

**Industry analysis #2 2019** 

#### Mobile data – full year 2018 (updated 9 July<sup>1</sup>)

# Prepping for 5G: Monetisation model and FWA define usage



This is tefficient's 23<sup>rd</sup> public analysis of the development and drivers of mobile data.

Mobile data usage is still growing in all of the 39 countries covered by this analysis. Two countries stand out – China and India.

But China and India aren't yet challenging the usage top – where the two unlimited superpowers, Finland and Taiwan, still reign.

Data-only remains a key driver for overall usage and new figures from Czech Republic, Latvia, Finland and Austria add insight to the extreme usage pattern of fixed wireless access.

While 4G's impact on usage deteriorates, 5G is initially another story. In May, the average Korean 5G subscription used 26 GB of 5G data. During the same month, the average 4G subscription used 8 GB of 4G data.

There is a prerequisite for continued data usage growth, though: The total revenue per gigabyte can't be too high – like in Canada and Belgium.

<sup>&</sup>lt;sup>1</sup> In previous versions, Italy, Hungary, Singapore and Korea were incorrectly displayed in Figure 16 and Figure 17 with 1H 2018 data usage and annualised 1H 2018 revenue – now corrected to FY 2018

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

Figure 1 shows the development of mobile data usage for 39 countries where regulators<sup>2</sup> report mobile data traffic. The usage is shown per SIM per month – and in Figure 1 we are including all<sup>3</sup> 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 15.3 GB of data per month in the first half of 2018. **59%** of the Finnish SIMs had **unlimited data volume** in December 2018.

The average Taiwanese SIM carried 14.3 GB per month. Unlimited is behind **Taiwan**'s usage development as well, but it's not known how large share of the base that have it. The Taiwanese operators – there are five MNOs – 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 quicker than in Finland in 2018.

<sup>&</sup>lt;sup>2</sup> Exception: USA, where the data is from the industry body CTIA

<sup>&</sup>lt;sup>3</sup> All SIMs in a market included; even the SIMs that used no or little data. We think it provides a better comparison than usage per 'mobile broadband subscription' even if it lowers the average mobile data usage numbers somewhat.



**Latvia** moves up as the new bronze medallist. The country took a quantum leap in 2018 thanks to a 16% expansion in the number of **data-only** subscriptions. These most often come with an unlimited data volume. It's interesting that this happens in the country that is the **European leader in FTTH/B** penetration – see who is number 1 in the graph from FTTH Council Europe:



#### FTTH/B Ranking – European ranking

Figure 2. FTTH/B ranking of FTTH Council Europe, March 2019

The notion that a high penetration of fibre broadband to the homes would make mobile data-only subscriptions less attractive and less used is contradicted by Latvia.

Latvia's growth has moved **Bahrain** into fourth place and **Austria** into fifth.

#### The M2M reporting dilemma

Regulators' reporting of M2M/IoT SIMs continues to create a challenge for the comparability between countries. A growing problem is international M2M SIMs that are registered in one country but used somewhere else. Sweden is a good example. The country regulator, PTS, reports 12.9 million M2M SIMs in Sweden – a figure that roughly doubles the total SIM base if added to the regular SIMs base. 9.8 million of these are with the international M2M unit of Telenor group,



Telenor Connexion. Most likely few of these SIMs are actually in Sweden. If including the 12.9 million M2M SIMs – like in Figure 1 – Sweden's average mobile data usage looks moderate – if excluding them, it looks higher.

The same issue now emerges in Austria where Deutsche Telekom group registers many of its international M2M SIMs. The number of 'Austrian' M2M SIMs as reported by RTR grew 81% in a year. Similar to Sweden, Austria's average mobile data usage per SIM thus looks higher if excluding M2M SIMs.

But if the homebase of international M2M SIMs is an issue, there's also another: Many regulators don't specify if M2M SIMs are included in the reported SIM base or not. These countries are marked 5) in our charts. In most of our graphs, Figure 1 included, we have assumed that M2M SIMs are included in the reported SIM base. The exception is in Figure 2 where we have assumed that M2Ms are excluded. This increases the separation between e.g. Finland and Taiwan.

Figure 3 is a variant of Figure 1 but with M2M SIMs *excluded*. As the M2M SIMs typically carry significantly less traffic than the regular SIMs, this makes the usage figures look higher.



Figure 3. 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 (kudos to Norway, Sweden, Czech and Greece), the assumption for most of the countries in Figure 3 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.

![](_page_4_Picture_0.jpeg)

The top five countries – **Finland**, **Taiwan**, **Latvia**, **Bahrain** and **Austria** – are the same as in Figure 1. Finland leads with an average usage per non-M2M SIM of **17.4 GB** per month. **67%** of the Finnish non-M2M SIMs had **unlimited data volume** in December 2018. Yes, two thirds. No other country in the world has a higher adoption of unlimited and it will be interesting to follow how it develops now that Finland became one of the first ten countries in the world to launch 5G.

The legends of Figure 1 and Figure 3 show the ranking of the 39 studied countries. But since it's difficult to spot them all, Figure 4 and 5 offer an easier visualisation. First including M2M:

![](_page_4_Figure_3.jpeg)

Figure 4. Mobile data usage per SIM (incl. M2M) per month, FY 2018 and FY 2017

And in Figure 5 excluding M2M:

![](_page_5_Figure_1.jpeg)

Figure 5. Mobile data usage per SIM (excl. M2M) per month, FY 2018 and FY 2017

The countries with the lowest data usage in both Figure 4 and Figure 5 are **Greece**, **Belgium**, **Mexico**, **Germany** and **Portugal**.

Figure 6 is a zoom-in on the lower end of Figure 1.

![](_page_6_Figure_1.jpeg)

Figure 6. Development of mobile data usage per SIM (incl. M2M) per month [zoom-in on low end]

It's interesting to note that maturing markets – China, India and Mexico – overtook mature markets in average mobile data usage in 2018. **China** overtook – among others – France, Sweden and the UK. **India** overtook markets like Hong Kong, Singapore, Italy, Spain and the UK. **Mexico** overtook Belgium and Germany.

**Greece** remain the country with the lowest average data usage – the only remaining country (of our 39) that hasn't yet passed the 1 GB per SIM per month bar.

#### Data usage growth fastest in China

Figure 7 shows the growth in average usage per SIM (incl. M2M) between 2017 and 2018.

![](_page_7_Figure_3.jpeg)

Figure 7. Development of mobile data usage per SIM 2017-2018

**China**'s 165% usage growth in 2018 is incredibly fast and unparalleled. It's fuelled by a fast take up of 4G which in turn has been fuelled by massive 4G-oriented marketing by the Chinese operators. Plans marketed as 'unlimited' contribute<sup>4</sup>. **China Unicom** was first with such plans and leads in usage, see Figure 8.

<sup>&</sup>lt;sup>4</sup> Albeit being throttled in speed after a certain full speed cap has been reached

![](_page_8_Figure_1.jpeg)

Figure 8. Development of mobile data usage per SIM per operator in China

It's beyond our 2018 time scope of this analysis, but Figure 8 shows that there's a deceleration of the usage growth in Q1 2019. The change in trajectory is particularly visible for the market leader, China Mobile.

If we revert to Figure 7 we should also note that the mobile data usage in **India** continues to grow quickly; +121%. 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 (now merged into Vodafone Idea Limited) have increased its average data usage many times when prices have been decreased and mobile networks improved.

Jio's lead in average usage is obvious, though; see Figure 9.

![](_page_9_Figure_1.jpeg)

Figure 9. Development of mobile data usage per SIM per operator in India

Back to Figure 7, we should also highlight the usage growth in **Mexico**; 104%. Also **Croatia** had a growth rate of 104% when the two larger operators, Hrvatski Telekom and A1 followed Tele2 in offering premium plans with unlimited data.

**Romania** continued to have a strong growh rate, 99%. **Czech Republic**'s 96% growth is strong – the country used to be a true mobile data usage laggard in Europe. Here the growth in almost entirely attributed to so-called 'fixed LTE' subscriptions which represented no more than **2.2%** of the Czech subscription base in December 2018. These 2.2% of SIMs carried **63%** of the mobile data traffic in Czech Republic. In 2019, Czech operators have however started to flirt with unlimited<sup>5</sup> also on regular, mobile, subscriptions.

We already explained Latvia's 93% growth, but like to highlight also the 76% growth of the **United States**. Coming from a very underwhelming 11% usage growth in 2017, 2018's 76% indicates that the unlimited mobile plans introduced in the US in 2016 and 2017 finally start to make an impact.

The growth laggards are **Sweden**, **Korea**, **Norway** and **Japan** – four mature markets where fixed broadband speeds are high, fuelled by high **fibre** penetration. One could expect **fibre-fed Wi-Fi** to play an important role here.

<sup>&</sup>lt;sup>5</sup> Vodafone launched a heavily thottled unlimited plan for converged customers and T-Mobile gives customers unlimited during the summer

![](_page_10_Picture_0.jpeg)

Although, as said, 67% of **Finland**'s non-M2M SIMs are on unlimited volume plans, the usage growth rate there was just 29% in 2018. Maybe the interest for more mobile data reduces the more unexceptional unlimited data is?

Maybe the interest for more mobile data reduces the more unexceptional unlimited data is?

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

We touched upon that 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 caps. It also helps if the 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. Since Q4 2017, the Austrian regulator RTR publishes the fixed data traffic of Austria. If we compare it to the mobile data traffic, it's obvious how important the mobile networks have become for the overall internet in Austria: In the first quarter of 2019, the mobile data traffic was **48%** of the fixed data traffic. In Q4 2018 the ratio was even higher; 51%.

![](_page_11_Figure_4.jpeg)

Figure 10. Development of fixed and mobile data traffic in Austria

This takes us to Figure 11. It plots the average data usage per SIM vs. the data-only share of a country's SIM base.

![](_page_12_Figure_1.jpeg)

Figure 11. Mobile data usage vs. data-only share

In December 2018, close to **24%** of the SIM base in Latvia was data-only. This makes **Latvia** the new leader in data-only share of base – and the average mobile data usage is also high. It's higher still in usage-leading Finland in spite of a slightly lower data-only share – 20%. **Bahrain** follows with close to 20%. After this come Italy, Poland and Australia – all around 15%.

The adherence to the regression line is strong. As in all previous reports we conclude that **data-only penetration is a significant driver of average mobile data usage**.

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. The US wireless market leader **Verizon** launched its first **5G** branded service last year to support a **fixed wireless access** (FWA) use case. More operators such as Optus in

![](_page_12_Picture_6.jpeg)

Australia, 3 in the UK and Sunrise in Switzerland have announced that they intend to follow Verizon into 5Gbased FWA. Figure 11 shows that even a relatively low share of such data-only services could lift the average data consumption significantly.

Some of the countries in Figure 11 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 12.

![](_page_13_Figure_2.jpeg)

Figure 12. Data-only share of total traffic vs. data-only penetration

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

- Portugal **10.1x** higher traffic per data-only SIM vs. any SIM
- Czech Republic 9.1x
- Norway 6.2x
- Austria 6.0x
- Sweden 4.9x
- Iceland **3.3x**
- Ireland 3.2x
- Finland **2.7x**
- Belgium **2.6x**
- Australia 2.1x
- Greece 2.0x
- Romania **0.6x**

• France **0.6x** 

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 13.

![](_page_14_Figure_3.jpeg)

Figure 13. Mobile data usage per data-only SIM per month, 2018 and 2017

**Czech Republic** is the new data-only usage leader with an average monthly consumption of **60.3 GB** per 'fixed LTE' subscription in 2018. Austria follows with **55.8 GB** per data-only subscription per month. **Finland** is third with **42.6 GB**. Other countries are far from the levels of Czech, Austria and Finland; **Iceland** is fourth with 20.5 GB and Norway fifth with 19.0 GB. The most likely explanation to low data-only usage is, in general, that unlimited data-only plans are absent.

If **5G** really should become the fibre-over-radio solution that e.g. Verizon and others suggest, the data-only usage figures of Czech, Austria and Finland give a taste of the usage that the solution must at least manage. Fixed broadband usage is yet higher – often around 200 GB per month.

![](_page_15_Picture_0.jpeg)

#### 4G adoption a weakening driver of data usage - 5G a different story

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

Figure 14 plots the average data usage per SIM vs. the 4G share of the country SIM base. **Taiwan** leads with 95% followed by **Korea** with 83%. But the adherence to the regression line is weaker than in the previous data-only section.

![](_page_15_Figure_4.jpeg)

Figure 14. Mobile data usage vs. 4G LTE share

While operators in e.g. Belgium and Germany still like to report that 4G drives data usage, Figure 15 shows that 4G in itself is a much weaker driver of traffic than data-only (compare with Figure 12).

**Korea** has already reached the point where effectively all data traffic is on 4G. This happened even though the 4G penetration was 'just' 83% in December.

Also **Turkey** and **Taiwan** have soon reached 100% of data traffic being on 4G networks.

4G adoption is a weakening driver of mobile data usage – but 5G is a different story

![](_page_16_Figure_1.jpeg)

Figure 15. 4G LTE share of total traffic vs. 4G LTE share

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

- Sweden **2.1x**<sup>6</sup> higher traffic per 4G user vs. any SIM
- Lithuania 2.0x
- Belgium **1.9x**
- France **1.8x**
- Turkey **1.8x**
- Ireland **1.7x**
- Korea **1.2x**
- UK **1.2x**
- Denmark **1.2x**
- Taiwan **1.0x**

If comparing with Figure 15 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.

<sup>&</sup>lt;sup>6</sup> The low 4G LTE adoption in Sweden is much because of the large number of international SIMs registered in Sweden

![](_page_17_Picture_0.jpeg)

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.

It's a different story with **5G**, though. At least to begin with when early adopters are attracted. The only traffic and subscriber statistics reported so far are from South Korea. The table below compares 4G and 5G traffic and usage in South Korea.

May 2019	Traffic [TB ]	Usage per average SIM per month [GB]
4G	456569	8.1
5G	13987	26.5

In May, the average Korean 5G subscription consumed 26.5 GB of 5G data. During the same month, the average 4G subscription consumed 8.1 GB of 4G data.

1.2% of the Korean SIMs were 5G capable in May, but 5G's share of traffic was higher; 2.9%.

#### The total revenue per GB can be very low – or very high

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<sup>7</sup> – which means that price still, essentially, is about data volume.

Figure 16 plots the *total* mobile service revenue per consumed gigabyte<sup>8</sup> against the average mobile data usage per SIM and month.

![](_page_18_Figure_4.jpeg)

Figure 16. 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 a few countries where operators enjoy much higher total revenue per consumed gigabyte: **Canada**, **Belgium**, **Germany**, **Switzerland** and **Greece**. The observation is based on the latest available

<sup>&</sup>lt;sup>7</sup> There are exceptions to this, e.g. Finnish operators, Swisscom and now Vodafone Spain, 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.

<sup>&</sup>lt;sup>8</sup> Attributing zero value to voice and messaging

![](_page_19_Picture_0.jpeg)

data – but in Canada's<sup>9</sup> and Switzerland's case that data is for FY 2017. We should expect Canada and Switzerland to move left in the graph when 2018 data eventually is reported, but it is unlikely that Canada will close the gap on the other countries. Canada has consistently played in the rightmost part of the graph in all of our previous country reports.

It's important to point out that our analysis looks at what the mobile operator industry *de facto* charges endusers, 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 earn the lowest revenue per consumed gigabyte: **India**, **Latvia**, **Taiwan**, **Finland**, **Lithuania** and **Poland**.

Looking at Figure 16 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 11.

Indian operators get the lowest total revenue per GB – operators in Canada and Belgium the highest

<sup>&</sup>lt;sup>9</sup> Canada's CRTC was last of the 39 country regulators to report 2017 stats

#### Only weak correlation between data usage and ARPU

Figure 17 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.

![](_page_20_Figure_3.jpeg)

Figure 17. 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**. For the first two, no 2018 data is yet reported by the regulator.

Operators in the upper left corner – **Finland**, **Taiwan**, **Latvia**, **Lithuania**, **Poland** and **India** – are being the most generous with mobile data considering their ARPU. These countries form a nice string suggesting that operators could expect to get rewarded with higher ARPU when usage grows.

But that's regretfully not to overall trend: The adherence to the grey regression line is very weak but it's not really pointing in the north-easterly direction one would like to see – with more usage leading to higher ARPU.

#### Conclusion

Mobile data usage is still growing in all of the 39 countries covered by this analysis. The growth rates are very different and so are the usage levels. As usual, **Finland** tops the charts – with 15.3 GB per average SIM per month in 2018. If excluding M2M, the average usage in Finland grows to 17.4 GB per month. But in spite of **67%** of non-M2M SIMs being **unlimited**, the data usage isn't particularly fast there – it grew 29% in 2018. **China** grew 165% and **India** 121%. This growth meant that **China** and **India** passed several new mature markets in average usage during 2018.

Our analysis shows strong correlation between the **data-only share** of a country's SIM base and the average data usage. **Latvia** and **Finland** are the two data-only powerhouses of the world. Finland's usage is higher, but Latvia's share of base higher even though Latvia has Europe's highest FTTH/B 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; 83%. 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. **5G** could change this: Early stats from Korea show a quick take-up of 5G services and an average data usage **3.3 times higher** than for 4G.

Regardless of technology, data usage could 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**, **Latvia**, **Taiwan**, **Finland**, **Lithuania** and **Poland**. If your hunger for data is high, this is where you'd like to reside.

**Canada** and **Belgium** represent the other end. For Canada no fresh data is available, but based on 2018 data, Belgium's total revenue per gigabyte is 56 times higher than in India, 24 times higher than in Latvia and 15 times higher than in Taiwan and Finland. And consequently, mobile usage is much lower than average.

Low usage doesn't necessarily mean that the ARPU is low, though. Market ARPU seems unrelated to usage. **Canada**, **Switzerland** and **USA** have much higher ARPU levels than all other countries in our analysis.

### tefficient

International telco competitiveness specialist providing operators and suppliers with analysis, benchmarks and go-tomarket 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