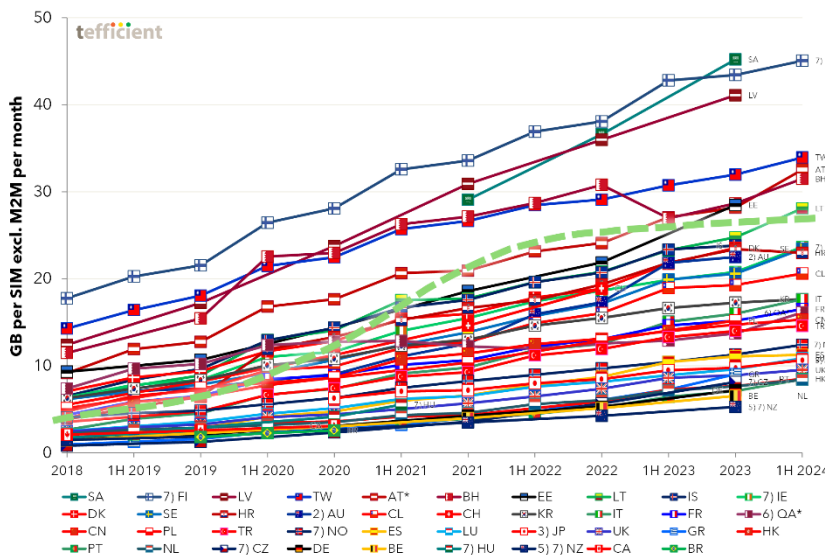


Industry analysis #3 2024

Mobile data - first half 2024 - excluding M2M/IoT

Is the end of the S-curve in sight?



Tefficient's 43rd public analysis of mobile data trends and drivers compares data from 39 countries, where M2M/IoT can be excluded from the total bases. Mobile data usage grew in every country year-on-year, with Saudi Arabia remaining the usage leader.

However, growth rates have decelerated - Portugal saw the highest increase at 32%, while Croatia and Finland posted just 5%.

Data-only subscriptions, while limited in market share, continue to define average usage. Latvia led with 164 GB per month in 2023, followed by Austria with 136 GB per month in the first half of 2024. In pure FWA, Australia led with 498 GB per month in 2023, followed by Sweden with 316 GB in 2023 and Ireland with 313 GB in the first half of 2024.

Unlike data-only subscriptions, 5G's impact on traffic remains limited, except in South Korea, Austria, and Saudi Arabia.

Mobile service revenue per gigabyte continued to decline but at a slower pace, with Luxembourg seeing the sharpest drop, 22%. Inflation-affected Turkey, however, again saw its revenue per gigabyte skyrocket. But this time Finland had an increase too - a first-ever for the country.

Encouragingly, 70% of markets saw ARPU growth aligned with higher data usage - a positive outcome in line with our previous edition of this analysis.

The M2M/IoT reporting dilemma

This page is about unexciting methodology issues and can be skipped.

Regulators' reporting of M2M/IoT¹ SIMs continues to create a challenge for the comparability between countries. To make this *excluding-M2M* analysis, we had to exclude countries where M2M SIMs aren't broken out in the reporting of the respective regulator²: USA, Singapore, Romania, India, Mexico, Malaysia, Peru, Pakistan, Slovenia, Canada and Cyprus.

To allow full comparability between countries in this excluding-M2M context, regulators must break out all these three data points in their reporting:

1. M2M subscriber (SIM) base
2. M2M data traffic
3. M2M revenue

This is done in four countries: **Sweden, Norway, Greece**, and **Bahrain**. We appreciate that the regulators PTS, Nkom, EETT, and TRA have done this since it allows us to calculate the error that would be made if only the M2M subscriber base (but not the M2M data traffic nor M2M revenue) was reported.

Taiwan and **New Zealand** exclude M2M from all three data points and is therefore also fully correct and comparable. **Qatar** also excludes M2M from all three data points, but only reports its base of data-enabled mobile subscriptions, excluding voice-only subscriptions.

For **Australia**, M2M base and M2M traffic are reported and as Telstra breaks out M2M revenue in its reporting, it has been excluded (but not the M2M revenue of the other two MNOs, Optus and TPG Telecom, as these aren't reported).

The regulators in the remaining countries most often only break out M2M subscriptions - not M2M data traffic and seldomly M2M revenue. For these markets, the consequence of this is:

- The **mobile data usage is slightly overstated** as the M2M data traffic is included, but not the M2M base.
- Since the M2M data traffic and the M2M revenue is included, the **revenue per GB is affected, likely overstated**.
- Since the M2M revenue is included, but not the M2M base, the **ARPU is slightly overstated**.

The error is estimated to be less than 1% on the usage side and 1-3% on the revenue side.

¹ Hereafter called M2M.

² In the case of USA, the industry association CTIA.

When excluding M2M, data usage is still growing year-on-year in all countries

Figure 1 shows the development of mobile data usage for 39 countries where regulators report mobile data traffic and where M2M subscribers can be excluded from the total mobile base. The usage is shown per SIM per month.

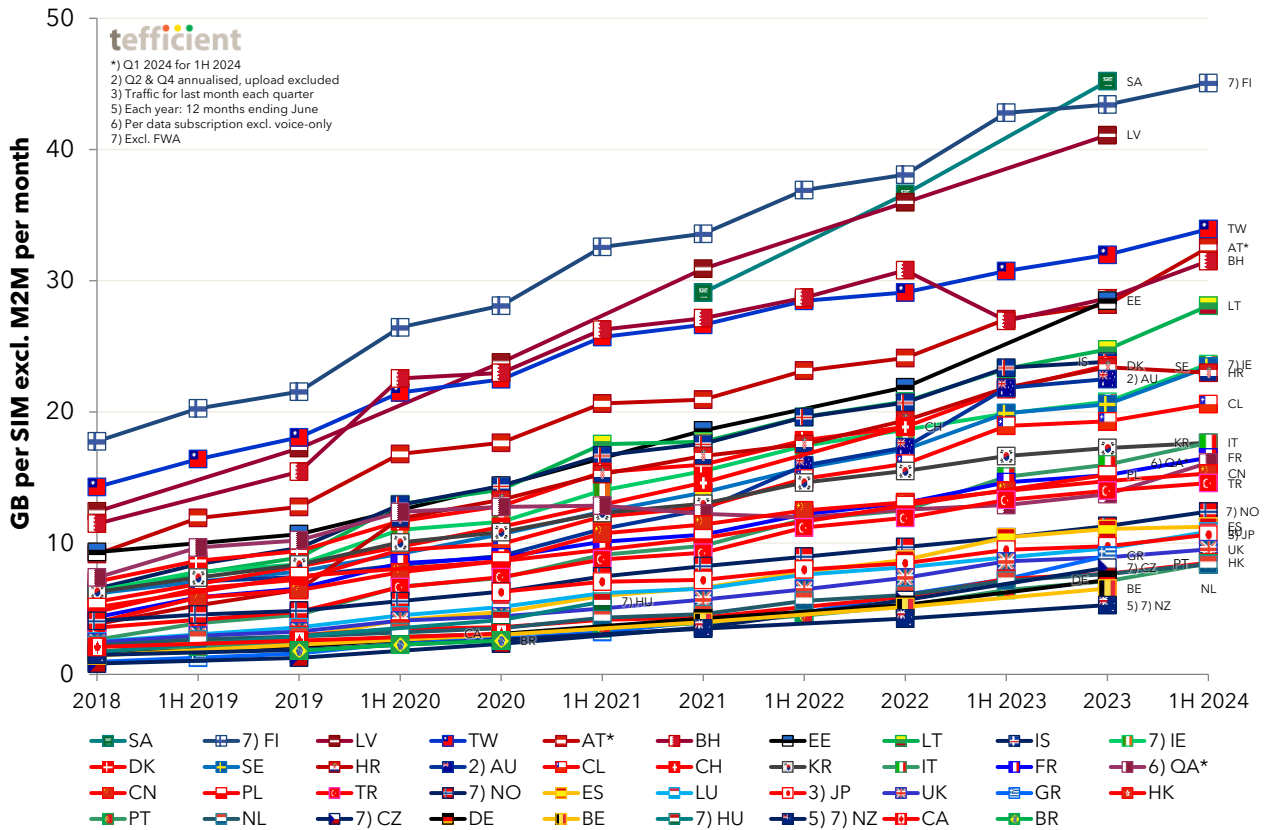


Figure 1. Development of mobile data usage per SIM (excl. M2M) per month - the legend shows the ranking³

Let's start from the top of the chart: Although there's six months fresher statistics available for **Finland**, its 45.1 GB per month in the first half of 2024 is not sufficient to overtake **Saudi Arabia's** 45.2 GB per month from 2023⁴.

Second-ranked **Finland** excludes the traffic from about 60k fixed wireless access (FWA) subscribers with a service guarantee, though. Since such FWA customers likely have very high usage, Finland could possibly have made it to the usage top if that traffic was included, but it is not broken out of the regulator's reported fixed broadband traffic.

³ Some countries will report 1H 2024 but haven't yet: Denmark, Australia, Iceland, and Greece. Switzerland has not yet reported 2023. Some countries have not reported sufficient data in a long time (Hungary, Canada, Brazil). For Austria and Qatar, Q1 2024 is used since the full first year of 2024 isn't reported yet.

⁴ The reporting of CST is incomplete, though. We emailed a few questions in April 2024 but haven't received a reply.

Latvia shadows the two with 41.1 GB per month in 2023. **Taiwan** is now a quite distant number four while **Austria** overtook Estonia and Bahrain and now is fifth-ranked.

Looking for explanations to the high usage levels, **5G FWA** plays a key role in Saudi Arabia, but no numbers are reported specifically for FWA. As to Finland, **86%** of the Finnish non-M2M SIMs had **unlimited data volume** in June 2024. If we exclude voice-only SIMs, that share grows to 89%. No other country is as unlimited as Finland.

Unlimited is offered as a premium option in regular mobile in **Latvia** but, as we will show later in this analysis, the high usage is largely explained by data-only subscriptions.

Unlimited, not FWA, is behind **Taiwan's** development since mid-2018, but usage growth slowed in the past years following attempts by the Taiwanese operators to bring rationality back into the market. The relatively late (mid-2020) introduction of 5G provided the Taiwanese operators with the tool they needed to turn the ARPU erosion around when the two challenger MNOs⁵ couldn't follow pace in 5G. Unlimited is still very much a standard, but with 5G it comes with a tiered premium.

Austria is one of the older FWA markets globally and since Austria also is one of Europe's fibre roll-out laggards, it's interesting to speculate what the chicken is and what the egg is.

Although the legend below Figure 1 shows the ranking of the 39 countries, it's difficult to spot them all. Figure 2 offers an easier visualisation.

⁵ There are now just three MNOs left in Taiwan. In 2023, Taiwan Mobile acquired Taiwan Star (T Star) and FarEasTone acquired APT (Gt).

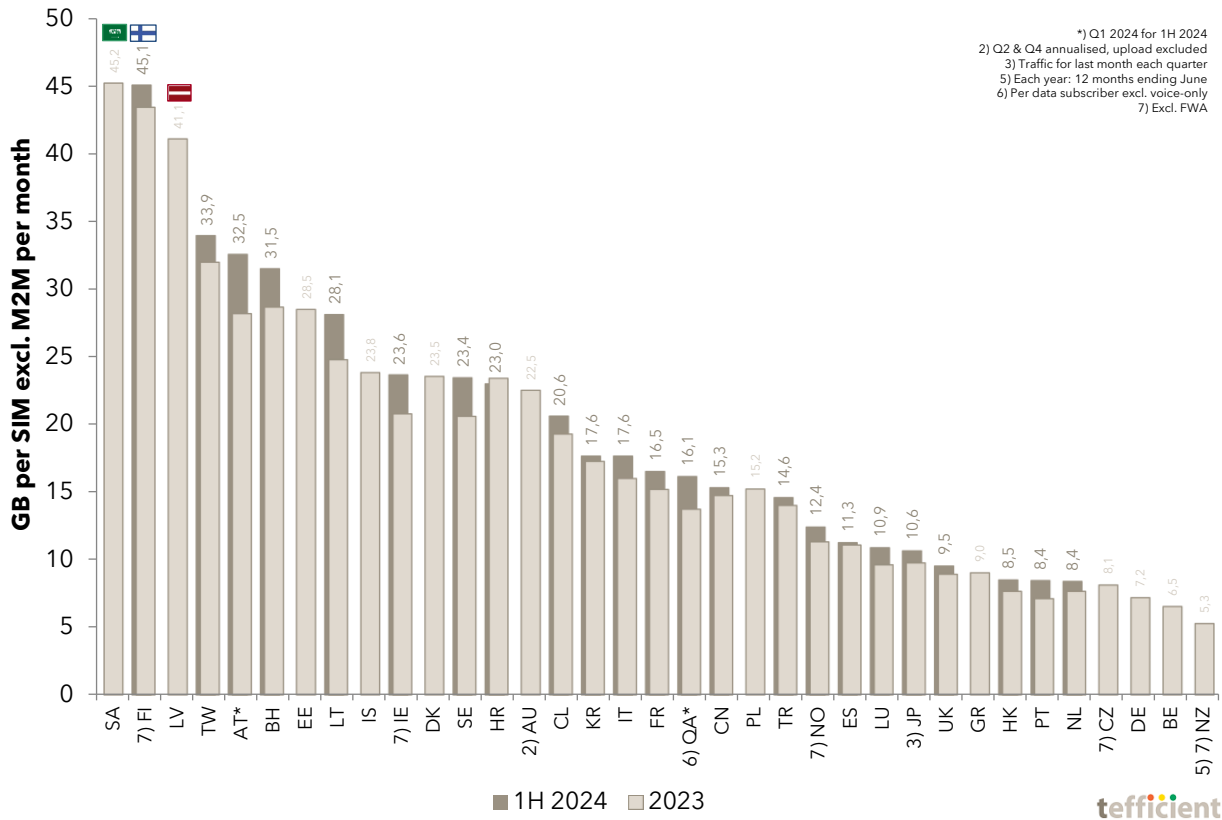


Figure 2. Mobile data usage per SIM (excl. M2M) per month, first half of 2024 and full year 2023

In comparison to our historical reports there’s not much dark grey on top of the 2023 light grey bars which shows that for most markets, there was little usage growth in the first half of 2024.

The markets with the lowest data usage in Figure 2 are **New Zealand**⁶, **Belgium**, **Germany**, **Czechia**⁶, the **Netherlands**, **Portugal**, and **Hong Kong**.

Figure 3 is a zoom-in on the lower end of Figure 1.

⁶ Note that FWA traffic is excluded from the reported mobile data traffic of the regulators.

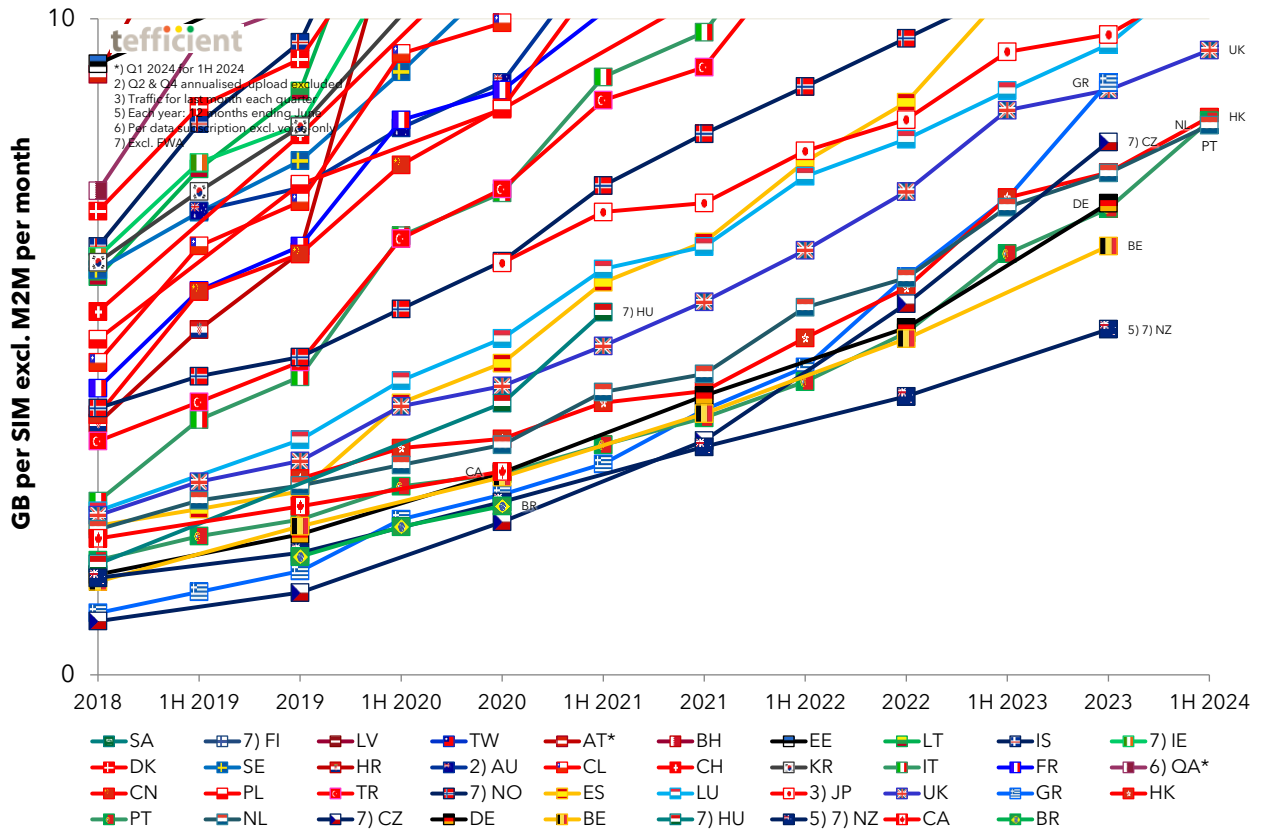


Figure 3. Development of mobile data usage per SIM (excl. M2M) per month [zoom-in on low end]

There are only maximum twelve countries left with a usage lower than 10 GB per month among our 39. Some of them, like **Portugal**, shows faster usage growth, 32%, than e.g. the **UK** with just 11%.

Data usage growth fastest in Portugal

Figure 4 shows the growth in average usage per SIM between the first half of 2023 and the first half of 2024. For comparison reasons, it also shows the growth in the previous year.

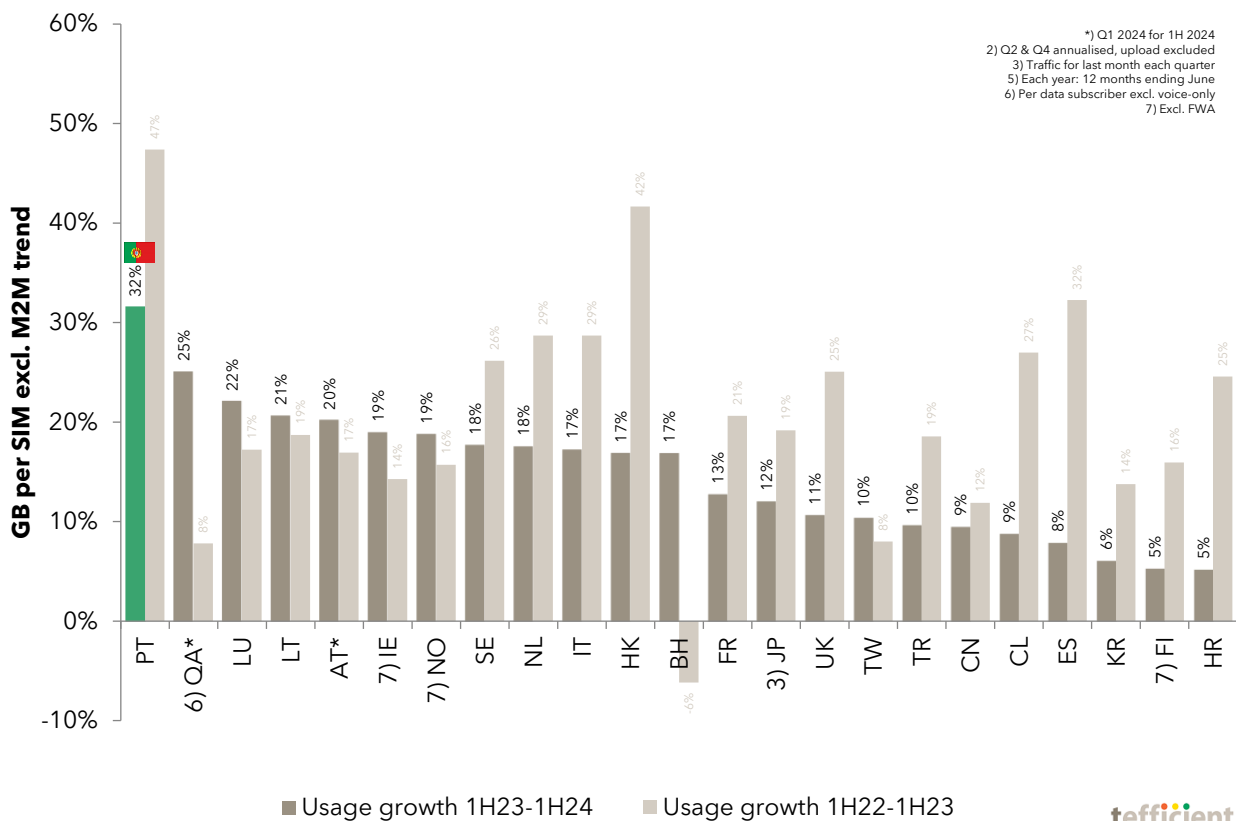


Figure 4. Development of mobile data usage per SIM (excl. M2M) 1H 2023-1H 2024 and 1H 2022-1H 2023

Of the countries that have reported 1H 2024 to date⁷, **Portugal** had the fastest growth in mobile data usage, **32%**. **Qatar** is the number two in growth with 25%. **Luxembourg** is number three with 22%, closely followed by **Lithuania** with 21%.

At the right end of the scale, we find **Croatia** and **Finland**, both with a growth of just **5%**. **South Korea** and **Spain** grew marginally faster, 6-8%.

If we compare to the growth rates a year before - the light grey bars - we can see that the seven countries with the slowest growth rates to 1H 2024 all experienced a deceleration in growth rate. **Spain**, for instance, went from 32% to just 8% in a year. **15 of 23 countries (65%) had decelerating growth rate.** It seems as if the mobile data usage development has the end of the S-curve in sight.

Croatia and Finland had the slowest usage growth.

65% of countries had decelerating growth rate.

⁷ In our [2023 analysis](#), Greece was leading the growth league, but 1H 2024 is not yet reported by the Greek regulator, EETT.

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

Although **fixed wireless access** (FWA) experiences a renaissance with 5G in the US where the MNOs collectively have recruited close to 11 million FWA customers in four years (read on), using mobile networks to substitute fixed broadband isn't 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 had reported for long, see Figure 5. Initially the fixed data traffic was just marginally higher than the mobile data traffic, but in the first half of 2023, the reported fixed data traffic leaped. The fixed data traffic in 2021 and 2022 might however have been under-reported by one or several of the fixed providers.

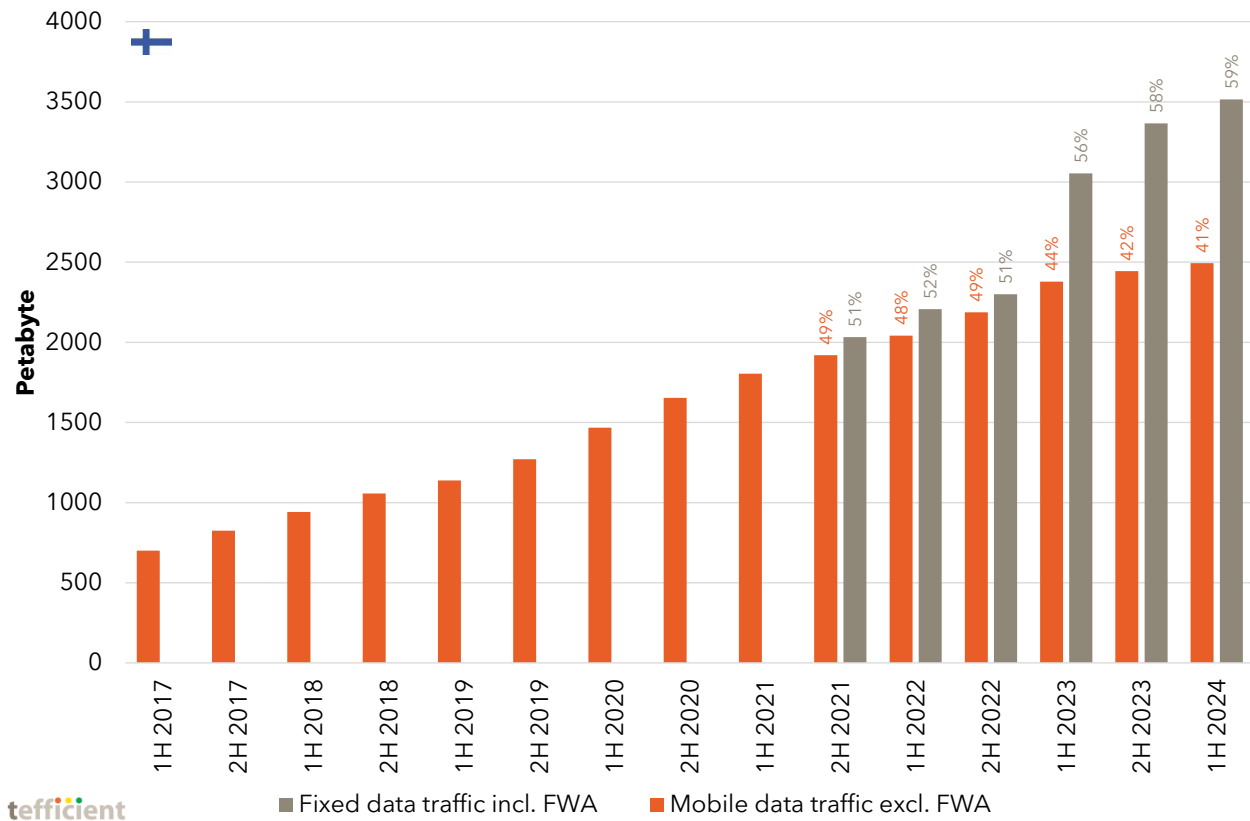


Figure 5. Development in reported mobile and fixed data traffic⁸ in Finland, 1H 2017-1H 2024

⁸ Remember, as mentioned, that the traffic from about 60k FWA subscriptions with a service level guarantee is reported as fixed, not mobile, traffic in Finland.

In the first half of 2024, the fixed data traffic represented 59% of the total traffic in Finland, making mobile data traffic represent 41%. Based on the three last reported half-yearly figures, fixed data traffic takes 'market share' from mobile data traffic in Finland.

A 41/59% split between mobile and fixed data traffic is still quite evenly distributed if compared to other countries⁹. But there's another market with a similar split and with a different trend: **Austria**.

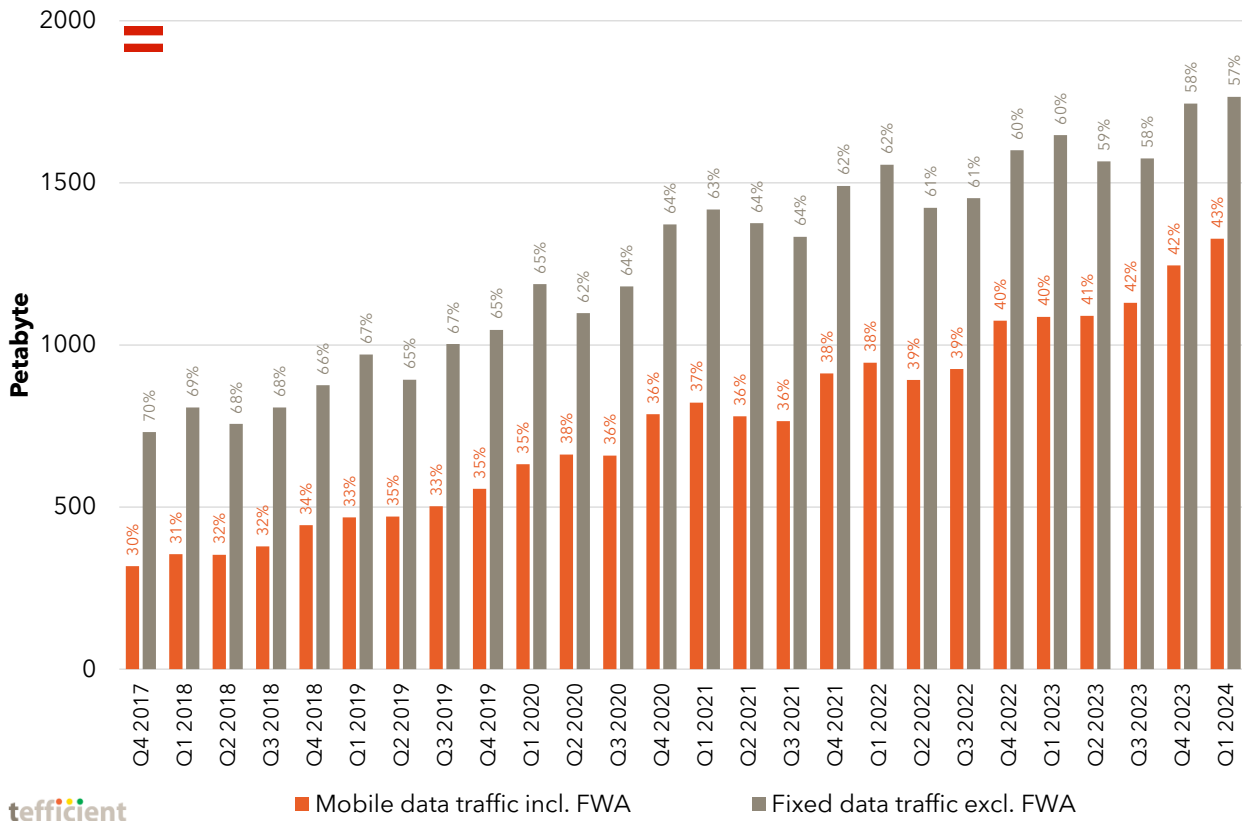


Figure 6. Development in reported mobile and fixed data traffic Austria, Q4 2017-Q1 2024

In the latest reported quarter by RTR, Q1 2024, the Austrian split was 43/57%, i.e. a bit more mobile-leaning than Finland. Unlike Finland, where the mobile data share of traffic is in decline, it continues to grow in Austria. Austria seems not to have the end of the S-curve in sight¹⁰.

Let's now put Finland and Austria into a chart comparing the data-only share of the country's SIM base with all the other reporting countries.

⁹ Based on reported numbers by MCMC, Malaysia has an even more extreme traffic balance in mobile's favour, 53/47% in Q2 2024. Malaysia is not a market that can be covered in this excluding-M2M analysis, though, as MCMC doesn't state M2M subscriber figures. The reported fixed data traffic stats have also had strange fluctuations in the past.

¹⁰ All traffic from mobile-based FWA is, unlike Finland, regarded as mobile data traffic in Austria. The Finnish regulator reports the traffic from about 60k FWA subscriptions with a service level guarantee as fixed data traffic.

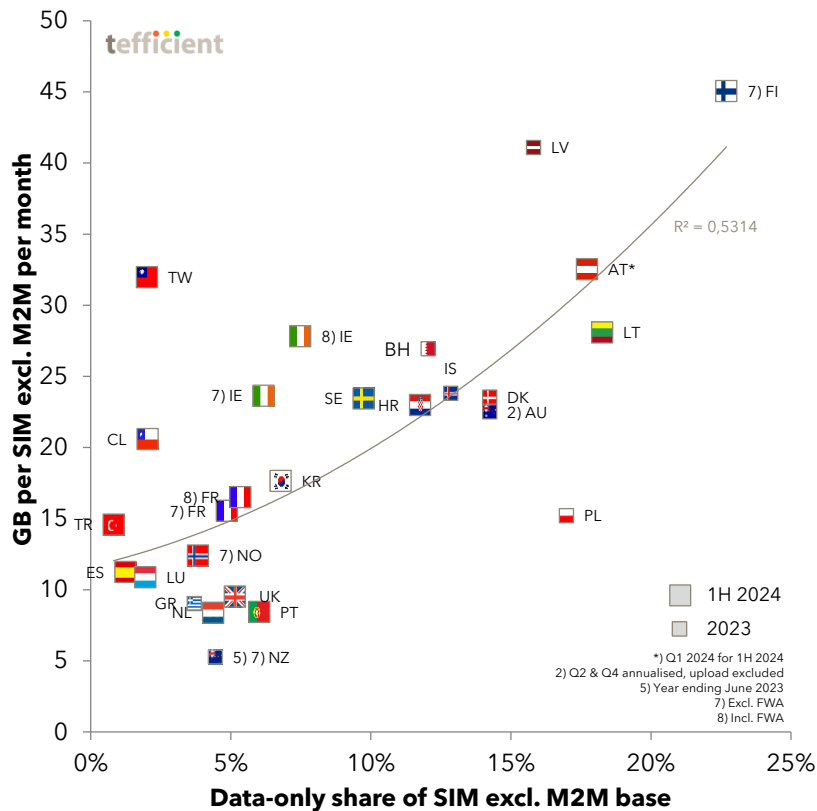


Figure 7. Mobile data usage vs. data-only share

In June 2024, **23%** of the SIM base in Finland was data-only¹¹. That makes **Finland** the leader in data-only share of base - and the average mobile data usage is also the second highest in the world. In **Lithuania** and **Austria**, data-only represented 18% of the bases and the usage was lower than in Finland. **Poland** was at 17% in 2023, but with much lower overall usage than Austria and Lithuania. **Latvia** was at 16% in 2023 and features the third highest overall usage.

Taiwan is an exception to the overall trend: Its mobile data usage is high although the data-only share of base was just 2%. Albeit at a bit lower usage level, also Chile has low data-only share of base.

Despite 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.

¹¹ Excluding those about 60k FWA subscriptions with a service level guarantee mentioned in the beginning.

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**, **U.S. Cellular**, and finally **AT&T** have since followed. It seems to work very well sales-wise as FWA since the beginning of 2022 totally dominates the overall broadband subscriber growth, see Figure 8. In Q3 2024, **155%** of the broadband net adds were FWA. (A value above 100% is possible as fixed broadband overall had negative net adds).

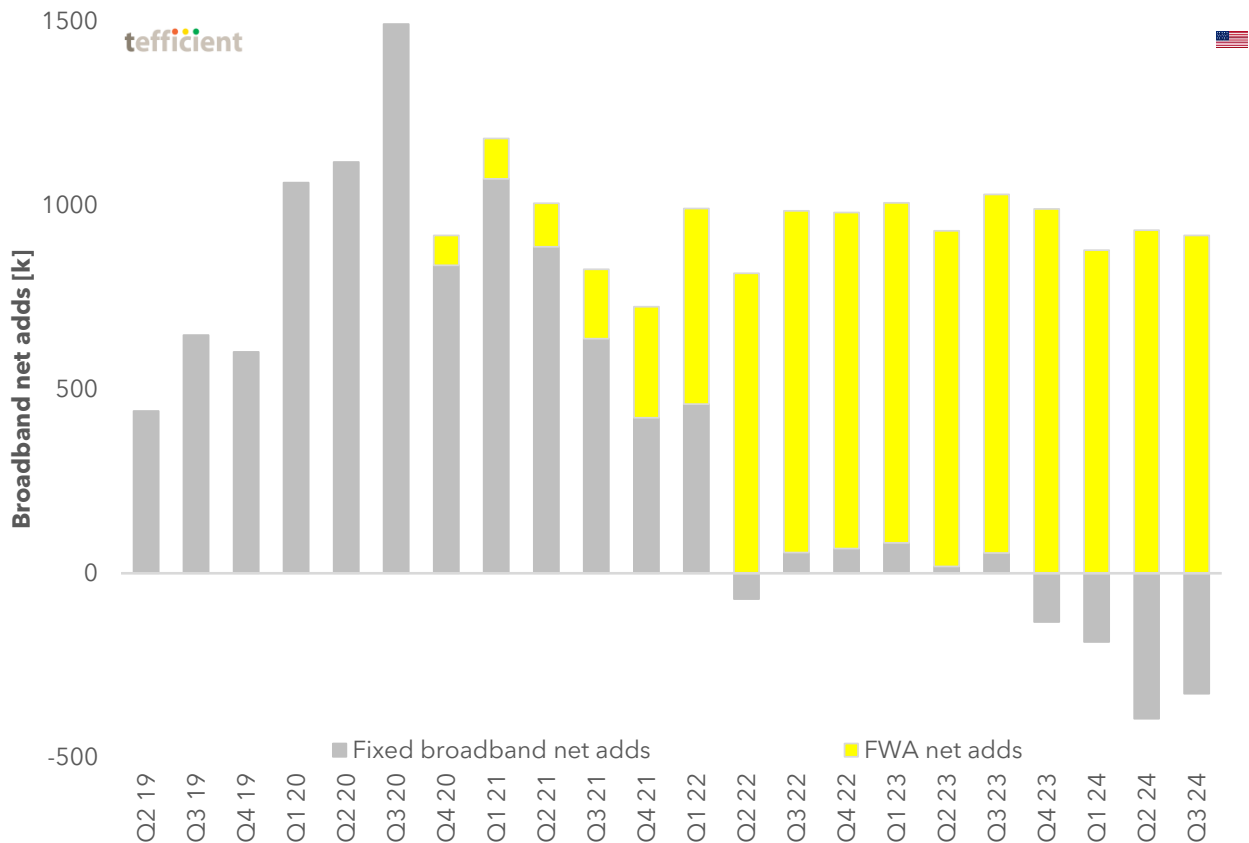


Figure 8. Broadband - fixed vs. FWA - net adds per quarter, USA¹²

In September 2024, T-Mobile had accumulated more than **6 million FWA subscribers** (4G and 5G) across the US. Since Verizon offers fibre broadband in parts of the country, it doesn't sell FWA everywhere. Verizon still had almost 4.2 million FWA subscribers (again across 4G and 5G) in September 2024, representing **35%** of Verizon's total broadband (fixed+FWA) base.

Read about [Tefficient's FWA Tracker](#) - new edition in 2025

¹² These providers are covered: Fixed: Verizon, AT&T, Comcast, Charter, Altice. FWA: Verizon, AT&T, T-Mobile, US Cellular.

Figure 7 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 7 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 9.

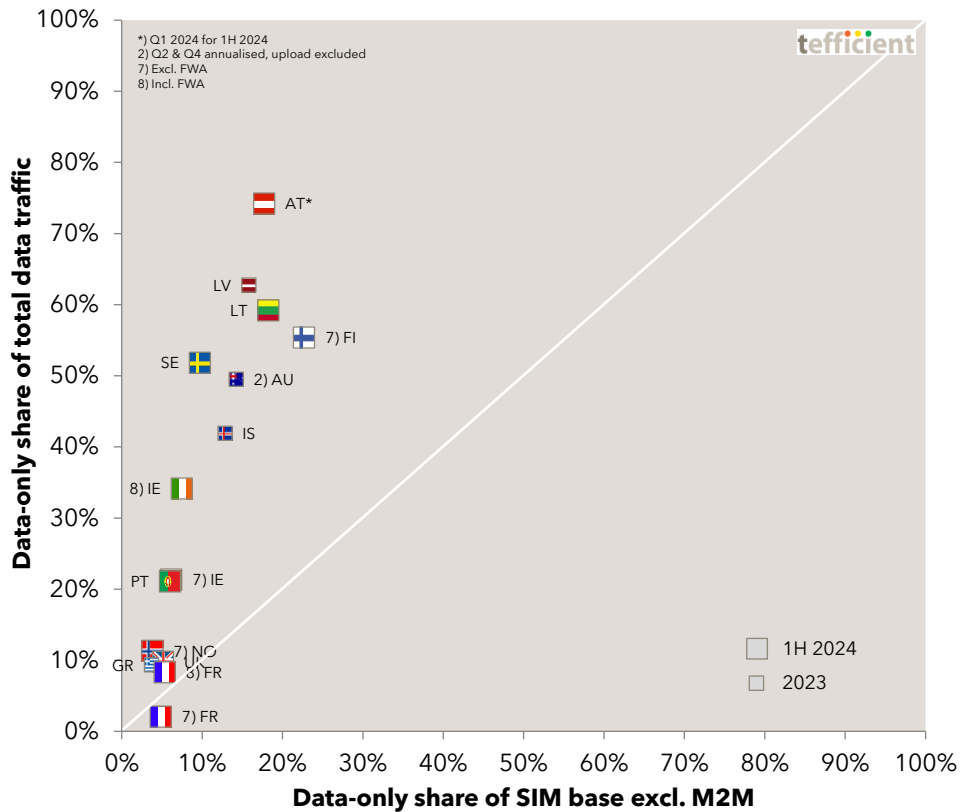


Figure 9. Data-only share of total traffic vs. data-only share of SIM base

Data-only SIMs carry a disproportionately high share of the data traffic:

- Sweden **5.3x** higher traffic per data-only SIM vs. any SIM
- Bahrain **4.8x**
- Ireland (incl. FWA) **4.6x**
- Austria **4.2x**
- Latvia **4.0x**
- Portugal **3.5x**
- Australia **3.5x**
- Iceland **3.3x**
- Lithuania **3.2x**
- Norway (excl. FWA) **3.0x**
- Greece **2.5x**
- Finland (excl. FWA) **2.4x**

- UK **1.9x**
- France (incl. FWA) **1.6x**

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 10.

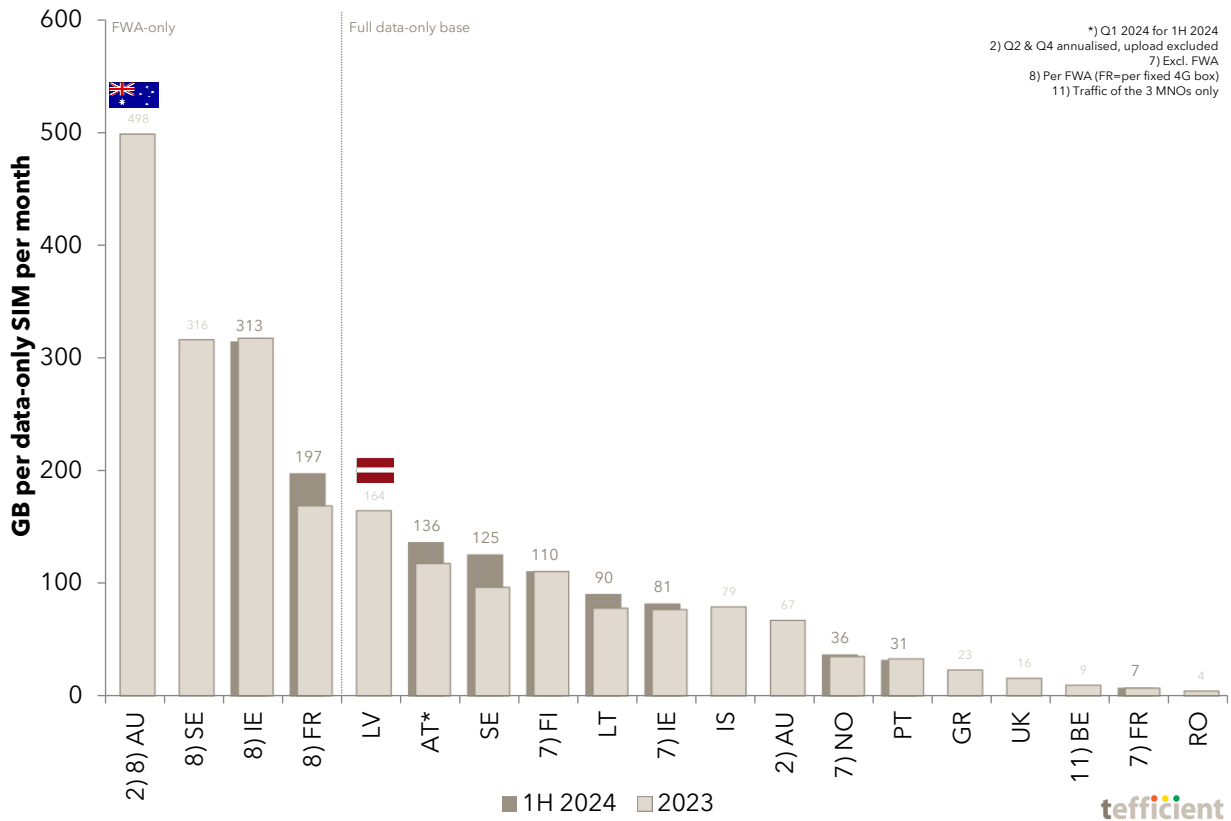


Figure 10. Mobile data usage per data-only SIM per month, first half of 2024 and full year 2023

Starting from the left, the average pure FWA subscription¹³ in **Australia** carried **498 GB** of mobile data per month in 2023. In Sweden, the average FWA subscription carried 316 GB of mobile data per month in 2023¹⁴. It's almost identical to **Ireland's** figure for 1H 2024 (313 GB). At the end the short FWA-only top list, we have **France** where the average '4G box' carried **197 GB** of mobile data per month in 1H 2024.

If instead looking at the whole data-only base (not just the pure FWA segment), **Latvia** leads with an average mobile data consumption per

The average Latvian data-only subscription consumed 164 GB per month in 2023.

¹³ Includes three categories: Wireless home broadband, NBN Wireless Plus, and non-NBN fixed wireless.

¹⁴ The regulator PTS indicates FWA usage only for full years. The growth in the data-only usage number (which includes FWA) suggests that the Swedish 1H 2024 FWA usage would be much higher.

data-only SIM of **164 GB** per month in 2023. **Austria** follows with 136 GB per month in 1H 2024 while **Sweden** grew to 125 GB. **Finland** had 110 GB per month in 2023 as well as in 1H 2024.

In comparison to our previous reports, there's little dark grey on top of the full year 2023 light grey bars which shows that for most markets, there was little usage growth in the first half of 2024.

If **5G FWA** should become the fibre-over-radio solution that T-Mobile and Verizon suggest, the data-only FWA usage figures of Australia, Sweden, and Ireland give a taste of the usage that the solution must at least manage. Fixed broadband usage is yet higher - often above 400 GB per month.

Unlike data-only, 5G adoption is seldom a driver of data traffic

Little by little, regulators are starting to report 5G subscriber bases. In a similar way as we correlated the data-only share of total mobile data with the data-only share of the subscription base, Figure 11 tries to do the same for 5G.

There are a few issues:

- In many countries, regulators reporting 5G subscribers aren't reporting 5G traffic (Chile, France, Croatia, Hong Kong, Taiwan, Iceland, and Japan).
- In Romania¹⁵, Spain, India, and Finland regulators report 5G traffic, but not 5G subscribers.
- The definition of what a 5G subscriber is differs.
- The definition of what 5G traffic is differs.

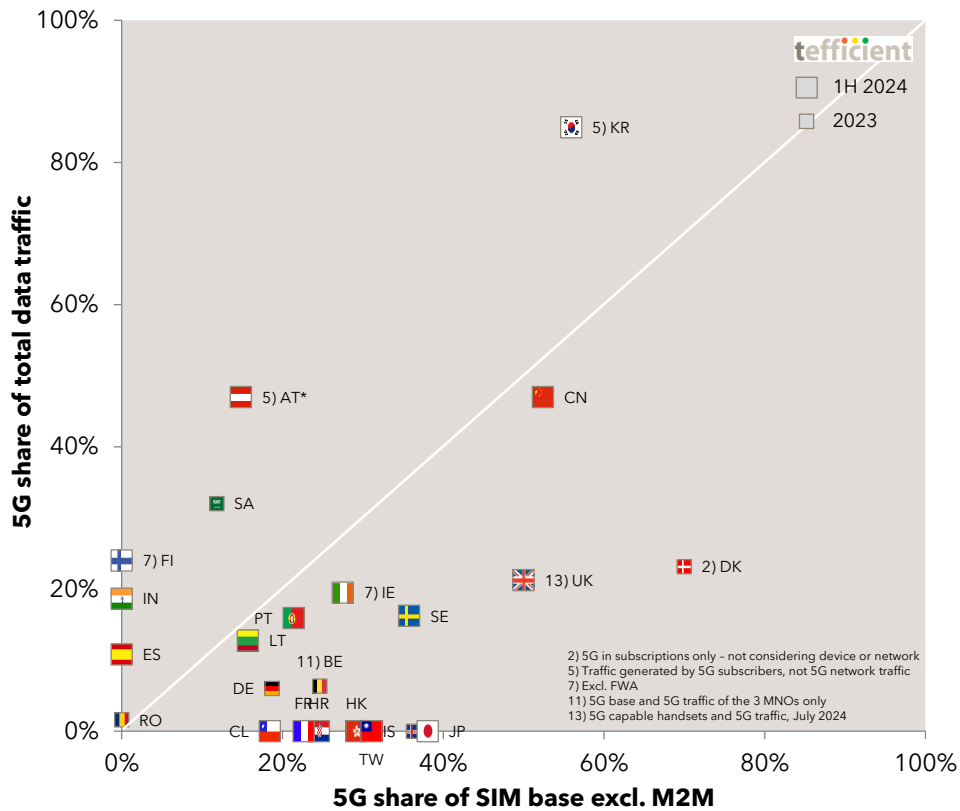


Figure 11. 5G share of total traffic vs. 5G share of SIM base

¹⁵ For Romania, the 5G share of SIM base including M2M is available but since this report is excluding M2M, that share is not visualised here. We have deemed that M2M has no visible impact on the share of total data traffic (same assumption for India).

With these difficulties, it's hard to be firm on the conclusion on 5G, but Figure 11 isn't necessarily showing that 5G drives data traffic. There are a few countries above the white equilibrium line for which it is true – **Saudi Arabia, Austria¹⁶, and South Korea** – but there are more countries below the line: Lithuania, Portugal, Germany, Belgium, Ireland, Sweden, the UK, China¹⁷, and Denmark. If we compare to Figure 9 – the data-only graph – the difference is clear. Whereas data-only drives average data usage, 5G doesn't seem to.

South Korea, Austria and Saudi Arabia report disproportionately high 5G traffic.

Why not? One obvious explanation is **coverage** (or rather lack thereof). 5G subscribers with 5G devices need 5G coverage to generate 5G traffic. When 5G coverage is being rolled out further, the 5G share of traffic should increase. The quantum leap in speed and quality that 5G could offer comes through new, higher, spectrum bands (typically the C-band), though. Regrettably it doesn't propagate well into buildings from outdoor sites and since most of the mobile data traffic is consumed indoors, the lack of 5G C-band indoor coverage is a hinder for 5G's traffic dominance. Operators might have to level up on dedicated indoor solutions to get a disproportionately high share of traffic on 5G.

While that sounds both costly and slow, another option is to **target the FWA market using 5G**. The positions of **Austria** and **Saudi Arabia** in Figure 11 – where 5G's share of traffic is higher than 5G's share of subscriptions – could be a result of that. Since each FWA subscriber consumes so much more traffic than the average mobile data user, even a small amount of 5G FWA customers will move the needle. Through stand-alone and slicing, 5G also offers the possibility to set monetisable thresholds for the speeds and quality of FWA.

We have in earlier editions of this report highlighted 3/Drei in Austria and Elisa in Finland as advanced 5G stand-alone examples with QoS tiering, but a more recently added example is **Jio** from India¹⁸, see Figure 12.

¹⁶ The Austrian regulator, RTR, has since our last analysis clarified that the reported 5G traffic is the traffic generated by 5G subscribers, but not necessarily carried on 5G networks. From Q2 2024 onwards, RTR might change this, something we will monitor and take into account in future editions of this analysis.

¹⁷ The 47% share of traffic is though for 2023 whereas the 52% share of subscriptions is for 1H 2024. In our [previous analysis](#), China was on the equilibrium line.

¹⁸ India can't be covered in this excluding-M2M analysis as the regulator, TRAI, does not separate out M2M in its reporting.



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Figure 12. An introduction to the 5G FWA offering of Jio India, AirFiber

Jio offers its 5G FWA product, AirFiber, with prices tiered on up-to speeds: 30, 100, 300, 500 or 1000 Mbit/s. Launched in September 2023, Jio had gained **2.8 million** AirFiber subscribers just a year later. Jio has stated that it uses network slicing and 5G standalone to support 5G FWA and to separate it from Jio's regular mobile data traffic.

Before closing this section, let's introduce a simpler version of Figure 11 which only shows the 5G share of traffic. It visualises how far the 5G journey has come in **South Korea and China**. But the high ranking of **Austria¹⁹ and Saudi Arabia** also shows how important 5G FWA could be to drive the overall 5G traffic.

¹⁹ Austria's traffic is, so far, reported as the total traffic generated by 5G subscriptions, but not necessarily carried on 5G networks. It's likely the case also for South Korea.

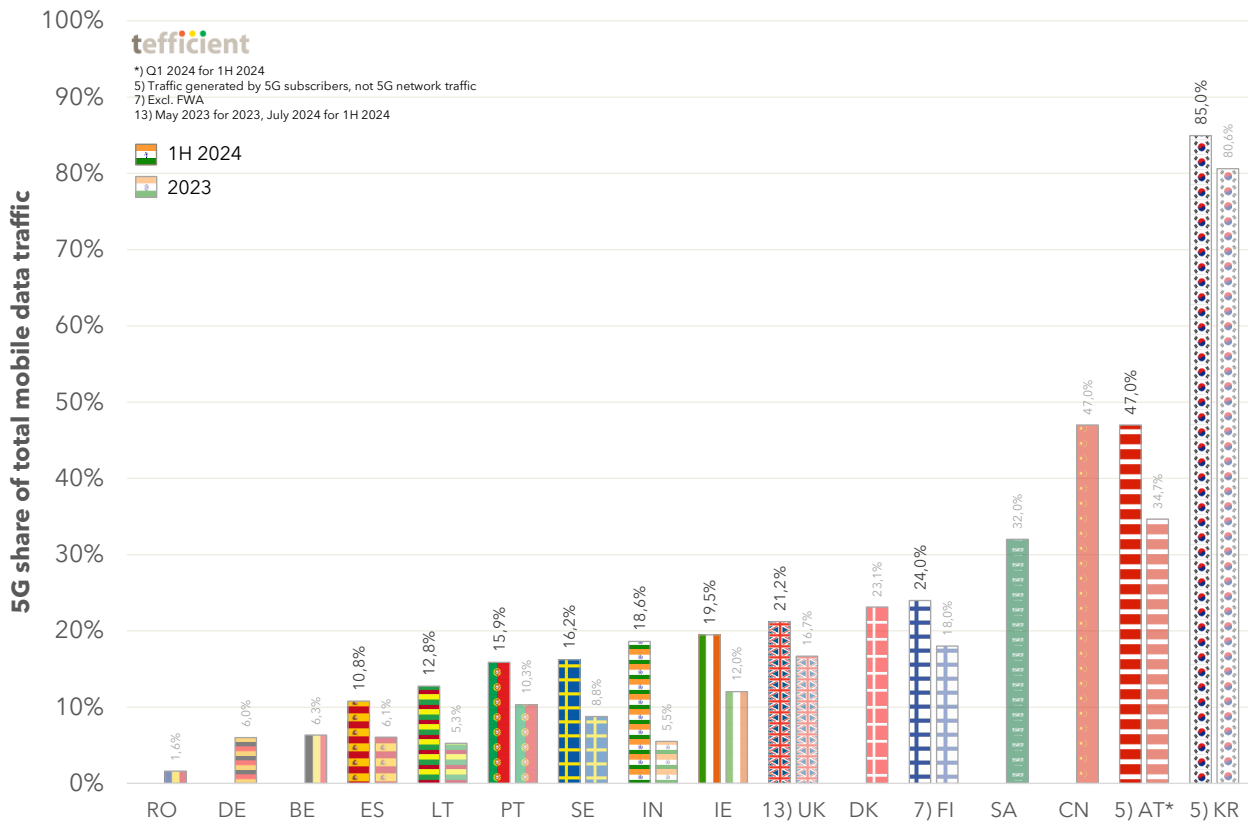


Figure 13. 5G share of total traffic - 1H 2024 (not dimmed) and full year 2023 (dimmed)

5G's proportion of total traffic disappoints in Europe, but growth is now rather fast.

Some European countries - Romania, Germany, and Belgium - struggle with 5G traffic take-up having achieved just 1.6% to 6.3% in 2023. Spain, Lithuania, Portugal, Sweden, Ireland, the UK, Denmark, Finland, and Austria are all above 10%, at least in 1H 2024. There has been good growth in 5G's proportion of traffic between 2023 and 1H 2024 in Spain, Lithuania, Portugal, Sweden, Ireland, the UK, Finland, and Austria.

Most impressive growth is however in just-mentioned **India** that grew its 5.5% 5G traffic proportion in 2023 to 18.6% in the first half of 2024, meaning that India now ranks higher than many European countries although the first Indian 5G networks were launched as late as Q4 2022.

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 plan²⁰ – which means that price still, essentially, is about data volume.

Figure 14 plots the *total* mobile service revenue per consumed gigabyte²¹ against the average mobile data usage per SIM and month.

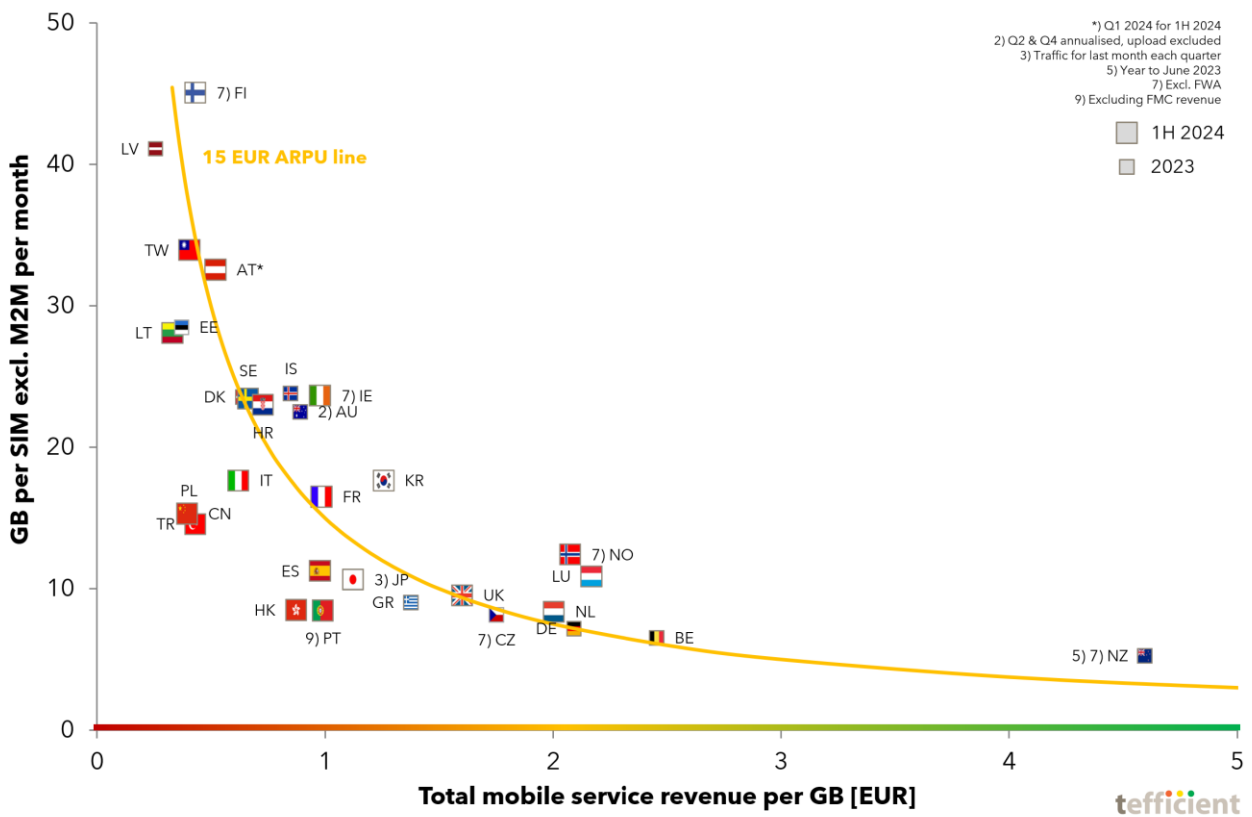


Figure 14. Mobile data usage vs. total mobile service revenue per consumed GB

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.

²⁰ There are exceptions to this - where the price-defining parameter instead is data throughput - e.g. Finnish operators, Swisscom, O2 Germany, Norwegian operators and Vodafone. There are also operators mixing several parameters such as volume, throughput, policy, zero-rating, video resolution, service bundling etc.

²¹ Attributing zero value to voice and messaging.

Without competition from Canada in this analysis²², **New Zealand**¹⁸ holds the position where operators collectively earn the highest total service revenue per consumed mobile GB.

There is a cluster of countries with high revenue per GB (if forgetting New Zealand): **Belgium, Luxembourg, Germany, Norway**²³, and the **Netherlands**.

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.

At the other end of the scale, we find the markets where operators get the lowest revenue per consumed gigabyte: **Latvia, Lithuania, Estonia, China, Poland, Taiwan, Finland**, and **Turkey**.

Looking at Figure 14 we can conclude - as in all our previous editions of this analysis - 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 within the data-only segment, see Figure 7.

Latvia's operators have the lowest total revenue per GB - New Zealand's operators the highest.

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 markets except Turkey. Figure 15 shows the revenue development from the first half of 2023 to the first half of 2024.

²² Canada can't be in this excluding-M2M analysis since the CRTC has not reported M2M base since 2020. In 1H 2024 and if including M2M, Canada had an almost as high revenue per GB as New Zealand had in the year ending June 2023 excluding M2M.

²³ FWA not included in the revenue nor in the data traffic since the regulators do not report the FWA traffic.

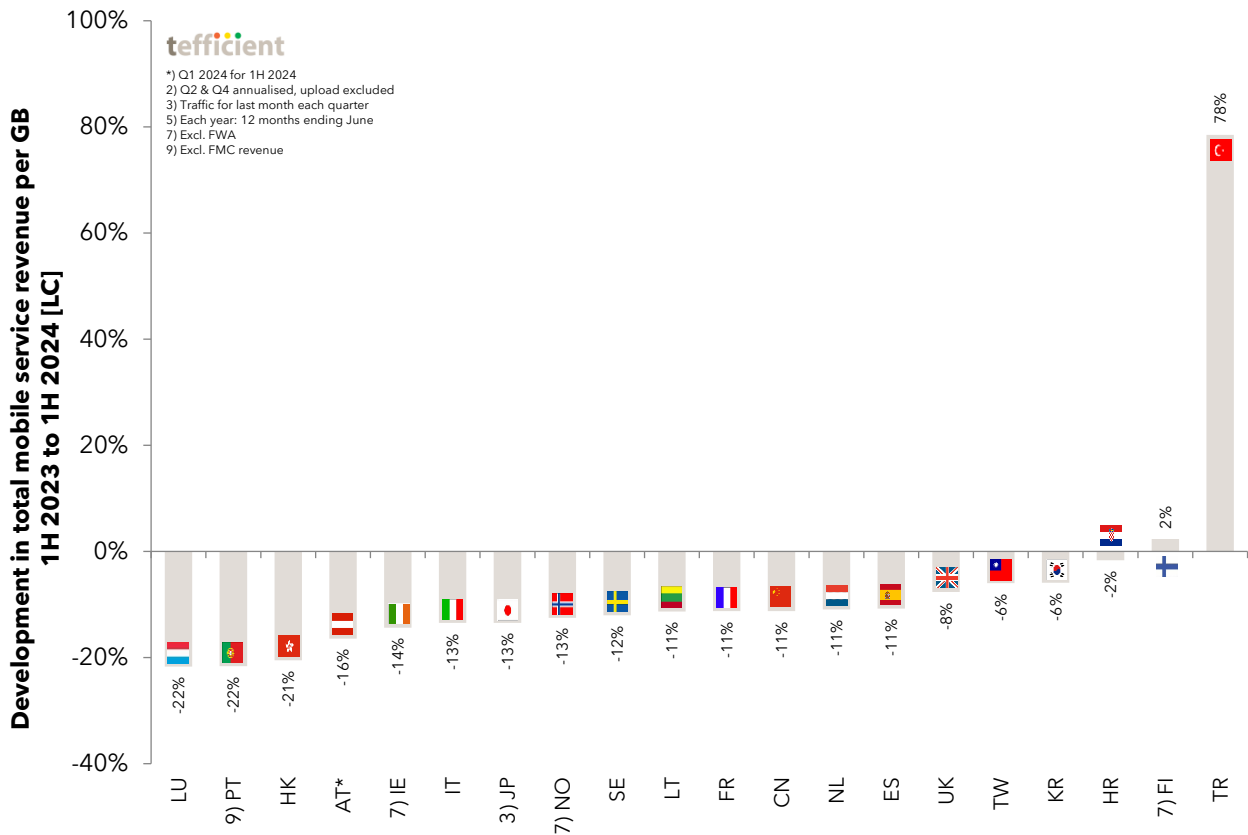


Figure 15. Development in total mobile service revenue per consumed GB - 1H 2023 to 1H 2024

The prerequisite to appear in Figure 15 is of course that the statistics are reported for both 1H 2023 and 1H 2024. Of these markets, **Luxembourg** had the fastest revenue erosion just before **Portugal** - both with 22%. **Hong Kong** follows with 21% while **Austria** had 16% (in their case to Q1 2024).

The erosion rates are slower than what we historically seen in this analysis. There are two reasons to it:

- 1) Slower growth in data usage,
- 2) Faster growth in mobile service revenue.

In **Turkey**, with its hyperinflation, the revenue per GB continued to increase - this time with **78%** - in local currency. But the development in **Finland** with a slower data usage growth and faster growth in mobile service revenue takes it north of the zero line too. In between the first half of 2023 and the first half of 2024, the revenue per gigabyte **increased 2%** in Finland. Another indication of that certain markets start to see the end of the S-curve.

The market with the slowest erosion in the revenue per GB is **Croatia** that rather abruptly moved from a European usage growth leader with much price erosion into a market with slow growth and slow erosion.

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.

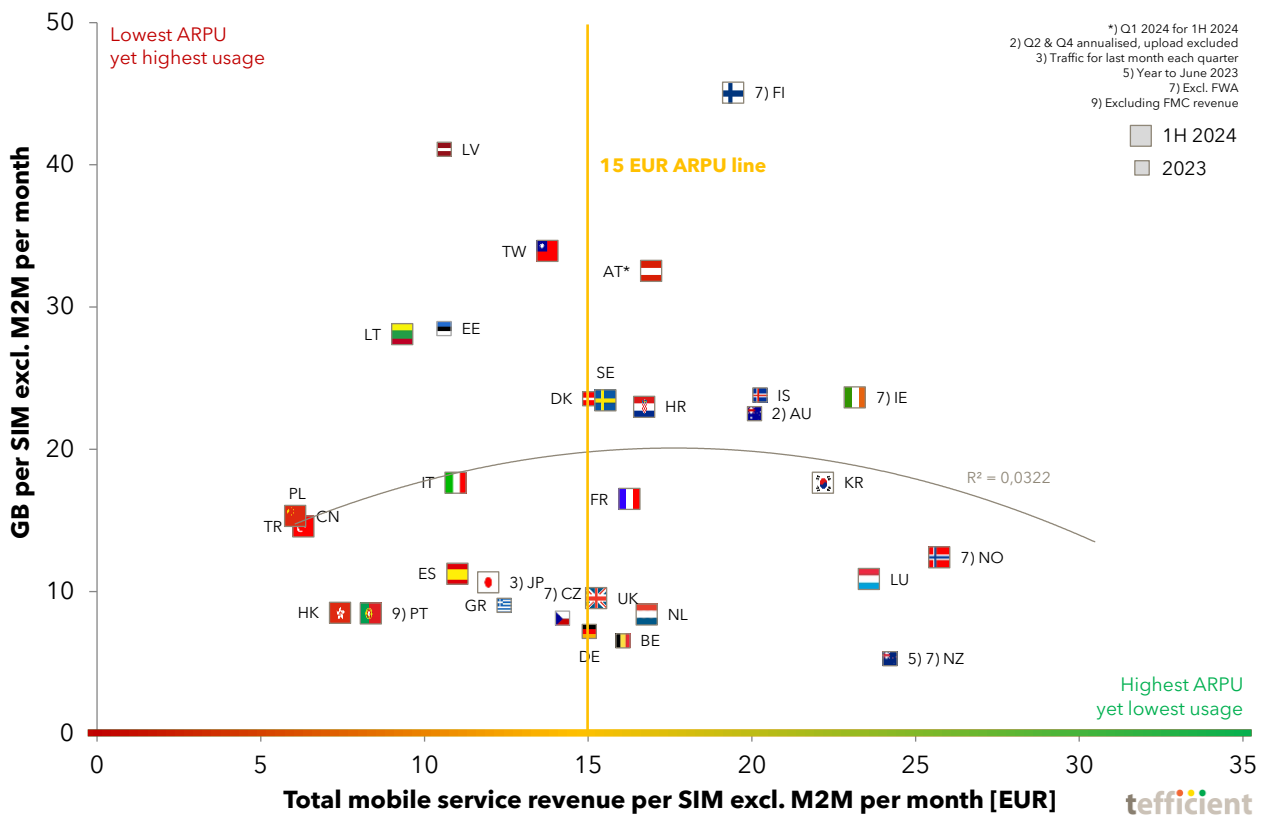


Figure 16. Mobile data usage vs. total mobile service revenue per SIM

Norway²⁴ had the highest ARPU among our markets, followed by **New Zealand, Luxembourg, Ireland,** and **South Korea**. The latter two have quite high mobile data usage, though.

Operators to the upper left - **Latvia, Lithuania, Estonia, Taiwan, Poland, China,** and **Turkey** - are 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 regrettably 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.

²⁴ FWA traffic, FWA subscriptions and FWA revenues excluded as FWA traffic isn't reported.

Dressing the Christmas tree based on ARPU development

Now to our Christmas tree graph which we continue to think is our best data representation. It's the graph where we 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.

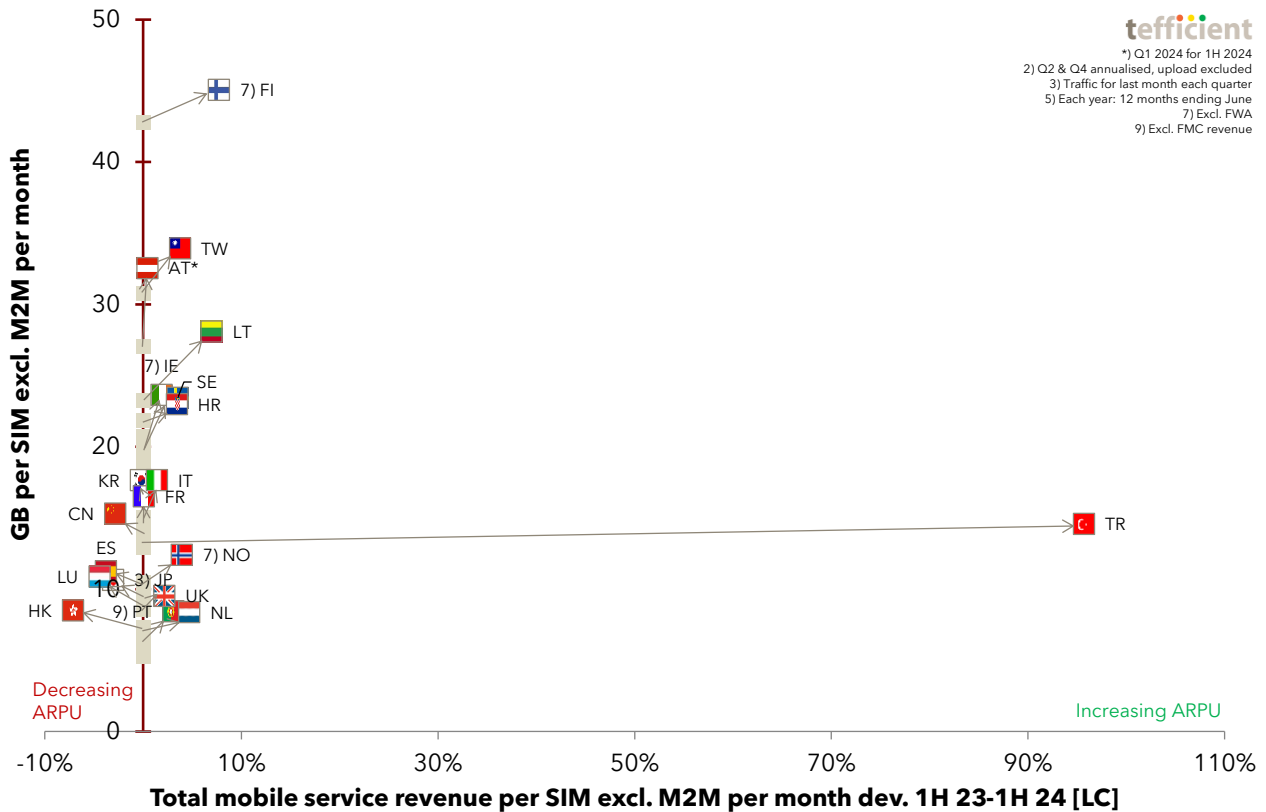


Figure 17. Development in mobile data usage vs. the development in ARPU - 1H 2023 to 1H 2024

The branches stretch right in **14 of 20 markets**²⁵ (70%) which means that the positive ARPU trend continues from our [previous edition](#). These markets are - from the top - **Finland, Taiwan, Austria, Lithuania, Ireland, Sweden, Croatia, Italy, France, Turkey, Norway, the UK, Portugal, and the Netherlands**.

In 6 markets (24%), the branches stretch left meaning that ARPU fell even though data usage grew. The ARPU erosion in **Hong Kong** was the fastest, 7%. **Luxembourg** and **Spain** were both at 4% and **Japan** and **China** at 3%.

ARPU grew, following an increase in mobile data usage, in 14 of 20 markets

²⁵ The markets for which regulators/operators have reported the necessary underlying stats to date.

Conclusion

In our country analysis focused on mobile data usage and revenues excluding M2M, **usage growth was observed in all 39 markets** covered.

Saudi Arabia leads with 45.2 GB per average SIM per month in 2023, just ahead of **Finland** with 45.1 GB per month in the first half of 2024. Finland had, alongside **Croatia**, the slowest usage growth rate, just 5%. **Portugal** experienced the fastest growth at 32%, down from 47% a year earlier. Like with Finland and Portugal, **usage growth rates decelerated** in most markets. For the first time in this analysis series, we see several markets having the end of the S-curve in sight.

Our analysis shows strong correlation between the **data-only share** of a country's SIM base and the average data usage. **Finland, Lithuania, Austria, Poland, and Latvia** are the data-only powerhouses of the world. Finnish statistics show that mobile networks carried 41% of the total data traffic in the first half of 2024, with fixed networks handling 59%. With that, Austria overtook Finland since the split there was 43/57% in Q1 2024, the latest reported quarter. Unlike Finland, mobile's share of traffic is still increasing in Austria.

Attempting to correlate **5G** share of base with 5G share of traffic faced challenges due to data limitations and varied definitions. Only **South Korea, Austria, and Saudi Arabia** report disproportionately high 5G traffic. Lack of 5G coverage emerges as a plausible explanation for the limited impact of 5G elsewhere. 5G's proportion of traffic shows good growth, though.

Regardless of 'G', increased data-only penetration, particularly through fixed-line substitution, has the potential to elevate data usage. However, a prerequisite for this, and for high data usage in general, is maintaining a low total revenue per gigabyte. Countries such as **Latvia, Lithuania, Estonia, China, Poland, Taiwan, Finland, and Turkey** exhibit this characteristic, while **New Zealand** represents the opposite end of the spectrum.

Despite variations in data usage, market ARPU does not consistently correlate with usage levels. **Norway, New Zealand, Luxembourg, Ireland, and South Korea** boast higher ARPU, though the first three do not have high usage.

14 of 20 markets could grow ARPU on the back the data usage growth which means that the positive ARPU trend continued from our previous edition of this analysis.