] Subject to that something would have happened in the second half of 2017 as the latest figures for Greece are from 1H 2017

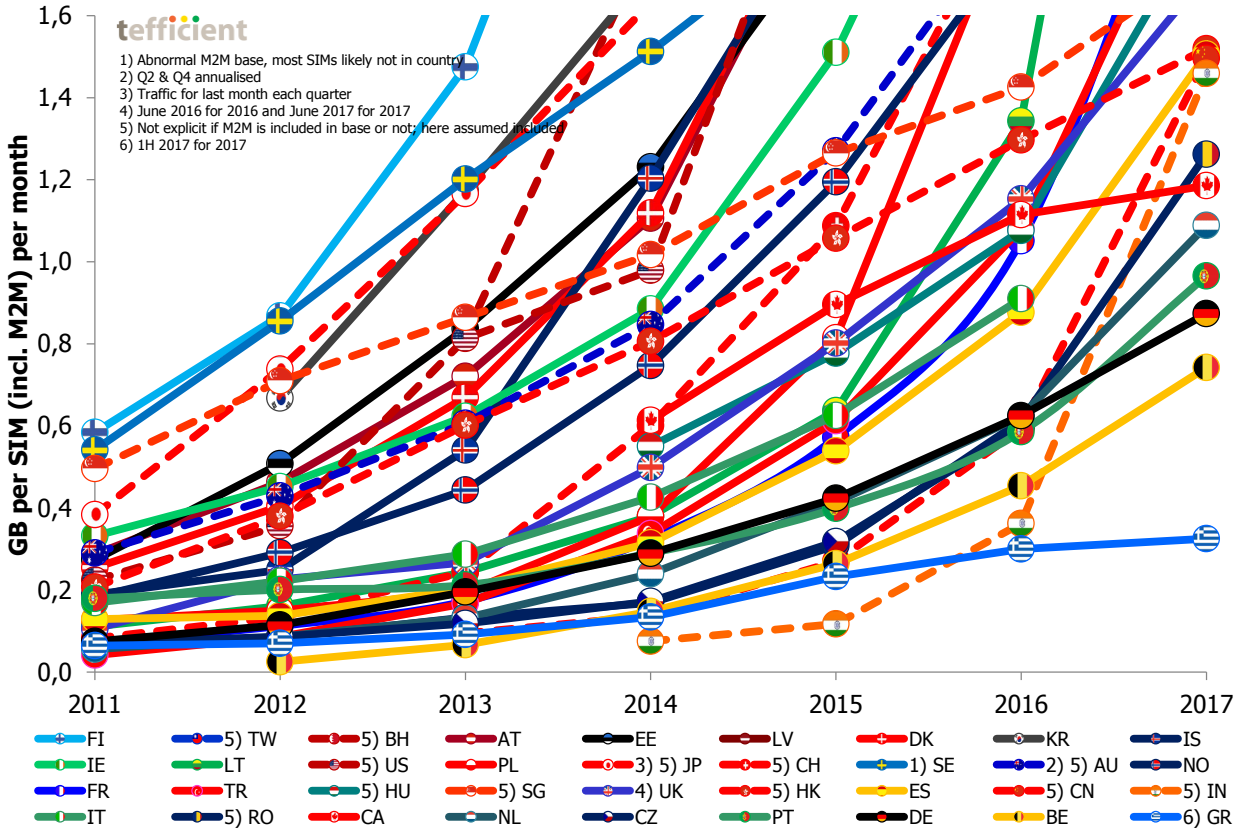


Figure 5. Development of mobile data usage per SIM (incl. M2M) per month [zoom-in on low end]

Another way to use Figure 5 is to see how many years behind a country is the global leader Finland in mobile data usage. Belgium did in 2017 pass the Finnish average usage of 2011, i.e. Belgium is roughly six years behind Finland whereas India and China are at around the Finnish level of 2013, i.e. four years behind.

Data usage growth fastest in India

Figure 6 shows the growth in average usage per SIM (incl. M2M) between 2016 and 2017.

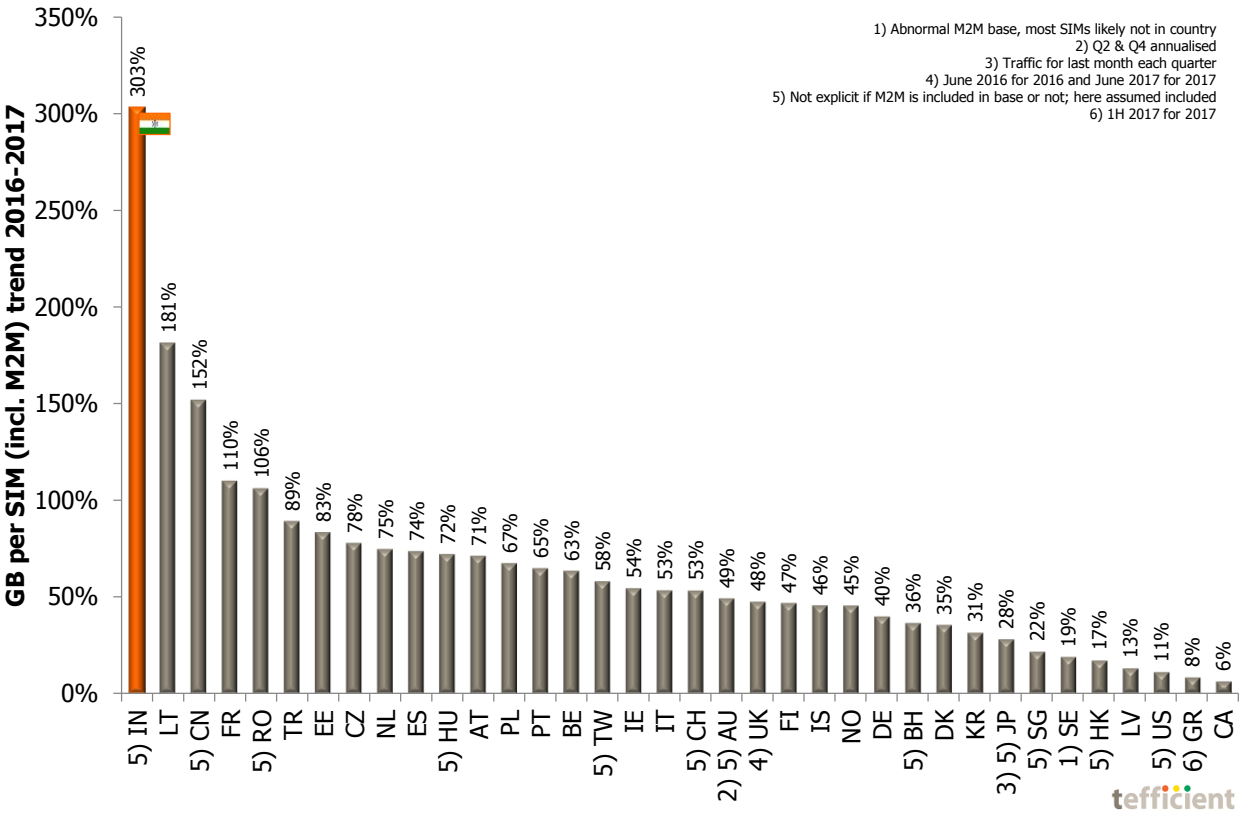


Figure 6. Development of mobile data usage per SIM 2016-2017

India's 303% growth in usage is unparallelled. It is a direct consequence of the market entry of a new disruptive operator, **Jio**. But all of the growth isn't attributed to Jio; the existing operators such as Airtel, Vodafone and Idea have during 2017 increased its average data usage many times when prices have been decreased and mobile networks improved.

Second-ranked **Lithuania** appears to have had very fast growth in data usage as well, but here we are facing a reporting comparability issue: Since January 2017, the Lithuanian regulator has included the traffic of the fixed-line substitution specialist Mezon. Their products used to be WiMax based, but the company shifted to 2.3 GHz TDD LTE during 2016. Mezon's traffic is not reported for 2016, hence the shown growth rate of 181% is exaggerated, but unclear how much.

China had 152% growth in usage in 2017. In absolute terms, China's mobile data traffic grew as fast as India's in 2017: The Chinese and Indian networks respectively carried **an incremental 15000 petabytes** in 2017 compared to 2016.

Among the more mature markets, **France** stands out with its 110% growth in data usage. The country has for a long time had an impressive y-o-y growth in mobile data traffic, see the quarterly stats in Figure 7.

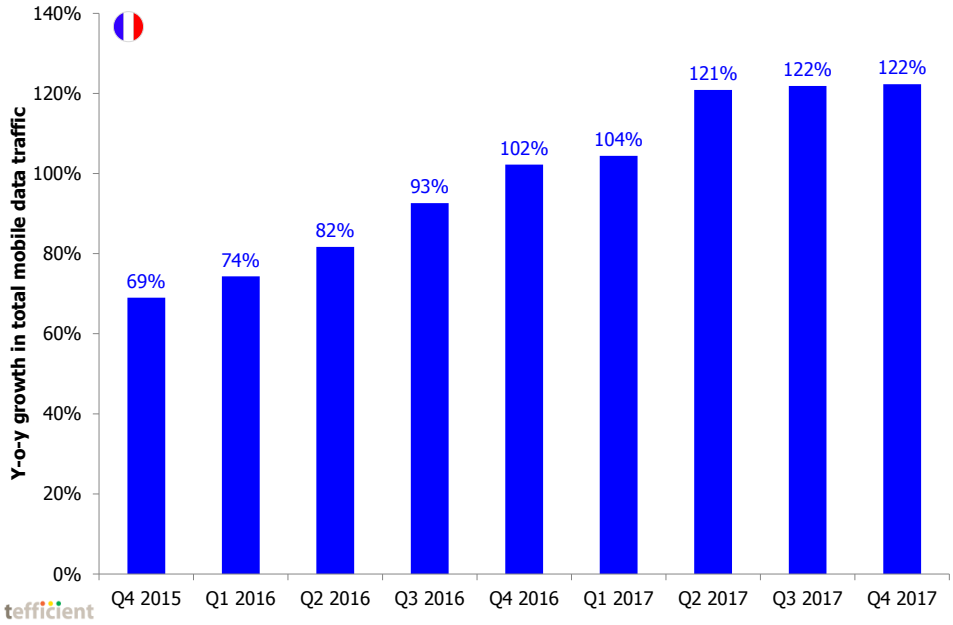


Figure 7. Year-on-year growth in total mobile data traffic – France

The reasons to the French growth are two: Introduction of fixed-line substituting 4G modems (sold in areas where fast fixed broadband networks don't reach) and a greater generousity in the inclusive allowances of French mobile plans. In March 2017, **Free** introduced unlimited for mobile customers that also subscribe to Free's triple-play service, the Freebox. SFR followed up with a premium unlimited plan which also is offered to stand-alone mobile customers.

The markets with the lowest growth in data usage in 2017 are **Canada**[4], **Greece**[5], **USA**, **Latvia**, **Hong Kong** and **Sweden**. The reasons are different.

- For **Canada** and **Greece**, high operator revenues per gigabyte play a key role – see the revenue section of this analysis
- The position of the **USA** is surprising as 2017 was the year when unlimited plans became widely available – but apparently these have not led to any major increase in the overall usage, perhaps due to the volume and video bandwidth limitations on these plans
- In **Latvia**, operators have scaled back on unlimited plans
- The operators of **Hong Kong** have built large public Wi-Fi networks that are offloading much of the mobile data traffic
- In **Sweden**, high speed fiber-to-the-home and fiber-to-the-building networks are now widespread – 67% of the Swedish fixed broadband users subscribe to 100 Mbit/s or higher download speeds

[4] According to stats from OECD broadband portal
[5] Based on latest avalable stats from the first half of 2017

Data-only seldom more than 20% of base, but defines usage

We touched upon how Wi-Fi and fibre rollout could affect mobile data usage. But mobile operators could also address the home market with **fixed-line substitution** offers. The take-up can be significant if these offers are reasonably charged and come without volume limitations. It also helps if they fixed broadband offering is weak with much DSL is the mix.

This pretty much described the situation in **Austria**, a country that has emerged as one of Europe's mobile data leaders. For the first time, the Austrian regulator RTR published the fixed data traffic of Austria. It's available just for the fourth quarter of 2017, but if we compare it to the mobile data traffic in the same quarter, it's obvious how important the mobile networks have become for the overall internet in Austria.

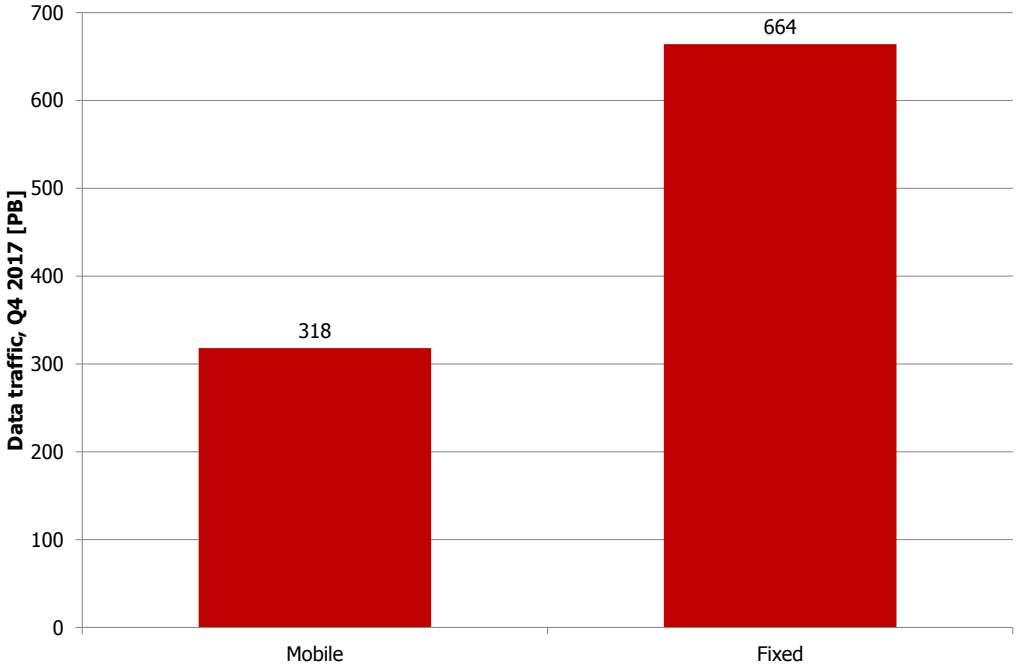


Figure 8. Comparison between the mobile and the fixed data traffic in Q4 2017 – Austria

Figure 8 shows that the mobile data traffic in Austria (318 petabyte) was close to half of the fixed data traffic in Q4 2017. Which takes us to our next graph, Figure 9. It plots the average data usage per SIM vs. the data-only penetration of a country's SIM base.

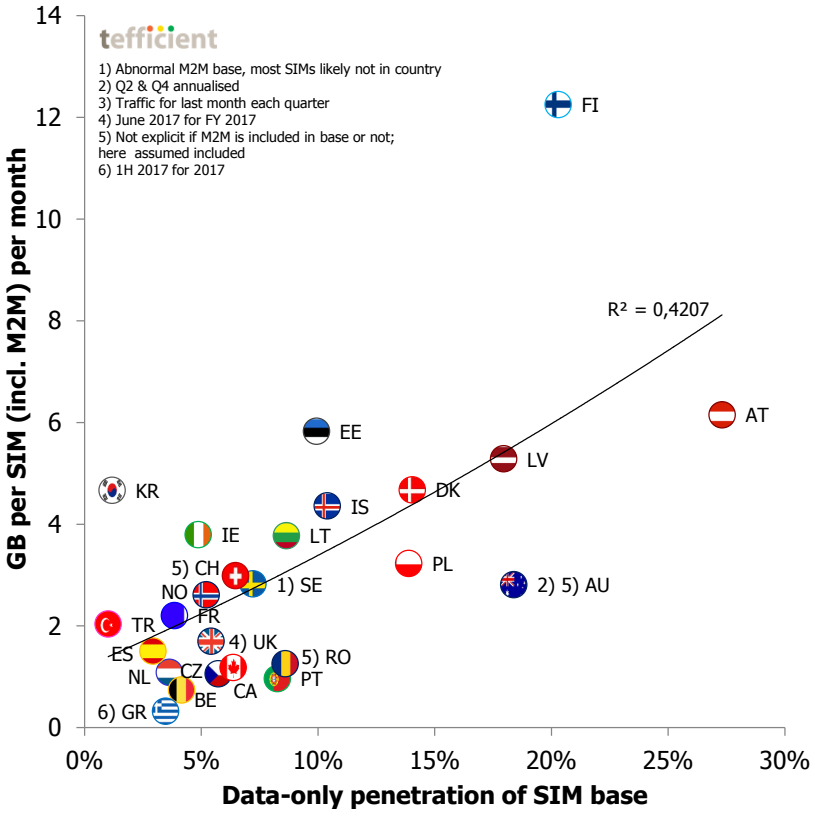


Figure 9. Mobile data usage vs. data-only penetration

Given our introduction, it's perhaps not surprising to see that Austria has the highest data-only penetration of our studied countries; **27.3%** in December 2017. Six months earlier, in June 2017, it was 23.7% so this is a development that is fast. Some of this could perhaps be explained by the introduction of *hybrid* mobile/fixed routers by A1 and T-Mobile making mobile a 'part time' element in fixed modems. The introductions signal that both companies find the performance of Austria's fixed broadband (most often DSL) insufficient – but also that a mobile-only broadband solution isn't deemed sufficient for capacity in densely populated urban areas[6].

The global data usage leader **Finland** had a data-only penetration of 'just' 20.3% in December 2017. Also in **Australia**, **Latvia**, **Denmark** and **Poland** data-only is popular with penetration rates at 14% or higher.

Data-only penetration is a significant driver of mobile data usage

The adherence to the regression line is quite strong. Countries without a developed data-only market such as Greece, Belgium and the Netherlands are having a low average data usage. An exception is Turkey where average data usage is high in spite on a near non-existent data-only market. The position of Korea depends a bit on how

[6] See https://newsroom.t-mobile.at/2017/11/13/t-mobile-breitband-offensive/

one likes to interpret the Korean stats. Figure 9 shows a low data-only penetration of just 1.2% based on the number of reported dedicated SIMs in tablets and PCs. If including also vehicle control units, remote control units, wireless payment terminals, wearables and other cellular-connected IoT devices, the Korean data-only penetration would be 9.2%. This would put the Korean marker closer to the regression line.

The easiest way for low-usage countries to grow data usage and expand the mobile market would be to **start addressing and monetising the data-only segment**. Based on the Austrian and Finnish examples this seems to be effective particularly in markets where fast fixed broadband networks (FTTH, FTTB or HFC) aren't already available to a substantial share of the households.

Some of the countries in Figure 9 are also reporting the data-only traffic. For these countries, we can compare the data-only penetration of the SIM base to its share of the total mobile data traffic, see Figure 10.

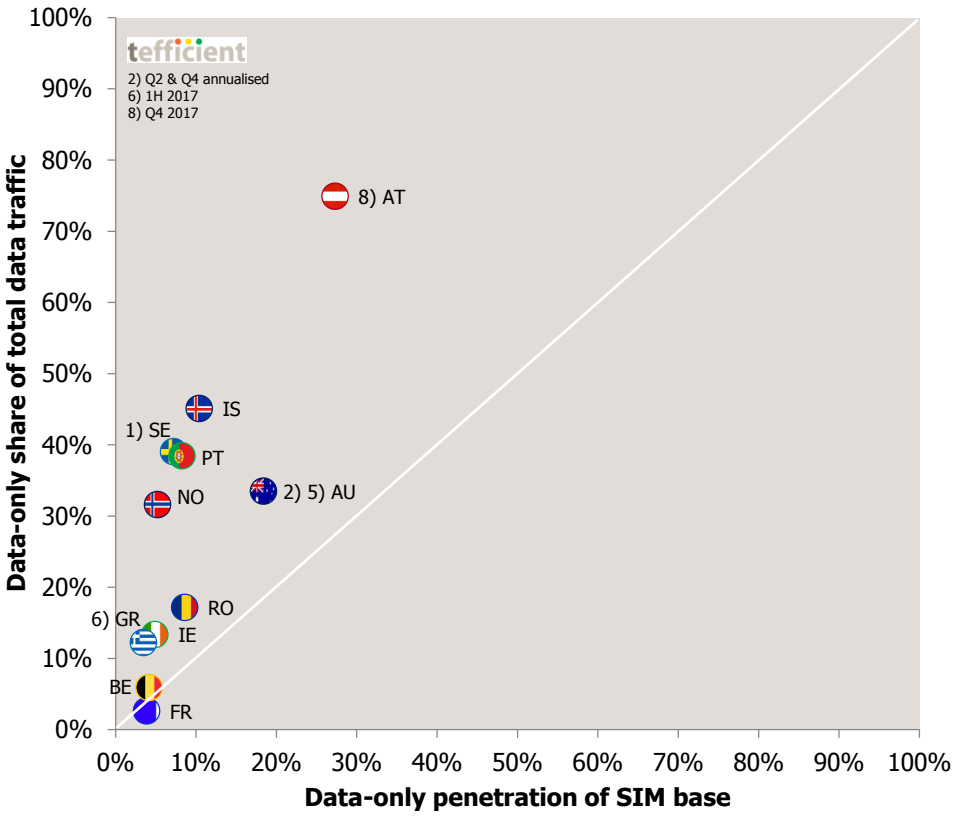


Figure 10. Data-only share of total traffic vs. data-only penetration

With the exception of France, data-only SIMs are carrying a disproportionally high share of the data traffic:

- Norway **6.1x** higher traffic per data-only SIM vs. any SIM
- Sweden **5.4x**
- Portugal **4.7x**
- Iceland **4.3x**

- Greece **3.5x**
- Ireland **2.7x**
- Austria **2.7x**
- Romania **2.0x**
- Australia **1.8x**
- Belgium **1.4x**
- France **0.7x**

For the countries that are reporting both data-only traffic and the number of data-only subscriptions, we can compare the average usage per *data-only* subscription, see Figure 11.

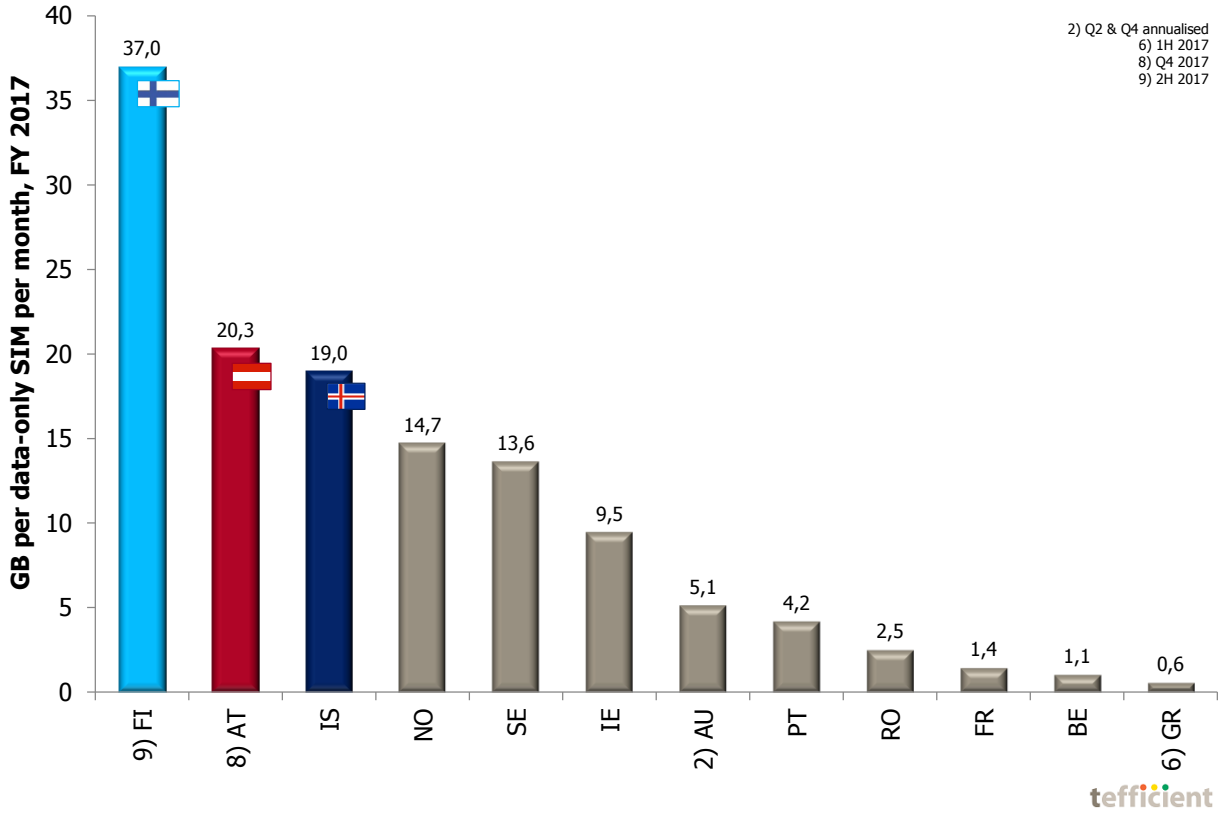


Figure 11. Mobile data usage per data-only SIM per month, 2017

The sample is quite small, 12 countries, but **Finland**'s usage leadership is cemented also within data-only. As expected, **Austria** is also high[7] (here represented with Q4 2017 as that's the only data point available so far), followed by Iceland, Norway and Sweden.

[7] The Austrian regulator reports a much higher 47 GB per month per *active* data-only subscription in Q4 2017 if excluding data-only subscriptions without a fixed monthly fee, but Figure 11 shows the average usage per *any* data-only subscription

4G adoption a weakening driver of data usage

If data-only defines the overall data usage, the same can't really be said for 4G.

Figure 12 plots the average data usage per SIM vs. the 4G adoption within the country SIM base. **Korea** and **Taiwan** are highest with 79%. But the adherence to the regression line is much weaker than in the previous data-only section.

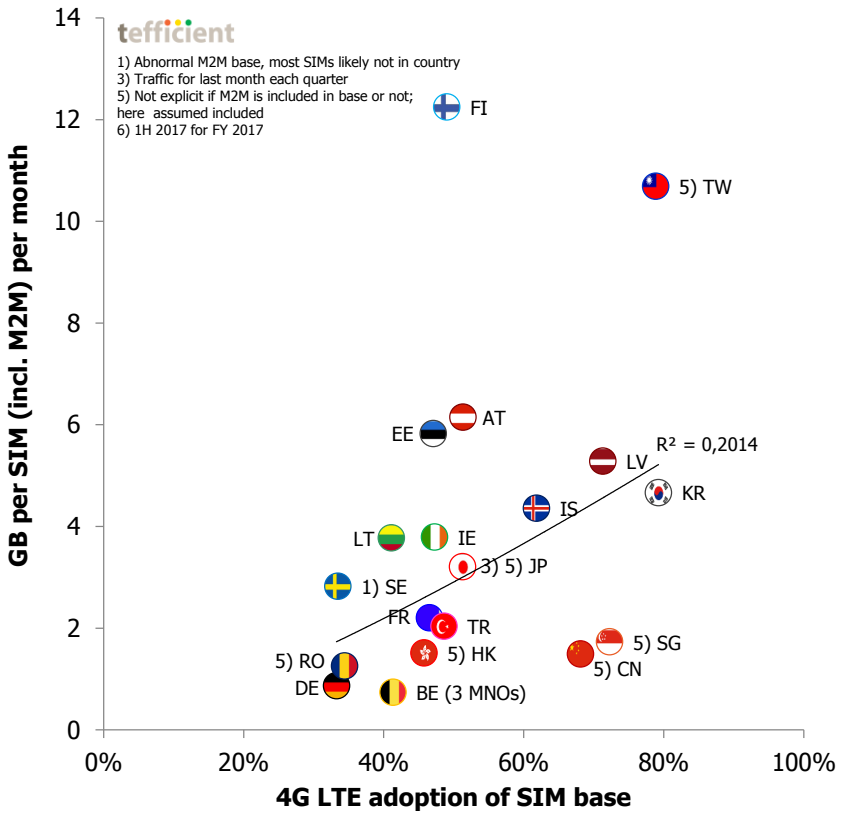


Figure 12. Mobile data usage vs. 4G LTE adoption

In Finland, only 49% of SIMs have subscriptions which allow 4G speeds[8] but the average data usage is still much higher than Korea. While operators from time to time still like to report that 4G drives data usage, Figure 13 shows that 4G in itself is a much weaker driver of traffic than data-only (compare with Figure 10).

Korea has already reached the point where essentially all data traffic is on 4G. This happened even though the 4G penetration was 'just' 79% in December. The three MNOs in **Japan** are also approaching the point where all mobile data traffic is on 4G.

4G adoption is a weakening driver of mobile data usage

[8] Higher or equal than 30 Mbit/s

The same is soon true also for **Turkey**.

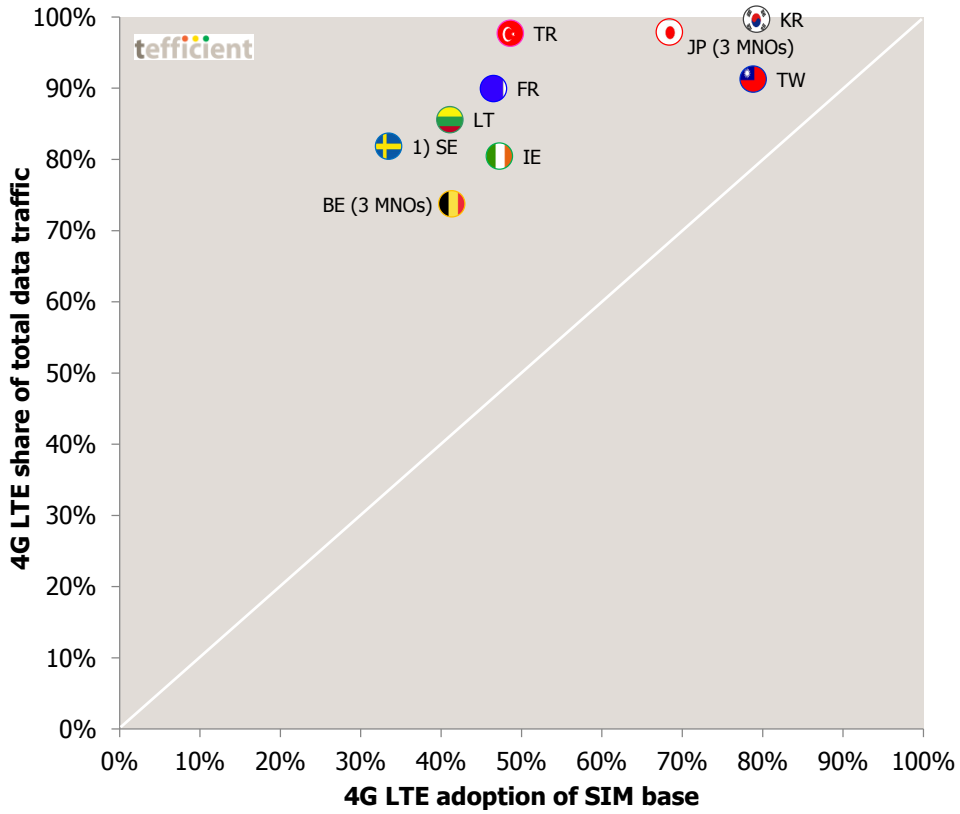


Figure 13. 4G LTE share of total traffic vs. 4G LTE adoption

Without exceptions, 4G LTE users are carrying a disproportionally high share of the data traffic – but in comparison to data-only, the multipliers are much lower:

- Sweden **2.4x**[9] higher traffic per 4G LTE user vs. any SIM
- Lithuania **2.1x**
- Turkey **2.0x**
- France **1.9x**
- Belgium **1.8x**
- Ireland **1.7x**
- Japan **1.4x**
- Korea **1.3x**
- Taiwan **1.2x**

[9] The low 4G LTE adoption in Sweden is much because of a large number of Telenor Connexion M2M SIMs registered in Sweden (9 million M2M SIMs of Sweden's total 11 million), but likely used somwhere else than in Sweden

If comparing with Figure 13 it is clear that the 4G multiplier drops with an increasing 4G adoption. It is, in other words, when 4G still has a relatively low adoption that it makes a difference for the overall data usage. Once 4G has become more common, the effect of the early adopters is watered out and the delta between a 4G user and any SIM becomes smaller.

Over time, the 4G penetration will grow – simply because new terminals will, almost by default, have 4G – but it will no longer have any strong impact on the average data usage.

With 5G expected to become available next year, in 2019, we will of course follow 5G's effect on data usage closely.

The total revenue per GB varies between 0.7 and 31 EUR

Most mobile operators in mature markets aren't attempting to monetise voice and SMS based on usage any longer; they have instead made these allowances unlimited and included them in a flat fee. This means that the remaining price-defining parameter for most mobile users is **data volume**. Even though more and more operators introduce unlimited propositions, these are often the last step in a tiered data plan[10] – which means that price still, essentially, is about data volume.

Figure 14 plots the *total* mobile service revenue per consumed gigabyte[11] against the average mobile data usage per SIM and month.

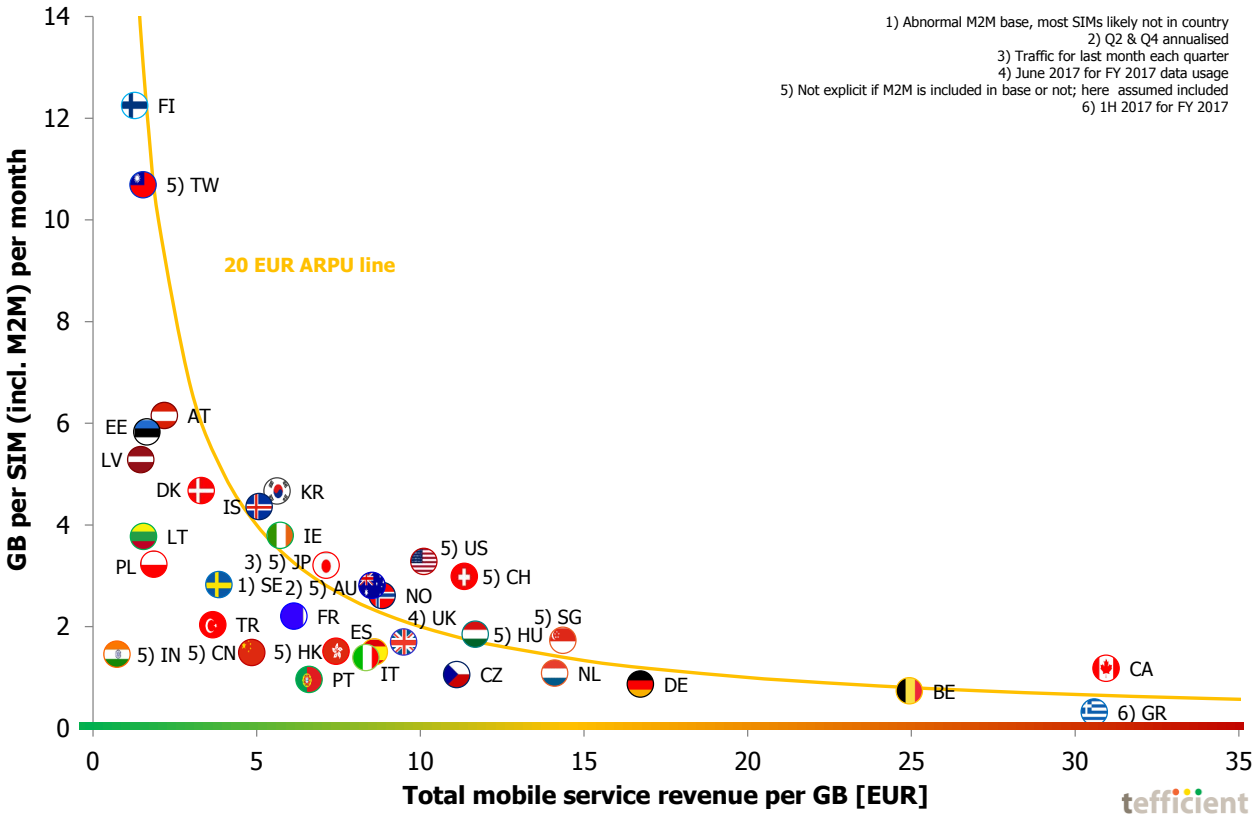


Figure 14. Mobile data usage vs. total mobile service revenue per consumed GB

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.

There are three countries where operators enjoy much higher total revenue per consumed gigabyte: **Canada**, **Greece** and **Belgium**.

[10] There are exceptions to this, e.g. Elisa, DNA and Swisscom, where the price-defining parameter instead is data throughput. There are also operators mixing several parameters such as volume, throughput, policy, zero-rating, video resolution, service bundling etc.
[11] Attributing zero value to voice and messaging

It's important to point out that our analysis looks at what the mobile operator industry *de facto* charges end-users, not what the best offer on the market currently is. In reality, most users are on old price plans because they are still locked in by a contract – or because they have not bothered to find the best deal.

In the other end of the scale we find the countries where operators get the lowest revenue per consumed gigabyte: **India**, **Finland**, **Latvia**, **Taiwan**, **Lithuania** and **Poland**.

Looking at Figure 14 we can conclude – as in all our previous analyses on this topic – that the key explanation to high mobile data usage is low effective revenue per gigabyte: **Bigger data buckets lead to lower revenue per GB – which, on the other hand, increases usage**. At least when customers can use those big buckets also on data-only devices; see Figure 9.

Indian operators have the lowest total revenue per gigabyte – Canadian operators the highest

Only weak correlation between data usage and ARPU

Figure 15 is a variant of the just-shown revenue per GB chart – it plots the usage against the average revenue per SIM, i.e. the ARPU.

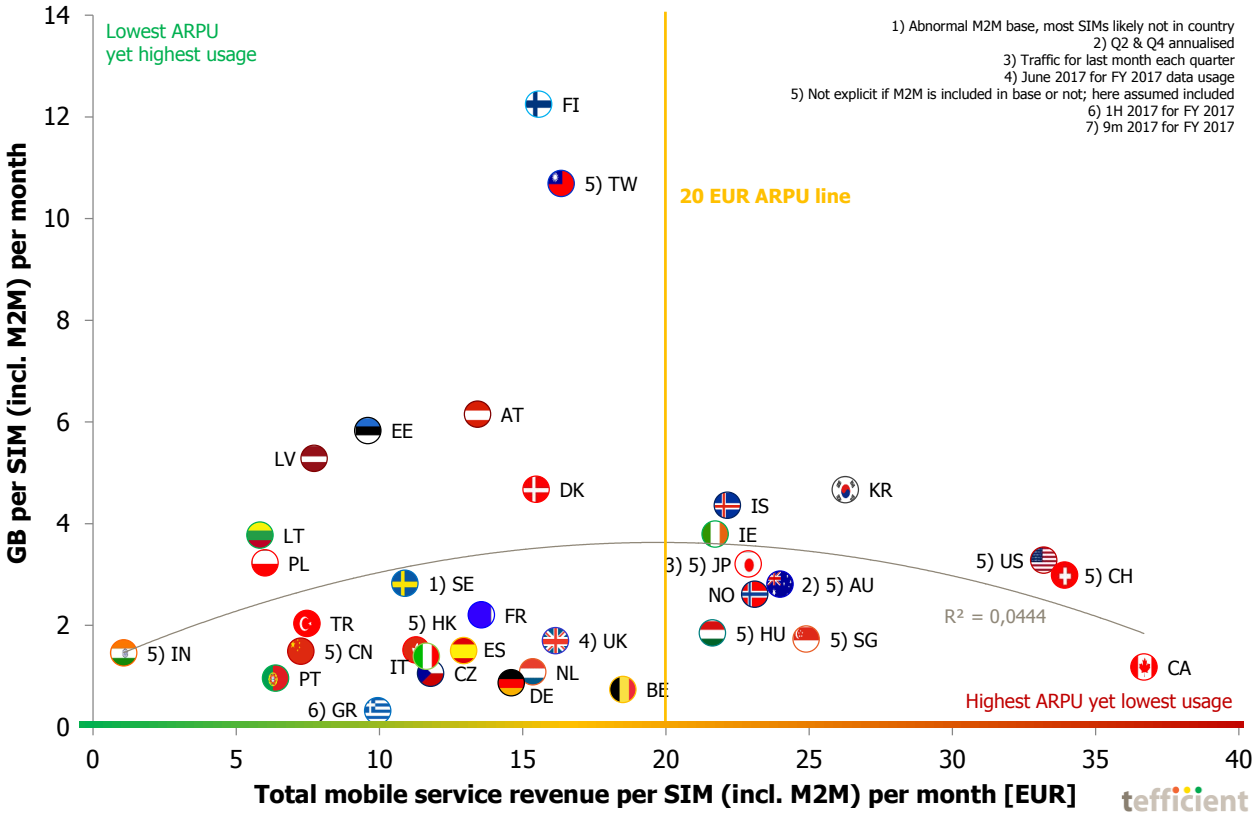


Figure 15. Mobile data usage vs. total mobile service revenue per SIM

Of our studied markets, there are three where operators derive ARPUs much higher than elsewhere: **Canada**, **Switzerland** and the **USA**.

Operators in the upper left corner – **Finland**, **Taiwan**, **Austria**, **Estonia**, **Latvia**, **Lithuania**, **Poland** and **India** – are being the most generous with mobile data considering their ARPU.

It's disappointing to see that the regression line isn't pointing in a north-easterly direction; there is not much in Figure 15 that suggests that operators in a country can expect to get rewarded with higher ARPU when usage grows. The adherence to the line is also very weak.

But isn't almost every operator telling that it has a "**more for more**" strategy? I.e. that it will give customers more data *if* they pay more. As shown already in our previous analysis, this is rather wishful thinking than reality. Many operators are giving customers more data regardless. This means that most operators should be proud for "more of the same" since quite many actually experience "more for less".

To demonstrate this, we have updated what we call the Christmas tree graph.

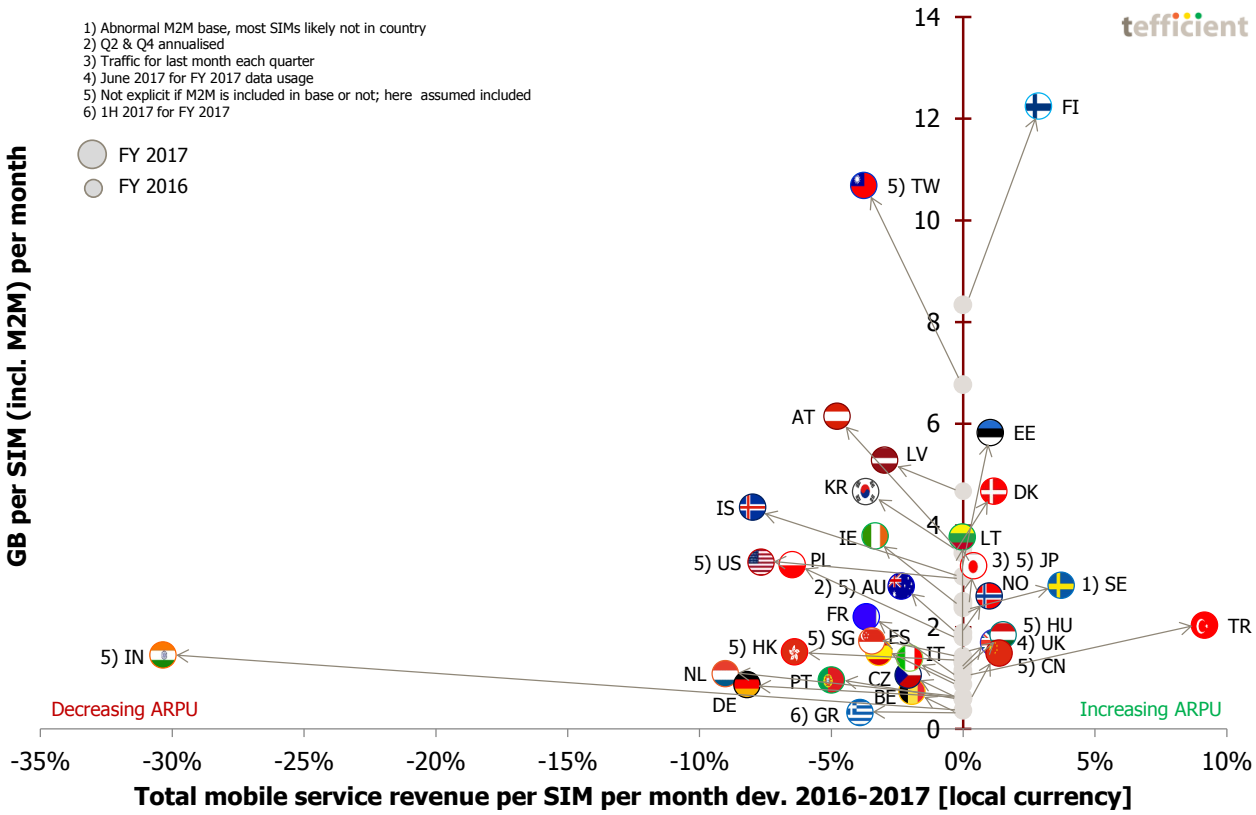


Figure 16. Mobile data usage vs. development in total mobile service revenue per SIM – with trends from 2016

Just like the branches of a Christmas tree, all arrows in Figure 16 are going upwards since data usage is growing in every single country. But the tree is unbalanced: Too many branches are pointing left towards lower ARPU – too few pointing right towards higher ARPU.

In most markets it's not "more for more" – it's "more for less"

But there are a few markets in which the growth in data usage has led to a growth in ARPU (in local currency): **Turkey**, **Sweden**, **Finland**, **Hungary**, **China**, **Denmark**, the **UK**, **Estonia**, **Norway** and **Japan**. These markets could be classified as "more for more" markets. It doesn't mean that every operator in these markets is successful, though.

In all the other markets, the mobile ARPU has declined in spite of the growth in mobile data usage. These markets are "more for less" with **India** as the extreme example. This doesn't mean that every operator in these markets is losing.

The next graph, Figure 17, shows how fast the **erosion** in the total mobile service revenue per gigabyte has been in 2017.

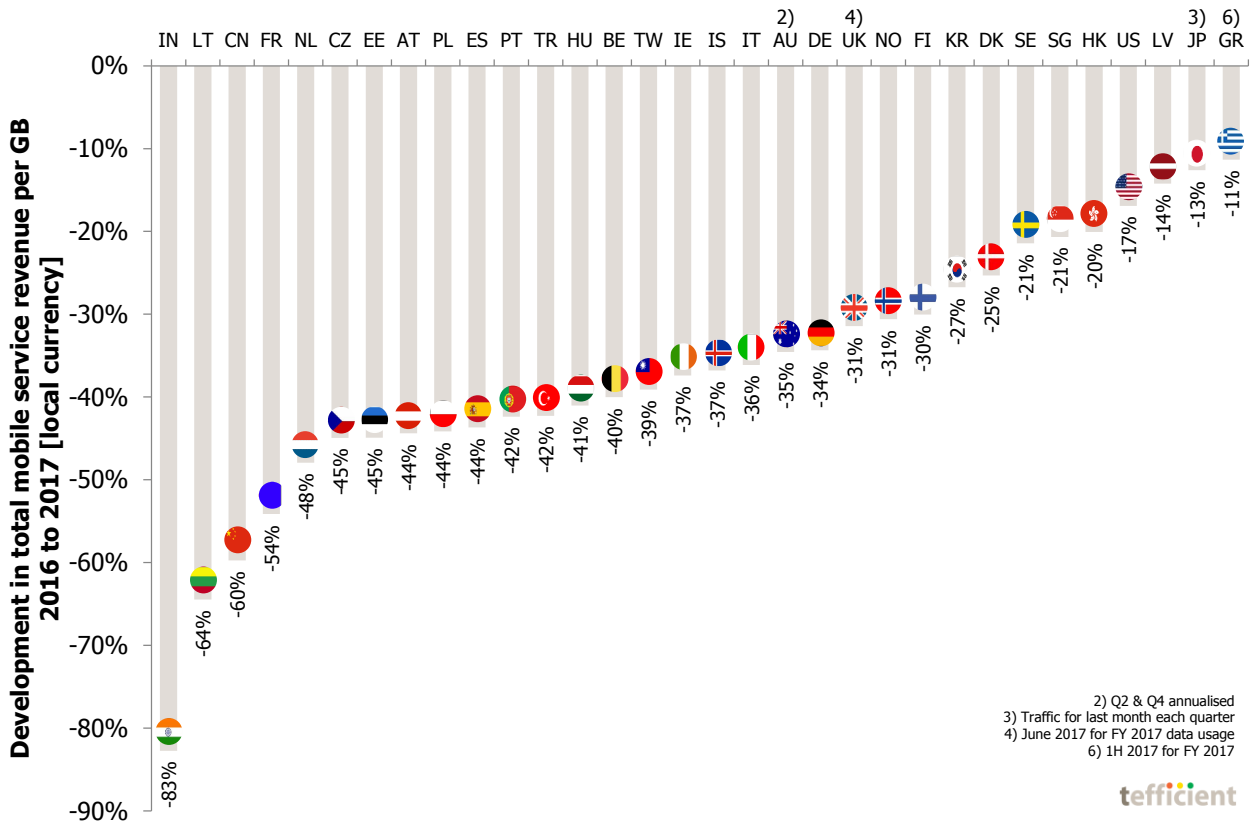


Figure 17. Erosion in total mobile service revenue per GB – 2016 to 2017

India, because of Jio and the reactions of the competitors, had the fastest erosion: -83%. **Lithuania** follows with -64% but this value is in part due to the mentioned comparability issue due to the inclusion of Mezon in 2017 but not in 2016. **China** had -60% with **France** following with -54%. The **Netherlands**, which featured in our previous analysis as one of the most expensive mobile data markets had -48%, in part due to the introductions of unlimited data by T-Mobile and Tele2.

In the other end of the scale we find the markets that, according to Figure 6, also had the lowest growth rates in data usage: **Greece**, **Japan**, **Latvia**, **USA**, **Hong Kong**, **Singapore** and **Sweden**.

Will the future hold even faster revenue erosion? Many operators have introduced plans with unlimited data in 2017 – won't that make things worse? Not necessarily; as said, these plans are typically *premium* plans. They will drive data usage, but perhaps not as much as expected as the primary motivation to buy them seems to be **peace of mind** – as opposed to a burning desire to consume that much more mobile data. As shown in a previous analysis, operators with bucket plans have generally been almost as quick to inflate those buckets as unlimited users have been to self-serve themselves to more data.

What makes operators with bucket plans so nervous that they themselves erode revenue per gigabyte like that? Competition. Operators know that the best strategy to keep a customer is to *not* limit his/her data usage. This means that almost all operators – regardless of what they say – are on the "more for the same" track where **customer loyalty is more important than a few extra Euros**.

Conclusion

Mobile data usage is still growing in all of the countries covered by this analysis. The growth rates are very different and so are the usage levels. As usual, **Finland** tops the charts – with 12.3 GB per average SIM per month in 2017. If excluding M2M, the average usage in Finland grows to 15.9 GB per month. But in spite of **64%** of non-M2M SIMs being **unlimited**, the data usage isn't particularly fast there – it grew 47% in 2017. France's usage grew 110%, China's 152% and India 303%. This growth meant that **China** and **India** passed countries like Canada, the Netherlands, Germany and Belgium in average usage in 2017.

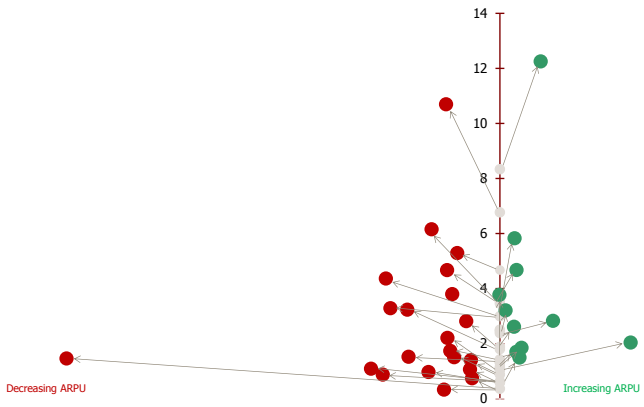
Our analysis shows strong correlation between the **data-only penetration** of a country's SIM base and the average data usage. **Austria** is now the data-only powerhouse of the world with 27% penetration.

The **4G** share of total mobile data traffic has already effectively reached 100% in **Korea** even though the 4G adoption is less than that; 79%. The rest of the world (except Taiwan) is behind Korea in 4G adoption, but Korea's data usage isn't the highest. For other mature markets this means that the data usage upside by an increasing 4G adoption in itself is limited. Data usage could instead be elevated by an increased data-only penetration through fixed-line substitution. But a prerequisite for this – and for high data usage in general – is that the **total revenue per gigabyte** is low.

This is the case in **India**, **Finland**, **Latvia**, **Taiwan**, **Lithuania**, and **Poland**. These countries are representing the mobile data heaven for users.

Canada, **Greece** and **Belgium** represent the other end. The total revenue per gigabyte here is more than 35 times higher than in India and 20 times higher than in Finland. And consequently, mobile usage is very low.

Low data usage doesn't necessarily mean that the ARPU is low, though. **Canada**, **Switzerland** and **USA** have the highest ARPU levels among the countries in our analysis and the Canadian consumers should be particularly unsatisfied with that – given how few gigabyte they can consume for that ARPU.

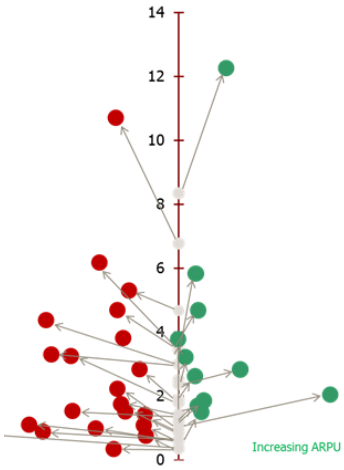


With the Christmas tree visualisation we show how difficult "**more for more**" generally is. In 22 markets **ARPU declined** in 2017 even though the data usage increased.

But in ten markets – Turkey, Sweden, Finland, Hungary, China, Denmark, the UK, Estonia, Norway and Japan – ARPU increased on the back of an increase in data usage.

Congratulations. Keep up the good work!

This is essentially how these countries have managed to turn mobile data usage growth into service revenue growth:



1 Be reasonably **generous with data**
Allow usage to grow 30-90% y-o-y

2 Accept a **mid-range ARPU**; refrain from exceeding 20 EUR
Accept a **low to medium service revenue per GB**

3 Sell **data-only** as **fixed-line substitution**
At least in areas where fast fixed broadband isn't available
Data-only should represent a reasonably high share of the base

4 Let **4G** handle a high share (>80%) of traffic
Don't push the 4G terminal and subscription adoption

tefficient