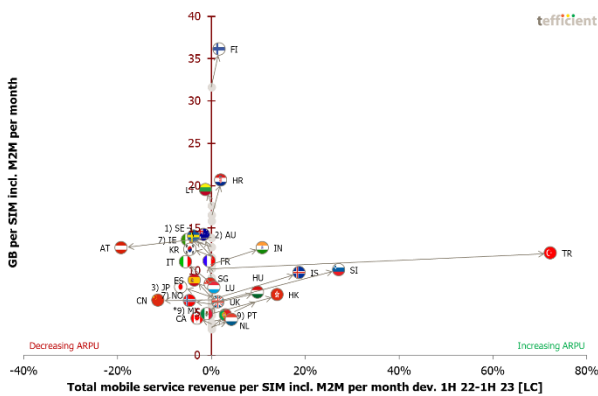


Industry analysis #5 2023

Mobile data – first half 2023 – including M2M/IoT

Human customers subsidise M2M/IoT customers



Tefficient’s 40th public analysis of mobile data development and drivers compares 47 countries worldwide, including M2M/IoT in the total bases. Mobile data usage grew in 44 of them, with Austria, Bahrain and China being exceptions.

When usage grows, the growth rates are slowing. Cyprus, however, had an astonishing growth rate of 123%, in stark contrast to much slower growth rates, or even declines, elsewhere.

Data-only subscriptions dominate average mobile data usage, although their market share is limited. In 2022, Latvia's average data-only subscription consumed 138 GB per month. In the FWA-only category, Australia stood out with 334 GB per month in 1H 2023.

While data-only drives traffic, the same cannot be said for 5G in general. Reporting is imperfect, but only three countries – South Korea, Austria and Saudi Arabia – demonstrate disproportionately high 5G traffic in relation to their 5G bases. We elaborate on the strategies adopted by these countries and highlight aspects other nations might be missing.

Overall, mobile data revenue reached its lowest level once again, although the erosion in revenue per gigabyte slowed compared to our previous analyses. Portugal experienced the fastest erosion rate at 30%, while Turkey witnessed a much-needed increase.

In 44% of the markets, an increase in ARPU followed data usage growth. This outcome is disappointing, especially given the inflationary backdrop. The result is worse than in our exclusive-M2M analysis. M2M/IoT customers do not contribute to the ARPU growth of operators in a similar way as human customers do. We conclude that human customers currently subsidise M2M/IoT customers, prompting us to wonder why.

The M2M/IoT reporting dilemma

This page is mainly about 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 *including-M2M* analysis, we had to exclude countries where M2M SIMs are excluded in the reporting of the respective regulator: Qatar and Taiwan. You will find these countries solely in our [excluding-M2M analysis](#).

Another, growing, problem is international M2M SIMs that are registered in one country but used somewhere else. Sweden is an example. The country regulator, PTS, reports 25.0 million M2M SIMs – much larger than the regular, human, SIM base of 14.8 million. We are therefore happy for that PTS breaks out the number M2M SIMs that are active in Sweden; 6.3 million, i.e., just 25% of the total M2M base. This has allowed us to recalculate a more representative mobile data usage figure for Sweden by including only the Swedish M2M SIMs.

The same issue was until recently also present in Austria where Deutsche Telekom group registers many of its international M2M SIMs. The number of total M2M SIMs as reported by RTR grew 74% in the twelve months to June 2023 – to 16.2 million. Like how it was for Sweden previously, Austria's average mobile data usage per SIM could thus look lower when including M2M SIMs than what it realistically is. Luckily Austria's regulator, RTR, now started to also report the number of M2M SIMs active in Austria. Until there's a multi-year data trend excluding international M2M SIMs, we will maintain two chart positions for Austria – with and without [marked 1) in our charts] international M2M SIMs.

International M2M SIMs are also behind the historical big swings in the number of reported M2M SIMs in Iceland.

Tefficient has issued a variant of this report where M2M is excluded: <https://tefficient.com/data-only-drives-traffic-the-same-cant-be-said-for-5g/>. Fewer markets are covered, but it avoids the problem described above with the international M2M SIMs.

¹ Hereafter called M2M.

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

Figure 1 shows the development of mobile data usage for 47 countries where regulators² report mobile data traffic. The usage is shown per SIM per month – and in Figure 1 we are including all³ SIMs, also M2M SIMs.

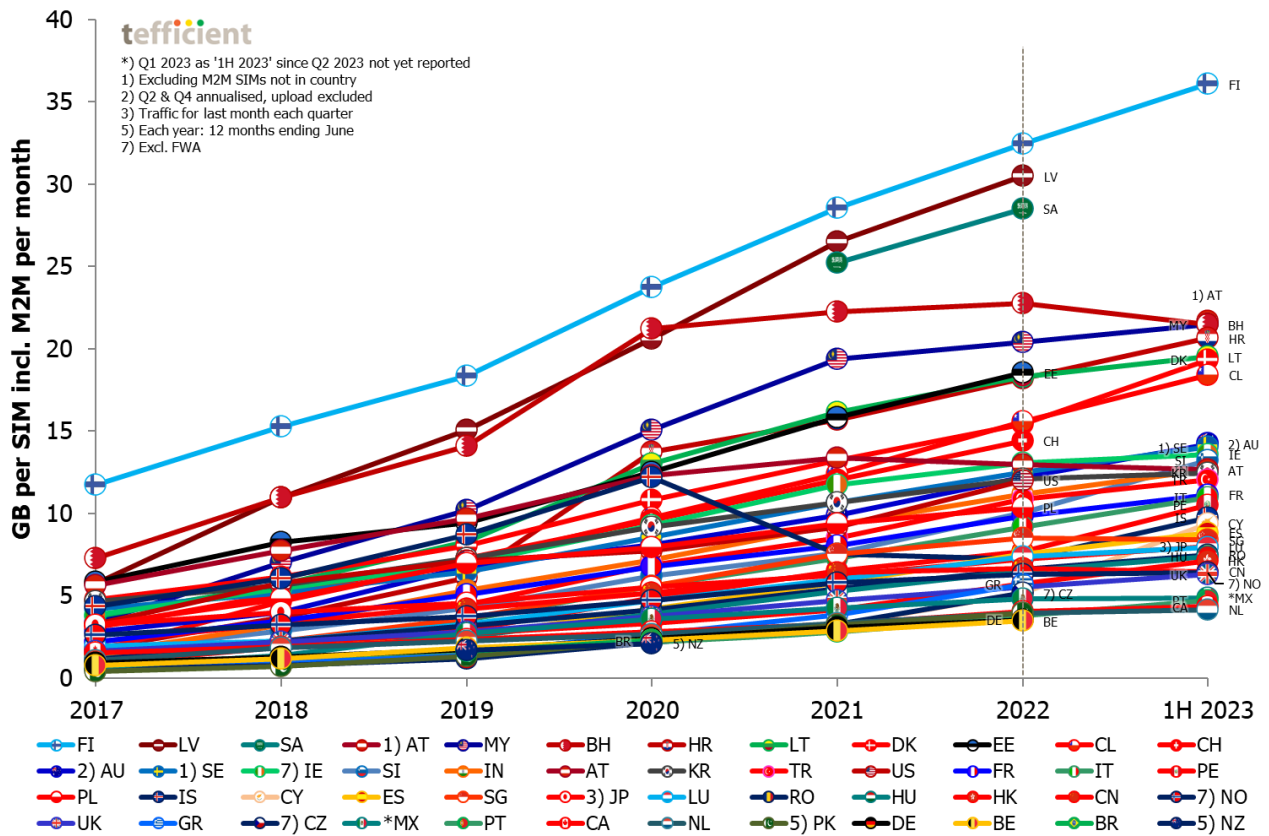


Figure 1. Development of mobile data usage per SIM (incl. M2M) per month – the legend shows the ranking⁴

Starting from the top of the chart, **Finland** is defending the world number one position when it comes to mobile data usage. **Latvia** is the runner-up with **Saudi Arabia** (new in this analysis) third. Both countries report annually, and the latest data point is hence for 2022. The regulator in Austria, RTR, has, like Sweden, started to also report the number of M2M SIMs active in the home country. If only using these in the calculation, **Austria** is the new number four in usage, just ahead of **Malaysia** and **Bahrain**.

The average Finnish SIM card carried **36.1 GB** of data per month in the first half of 2023 (+4.5 GB vs. 1H 2022). **72%** of the Finnish SIMs (M2M included) had **unlimited data volume** in June 2023. No other country is as unlimited as Finland.

² Exception: USA, where the data is from the industry body CTIA.

³ All SIMs in a market included, even the SIMs that usage 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.

⁴ One country, Greece, has not yet reported 1H 2023. For one *-marked country, Mexico, Jan-Mar 2023 figures are used as Q2 2023 isn't yet reported. Some countries have not reported sufficient data in a long time (Brazil, New Zealand).

The average Latvian SIM carried 30.5 GB per month (+4.0 GB vs. 2021). 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, just like for Finland, also explained by data-only subscriptions.

In **Saudi Arabia** (28.5 GB), growth continued from 2021 (+3.3 GB). **Austria** – excluding M2M SIMs outside of Austria – recorded an average usage per month of 21.7 GB, with no trend yet available as this reporting is new.

In **Malaysia** (21.5 GB), growth continued (+1.9 GB vs. 1H 2022) while in **Bahrain** (21.5 GB), usage declined in the first half of 2023 (-1.3 GB vs. 1H 2022).

The legend of Figure 1 shows the ranking of the 47 studied countries. But since it's difficult to spot them all, Figure 2 offers an easier visualisation.

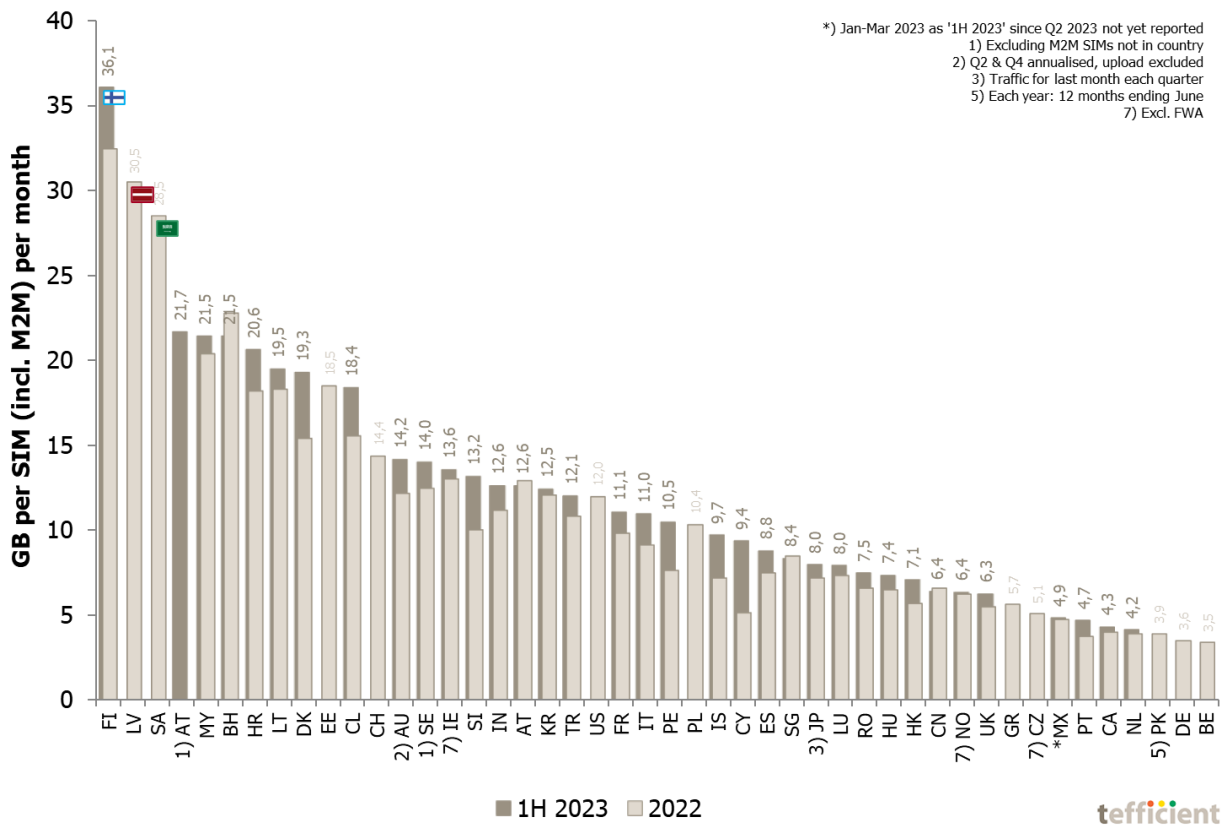


Figure 2. Mobile data usage per SIM (incl. M2M) per month, 1H 2023 and full year 2022

In comparison to previous reports there's not much dark grey on top of the full year 2022 light grey bars which shows that for most markets, there was little usage growth in the first half of 2023. **In some countries, usage even declined:** Bahrain, Austria (when counting also international M2M SIMs), Singapore and China.

The countries with the lowest data usage in Figure 2 are **Belgium, Germany, Pakistan, the Netherlands, Canada and Portugal**.

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

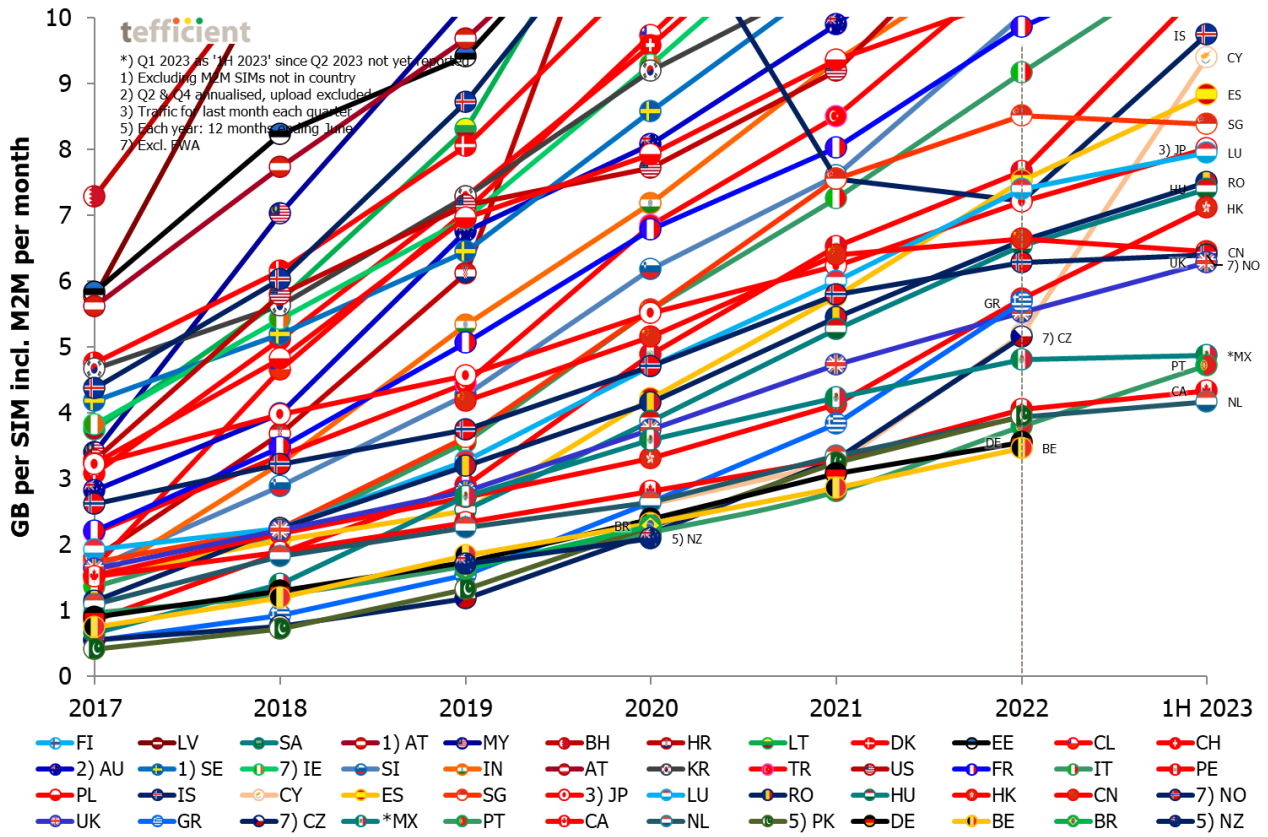


Figure 3. Development of mobile data usage per SIM (incl. M2M) per month [zoom-in on low end]

Albeit in the lower usage range, the **Netherlands, Canada, Mexico** (up to Q1 2023 as Q2 not yet reported), **Norway**⁵ and **Singapore** had quite modest usage growth in the first half of 2023. **China** even had a decline. Faster growth than in e.g. Portugal, Hong Kong, Cyprus and Iceland⁶.

⁵ Excluding FWA traffic and FWA subscriptions as FWA traffic not reported.

⁶ Iceland's big variations explained by big swings in the number of reported M2M SIMs including international M2M SIMs.

Data usage growth fastest in Cyprus

Figure 4 shows the growth in average usage per SIM (incl. M2M) between the first half of 2022 and the first half of 2023.

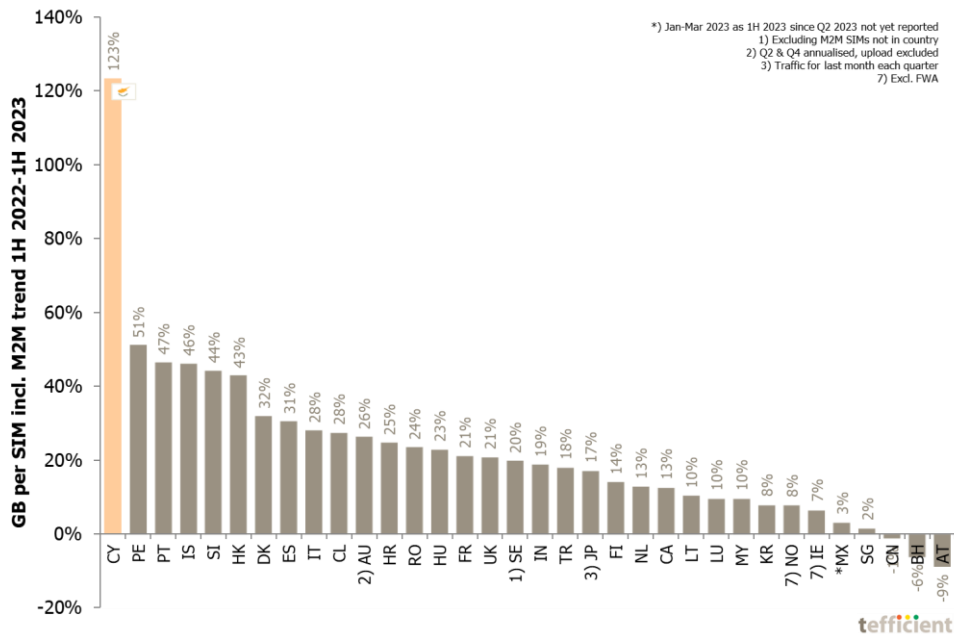


Figure 4. Development of mobile data usage per SIM 1H 2022-1H 2023

Our newly added market, **Cyprus**, had the fastest growth in mobile data. With **123%**, Cyprus beats all other markets comfortably. Cyprus was, until recently, a low-usage market but a wide introduction of unlimited contracts has drastically changed the position of Cyprus. **Peru** is the number two in growth with 51% while **Portugal** is number three with 47%. **Iceland**, **Slovenia** and **Hong Kong** follow with 43-46%.

At the other end of the scale, we find three countries where the average mobile data usage declined:

- **Austria** is, as described, a special case due to the impact of international M2M SIMs. Thanks to the new reporting of the Austrian regulator, we should in our next update of this analysis be able to show also Austrian development figures excluding international M2M SIMs. If excluding M2M fully, Austria’s mobile data usage grew 17%.
- **Bahrain** where the mobile data usage declined also if excluding M2M SIMs.
- **China** where the number of M2M SIMs grew by 30% (to 2.1 billion) but slow growth in the data usage if excluding M2M SIMs, +12%, did not help.

Austria, Bahrain and China experienced a decline in its average mobile data usage.

Neither **Singapore**, **Mexico**⁷, **Ireland**⁸, **Norway**⁹ nor **South Korea** had impressive usage growth rates.

⁷ Q2 2023 not yet reported.

Data-only never more than 20% of base, but defines usage

Although **fixed wireless access** (FWA) experiences a renaissance with 5G in the US with the US MNOs collectively having recruited over 7 million FWA customers in the past three years (see our [excl-M2M analysis](#)), 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.

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

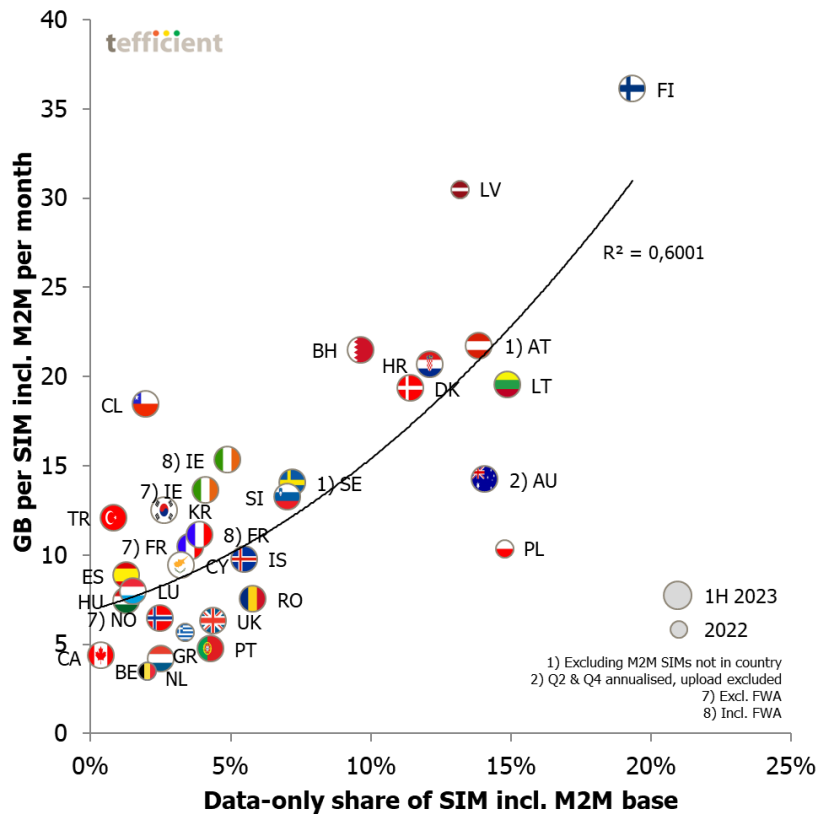


Figure 5. Mobile data usage vs. data-only share

In June 2023, **19%** of the SIM base in Finland was data-only. That makes **Finland** the leader in data-only share of base – and the average mobile data usage is also the highest. In **Lithuania**, data-only represented 15% of the base and the usage was lower than in Finland. **Poland** has an almost as high data-only share of

⁸ Excluding FWA traffic and FWA subscriptions.

⁹ Excluding FWA traffic and FWA subscriptions as FWA traffic not reported.

base but much lower overall usage. **Australia** had a high data-only share too – 14%. That percentage is the same for **Austria** when excluding international M2M SIMs. **Latvia**¹⁰ was at 13% in 2022.

The adherence to the regression line is 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. Figure 5 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 5 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 6.

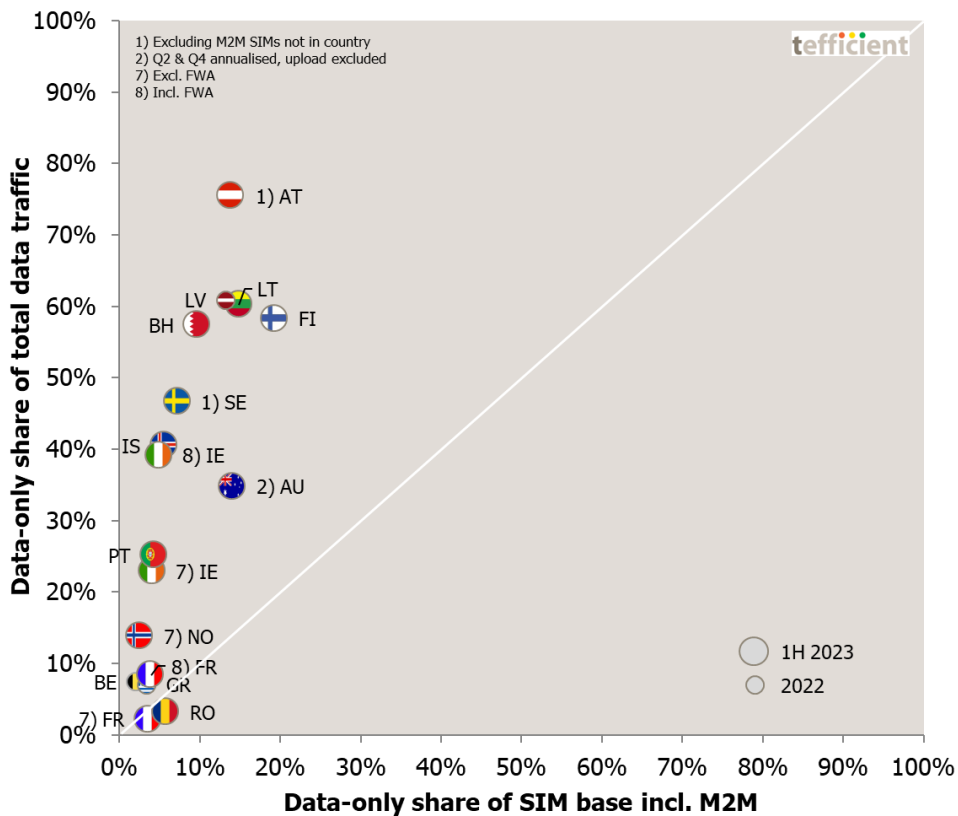


Figure 6. Data-only share of total traffic vs. data-only share of SIM base

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

- Ireland (incl. FWA) **8.0x** higher traffic per data-only SIM vs. any SIM

¹⁰ The Latvian regulator reduced its reported data-only base significantly in 2022.

- Iceland **7.3x**
- Sweden **6.5x**
- Bahrain **5.9x**
- Portugal **5.9x**
- Norway (excl. FWA) **5.5x**
- Austria (excl. international M2M SIMs) **5.4x**
- Latvia **4.6x**
- Lithuania **4.0x**
- Belgium **3.7x**
- Finland **3.0x**
- Australia **2.5x**
- France (incl. FWA) **2.1x**
- Greece **2.1x**
- Romania **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 7.

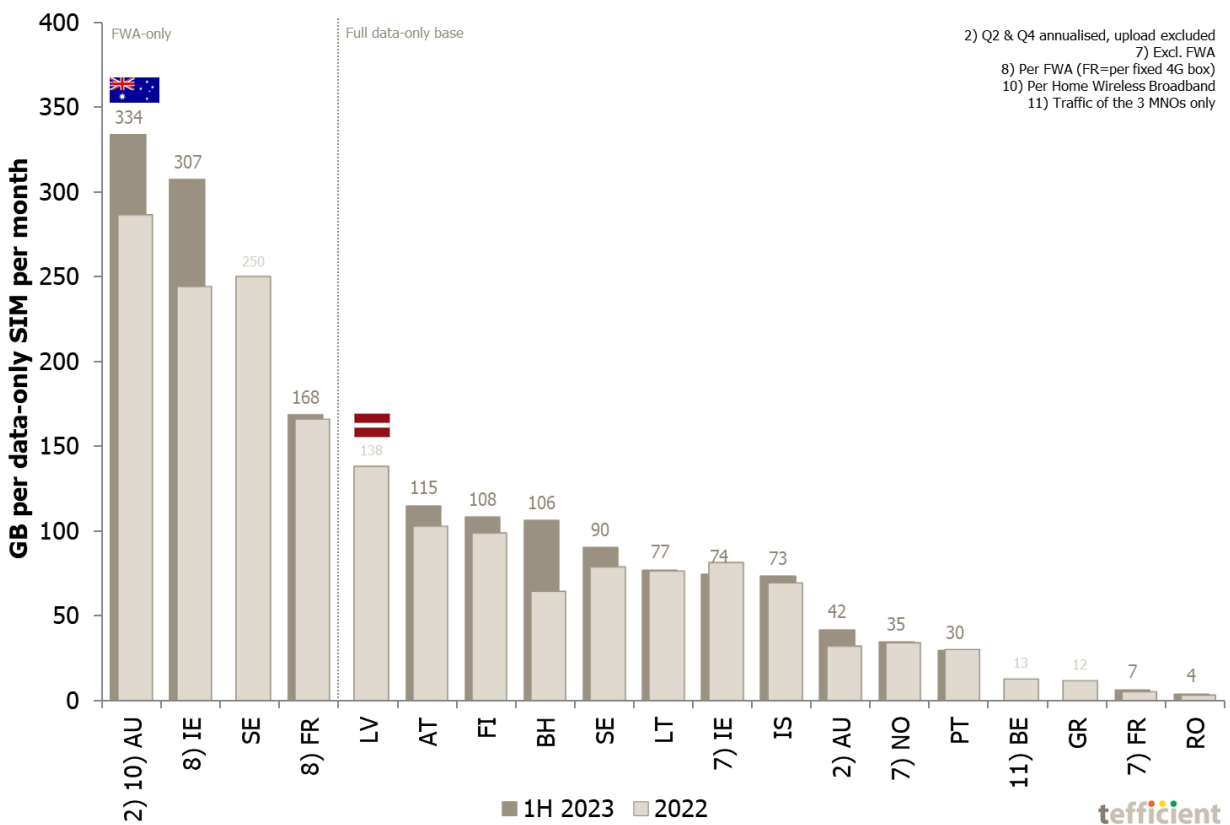


Figure 7. Mobile data usage per data-only SIM per month, 1H 2023 and full year 2022

Starting from the left, the average Home Wireless Broadband subscription in **Australia** carried **334 GB** of mobile data per month in the first half of 2023. In **Ireland**, the average FWA subscription carried **307 GB** of mobile data per month. **Sweden** follows with 250 GB per month in 2022 (no number reported for 1H 2023). At the end of the short FWA-only top list, we have **France** where the average '4G box' carried **168 GB** of mobile data per month in 1H 2023.

If instead looking at the whole data-only base (not just the FWA segment), **Latvia** leads with an average mobile data consumption per data-only SIM of **138 GB** per month in 2022. **Austria** follows with 115 GB per month in 1H 2023. **Finland** had 108 GB and **Bahrain** 106 GB.

In comparison to our previous reports, there's not much dark grey on top of the full year 2022 light grey bars which shows that for most markets, there was little usage growth in the first half of 2023. In two cases – Ireland (excl. FWA) and Portugal – the average data-only usage was even decreasing.

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

The average Latvian data-only subscription consumed 138 GB per month in 2022.

Unlike data-only, 5G adoption isn't an obvious 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 8 tries to do the same for 5G.

There are a few issues:

- In many countries, regulators reporting 5G subscribers aren't reporting 5G traffic (Malaysia, Iceland, France, Chile, Croatia, Singapore, China, Slovenia, Hong Kong, Japan and USA).
- In India, Spain and the UK, regulators report 5G traffic, but not 5G subscribers.
- The definition of what a 5G subscriber is differs.

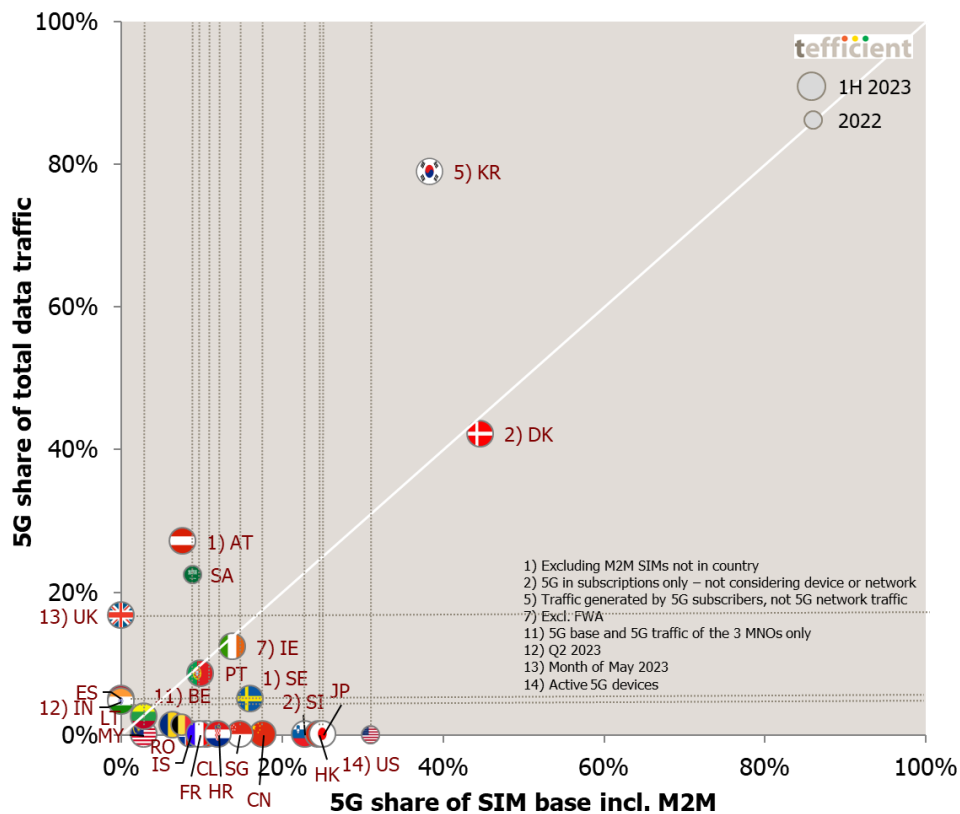


Figure 8. 5G share of total traffic vs. 5G share of SIM base


With these difficulties, it's hard to be firm on the conclusion on 5G, but Figure 8 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, Austria and South Korea** – but there are more countries below the line: Lithuania, Romania, Belgium, Portugal, Ireland, Sweden and Denmark. If we compare to Figure 6 – the data-only graph – the difference is clear. Whereas data-only drives data traffic, 5G doesn't seem to.


Why not? One obvious explanation is **coverage** (or rather lack thereof). 5G subscribers with 5G devices need 5G coverage to generate 5G traffic and while 5G coverage is being rolled out, 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. Regretfully 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.

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

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 8 – where 5G's share of traffic is higher than 5G's share of subscriptions – is 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. An early example of that is **3 in Austria**, see Figure 9.

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 Bis zu 1000 Mbit/s
mit Bandbreiten-Garantie.

Unlimitiertes Datenvolumen mit Glasfaser oder als ultraschnelles 5G+ Internet mit Bandbreiten-Garantie und leistungsfähigem WLAN-Router. Der Clou bei diesen Tarifen: Sobald Glasfaser an Ihrer Adresse verfügbar ist, können Sie im selben Tarif auf die neue Technologie umsteigen – auch innerhalb Ihrer Mindestvertragsdauer und ganz ohne Wechselkosten.

FIX Data 150	FIX Data 250	FIX Data 500	FIX Data 1000
<p>Unlimitiertes Datenvolumen</p> <p>↓ Download max. 150 Mbit/s ↑ Upload max. 20 Mbit/s</p> <p>Erhältlich als</p> <p>5G+ Mobilfunk</p>	<p>Unlimitiertes Datenvolumen</p> <p>↓ Download max. 250 Mbit/s ↑ Upload max. 100 Mbit/s</p> <p>Erhältlich als</p> <p>5G+ Mobilfunk Glasfaser</p>	<p>Unlimitiertes Datenvolumen</p> <p>↓ Download max. 500 Mbit/s ↑ Upload max. 100 Mbit/s</p> <p>Erhältlich als</p> <p>5G+ Mobilfunk Glasfaser</p>	<p>Unlimitiertes Datenvolumen</p> <p>↓ Download max. 1000 Mbit/s ↑ Upload max. 250 Mbit/s</p> <p>Erhältlich als</p> <p>Glasfaser</p>
<p>29,98 €* / Monat</p> <p>Adresse prüfen</p> <p>Details zum Tarif</p>	<p>35,57 €* / Monat</p> <p>Adresse prüfen</p> <p>Details zum Tarif</p>	<p>45,73 €* / Monat</p> <p>Adresse prüfen</p> <p>Details zum Tarif</p>	<p>73,65 €* / Monat</p> <p>Adresse prüfen</p> <p>Details zum Tarif</p>
<p>Im Unlimited Mix</p> <p>26,99 €* /Mon.</p> <p>Preis inkl. 70€ Weihnachts-Bonus</p>	<p>Im Unlimited Mix</p> <p>32,01 €* /Mon.</p> <p>Preis inkl. 80€ Weihnachts-Bonus</p>	<p>Im Unlimited Mix</p> <p>41,16 €* /Mon.</p> <p>Preis inkl. 100€ Weihnachts-Bonus</p>	<p>Im Unlimited Mix</p> <p>66,29 €* /Mon.</p> <p>Preis inkl. 150€ Weihnachts-Bonus</p>

Figure 9. The premium broadband offering of 3 Austria – 5G+ (=5G stand-alone) and fibre

If selecting the bandwidth guarantee (Bandbreiten-Garantie) option, 3 Austria states that the **guaranteed download speed** of the connection is 50% of the stated maximum speed. For the FIX Data 500 option with a maximum download speed of 500 Mbit/s, the guaranteed download speed is then 250 Mbit/s.

The other country in Figure 8 that successfully has been able to drive 5G share of traffic faster than 5G share of base is **South Korea**. The explanation here isn't FWA (not offered) but rather a massive rollout of 5G base stations coupled with an initially intense sales activity from the MNOs promoting data-rich or unlimited 5G plans.

The new South Korean government has since it came to power in 2022 however focussed on bringing down living costs and has pushed South Korea's MNOs to introduce cheaper 5G plans – with less data. In 2023, it also agreed with the MNOs to allow users of 5G handsets to subscribe to LTE plans (and vice versa) which could provide users with new saving possibilities. The government also revoked the mmWave 5G frequencies rewarded to SK Telecom, KT and LG U+ as none of the MNOs had fulfilled the rollout requirement. In November 2023, it opened a tender for this spectrum, making it technically possible for a 4th MNO to establish itself in South Korea.

All this seems to have had a negative effect on the progress of 5G in South Korea. As shown in Figure 10, neither the 5G subscription base nor the 5G share of traffic develops as quickly as in the past. But make no mistake, South Korea is still the global 5G leader.

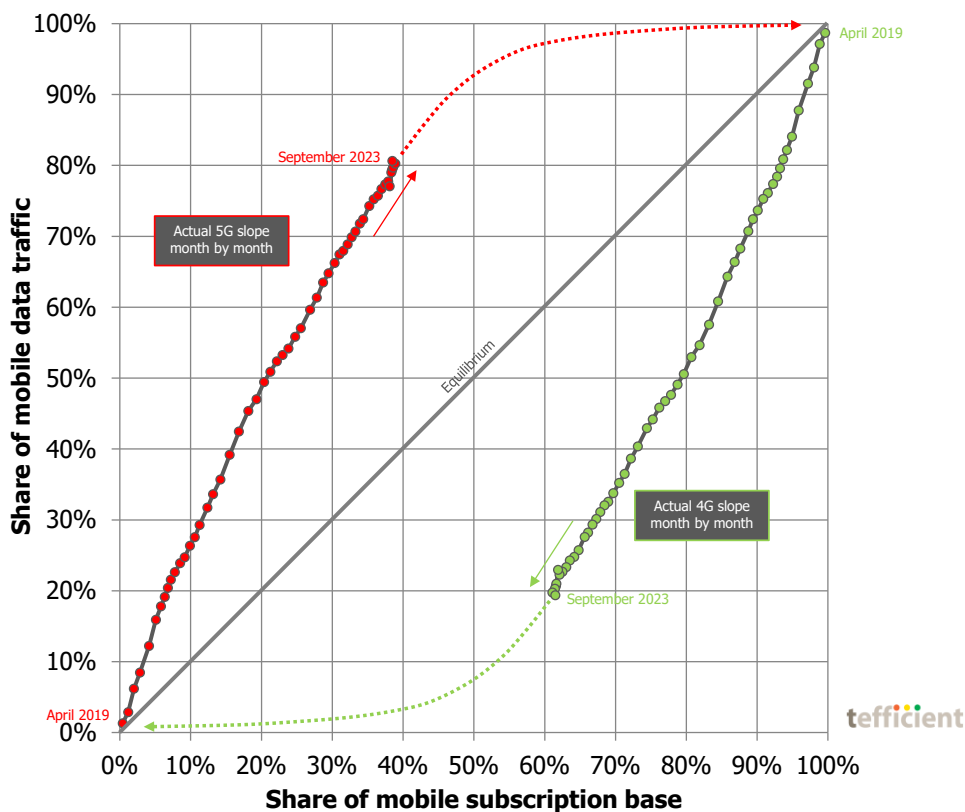


Figure 10. 5G share of total traffic vs. 5G share of SIM base and 4G share of total traffic vs. 4G share of SIM base – Korea per month since 5G launch

In September 2023, **81%** of the mobile data traffic in South Korea was consumed by 5G subscribers. 5G represented 38% 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 September 2023 are:

- 5G: **28.5** GB per month
- 4G: **7.5** GB per month

Although 4G still represents 59% of the mobile subscriber base in South Korea, these 4G subscriptions only consume 18% of the mobile data traffic – as shown by the latest green dot in Figure 10.

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 South Korea: In September 2023, the average unlimited 5G subscription consumed **49.9 GB** whereas the average unlimited 4G subscription used much less – **25.9 GB**.

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 plan¹¹ – which means that price still, essentially, is about data volume.

Figure 11 plots the *total* mobile service revenue per consumed gigabyte¹² against the average mobile data usage per SIM and month.

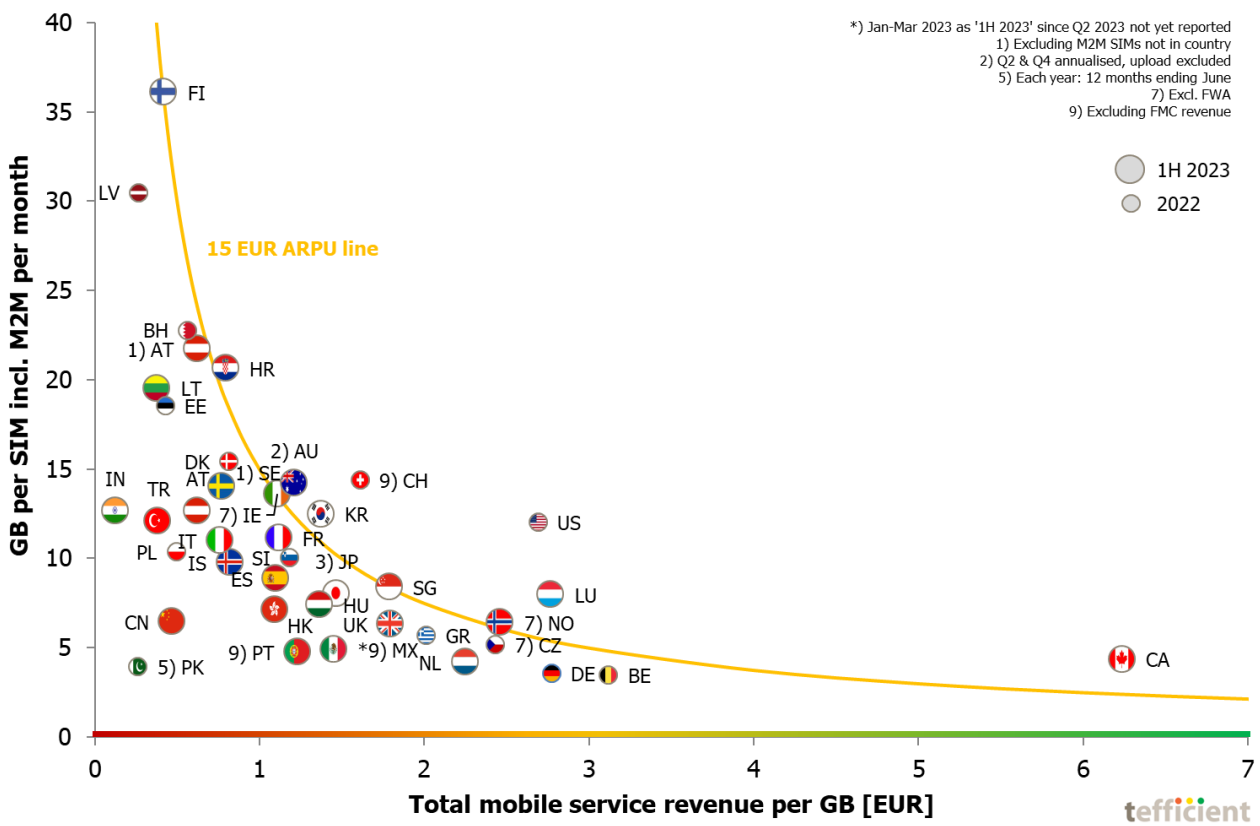


Figure 11. Mobile data usage vs. total mobile service revenue per consumed GB

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.

¹¹ 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 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.

¹² Attributing zero value to voice and messaging.

With New Zealand not being in this including-M2M analysis¹³ (due to lack of M2M reporting), **Canada** 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 without being as extreme as Canada: **Belgium, Germany, Luxembourg, Norway**¹⁴ and **Czechia**¹⁵. **USA** should also be mentioned: The average mobile data usage is relatively high, but the revenue per GB is still high.

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, Pakistan, Latvia, Lithuania, Turkey, Finland, Estonia, China** and **Poland**.

Looking at Figure 11 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 5.

Indian operators have the lowest total revenue per GB – Canadian 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 countries but **Turkey**. Figure 12 shows the revenue development from 1H 2022 to 1H 2023.

¹³ New Zealand is in the excluding-M2M analysis, though: <https://tefficient.com/data-only-drives-traffic-the-same-cant-be-said-for-5g/>.

¹⁴ FWA not included in the revenue nor the data traffic due to FWA data traffic not in the reporting of the regulator, Nkom.

¹⁵ FWA not included in the data traffic due to the reporting of the regulator, CTU. It's not clear if FWA revenue is included or excluded.

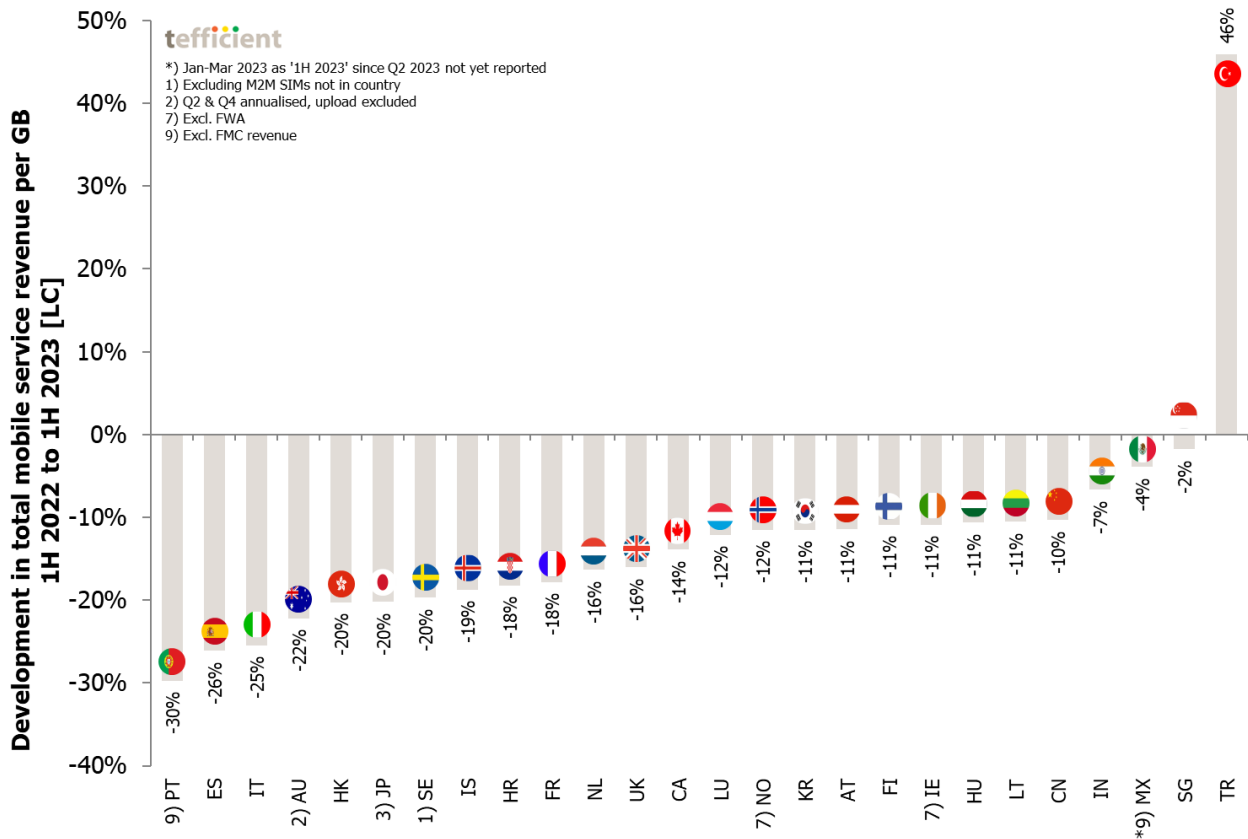


Figure 12. Development in total mobile service revenue per consumed GB – 1H 2022 to 1H 2023

The prerequisite to appear in Figure 12 is of course that the statistics have been reported both for 1H 2022 and 1H 2023. Of these markets, **Portugal** had the fastest revenue erosion, 30%. **Spain** had 26% while Italy had 25%.

In **Turkey**, the revenue per GB **increased with 46%** - in local currency – between 1H 2022 and 1H 2023. But where inflation increased in the world in 2022, Turkey had *hyperinflation*: It was 72% in 2022, making Turkey an outlier among our markets. The Turkish inflation lowered in 2023 – in Q2 2023 it was 40% – but the Turkish MNOs have some catching up to do.

Markets with a slow erosion in the revenue per GB are **Singapore, Mexico and India**.

No correlation between data usage and ARPU

Figure 13 is a variant of the revenue per GB chart – it plots the usage against the average revenue per SIM, i.e. the ARPU.

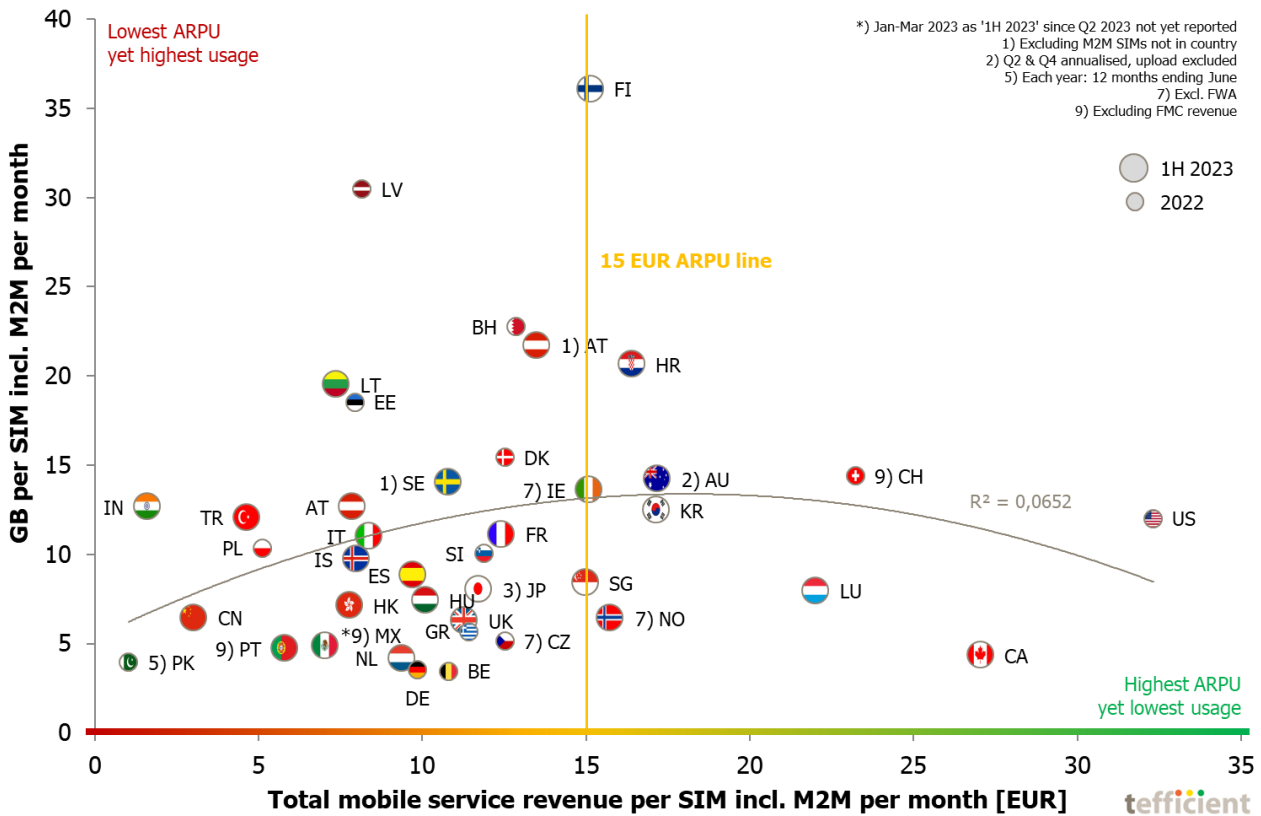


Figure 13. Mobile data usage vs. total mobile service revenue per SIM

USA has the highest ARPU among our markets, followed by **Canada**. The mobile data usage is quite decent in the US but not at a very high level if considering the high ARPU. The mobile data usage increases quite slowly in Canada (+13%) but is still very low given the high ARPU. **Switzerland** and **Luxembourg** are the only two countries relatively close to Canada and the US in Figure 13.

Operators to the upper or left – **Finland, Latvia, Lithuania, Estonia, India, Turkey, Poland, China** and **Pakistan** – 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 which we continue to be so proud of. It's the graph were 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.

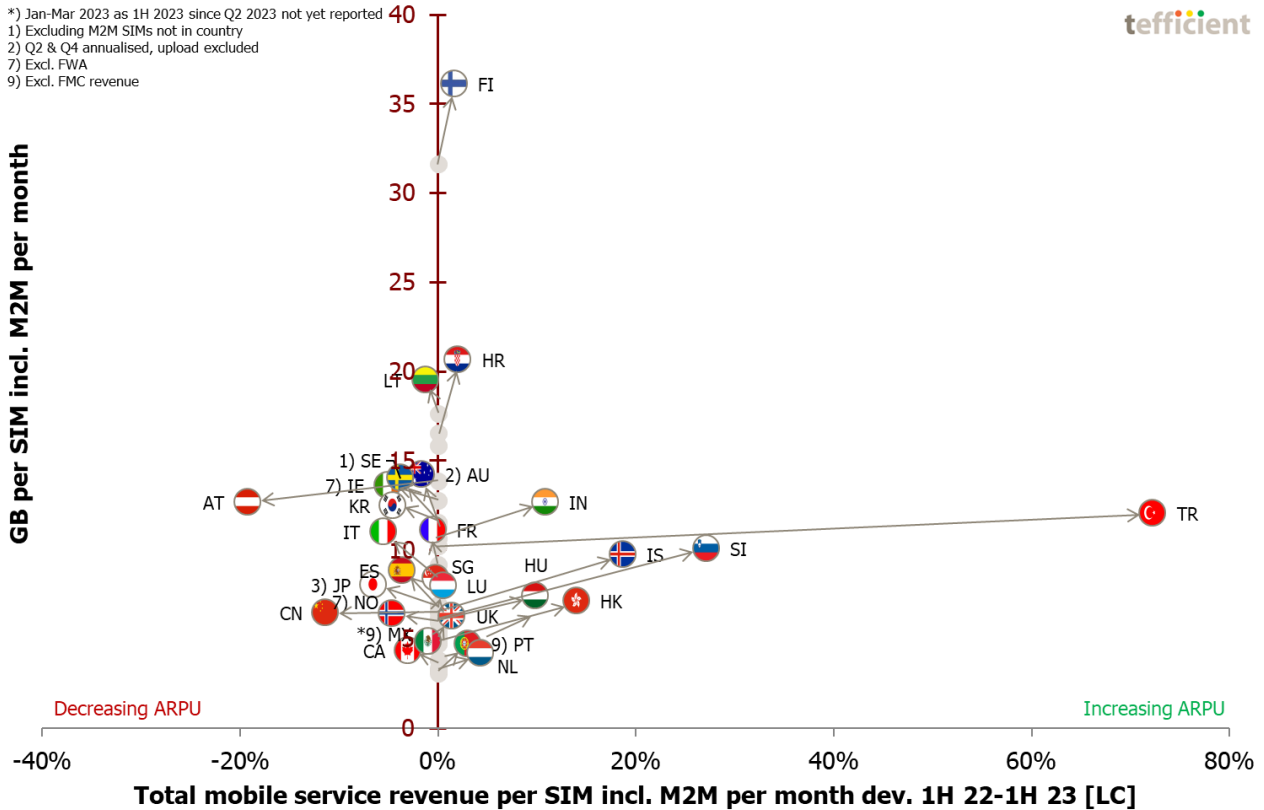


Figure 14. Development in mobile data usage vs. the development in ARPU – 1H 2022 to 1H 2023

The branches stretch right in **12 of 27 markets**¹⁶ (44%). These are – from the top – **Finland, Croatia, India, Turkey, Slovenia, Iceland, Luxembourg, Hungary, Hong Kong, the UK, Portugal and the Netherlands**. In 15 markets (56%), the branches stretch left meaning that even though data usage generally grew, ARPU fell. This time, the ARPU erosion in **Austria**¹⁷ is the fastest; 19%. **China** follows with 11%. Both countries had fast expansion of their M2M SIM bases.

The 1H 2023 Christmas tree represents a slight improvement compared to our [2022 report](#). A larger share of countries is now to the right.

¹⁶ The 27 markets for which regulators/operators have reported the necessary underlying stats to date.

¹⁷ Including international M2M SIMs. Excluding them can't yet be done as the regulator started to report international M2M SIMs in the 2nd half of 2022. If excluding M2M SIMs entirely, Austrian ARPU grew 4%.

While this might be comforting, we should remember that **inflation** ravaged during these twelve months. As shown in our [excluding-M2M analysis](#), the ARPU growth in very few countries could compensate for inflation.

When comparing the Christmas tree graph including M2M with that excluding M2M – see them side-by-side below – it's clear that it **looks better when excluding M2M**. 73% of the markets are then to the right. This means that the continued expansion in the number of M2M SIMs worsens the overall ARPU trends – compared to how the trends would be if not doing M2M.

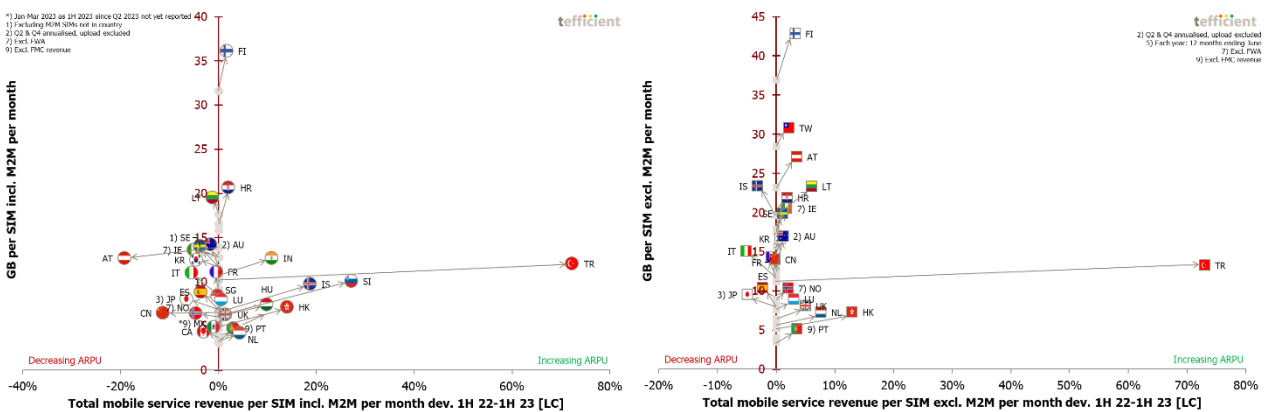


Figure 15. Development in mobile data usage vs. the development in ARPU – left including M2M, right excluding M2M

The **human customers of operators currently seem to subsidise M2M/IoT customers** who don't contribute to ARPU growth.

While many operators have implemented **CPI¹⁸-driven price increases** for its human customer base, this seems not to happen in M2M. The M2M subscription base is generally growing much faster than the associated revenues, see Figure 16.

Human customers of operators currently seem to subsidise M2M/IoT customers.

¹⁸ Consumer price index

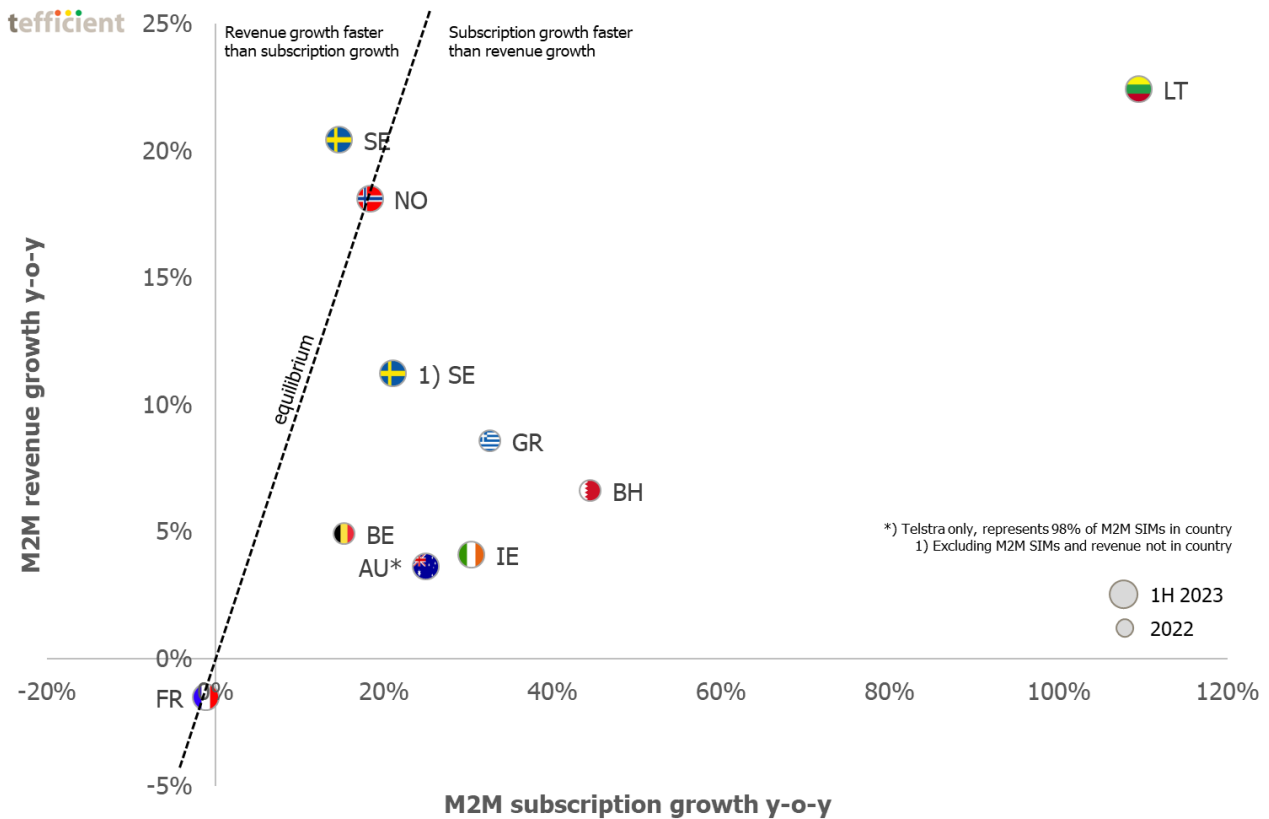


Figure 16. Development in M2M subscriptions vs. the development in M2M revenue – for reporting countries

Of the ten cases where regulators report both M2M revenue and M2M subscriptions, we note that just one case – Sweden if including international M2M – had faster growth in M2M revenue than in M2M subscriptions. Two countries, Norway and France, are on the equilibrium line between M2M revenue and M2M subscriptions.

For all the remaining country positions, **M2M subscription growth outpaces the growth in M2M revenue**. It doesn't just dilute the M2M ARPU: As the M2M subscriber base grows, it dilutes the overall ARPU and affects the total ARPU development negatively. It pushes countries towards the left in the Christmas tree graph in Figure 14, eventually making them end up on the wrong side of it.

M2M subscriber growth outpaces M2M revenue growth.

Is it time to apply the same business targets to operators' M2M/IoT business as to its human connectivity business?

Conclusion

In our latest analysis solely focused solely on mobile data usage and revenues including M2M, **usage growth prevailed in 44 of the 47 markets**, with **Austria, Bahrain** and **China** being exceptions.

Finland leads the charts with 36.1 GB per average SIM per month in 1H 2023. Despite **72%** of SIMs being **unlimited**, data usage growth rate was relatively slow in Finland at 14%, while **Cyprus** exhibited remarkable growth at 123%. In absolute terms, Cyprus even outpaced Finland, with data usage growing by 5.2 GB compared to 4.5 GB.

Our analysis reveals a strong correlation between the **data-only share** of a country's SIM base and the average data usage. **Finland, Lithuania, Australia, Austria, Poland** and **Latvia** emerge as the data-only powerhouses of the world.

While 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** have disproportionately high 5G traffic. A lack of 5G coverage emerged as a plausible explanation for the limited impact of 5G elsewhere.

Across technologies, 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 **India, Pakistan, Latvia, Lithuania, Turkey, Finland, Estonia, China and Poland** exhibit this characteristic, while **Canada** represents the opposite end of the spectrum.

Despite variations in data usage, market ARPU does not consistently correlate with usage levels. **Canada** and the **USA** boast higher ARPU without particularly high usage.

In 15 of 27 markets, ARPU couldn't grow on the back of data usage growth. Although representing a slight improvement, this outcome is disappointing, especially given the inflationary backdrop. The result is worse than in our exclusive-M2M analysis.

M2M/IoT customers do not contribute to the ARPU growth of operators in a similar way as human customers do. We conclude that **human customers currently seem to subsidise M2M/IoT customers** and wonder why.