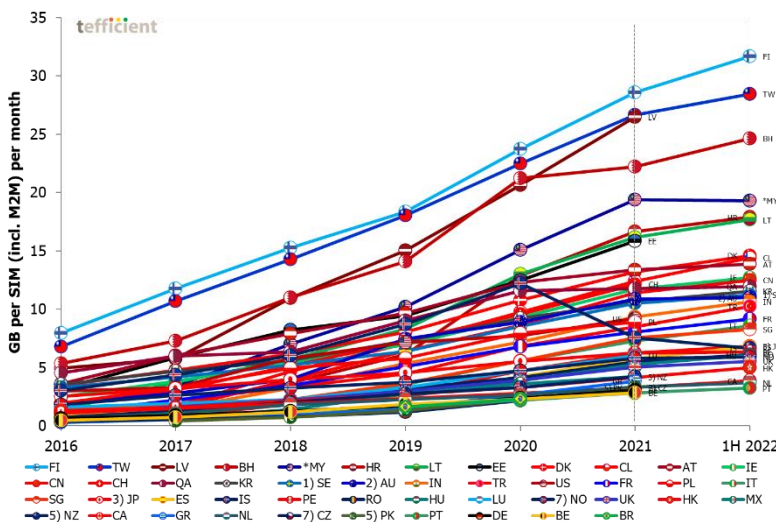


Industry analysis #3 2022

Mobile data – first half 2022 (updated 27 December)

Further slowdown in data usage growth causes positive ARPU development to soften



Tefficient’s 35th public analysis of the development and drivers of mobile data compares the trends of 46 countries from around the world.

In our previous reports, we observed that the pandemic drove an increase in mobile data usage. However, during the second half of 2021 and into 2022, the demand for more mobile data slowed.

Canada experienced the fastest growth in mobile data usage, with a 31% increase. On the other end of the spectrum, Qatar, Peru, Malaysia, and Austria saw unusually slow growth rates of just 1-3%.

Data-only continues to define the average mobile data usage, although the share of base is limited. Austria became the first country to reach 100 GB per data-only SIM per month, closely followed by Finland.

Overall, mobile data usage has never been cheaper, but the erosion in revenue per gigabyte slowed compared to previous reports. The Netherlands saw the fastest erosion at 28%, while India reported an increase.

The positive ARPU development seen in our [previous analysis](#) did not continue in the first half of 2022. Mobile data usage grew at a slower rate, and a lower share of countries were able to improve their ARPU. Given the rising inflation starting in the latter half of 2022, we had hoped that the ARPU improvement trend from our last analysis would continue.

## Data usage is still growing in most, but not all, countries

Figure 1 shows the development of mobile data usage for 46 countries where regulators<sup>1</sup> report mobile data traffic. The usage is shown per SIM per month – and in Figure 1 we are including all<sup>2</sup> SIMs, also M2M/IoT SIMs.

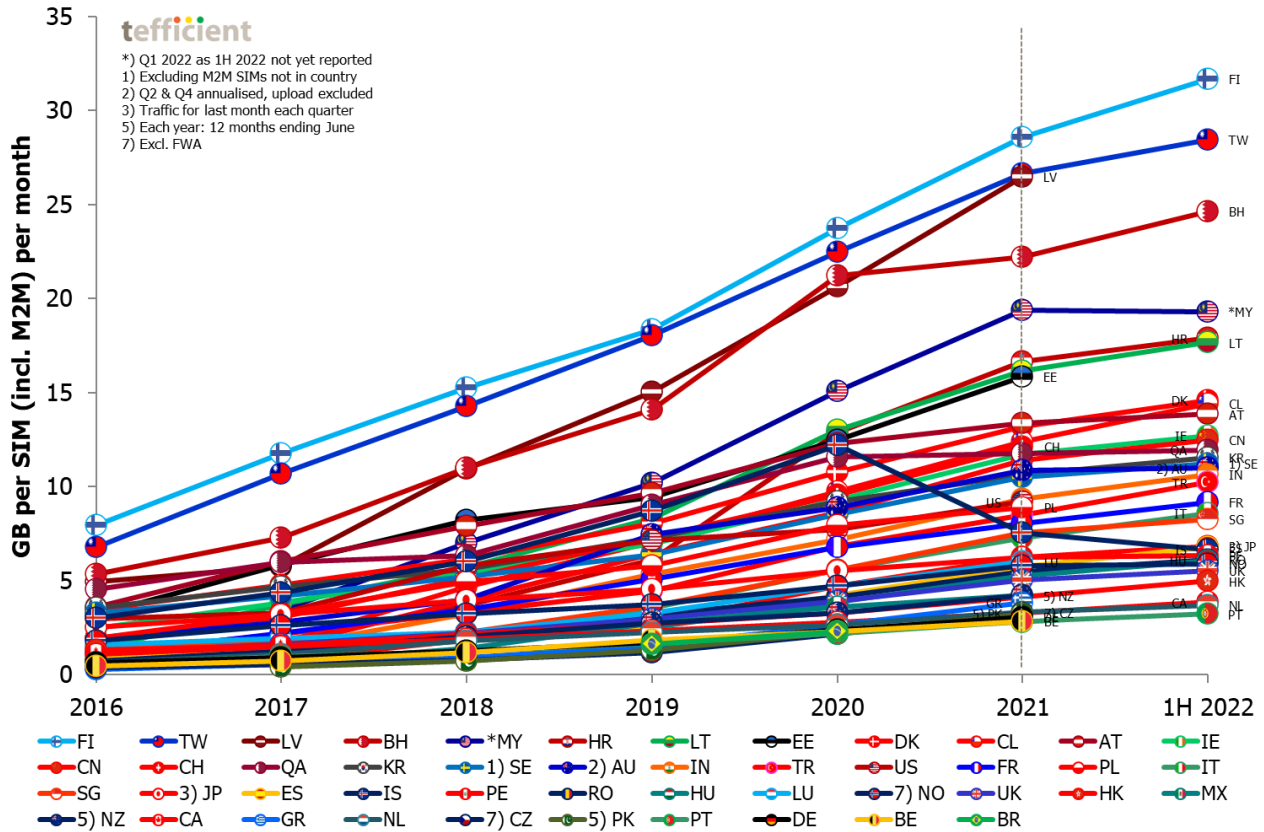


Figure 1. Development of mobile data usage per SIM (incl. M2M) per month – the legend shows the ranking<sup>3</sup>

Starting from the top of the chart, **Finland** is defending the world number one position when it comes to mobile data usage. In 2019, **Taiwan** was on the verge of overtaking Finland, but Finland managed to put more distance between itself and Taiwan since. **Latvia** is now challenging Taiwan for the number two position, but the Latvian regulator only reports annually. **Bahrain** is fourth-ranked in data usage while **Malaysia** is fifth-ranked based on its Q1 2022 usage (Q2 2022 not yet reported) which is *lower* than in 2021. The now-solved debacle around the national 5G network in Malaysia could have affected the Malaysian mobile data usage negatively in this period.

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

<sup>2</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.

<sup>3</sup> Greece, Mexico and Luxembourg have not yet reported 1H 2022. Brazil has not yet reported the full year of 2021.

The average Finnish SIM card carried **31.7 GB** of data per month in the first half of 2022 (+4.4 GB vs. 1H 2021). **72%** of the Finnish SIMs (M2M included) had **unlimited data volume** in June 2022. If excluding M2M, 84%. If excluding also voice-only SIMs, 88%. No other country is as unlimited as Finland.

The average Taiwanese SIM carried 28.5 GB per month (+2.8 GB vs. 1H 2021). Unlimited is behind **Taiwan's** usage development as well. The Taiwanese operators – there are five MNOs – have cooled off the market by attempting to move the unlimited price points upwards while discontinuing unlimited for customers that have run out of binding. It initially worked so-so, but the relatively late (mid-2020) introduction of 5G provided the Taiwanese operators with the tool they needed to turn the ARPU erosion curves around. Unlimited is still very much a standard, but with 5G it comes with a tiered premium.

**Latvia's** usage in 2021 was 26.5 GB. Unlimited is offered as a premium option in regular mobile but, as we will show later in this analysis, the high usage is to a large extent explained by data-only subscriptions.

In **Bahrain** (24.6 GB) growth took off again in the first half of 2022 (+2.3 GB vs. 1H 2021). **Malaysia's** usage just increased 0.5 GB to 19.3 GB in the nine months from 1H 2021 to Q1 2022. Let's see if the negative usage trend in 2022 continues once Q2 2022 has been reported by Malaysia's MCMC.

### **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 21.8 million M2M SIMs – a figure that more than doubles the total SIM base if added to the regular SIM base of 14.7 million. We are therefore happy that PTS now reports the number M2M SIMs that are active in Sweden; 5.2 million, i.e., just 24% of the total M2M base. This has allowed us to recalculate a more representative mobile data usage figure for Sweden when including M2M.

The same issue 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 35% in the twelve months to June 2022 – to 9.3 million. Similar to how it was for Sweden previously, Austria's average mobile data usage per SIM thus looks lower when including M2M SIMs than what it realistically is. Luckily Austria's regulator is one of those breaking out M2M SIMs in its reporting allowing a like-for-like comparison of mobile data usage per *non-M2M* SIM, see Figure 2 and Figure 4.

International SIMs are also behind the astronomical growth in the number of reported M2M SIMs in **Iceland**. In one year, the number of M2M SIMs grew from 300 to 775 thousand – in a country with less than 400 thousand inhabitants. It seems likely that most of those M2M SIMs are used outside of Iceland.

Figure 2 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.

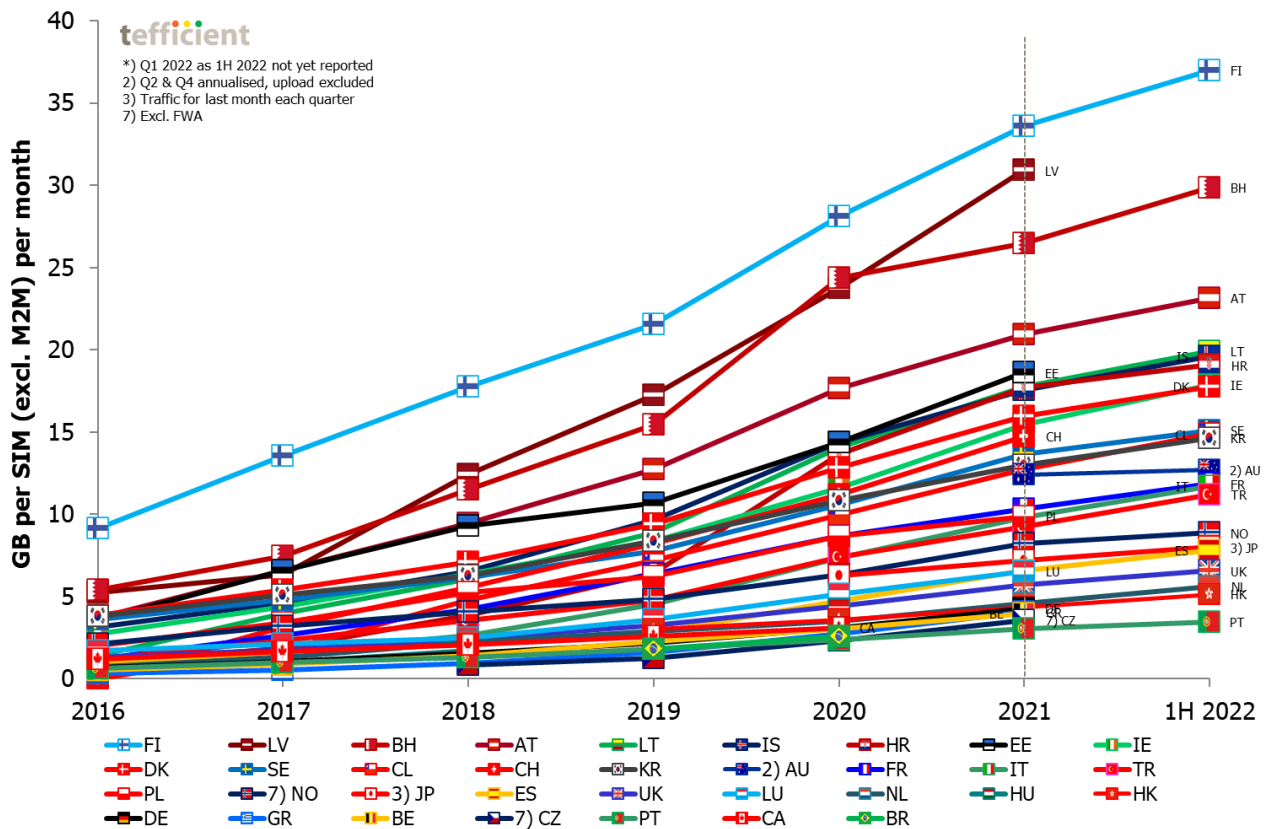


Figure 2. Development of mobile data usage per SIM (excl. M2M) per month – the legend shows the ranking<sup>4</sup>

Since only a fraction of the countries separate out the data traffic associated with M2M SIMs in their reporting (kudos to Norway, Sweden, Czech, Bahrain, Greece and Australia, 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 could expect M2M/IoT SIMs to carry more traffic in future, we think that Figure 1 provides the most accurate comparison.

With **37.0 GB** per non-M2M SIM per month (+4.4 GB vs. 1H 2021), **Finland** tops also Figure 2. **Latvia** follows with a value for 2021 of 30.9 GB and **Bahrain** with 29.9 GB (+3.6 GB vs. 1H 2021). Taiwan and Malaysia have disappeared from the top five here as the M2M SIM number isn't broken out in these countries.

The legends of Figure 1 and Figure 2 show the ranking of the 46 studied countries. But since it's difficult to spot them all, Figures 3 and 4 offer an easier visualisation. First including M2M:

<sup>4</sup> Countries for which the regulator doesn't break out the M2M SIMs have been excluded

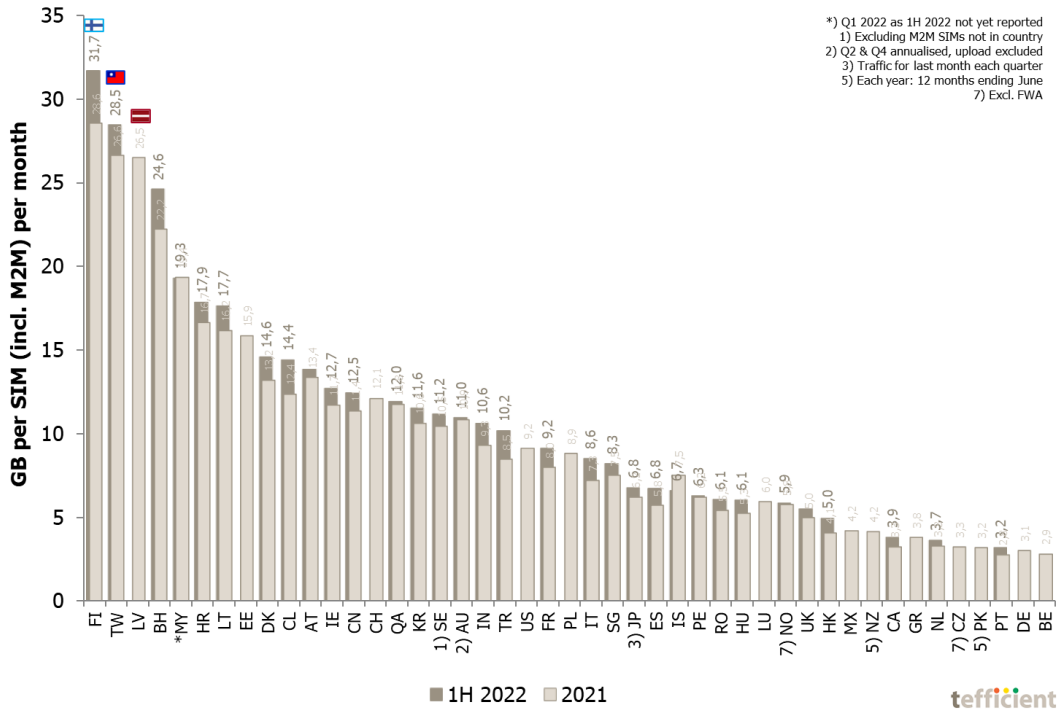


Figure 3. Mobile data usage per SIM (incl. M2M) per month, 1H 2022 and 2021

And in Figure 4 excluding M2M:

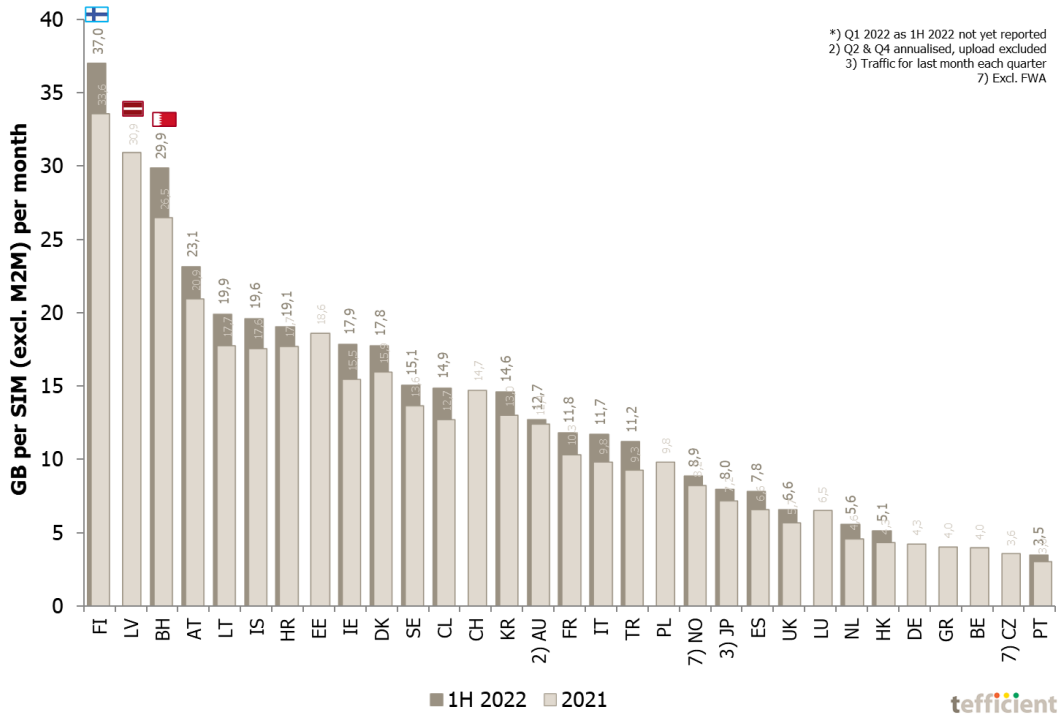


Figure 4. Mobile data usage per SIM (excl. M2M) per month, 1H 2022 and 2021

In comparison to previous reports, there's not much dark grey on top of the 2021 light grey bars which shows that for most markets, there was little usage growth in the first half of 2022.

The countries with the lowest data usage in Figure 3 and Figure 4 are **Portugal, Belgium, Germany, Pakistan, Czech Republic**<sup>5</sup>, the **Netherlands and Greece**. **Hong Kong** is low ranked if excluding M2M.

Figure 5 is a zoom-in on the lower end of Figure 1.

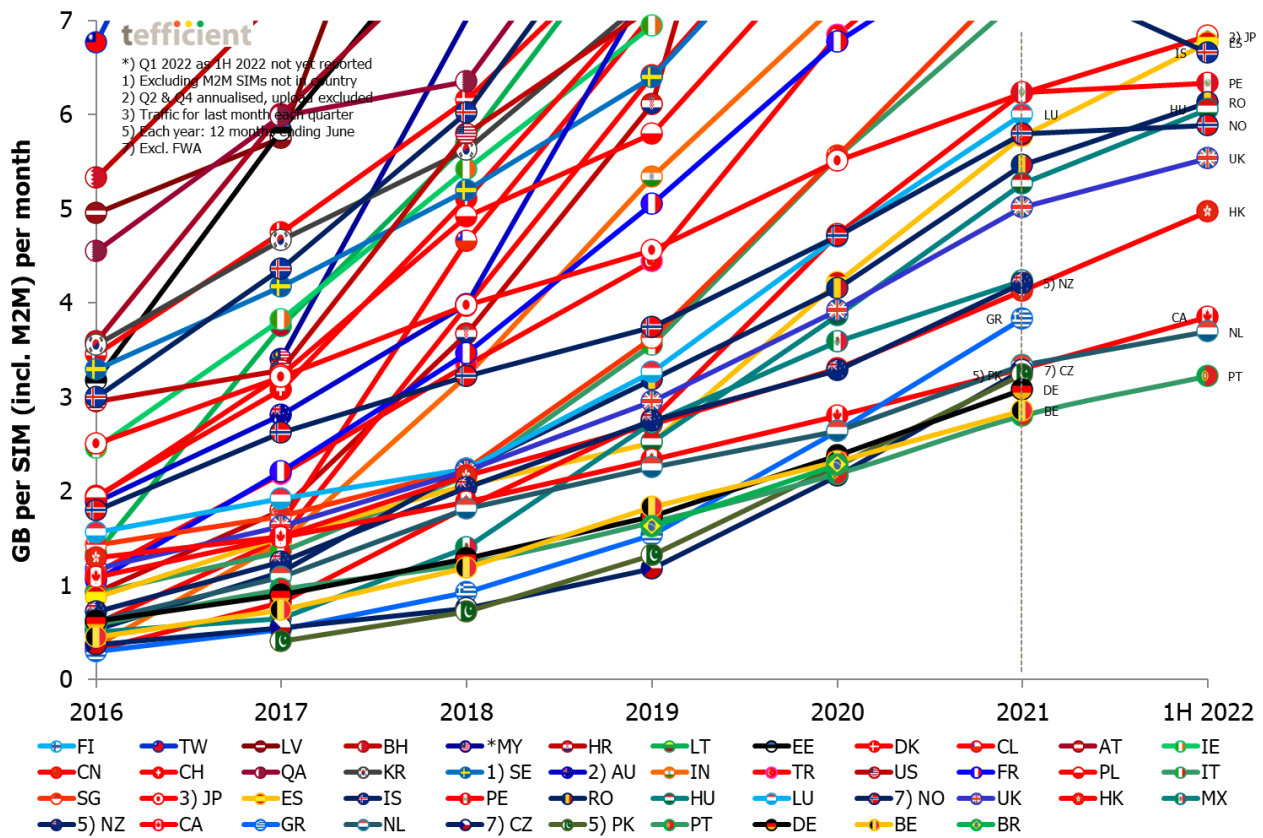


Figure 5. Development of mobile data usage per SIM (incl. M2M) per month [zoom-in on low end]

Albeit in the lower usage range, the **Netherlands, Norway, Peru** and **Japan** had quite modest usage growth in the first half of 2022. Faster growth than in Spain, Hungary, Romania, the UK, Hong Kong, Canada and Portugal. Iceland continues down due to the expansion in international SIMs.

<sup>5</sup> Note that FWA (fixed wireless access) traffic is excluded in the reported mobile data traffic of the regulator CTU. To make it comparable with other markets, we could have added it, if only CTU reported it.

## Data usage growth fastest in Canada

Figure 6 shows the growth in average usage per SIM (incl. M2M) between 1H 2021 and 1H 2022.

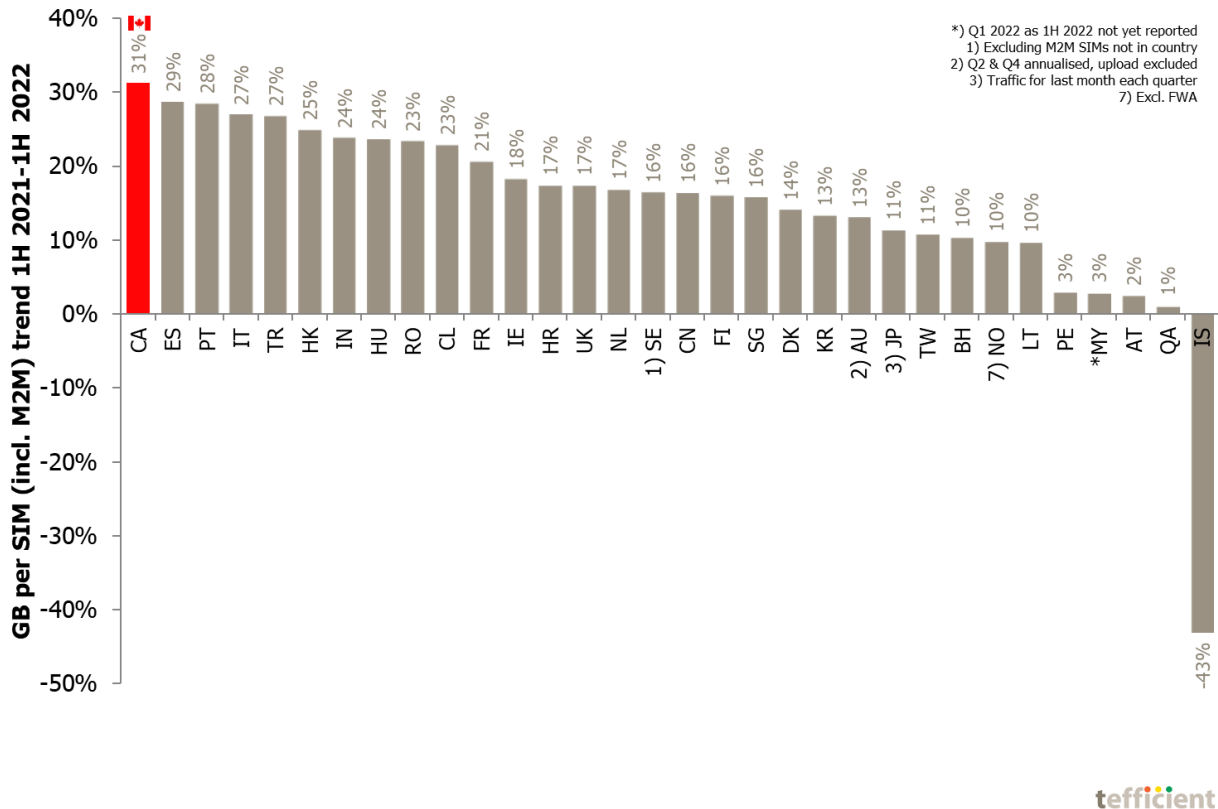


Figure 6. Development of mobile data usage per SIM 1H 2021-1H 2022

**Canada** had the fastest growth in mobile data usage: **31%**. The country has been a constant outlier in our previous country reports, but thanks to this usage growth, it starts to approach other countries – although there’s still a gap to the rest of the world in revenue per GB (read on).

**Spain, Portugal, Italy** and **Turkey** follow with 27-29%.

In our previous country report, it was **Peru** that had the fastest growth. Six months later, Peru had one of the *slowest* growth rates – just 3%. **Malaysia** had 3% too (but remember that Q2 2022 isn’t reported yet) while **Austria** (2%) and **Qatar** (1%) were even lower. Further into the analysis, we will see that Austria has the highest share of mobile data traffic originating from data-only subscriptions, typically home routers. Perhaps this slow growth is a reflection of the end of COVID-19 restrictions more than anything else – i.e. people spending more time out of their homes?

Qatar, Austria, Malaysia and Peru had the slowest usage growth.

**Iceland** is again a special case with declining data usage due to the expansion in international SIMs. If excluding all SIMs, Iceland’s data usage would have grown 17% – a typical value.

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

Although **fixed wireless access** (FWA) experiences a renaissance with 5G in the US with T-Mobile and Verizon collectively having recruited 3.2 million FWA customers in the past two years (read on), using mobile networks to substitute fixed broadband is hardly something new. In some markets, like Finland and Austria, this was around for long. The take-up can be significant if the FWA/data-only offers are reasonably charged and without usage caps. It also helps if the fixed broadband offering is weak with much DSL in the mix.

In the second half of 2021, the Finnish regulator, Traficom, started to report also fixed data traffic, allowing a comparison with the mobile data traffic it has reported for long, see Figure 7.

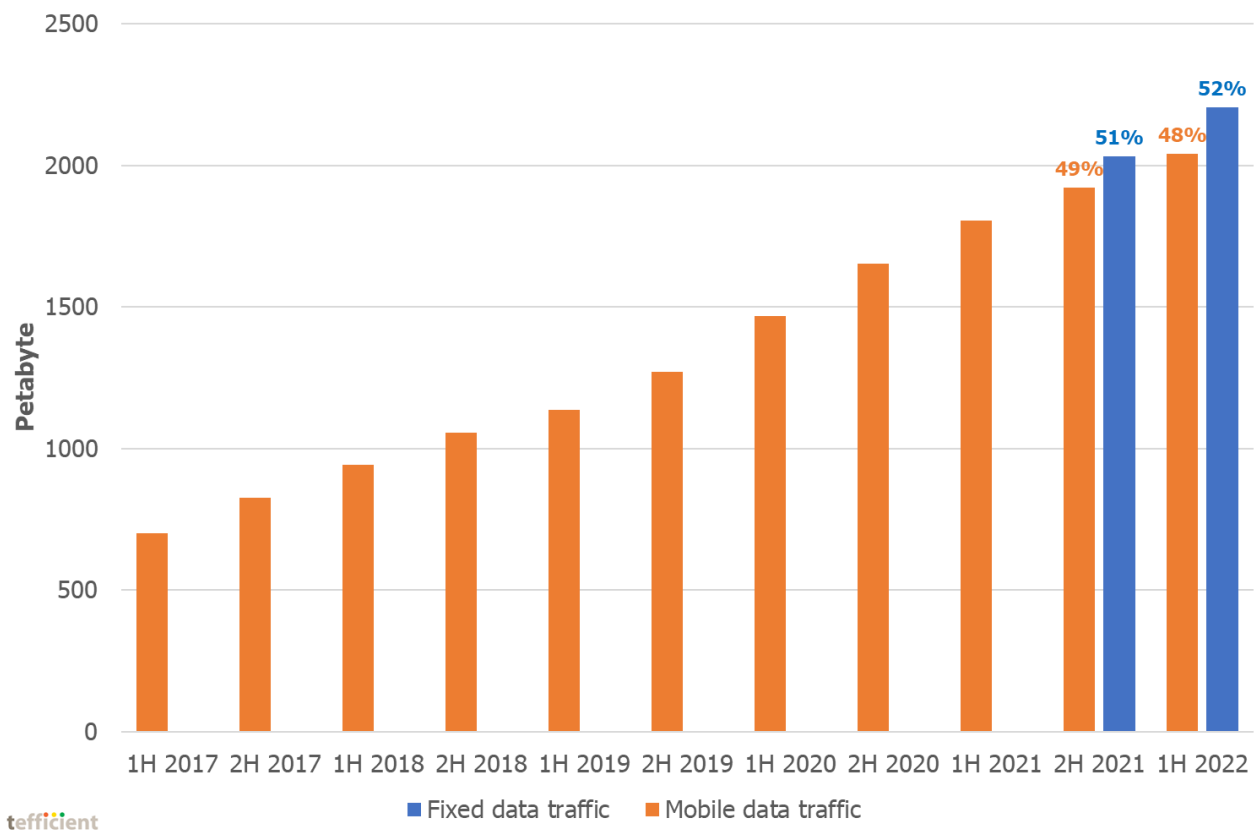


Figure 7. Development in reported mobile and fixed data traffic in Finland, 1H 2017-1H 2022

The mobile data traffic represented **48%** of the total data traffic in **Finland** in 1H 2022 whereas fixed data traffic represented 52%. Although it was a bit more extreme – 49/51 – in 2H 2021, it’s still the most even distribution between fixed and mobile networks among our 46 markets. **Austria**, in comparison, had **38%** over mobile vs. 62% over fixed in 1H 2022.

This takes us to Figure 8. It plots the average data usage per SIM vs. the data-only share of a country’s SIM base.



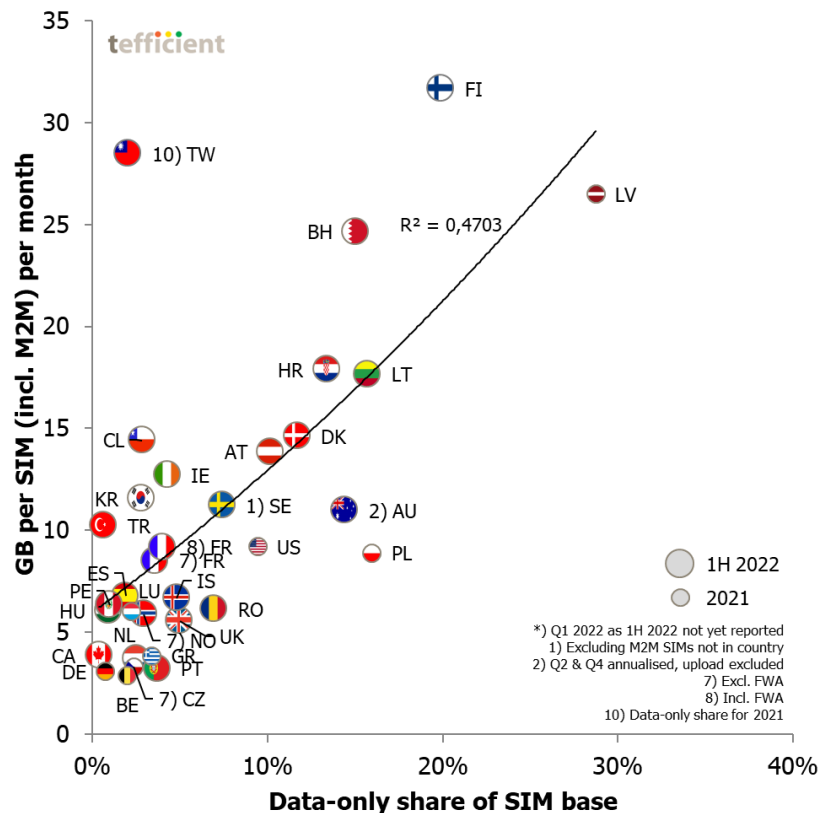


Figure 8. Mobile data usage vs. data-only share

In December 2021, **29%** of the SIM base in Latvia was data-only. That makes **Latvia** the clear leader in data-only share of base – and the average mobile data usage is also very high. In **Finland** data-only represented 20% of the base in June 2022 but the usage is even higher than in Latvia. **Bahrain** had a high data-only share too – 15%. **Lithuania** is at 16% and **Croatia** at 13%.

**Taiwan** is an exception to the overall trend: Its 1H 2022 mobile data usage is very high although the data-only share of base was just 2% in December 2021. At a relatively lower usage level, also Chile, South Korea and Turkey all have low data-only share of base.

In spite of these exceptions, the adherence to the regression line is relatively strong. As in all previous reports we therefore conclude that **data-only penetration is a significant driver of the 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**. 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 in December 2018 to support a fixed wireless access (FWA) use case. **T-Mobile** has since followed. And it seems to work well sales-wise, see Figure 9.

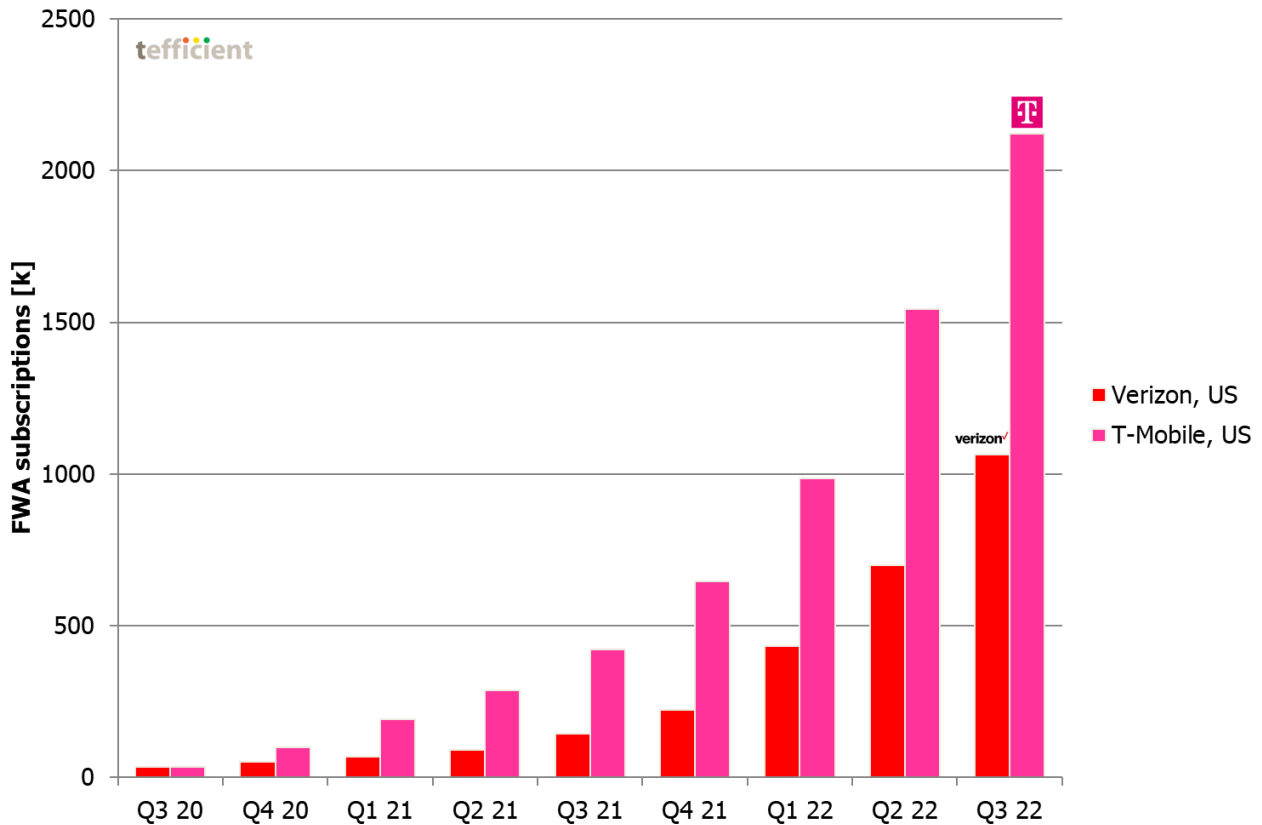


Figure 9. Development in the FWA subscription base of Verizon and T-Mobile USA

In September 2022, T-Mobile had accumulated more than **2 million FWA subscribers** (4G and 5G) across the USA. Since Verizon offers fibre broadband in parts of the country, it doesn't sell FWA everywhere. Verizon still had more than 1 million FWA subscribers (again across 4G and 5G) in September 2022, representing **12%** of Verizon's total broadband (fixed+FWA) base.

**Telenor** in Norway had 120k FWA subscribers in September, representing a yet higher share of their total broadband base: **16%**. It's a pity that the Norwegian regulator, Nkom, doesn't report the traffic generated by Norwegian FWA subscribers as it would be interesting to compare it with e.g. the French FWA traffic.

Figure 8 shows that even a relatively low share of such data-only subscriptions could lift the average data consumption significantly.

Some of the countries in Figure 8 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.

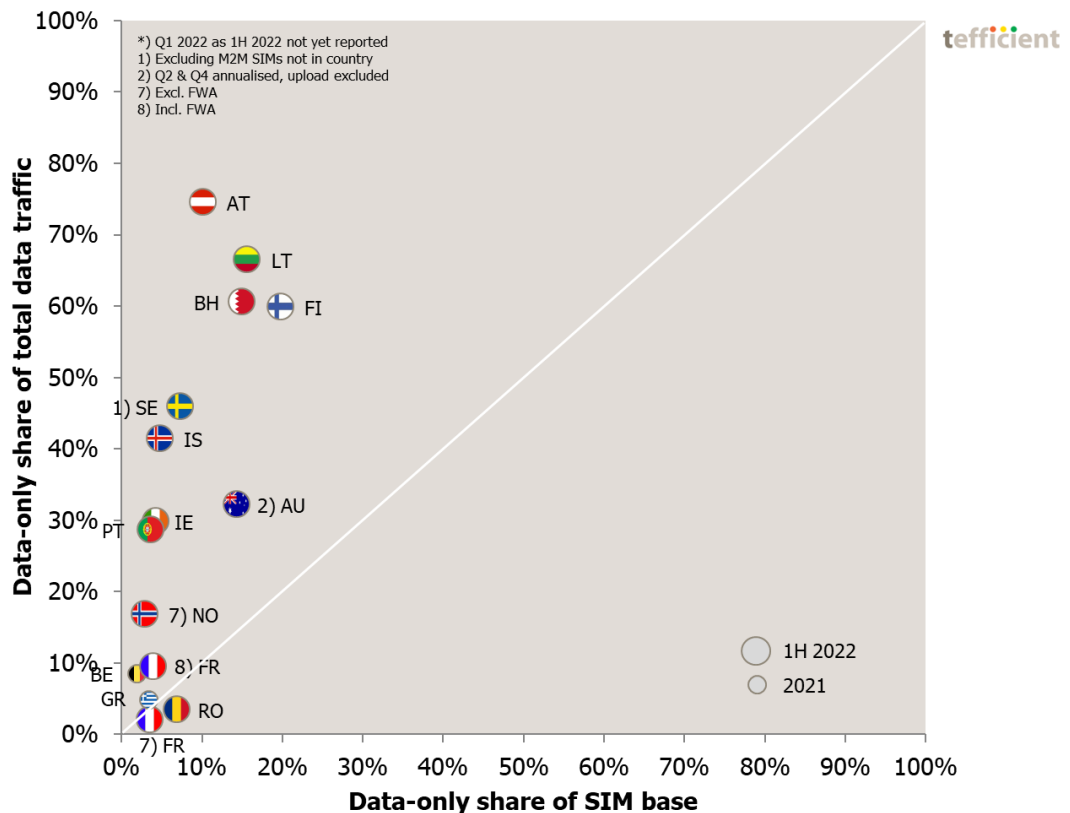


Figure 10. Data-only share of total traffic vs. data-only share of SIM base

Except for Romania, data-only SIMs carry a disproportionately high share of the data traffic:

- Iceland **8.6x** higher traffic per data-only SIM vs. any SIM
- Portugal **7.7x**
- Austria **7.3x**
- Ireland **7.0x**
- Sweden **6.2x**
- Norway (excl. FWA) **5.7x**
- Belgium **4.3x**
- Lithuania **4.2x**
- Bahrain **4.0x**
- Finland **3.0x**
- France (incl. FWA) **2.4x**
- Australia **2.2x**
- Greece **1.4x**
- Romania **0.5x**

In addition to the countries in Figure 10, there is one which doesn't report data-only SIM base, but data-only's share of traffic: In **China**, 4% of mobile data traffic wasn't carried over regular mobile phones.

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.

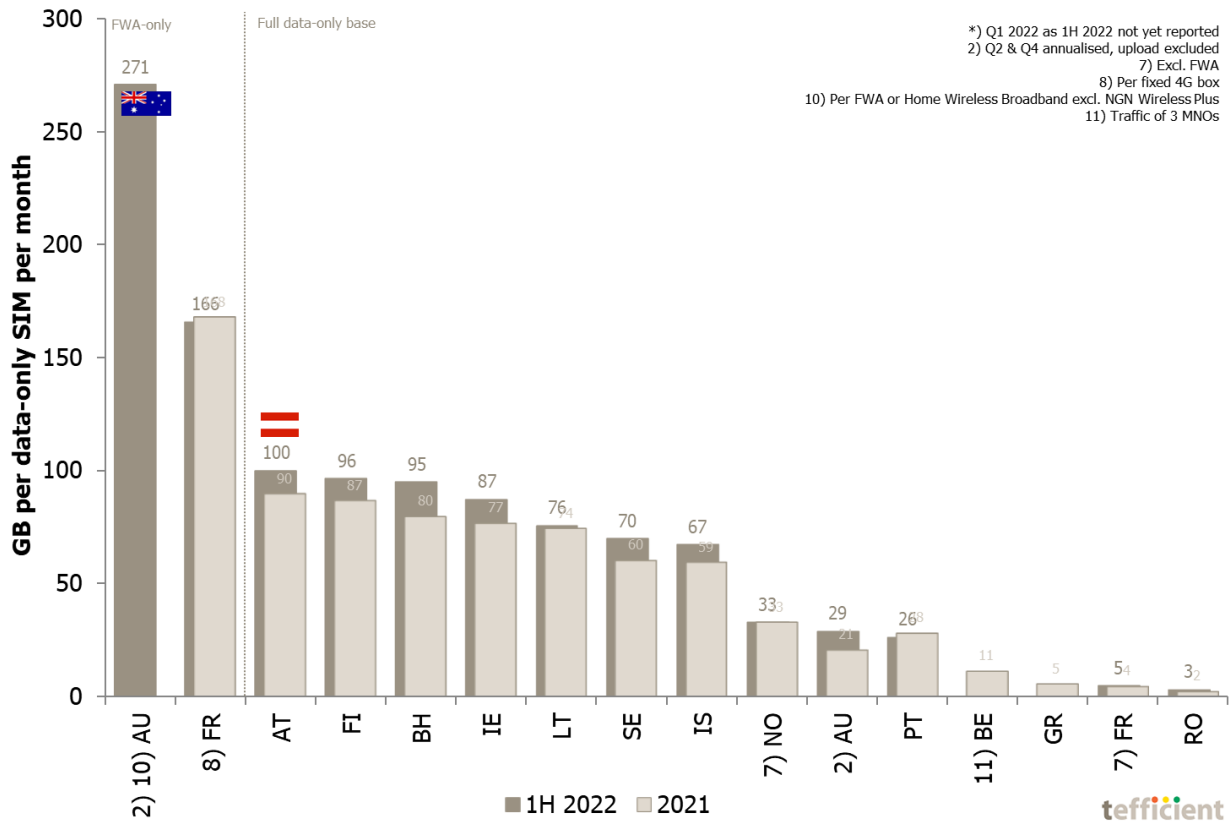


Figure 11. Mobile data usage per data-only SIM per month, 1H 2022 and 2021

Starting from the left, the average FWA and Home Wireless Broadband subscription in **Australia** carried 271 GB of mobile data per month in the first half of 2022. The average '4G box' in **France** carried **166 GB** of mobile data per month in the first half of 2022 – a slight decrease from 168 GB in 2021.

If instead looking at the whole data-only base (not just the FWA segment), **Austria** leads with the average mobile data consumption per data-only SIM of **100 GB**. **Finland** had 96 GB. **Bahrain** follows with 95 and **Ireland** with 87 GB.

In comparison to previous reports, there's not much dark grey on top of the 1H 2021 light grey bars which shows that for most markets, there was little usage growth in the first half of 2022. In some cases, like Lithuania, Norway and Portugal (and French FWA) the usage was flat or even decreasing.

If **5G** should become the fibre-over-radio solution that T-Mobile, Verizon and Telenor suggest, the data-only FWA usage figure of Australia gives a taste of the usage that the solution must at least manage. Fixed broadband usage is yet higher – often well above 300 GB per month.

The average Austrian data-only subscription consumed 100 GB per month in 1H 2022

### 5G adoption a driver of data usage – or?

5G has been in commercial operation for 3.5 years by now and it would be high time to **correlate mobile data usage with 5G adoption**. Too few regulators (and operators for that sake) are however reporting 5G traffic – and 5G base – to make a sensible correlation graph for 5G. We strongly encourage regulators to see to that 5G numbers are reported.

Figure 12 below gathers all 5G information reported for our 46 markets in 1H 2022 (or 2021).

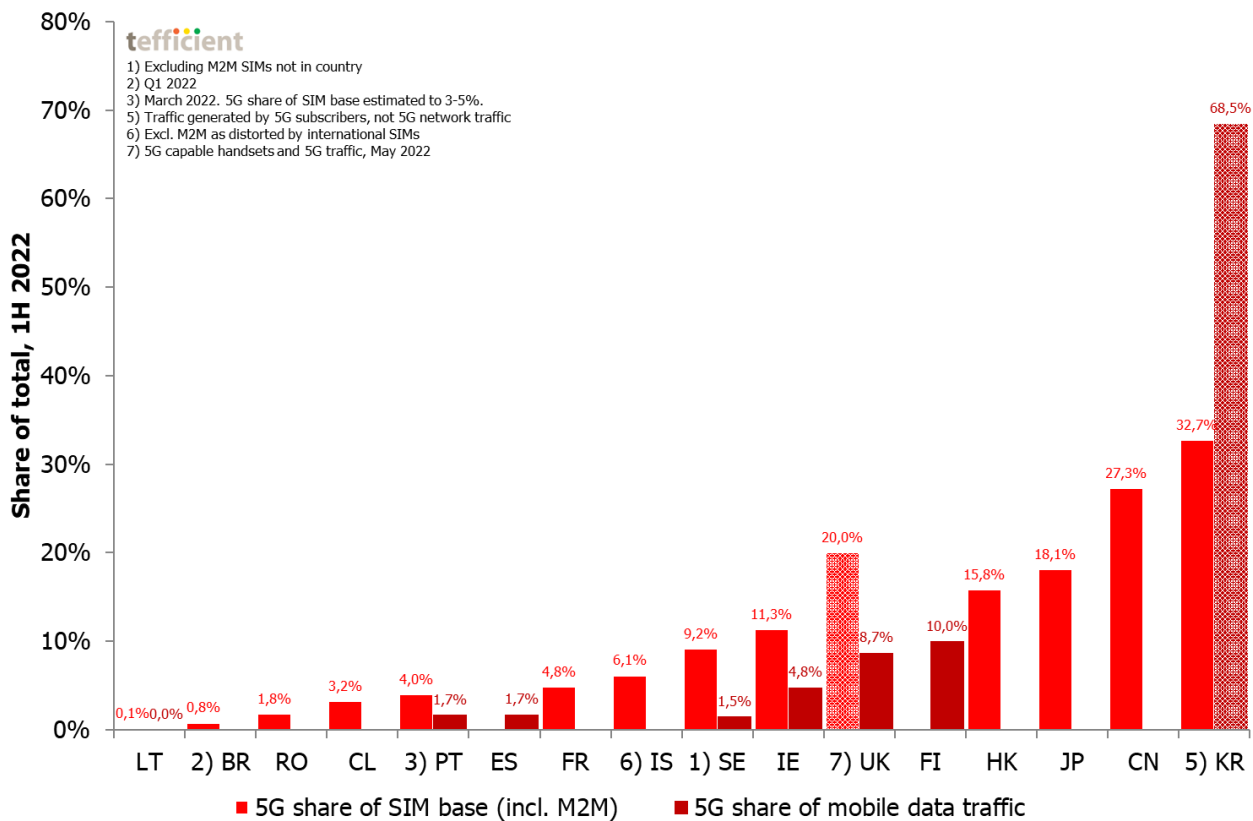


Figure 12. 5G share of base and 5G share of total mobile data traffic – reporting countries

From left in Figure 12: 0.1% of **Lithuania’s** mobile subscriber base was 5G in June 2022, generating **0.05%** of the mobile data traffic in the first half of 2022. It’s very little, but due to late C-band licensing, Lithuanian operators could not effectively launch until August-September 2022. In March 2022, 0.8% of **Brazil’s** mobile subscribers were on 5G. In **Romania**, 1.8% of the subscriber based was 5G in June 2022. In **Chile**, 3.2% of subscriber base was 5G in June 2022.

In March 2022, an approximate 3-5% of subscribers were on 5G in **Portugal** and the share of traffic was 1.7%; rather high given Portugal’s very late 5G launch. 5G has been around longer in **Spain**, but just 1.7% of the mobile data traffic was carried by 5G networks in 1H 2022 (the 5G subscriber base isn’t reported). In **France**, 4.8% of the subscriptions were 5G in June 2022, but 5G traffic isn’t reported. 6.1% of **Iceland’s**

non-M2M SIM base was active on 5G in June 2022. Of **Sweden's** SIM base, 9.2% was 5G in June 2022, but the 5G traffic in 1H 2022 was just 1.5% of the total. Higher figures then in **Ireland**: 11.3% of subscriptions in June 2022, 4.8% of the traffic in the first half of 2022. In the month of May 2022, 5G represented 8.7% of the mobile data traffic (but the 20% isn't share of SIMs, but 5G capable handsets). With 10% of the traffic in 1H 2022, **Finland** might be the European leader in 5G share of traffic.

The top four markets in Figure 12 are all in Asia: 15.8% of **Hong Kong's** mobile subscriptions were 5G in June 2022. 18.1% of **Japan's** mobile subscriptions were 5G in June 2022. In **China** yet higher: 27.3%. But highest of all is of course **South Korea** where 32.7% of mobile subscriptions were on 5G in June 2022. In 1H 2022, 5G subscriptions generated **68.5%** of South Korea's total mobile data traffic. Not all that traffic is necessarily on the 5G networks, though: Unlike other countries, all traffic generated by 5G subscribers (even when on 4G networks) is included.

South Korea: 69% of the mobile data traffic was generated by 5G subscribers in 1H 2022

Since the Korean government reports monthly stats on 5G, Figure 13 shows the monthly development for the subscriber and traffic adoption.

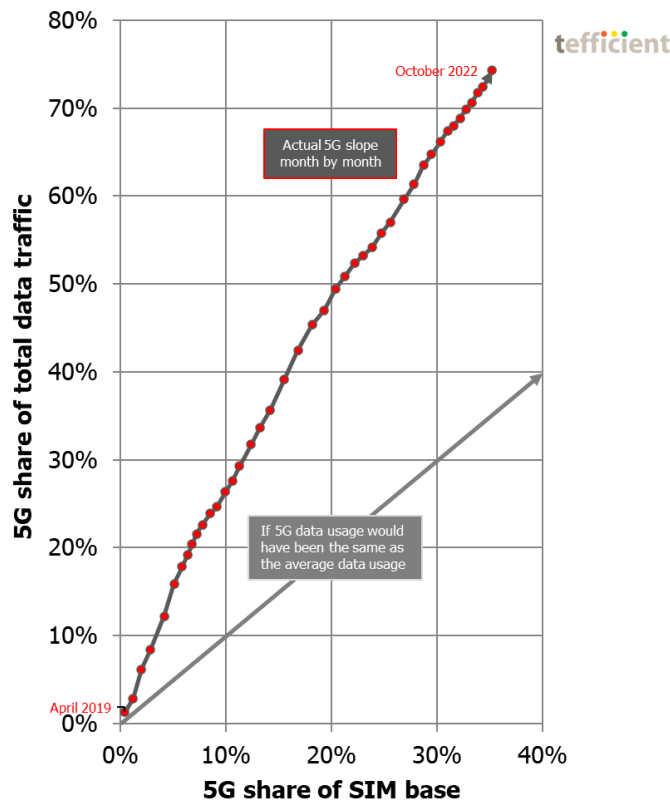


Figure 13. 5G share of total traffic vs. 5G share of SIM base – Korea per month since 5G launch

In October 2022, **74%** of the mobile data traffic in South Korea was generated by 5G subscribers. 5G represented 35% of the total SIM base, indicating that the average mobile data usage per 5G subscriber is far higher than for non-5G subscribers in South Korea.

The usage figures for October 2022 are:

- 5G: **28.8** GB per month
- 4G: **8.1** GB per month

It's important to point out that it's not 5G as such that alone explains the higher mobile data usage in 5G: Korea's operators are offering **unlimited** data plans more widely in 5G compared to what they did in 4G. But even if comparing apples to apples – unlimited to unlimited – 5G still seems to drive usage.

In September 2022, the average unlimited 5G subscription generated **44.4 GB** whereas the average unlimited 4G subscription generated less – **33.2 GB**.

The development in Korea is impressive and bodes well for the industry. It will be interesting to see if **China** and **Japan** – two other countries where operators have started to report 5G customer numbers – will be able to follow the Korean 'gearing' curve between base and traffic.

### A gigabyte has never been cheaper

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 last 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>6</sup> – which means that price still, essentially, is about data volume.

Figure 14 plots the *total* mobile service revenue per consumed gigabyte<sup>7</sup> against the average mobile data usage per SIM and month.

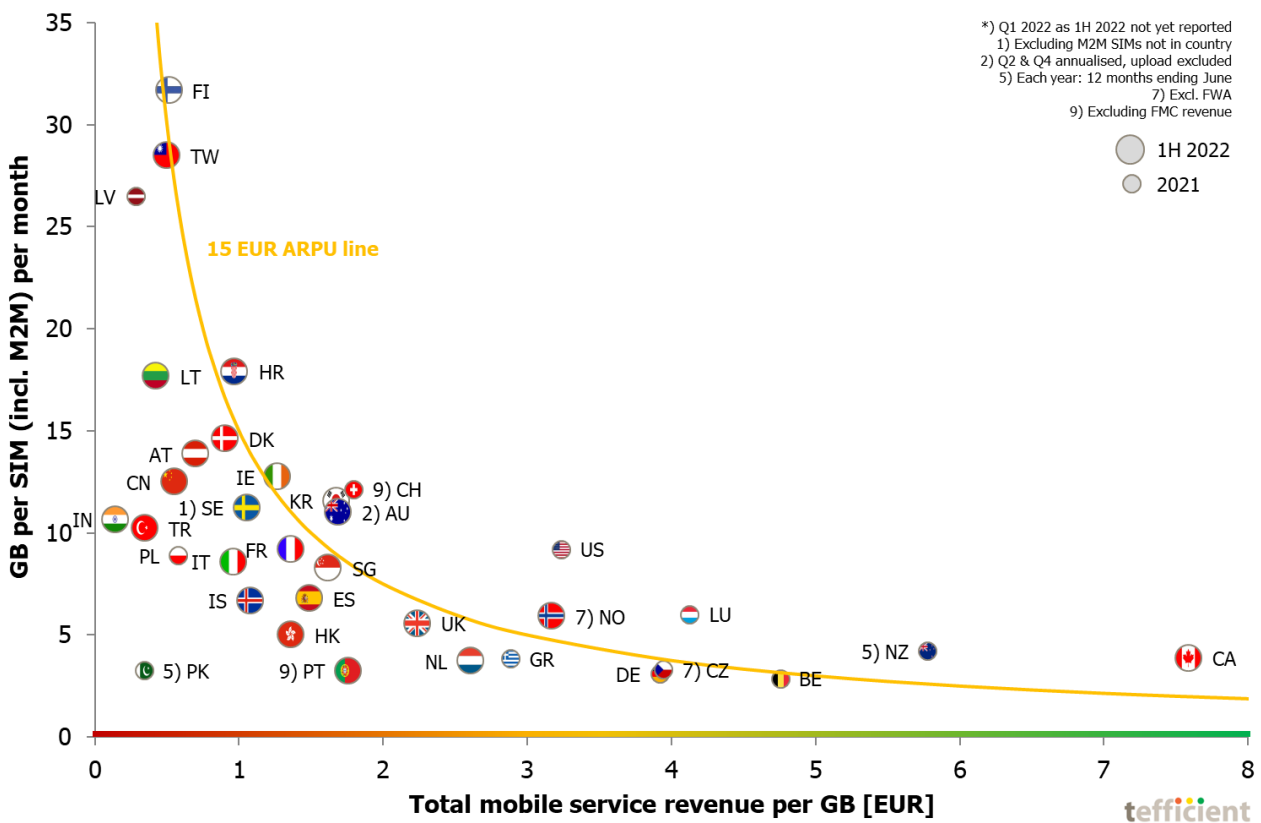


Figure 14. Mobile data usage vs. total mobile service revenue per consumed GB

The amber line shows where **15 EUR of ARPU** is earned. Countries below it had an ARPU lower than 15 EUR, countries above an ARPU higher than 15 EUR.

<sup>6</sup> There are exceptions to this – where the price-defining parameter instead is data throughput – e.g. Finnish operators, Swisscom, O2 Germany, Telenor Norway and Vodafone in Spain, the UK and most other European Vodafone markets (except Germany). There are also operators mixing several parameters such as volume, throughput, policy, zero-rating, video resolution, service bundling etc.

<sup>7</sup> Attributing zero value to voice and messaging



There are a few countries where operators enjoy very high total revenue per consumed gigabyte: **Canada, New Zealand<sup>8</sup>, Belgium, Luxembourg, Czech Republic and Germany.**

It's important to point out that our analysis looks at what the mobile operator industry *de facto* makes on end-users, not what the best offer on the market currently is. 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 markets where operators get the lowest revenue per consumed gigabyte: **India, Latvia, Pakistan, Turkey, Lithuania, Taiwan, Finland, China and Poland.**

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

Looking at Figure 14 we can conclude – as in all our previous analyses on this topic – 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 within the data-only segment, see Figure 8.

But we also said that a gigabyte has never been cheaper. More correctly put is that operators never had lower total service revenue per gigabyte than what they currently have – which is true for all countries but **India.** Figure 15 shows the revenue development from 1H 2021 to 1H 2022.

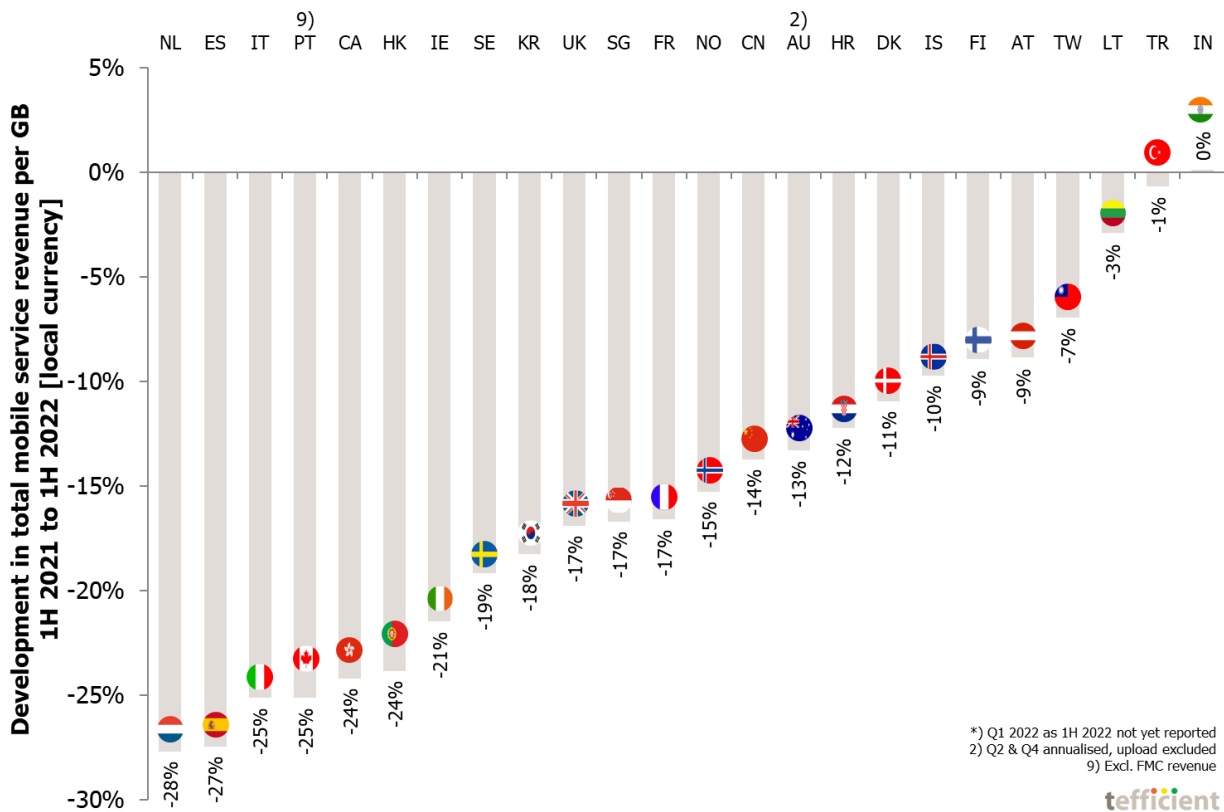


Figure 15. Development in total mobile service revenue per consumed GB – 1H 2021 to 1H 2022

<sup>8</sup> Based on latest available (12 months to June 2021) data

The prerequisite to appear in Figure 15 is of course that the statistics have been reported both for 1H 2021 and 1H 2022. Of these markets, the **Netherlands** had the fastest revenue erosion, 28%. **Spain** had 27%, **Italy** 25%, **Canada** 24% and **Hong Kong** 24%. In comparison to previous reports, the erosion has again generally slowed down.

**Turkey** is now having the slowest erosion, 1%. Given Turkey's hyperinflation – in June 2022 it was 79% – slow price erosion is not exactly surprising. But **India** didn't have any erosion at all (and no hyperinflation). By contrast, the mobile service revenue per GB grew 0.1% in India in 1H 2022. This is just the second time in the history of this analysis series we have registered growth in the revenue per GB for a country.

### No correlation between data usage and ARPU

Figure 16 is a variant of the revenue per GB chart – it plots the usage against the average revenue per SIM, i.e. the ARPU.

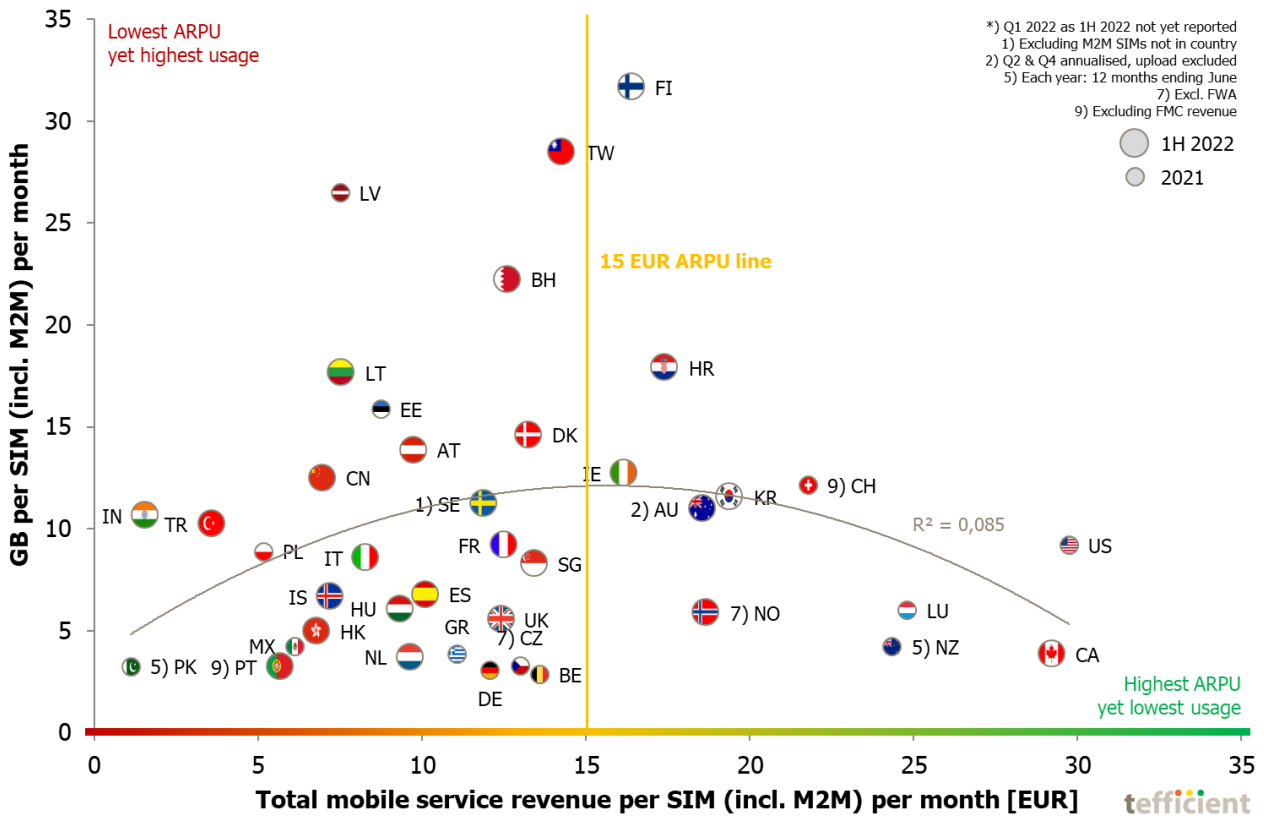


Figure 16. Mobile data usage vs. total mobile service revenue per SIM

**USA** (2021) and **Canada** (1H 2022) have the two highest ARPUs among our markets. The mobile data usage is increasing quickly in Canada but is still low given the high ARPU. **Luxembourg, New Zealand** and **Switzerland** are also markets where operators derive higher ARPUs than elsewhere.

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

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

## Dressing the Christmas tree based on ARPU development

Now to our Christmas tree graph. It's the graph where we ideally like to see the branches stretch to the right since that means that the ARPU grew in the past year. That would demonstrate that the operators of a country have been able to monetise the growth in data usage.

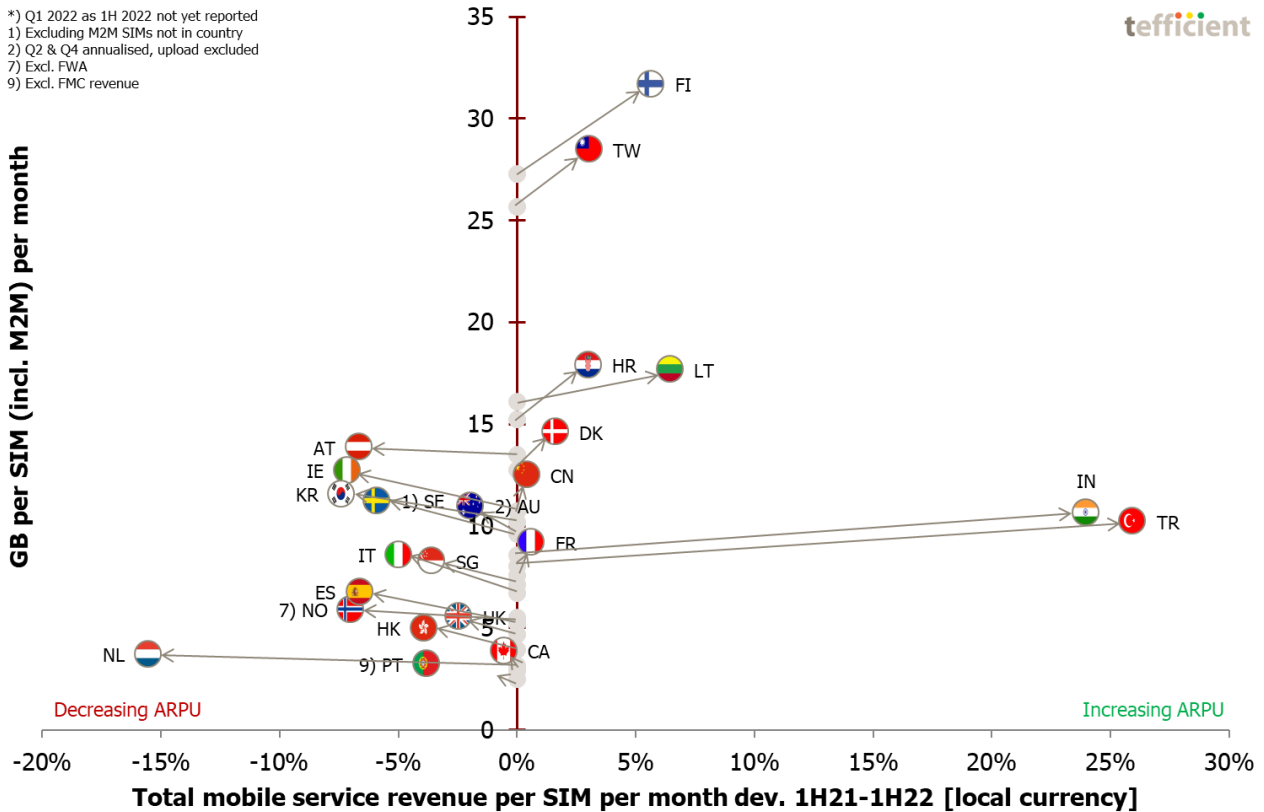


Figure 17. Development in mobile data usage vs. the development in ARPU – 1H 2021 to 1H 2022<sup>9</sup>

The branches stretch right in **9 of 23 markets**<sup>10</sup> (39%). These are – from the top – **Finland, Taiwan, Croatia, Lithuania, Denmark, China, India, Turkey** and **France**<sup>11</sup>. In 14 markets (61%), the branches stretch left meaning that even though data usage generally grew, ARPU fell. This time, the ARPU erosion in the Netherlands is the fastest; 16%.

We are still missing 1H 2022 reporting from a few countries, but the 1H 2022 Christmas tree so far represents a deterioration compared to our [2021 report](#). A larger share of countries is again to the left.

<sup>9</sup> Iceland has been excluded from this graph as the international SIMs drive both data usage and ARPU down when including M2M

<sup>10</sup> The 23 markets for which regulators have reported the necessary underlying stats to date. Iceland excluded.

<sup>11</sup> The UK was in this category in our previous version of this report but new, much higher, M2M subscriber numbers reported by Ofcom in December 2022 moved the UK to the left side of the tree graph

The pandemic initially damaged the Christmas tree, but after a rough 2020 and an improving first half of 2021, the year of 2021 ended in optimism with regards to our industry's ability to monetise an increase in mobile data usage. 1H 2022 seems to be one (or one half) step back.

## Conclusion

With few exceptions, the mobile data usage is still growing although the growth rate decelerated further. In our previous reports we noted how COVID-19 restrictions contributed to mobile data usage growth. When most societies now went back to a life without restrictions, mobile data usage growth consequently slowed.

As usual, **Finland** tops the charts – with 31.7 GB per average SIM per month in 1H 2022. If excluding M2M, the usage was 37.0 GB per month. But despite **84%** of non-M2M SIMs being **unlimited** and three 5G networks covering at least 70% of the population in June 2022, the data usage growth rate wasn't particularly high in Finland – 16%. Usage in **Canada** grew 31%. But in absolute terms, the data usage grew 4.4 GB in Finland and just 0.9 GB in Canada.

Our analysis shows strong correlation between the **data-only share** of a country's SIM base and the average data usage. **Latvia, Finland** and **Bahrain** are the data-only powerhouses of the world. Official Finnish statistics show that mobile networks carried 48% of the total data traffic in the first half of 2022 – fixed networks just slightly more, 52%.

**5G** – or the monetisation model changes associated with 5G – seems to drive data usage in countries where operators have rolled out much 5G on dedicated frequency bands. Such as South Korea. Here traffic generated by 5G subscribers surpassed the traffic generated by 4G subscribers in March 2021 and has represented a majority of the mobile data traffic ever since April 2021. The data consumption per 5G subscription was 28.8 GB per month in October 2022 – about **3.2 times** that of the average 4G subscription.

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, Pakistan, Turkey, Lithuania, Taiwan, Finland, China and Poland. Canada, New Zealand, Belgium, Luxembourg, Czech Republic** and **Germany** represent the other end.

Low usage doesn't necessarily mean low ARPU, though. Market ARPU is uncorrelated with usage. **USA** and **Canada** have much higher ARPU than other countries without having high usage.

What is slightly disappointing is that only **9 of 23 markets could grow ARPU** on the back of the data usage growth. That's no longer a majority of the markets and it thus represents a softening compared to the end of 2021 (which, in turn, was an improvement compared to the start of the COVID period).

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