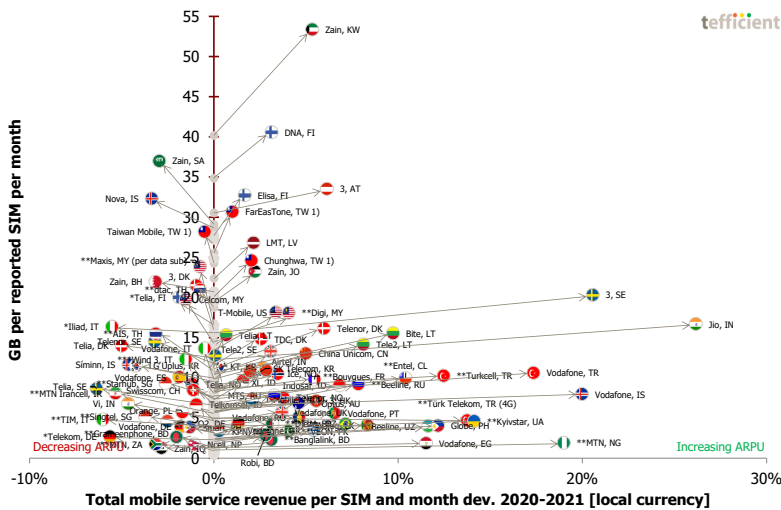


Industry analysis #2 2022 – updated 9 September

Mobile data – full year 2021 and first half of 2022

ARPU improved when data usage growth slowed down

Timely; inflation knocked on the door shortly after



tefficient Tefficient’s 34<sup>th</sup> public analysis on the development and drivers of mobile data ranks 104 operators based on average data usage per SIM, total data traffic and revenue per gigabyte in the full year of 2021 and in the first half of 2022.

In 2021 – a year marked by COVID – the data usage per SIM grew for 97% of operators. The average traffic growth was 32%. A majority of operators, 62%, could turn data usage growth into ARPU growth.

In the first half of 2022, the data usage per SIM grew for 98% of operators. The average annual growth rate in traffic slowed to 27%. But 61% of operators could still turn data usage growth into ARPU growth.

Our famous Christmas tree graphs show how ARPU improved after COVID restrictions were lifted – although usage growth slowed down. In many markets, operators became more rational and started to use their pricing power at the end of 2021.

When the world suddenly faced a quickly rising inflation rate in the spring of 2022, this trend shift became even more important. Operators are lucky to have started the journey towards an improved monetisation of mobile data already before inflation knocked on the door.



## Half of the operators now above 10 GB per SIM per month

Figure 1 shows the average mobile data usage for 104 reporting or reported<sup>1</sup> mobile operators globally with values for the full year of 2021 or the first half of 2022.

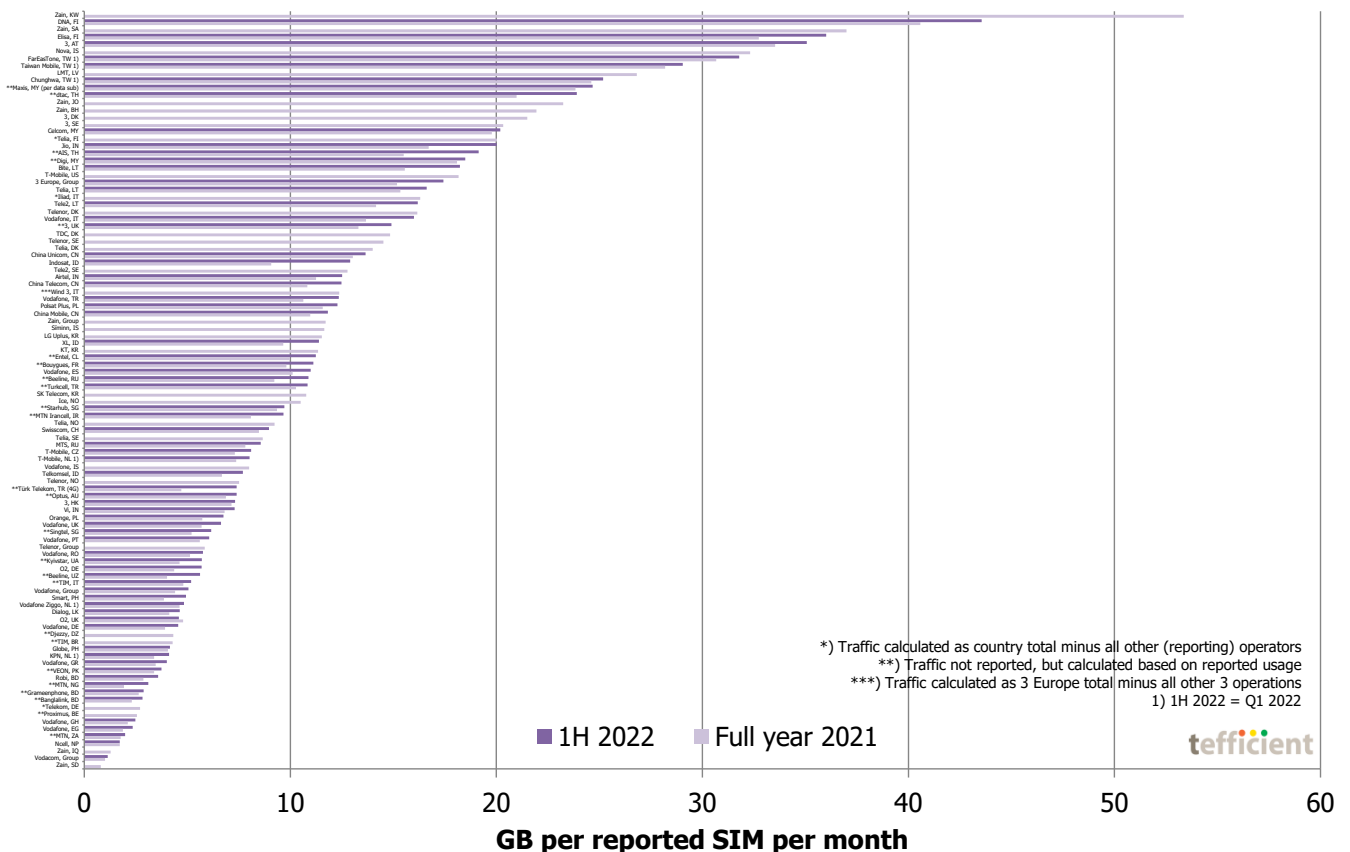


Figure 1. Average data usage per reported SIM per month – all operators

As it's not easy to read Figure 1 we will break it down into three regions of the world, but let's first identify the **global data usage podium** – see Figure 2.

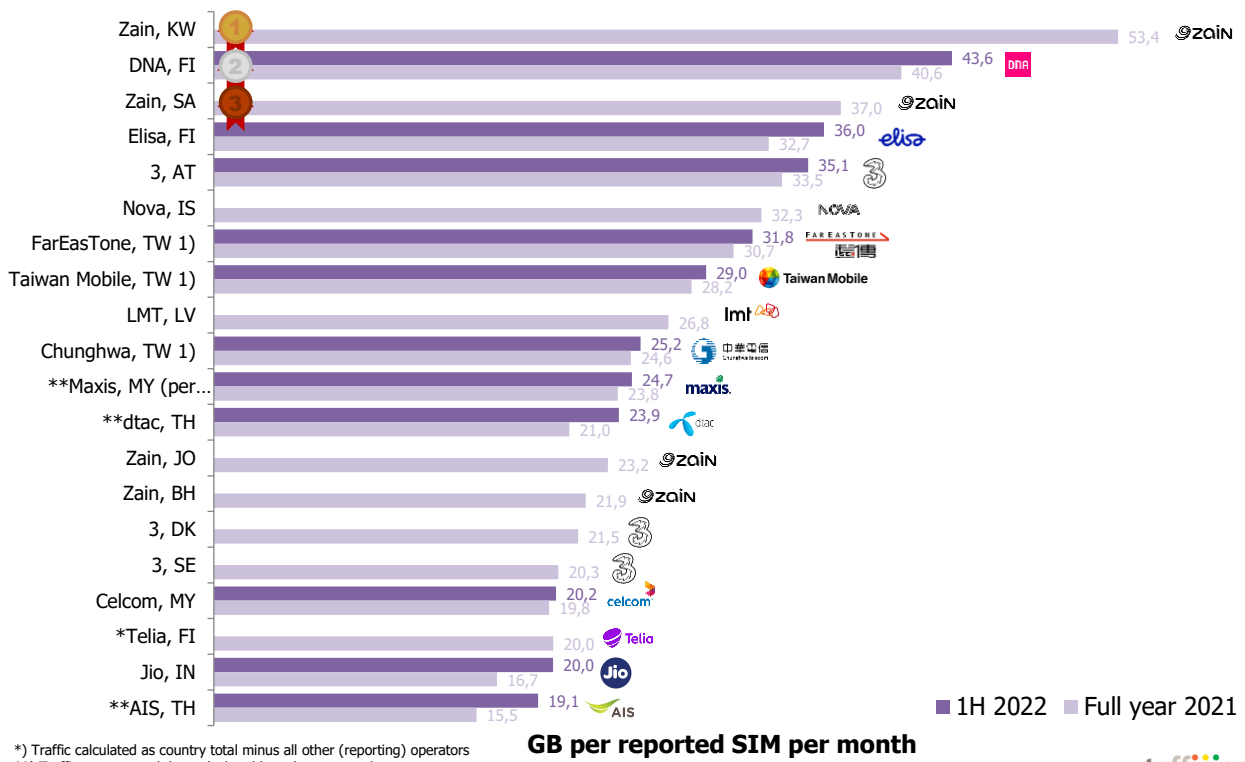


**Zain** Kuwait defends the gold medal from our [analysis for 2020](#). Zain doesn't report mobile data traffic more than once a year, so the latest value is for 2021. Zain Kuwait's impressive **53.4 GB** per average SIM per month in 2021 quite comfortably grants it the number one position of the world. Zain launched **5G** in June 2019 and claimed 100% population coverage by end of 2021 with more than 2000 of Zain's 2738 sites being equipped with 5G. The high usage comes from Zain selling smartphone plans with massive buckets – with **unlimited** as the ultimate tier. But Zain is also offering **5G fixed routers** with unlimited data volume whose popularity might explain some of the 25% traffic growth Zain Kuwait had in 2021.

<sup>1</sup> By regulators – if reported by 1 September 2022

**DNA** With **43.6 GB** per month in the first half of 2022, **DNA** from Finland again grabs the silver medal. **Unlimited, speed-tiered, plans** – both for smartphones and data-only – form a key component of the Finnish market logic. DNA doesn't report how large share of its customer base that has unlimited plans, but for Finland as a whole, that share was **82%** of non-M2M SIMs in December 2021. The Finnish operators all launched **5G** in 2019 and DNA claimed 70% 5G population coverage in June 2022.

**zain** **Zain** Saudi Arabia wins the bronze medal this time with **37.0 GB** per month in 2021. Zain launched **5G** in 2019 and claimed 63% population coverage by end of 2021 with 4805 of Zain's 10003 sites being equipped with 5G. The high usage comes from Zain selling smartphone plans with large buckets – with **unlimited** as the ultimate tier. Just like in Kuwait, Zain is also offering **5G home routers** with unlimited data volume but in Saudi Arabia these are offered with speed tiers: 100, 200 Mbit/s and maximum speed. Zain Saudi Arabia had 31% traffic growth in 2021.



\*) Traffic calculated as country total minus all other (reporting) operators  
 \*\*) Traffic not reported, but calculated based on reported usage  
 1) 1H 2022 = Q1 2022

GB per reported SIM per month

Figure 2. Average data usage per reported SIM per month – top 20 operators

Below the podium we find **Elisa** from Finland as number four with 36.0 GB per month in the first half of 2022. Previous bronze medallist **Drei (3)** from Austria is fifth with 35.1 GB. **Nova** from Iceland is ranked sixth with a regulator-reported 32.3 GB for 2021. The Taiwanese operator **FarEasTone** follows with 31.8 GB

per month in the first quarter of 2022<sup>2</sup> – shadowed by **Taiwan Mobile** with 29.0 GB. Latvia's **LMT** is number nine. The top ten ends with **Chunghwa** from Taiwan.

The rest of Figure 2 consists of Thailand's **dtac** and **AIS, Zain** Jordan & Bahrain, **3** Denmark and Sweden, Malaysia's **Maxis**<sup>3</sup> and **Celcom, Telia** Finland and India's **Jio**.

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<sup>2</sup> Taiwan's regulator has not yet reported Q2 2022

<sup>3</sup> Maxis's usage is per data subscription: Maxis no longer reports the number of data subscriptions, so Maxis's usage number is likely slightly exaggerated vs. the local peers

**Europe: Nordic & Baltic operators and '3' dominate the top**

Now to the first of three breakdowns: Europe. The number 2, 4 and 5 of the world, **DNA**, **Elisa** (both from Finland) and **Drei** (3) Austria, make up the European podium.

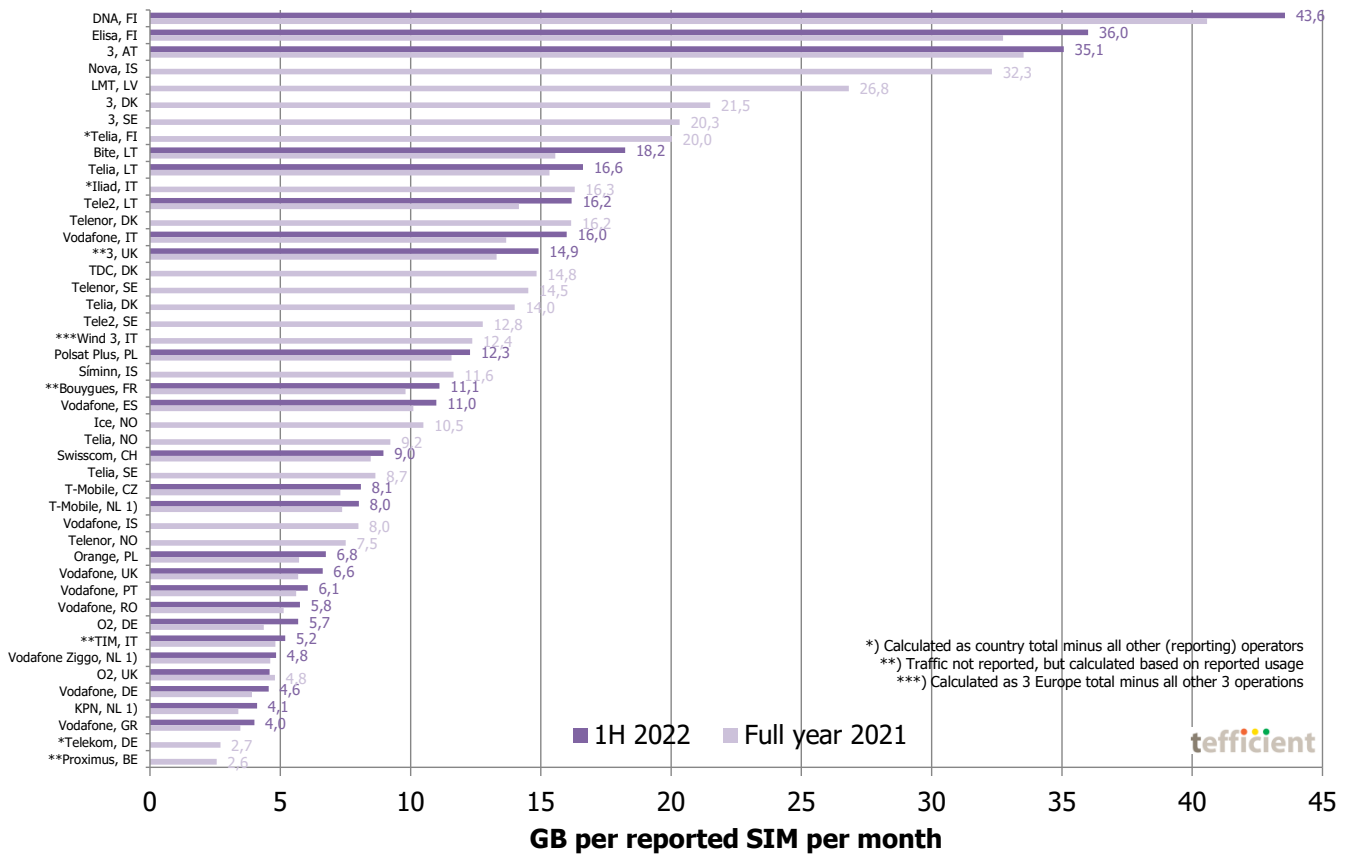


Figure 3. Average data usage per reported SIM per month – European operators

Iceland’s **Nova** is ranked as number four based on a figure for 2021. **LMT** from Latvia is number five. **3** Denmark is number six (with a 2021 value) followed by **3** Sweden. **Telia** from Finland is number eight. Since Telia doesn’t report its mobile data traffic, we have assigned the country residual to Telia (after having deducted Elisa’s and DNA’s reported traffic). The Lithuanian operators **Bite** and **Telia** finish the European top ten.

The bottom four operators are from the low usage markets<sup>4</sup> of **Belgium** (Proximus), **Germany** (Telekom) **Greece** (Vodafone) and the **Netherlands** (KPN).

Who had the fastest usage growth in Europe?

<sup>4</sup> See our latest country data usage report: <https://tefficient.com/usage-growth-decelerates-after-covid-but-monetisation-improves/>



In 2021 it was **O2 Germany** with **53%** – from just 2.9 GB per month in 2020 to 4.4 GB per month in 2021. And in the first half of 2022, the y-o-y growth was still fast, **44%** (to 5.7 GB). O2 has always been standing in the shadow of the two original mobile operators Telekom and Vodafone in Germany, but O2 has gradually increased its generosity with data – first with endless, speed-throttled, data, then with **speed-tiered unlimited** data – while at the same time investing in the expansion and modernisation of its network (including 5G). In 2021, **Vodafone Greece** had even faster growth than O2 Germany, though: **67%**. Unlimited was generally introduced in the premium end of the Greek market in 2020.

<b>Fastest</b>	<b>1H 2022</b>	<b>2021</b>
O2, Germany	+44%	+53%
Vodafone, Greece	+41%	+67%
<b>Slowest</b>	<b>1H 2022</b>	<b>2021</b>
Drei (3), Austria	+3%	+10%

High-ranked **Drei (3) Austria** had the slowest usage growth in Europe in both 2021 (10%) and in the first half of 2022 (3%). A large share of the traffic carried by Drei are generated by home routers and it could be that fixed internet (although still with a low FTTH availability vs. rest of Europe) gained popularity in Austria during COVID. In Figure 4 we can see that 38% of the entire data traffic in Austria was carried by mobile networks in Q2 2020 (at the start of COVID) but that the share since was flat at 36%-37% until reaching 38% again in Q4 2021.

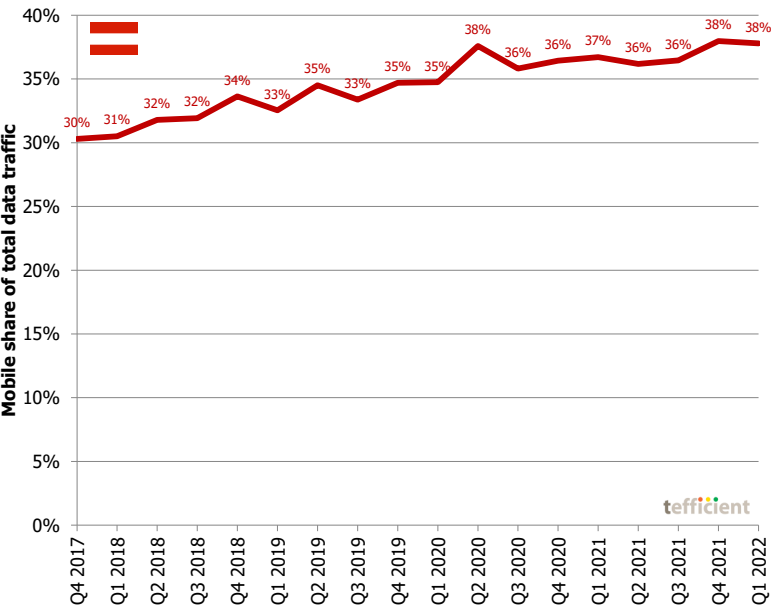


Figure 4. Austria: Development in the mobile share of total data traffic [source: Austria’s regulator RTR]

**Asia and China: Taiwan fills the podium – Malaysia challenged by Thailand & India**

As in our previous reports, the three Taiwanese operators **FarEasTone**, **Taiwan Mobile** and **Chunghwa**<sup>5</sup> hold the top three usage positions in Asia and China. A total of five operators offering cheap unlimited plans continue to drive Taiwan’s traffic although the operators finally seem to have become more rational with regards to pricing. **5G** was launched relatively late – in 2020 – but the operators have built coverage very fast. According to the latest global [5G Experience report](#) from Opensignal – issued in June 2022 – Taiwan ranks very high in download speed (with the highest peak download speed) and ranks almost as high as the well-known 5G leaders Kuwait, South Korea and Saudi Arabia in 5G Availability.

The rest of the top ten consist of Malaysia’s leading operators **Maxis**, **Celcom** and **Digi** together with Thailand’s **dtac** and **AIS**, India’s **Jio** and **China Unicom**.

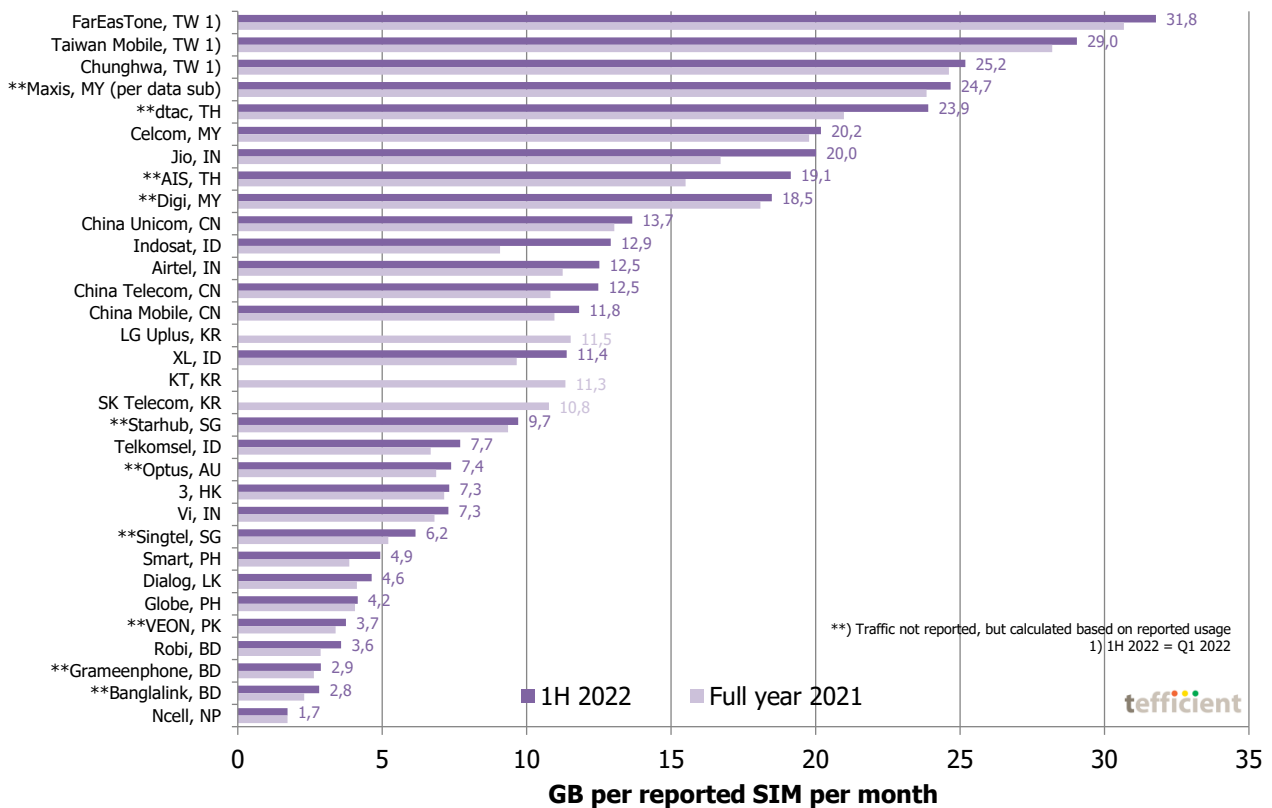


Figure 5. Average data usage per reported SIM per month – Asian and Chinese operators

Whereas 5G already is rolled out to a very high extent in Thailand and China, the 5G spectrum auction was just ended in India. In **Malaysia**, 5G rollout was delayed when the government decided to create a state-controlled wholesale company, Digital Nasional Berhad (DNB), who would be responsible for all 5G in

<sup>5</sup> The operators aren’t reporting their mobile data traffic themselves; it is being reported by the regulator with a certain delay. There are two other Taiwanese operators, T Star and Gt, but they are just reported together as ‘other’ and hence not shown here.

Malaysia. The mobile operators were instructed to take stakes in DNB but at present this [seems not to resonate](#) with all operators. This 5G hiccup has affected the mobile data usage growth in Malaysia: It is no longer as fast as it used to be.

The Asian/Chinese operators with the fastest and slowest annual growth in mobile data usage in 1H 2022 and 2021 are:

<b>Fastest</b>	<b>1H 2022</b>	<b>2021</b>
Grameenphone, Bangladesh	+71%	+48%
Banglalink, Bangladesh	+44%	+40%
Ncell, Nepal	+10%	+46%
<b>Slowest</b>	<b>1H 2022</b>	<b>2021</b>
Starhub, Singapore	+5%	+19%
Digi, Malaysia	+5%	+20%
3, Hong Kong	+6%	+14%
Taiwan Mobile, Taiwan	+6%	+14% <sup>6</sup>

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<sup>6</sup> From 1H 2021 to Q1 2022



**RoW: Zain dominates the top**

The rest of world ranking combines Latin American and Russian/CIS operators with operators from Middle East, Turkey, Africa and reporting international groups, see Figure 6.

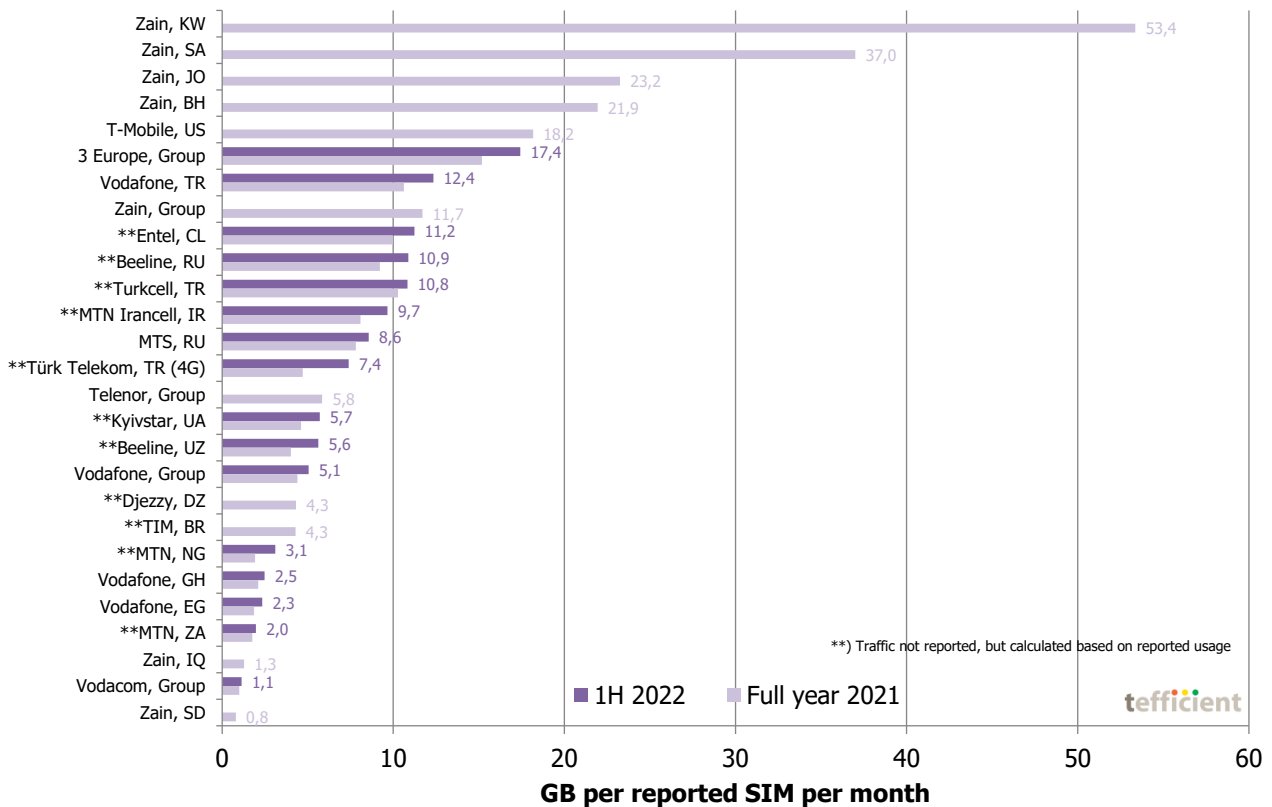


Figure 6. Average data usage per reported SIM per month – RoW operators

The world number 1, **Zain Kuwait**, obviously tops this chart too. Actually all of the top four operators are Zain operations. Zain Group is though just ranked as number eight, showing that two Zain operations, Iraq and Sudan, pull that group average down significantly. Two thirds of the subscriptions in Zain Group are in these two countries.

For many years there’s been no representation of North America in our operator report. The simple reason being that US and Canadian operators do not report their mobile data traffic or usage. But we finally managed to – via energy consumption figures in the annual corporate responsibility report – crack one of the three US carriers, **T-Mobile**<sup>7</sup>. Being the first operator to reintroduce unlimited into the US market, one can suspect that the average usage of a T-Mobile customer could be higher than that of Verizon and AT&T; T-Mobile’s mobile data usage per average subscription is calculated to be **18.2 GB** per month in 2021.

<sup>7</sup> The same can’t regretfully be done for AT&T and Verizon as they include also fixed network traffic in their energy KPIs

**3 Europe** Group is ranked as number six and it's easy to see why; in the European comparison (Figure 3), several operations of '3' are ranked high: Austria, Denmark, Sweden and the UK.

Turkish and Russian operators have relatively high usage and the growth is still there. Of the two Latin American operators, Entel has fairly high average usage whereas TIM has fairly low usage.

**African** operators are – together with Zain Iraq – having the lowest monthly data usage per SIM in our sample.

These are the RoW operators with the fastest and slowest growth in mobile data usage in 1H 2022 and 2021:

<b>Fastest</b>	<b>1H 2022</b>	<b>2021</b>
MTN, Nigeria	+76%	+88%
Beeline, Uzbekistan	+57%	+70%
Beeline, Russia	+30%	+62%
<b>Slowest</b>	<b>1H 2022</b>	<b>2021</b>
Turkcell, Turkey	+9%	+19%
MTN, South Africa	+13%	+42%
Zain, Iraq	n/a	-19%
Türk Telekom, Turkey	+29%	-7%
Zain, Sudan	n/a	-6%

Although growth rates generally slowed in 1H 2022 compared to 2021, there were three operators, Zain Iraq, Türk Telekom and Zain Sudan, who experienced a decline in the average mobile data usage in 2021.

## Traffic growth continued – but at a slower rate than during the pandemic peak

We have seen that the data usage varies much between customers of different operators in different countries. If we instead compare the total data traffic, the large population differences between the countries make the spread even wider, see Figure 7.

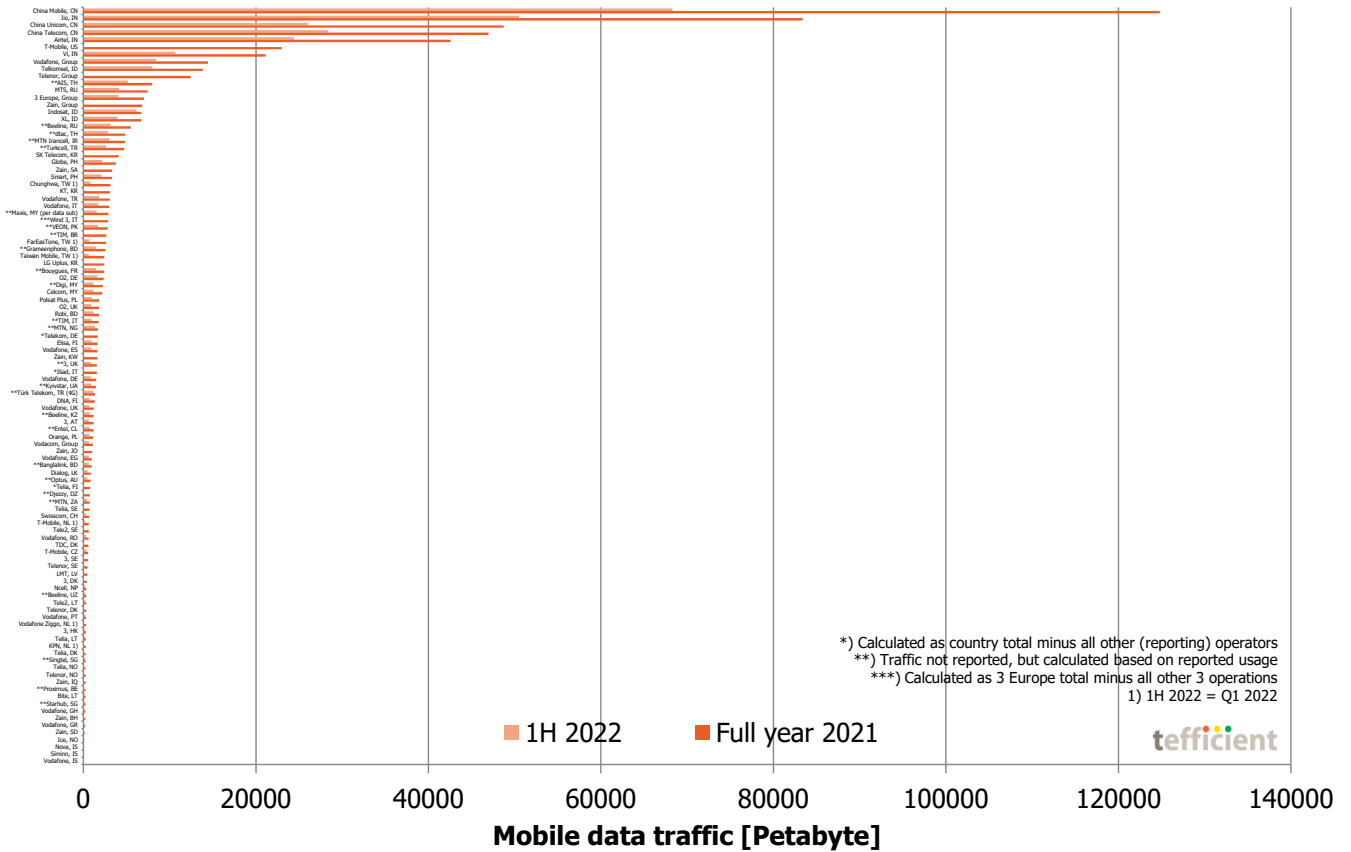
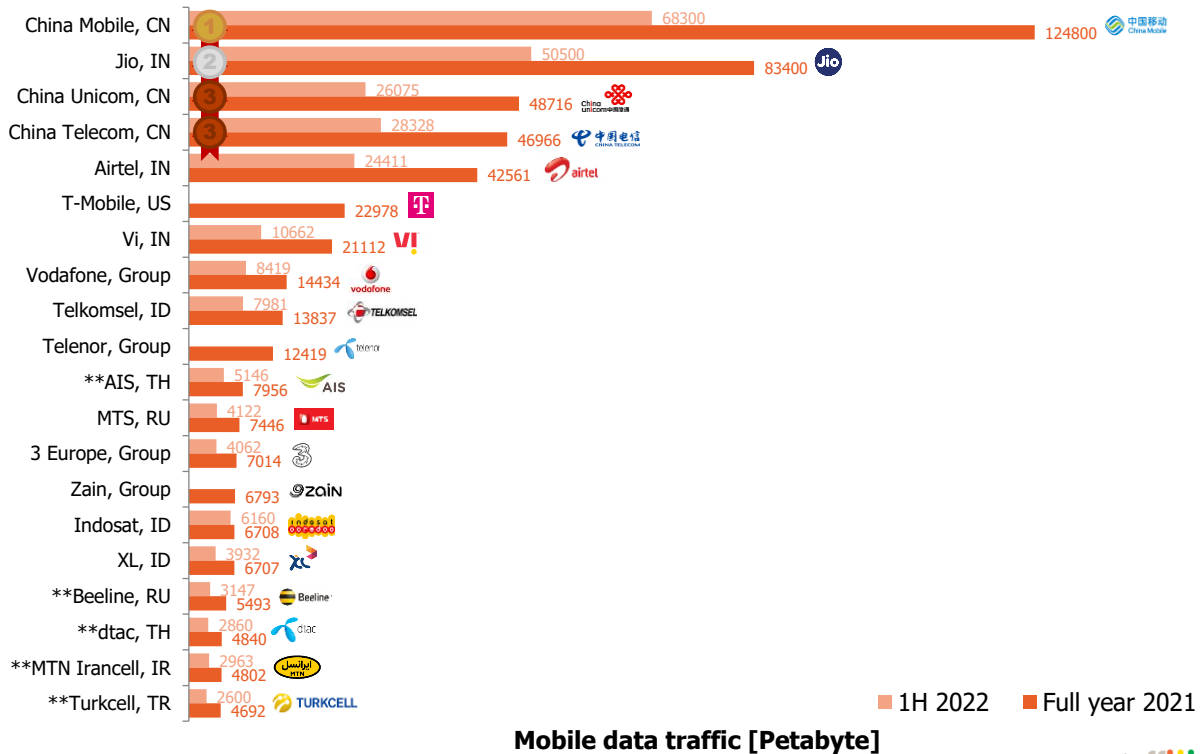


Figure 7. Total data traffic – all operators

As it's difficult to read Figure 7 we will in a bit break it down into the three regions of the world, but let's first identify the **global data traffic leaders** – see Figure 8.



Mobile data traffic [Petabyte]

\*\* Traffic not reported, but calculated based on reported usage

Figure 8. Total data traffic – top 20 operators



**China Mobile** had 970 million mobile subscribers in June 2022 (of which more than half, 511 million, are on 5G plans and 263 million are on its one-million-base-station 5G network) and is, by far, the largest operator in the world in mobile data traffic. Its total handset traffic grew **17%** from 1H 2021 to 1H 2022 (and 38% 2020 to 2021).



India’s **Jio** is the operator with the largest subscriber base in India – 420 million in June 2022. Jio’s data traffic growth in the year to June 2022 was **36%** (and 45% 2020 to 2021). In the first half of 2022, Airtel India had an annual traffic growth of **22%** whereas troubled Vi only had **3%**.



**China Unicom** is still the Chinese operator with the highest average usage per subscription. But in absolute traffic, Unicom lost the bronze medal to China Telecom in 1H 2022. The total handset data traffic of Unicom grew much slower than China Mobile’s and China Telecom’s: **13%** in the first half of 2022 vs. China Mobile’s 17% and China Telecom’s 30%.



China Telecom has, as just shown, the fastest traffic growth in China. It is also the Chinese operator with the largest share of its base on 5G plans.

We’d like to highlight that **T-Mobile USA** enters the global top list as number six, thereby breaking the Chinese-Indian dominance of the top by pushing Vi down to seventh position. If Verizon and AT&T would report their mobile data, they would likely be at a level similar to T-Mobile.

**Europe: Italy, France, Germany, Poland and the UK take the first eight positions**

First to the European breakdown: Since the highest ranked European operator is just number 28 in our global ranking, we could generally conclude that the European countries are less populated than the global leaders – but also that growth often is faster outside of Europe. And it’s not the operators that you necessarily would suspect (with the largest SIM base) that are in the top of Figure 9.

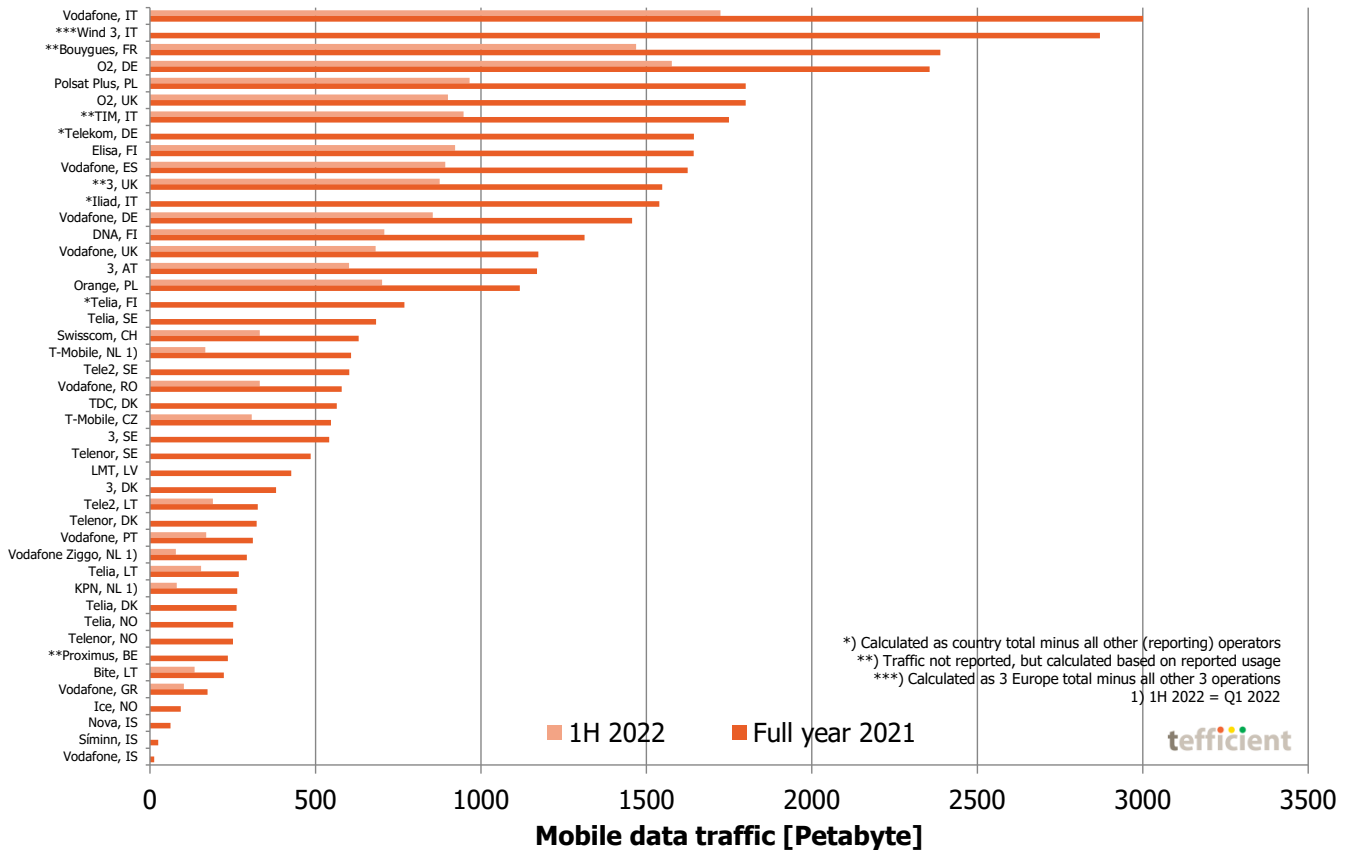


Figure 9. Total data traffic – European operators

Of reporting operators, **Vodafone** Italy is again Europe’s largest operator in total data traffic. Its competitor **Wind 3** is no longer reporting but based on our calculation<sup>8</sup> we believe Wind 3 is number two. Italy has had an explosion in mobile data usage ever since the new fourth operator, Iliad, launched 30 GB for 5.99 EUR in May 2018 – which all of competition copied.

<sup>8</sup> CK Hutchison has taken over the full ownership of Wind 3 and as it was their previous shareholder VEON that reported data usage, we miss input from Wind 3. In this analysis we have assigned the residual traffic of 3 Europe Group after having subtracted the calculated traffic of UK, Denmark, Austria, Sweden and Ireland to Wind 3.

The French operator **Bouygues** follows<sup>9</sup>. Following their previously described modernisation of mobile plans combined with an ambitious rollout and consequently an increase in data traffic, the German challenger, **O2**, is now number 4 in Europe<sup>10</sup>.

The Polish operator **Polsat Plus** is number five, **O2** UK number six and Italy's **TIM** number seven. **Telekom** is number eight. **Elisa** from Finland is number nine and the top ten ends with **Vodafone** Spain.

These are the European operators with the fastest and slowest growth in mobile data traffic in 1H 2022 and 2021:

<b>Fastest</b>	<b>1H 2022</b>	<b>2021</b>
O2, Germany	+49%	+56%
Vodafone, Greece	+46%	+61%
<b>Slowest</b>	<b>1H 2022</b>	<b>2021</b>
Drei (3), Austria	+2%	+8%
Swisscom, Switzerland	+7%	+14%

Of the operators with the slowest growth, we have already commented on Drei in Austria, but also Swisscom – one of Europe's first operators to deploy 5G – experienced slow traffic growth in 2022.

<sup>9</sup> Orange, SFR and Free could have been high ranked as well but aren't reporting data traffic or usage. Free used to do it but has regretfully stopped.

<sup>10</sup> Telekom has not reported mobile data traffic lately and has been assigned the country residual after having deducted O2 and Vodafone. If Telekom did report, they might have had a higher ranking.

**Asia and China: Substantial traffic growth in petabyte, but slowing growth rates**

We find the five global traffic leaders in the top of the Asian/Chinese comparison: **China Mobile, Jio, China Unicom, China Telecom** and **Airtel**. The annual growth rates have come down for these operators (13%-36%), but in absolute petabyte terms, the growth was still massive.

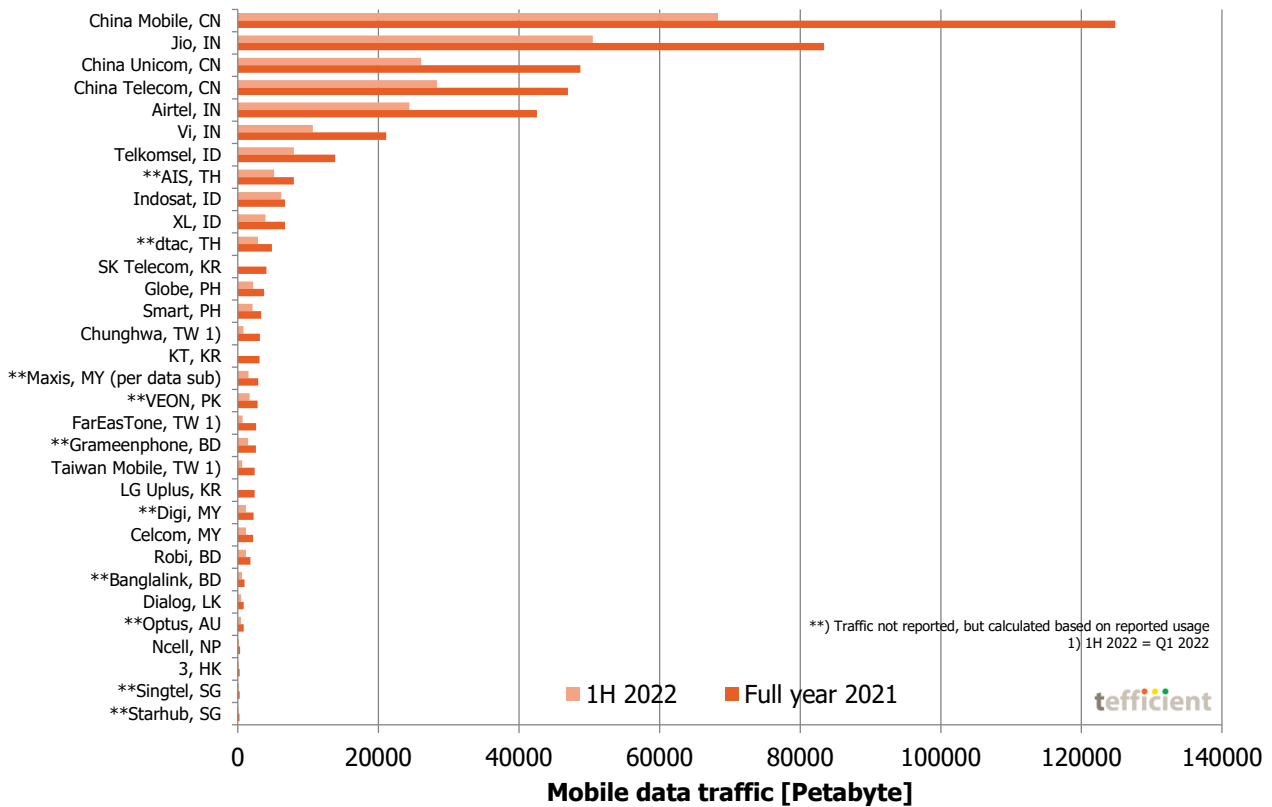


Figure 10. Total data traffic – Asian and Chinese operators

India’s **Vi** and the **Indonesian** operators (Telkomsel, Indosat<sup>11</sup>, XL) and the Thai operators **AIS** and **dtac** follow.

<sup>11</sup> Indosat and 3 merged in 2022 which explains why the 1H 2022 traffic almost is as large as Indosat (without 3) in the whole of 2021

These are the Asian/Chinese operators with the fastest and slowest growth in mobile data traffic in 1H 2022 and 2021:

<b>Fastest</b>	<b>1H 2022</b>	<b>2021</b>
Grameenphone, Bangladesh	+78%	+102%
Banglalink, Bangladesh	+52%	+70%
<b>Slowest</b>	<b>1H 2022</b>	<b>2021</b>
3, Hong Kong	+1%	+8%
Digi, Malaysia	+6%	+20%
Starhub, Singapore	+7%	+16%



**RoW: MTS larger than 3 Europe Group and Zain Group**

Figure 11 collects operators from the rest of the world, but also a few reporting international groups.

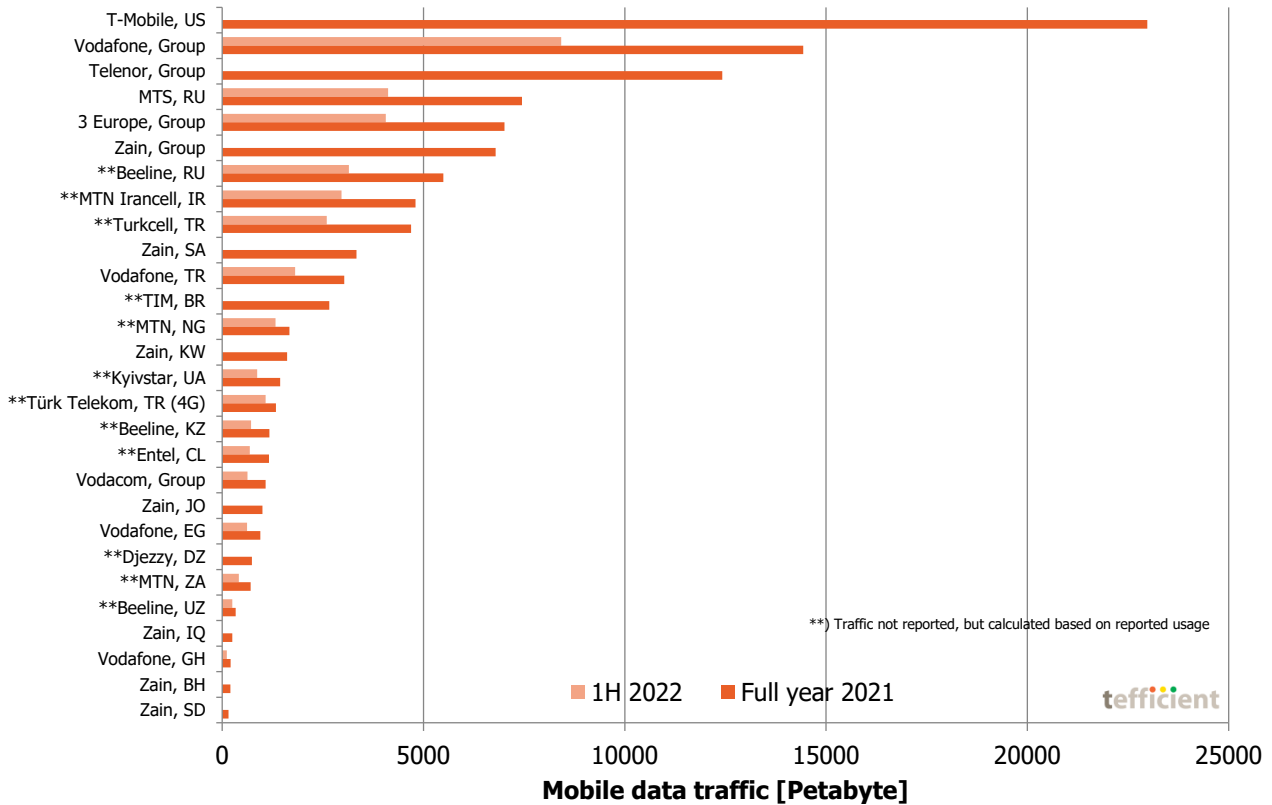


Figure 11. Total data traffic – Rest of world operators

Our newly added North American operator, **T-Mobile**, tops this chart, followed by **Vodafone Group** and **Telenor Group** as number two and three<sup>12</sup> in this RoW ranking. The other two groups, **Zain** and **3 Europe**, are ranked as number five and six. (Vodacom Group is number 19, but also part of Vodafone Group).

The Russian operator **MTS** is number four whereas **Beeline** is number seven. Iranian, Turkish, Saudi and Brazilian operators follow.

<sup>12</sup> Based on the assumption that the CO2e of Telenor Group was constant in 2019, 2020 and 2021

These are the RoW operators with the fastest and slowest growth in mobile data traffic in 1H 2022 and 2021:

<b>Fastest</b>	<b>1H 2022</b>	<b>2021</b>
MTN, Nigeria	+73%	+93%
Beeline, Uzbekistan	+72%	+58%
Beeline, Russia	+25%	+54%
MTN, South Africa	+23%	+57%
<b>Slowest</b>	<b>1H 2022</b>	<b>2021</b>
Turkcell, Turkey	+16%	+25%
Zain, Iraq	n/a	-17%
Zain, Sudan	n/a	-5%
Türk Telekom, Turkey	+35%	-4%

## How much money can you make on mobile data?

The way we calculate revenue per gigabyte – *total* mobile service revenue per carried gigabyte – will resonate with mature markets where operators generally aren't attempting to monetise voice and SMS based on usage. Instead, they have made voice and messaging allowances unlimited and included them in a flat fee.

In *maturing* markets, usage-based monetisation is still used to a higher degree. This is true also for voice and messaging. With our calculation method, one might think that the operators ending up with the highest effective revenue per gigabyte would thus be operators from maturing markets. On the contrary, the operators with the highest revenue per GB are from European countries: **Norway**, the **Netherlands**, **Greece**, **Germany** and **Switzerland**.

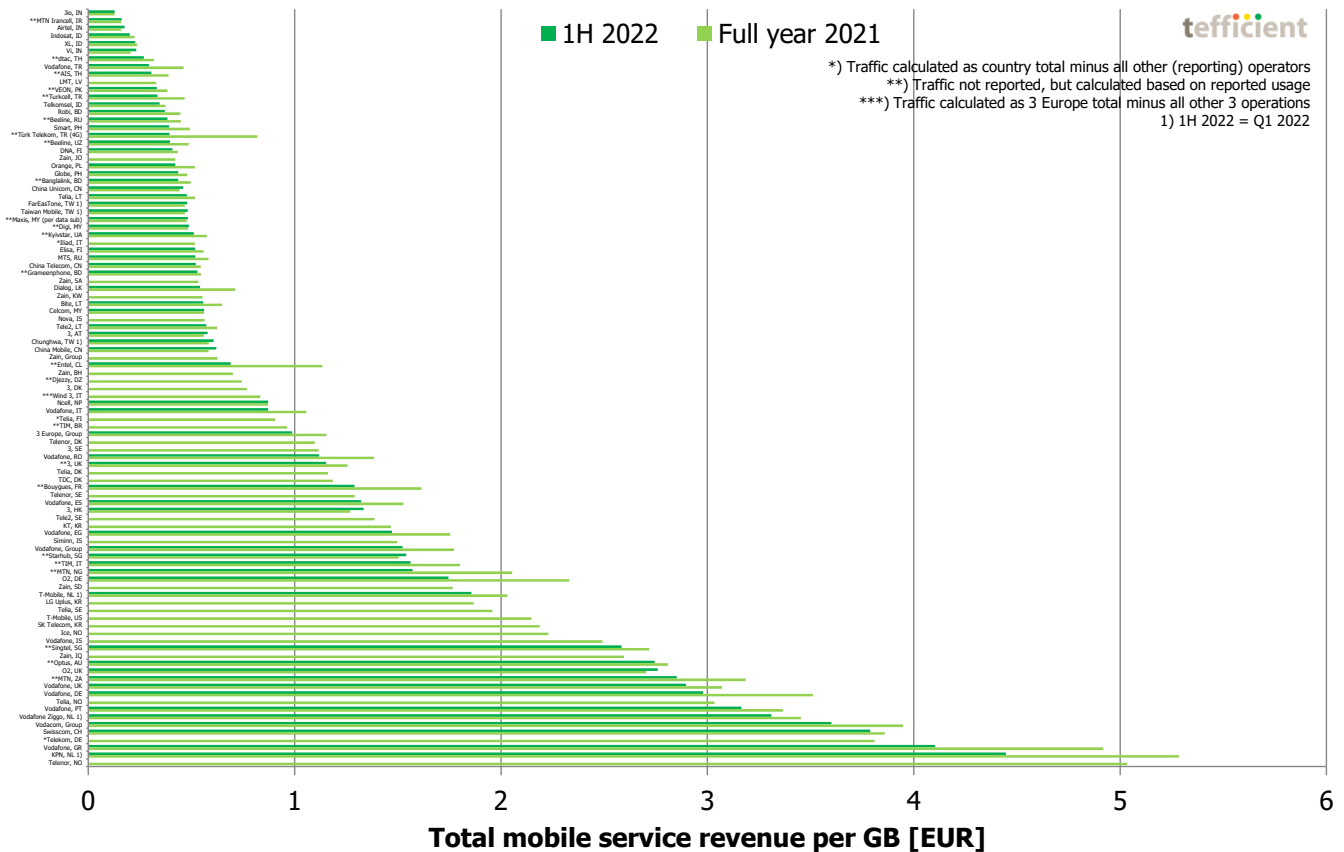


Figure 12. Total mobile service revenue per gigabyte – all operators<sup>13</sup>

We will – for readability reasons – soon break Figure 12 down into Europe, Asia/China and RoW, but let's first look into a disclaimer with regards to operators marked with \* or \*\*.

<sup>13</sup> That also report mobile service revenue

### When reporting mobile data traffic, take inspiration from Vodafone and Axiata

Most graphs in this analysis carry this legend:

\*) Traffic calculated as country total minus all other (reporting) operators

\*\*\*) Traffic not reported, but calculated based on reported usage

There are a number of operators globally that, in their regular easy-to-use Excel sheets, report their **total mobile data traffic** quarter by quarter. Of the larger operator groups, **Vodafone** and **Axiata** are good examples. We encourage all operators to follow it.

Some operators are instead reporting – or occasionally indicating – **data usage**. These are the operators marked with \*\*. The problem here is that many operators aren't defining what a user is – sometimes it is all users, sometimes "active data users" (whatever that is), sometimes smartphone users, sometimes branded smartphone users, sometimes postpaid users, sometimes 4G users. Typically these usage numbers are stated to impress, i.e. they are representative only for a smaller, high-usage, segment of the subscriber base. Exceptions to that operators reporting usage aren't reporting the number of associated users are e.g. **VEON Group**, **MTN Group** and **AIS** that report the usage per mobile data customer *and* the number of such mobile data customers (a subset of the total customer base). Well done.

The majority of operators are still not reporting anything, though. Orange Group and Telia Company are such examples. And, of course, most North American carriers. In some cases, country regulators are helpful in reporting a breakdown per operator. But in most cases, the country regulator is just reporting the total. In such occasions – and if also all other operators report data traffic or at least usage – we have calculated the country residual and assumed that this traffic equals that of the non-reporting operator. These are the operators marked with \*.

It's not necessarily so that a regulator and the reporting operators use exactly the same definition when reporting data traffic. Traffic via MVNOs or roaming traffic can e.g. disturb the comparability. Where the error risks to be the largest, though, is in countries where the country residual has been assigned to a \*-marked operator while, at the same time, one or several of the other operators are \*\*\*-marked operators, i.e. have not explicitly reported the total data traffic but some type of usage.

So if any operator (\*-marked or \*\*\*-marked) is unhappy with its calculated data traffic, the solution is simple: Start to report your total mobile data traffic.

Having explained this, let's now from Figure 12 identify the ten operators that get the *lowest* total mobile service revenue per gigabyte in the world:

	Full year 2021	1H 2022
1. <b>Jio</b> , India	0.1 EUR	0.1 EUR ↓
2. <b>MTN Irancell</b> , Iran**	0.2 EUR	0.2 EUR ↑
3. <b>Airtel</b> , India	0.2 EUR	0.2 EUR ↑
4. <b>Indosat</b> , Indonesia	0.2 EUR	0.2 EUR ↓
5. <b>XL</b> , Indonesia	0.2 EUR	0.2 EUR ↓
6. <b>Vi</b> , India	0.2 EUR	0.2 EUR ↑
7. <b>dtac</b> , Thailand	0.3 EUR	0.3 EUR ↓
8. <b>Vodafone</b> , Turkey	0.5 EUR	0.3 EUR ↓
9. <b>AIS</b> , Thailand	0.4 EUR	0.3 EUR ↓
10. <b>LMT</b> , Latvia	0.3 EUR	n/a

These operators are either active in mature high data usage markets (Latvia) or in highly competitive maturing markets (India, Indonesia, Thailand). Vodafone Turkey is new on the list driven by the quick depreciation of the Turkish lira. As before, you also find MTN Irancell in the list.

The Indian operators **Airtel** and **Vi** were able to **increase their revenue per gigabyte** in 1H 2022 (vs. 2021 but also vs. 1H 2021). The same goes for **MTN Irancell**. It hasn't been many times in our report history that we have been able to spot operators being able to increase revenue per gigabyte, but now it starts to happen. Further down the list we can also see it in e.g. Taiwan, Austria, the UK, Hong Kong and Singapore.

The ten operators that get the *highest* total mobile service revenue per gigabyte in the world are:

	Full year 2021	1H 2022
1. <b>Telenor</b> , Norway	5.0 EUR	n/a
2. <b>KPN</b> , Netherlands* 1)	5.3 EUR	4.4 EUR <sup>14</sup> ↓
3. <b>Vodafone</b> , Greece	4.9 EUR	4.1 EUR ↓
4. <b>Telekom</b> , Germany*	3.8 EUR	n/a
5. <b>Swisscom</b> , Switzerland	3.9 EUR	3.8 EUR ↓
6. <b>Vodafone</b> , Group	3.9 EUR	3.6 EUR ↓
7. <b>Vodafone Ziggo</b> , Netherlands 1)	3.5 EUR	3.3 EUR <sup>16</sup> ↓
8. <b>Vodafone</b> , Portugal	3.4 EUR	3.2 EUR ↓
9. <b>Telia</b> , Norway	3.0 EUR	n/a
10. <b>Vodafone</b> , Germany	3.5 EUR	3.0 EUR ↓

In our mature market focused [country analysis](#) you can identify New Zealand, Belgium, Luxembourg, Germany, the Netherlands, Norway and Greece as some of the country markets (of the covered) with the highest revenue per gigabyte so this list seems plausible.

We conclude that there in 2021 was **41x difference** between the operator with the highest total service revenue per gigabyte (KPN Netherlands) and the operator with the lowest (Jio India). In the first half of 2022, the multiplier was **35x**. Although high, it has been higher in our previous analyses.

<sup>14</sup> 1) = Q1 2022 for 1H 2022

**Europe: Widespread revenue per GB – increasing in a couple of instances**

Figure 13 shows the European breakdown. Since European operators played both in the bottom and in top of the global chart, the spread is almost as large as in the global view.

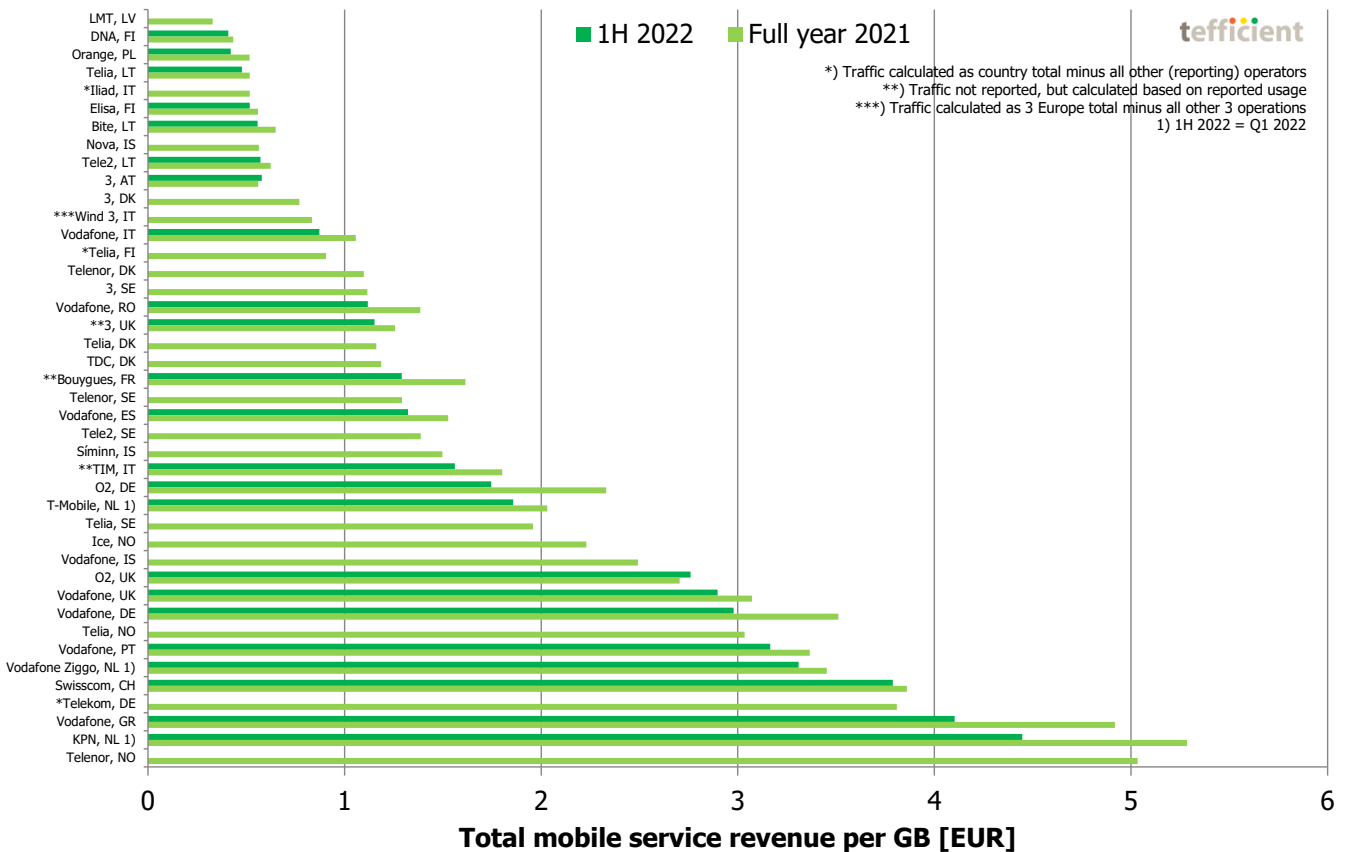


Figure 13. Total mobile service revenue per gigabyte – European operators

Norwegian, Dutch, Greek, Swiss and German operators play in the bottom of the graph – where the total service revenue per consumed gigabyte is high. In the other end of the scale – where the revenue per gigabyte is low – we find operators from **Latvia, Finland, Poland, Italy, Austria, Iceland** and **Lithuania**.

Two European operators had higher revenue per GB in 1H 2022 than in 2021: **Drei** (3) Austria and **O2** UK.

**Asia and China: Revenue per GB no longer decreasing fast – increasing in several cases**

Figure 14 shows the Asian and Chinese operators. Indian, Indonesian and Thai operators have the lowest revenue per gigabyte whereas South Korean, Singaporean and Australian operators are having high revenue.

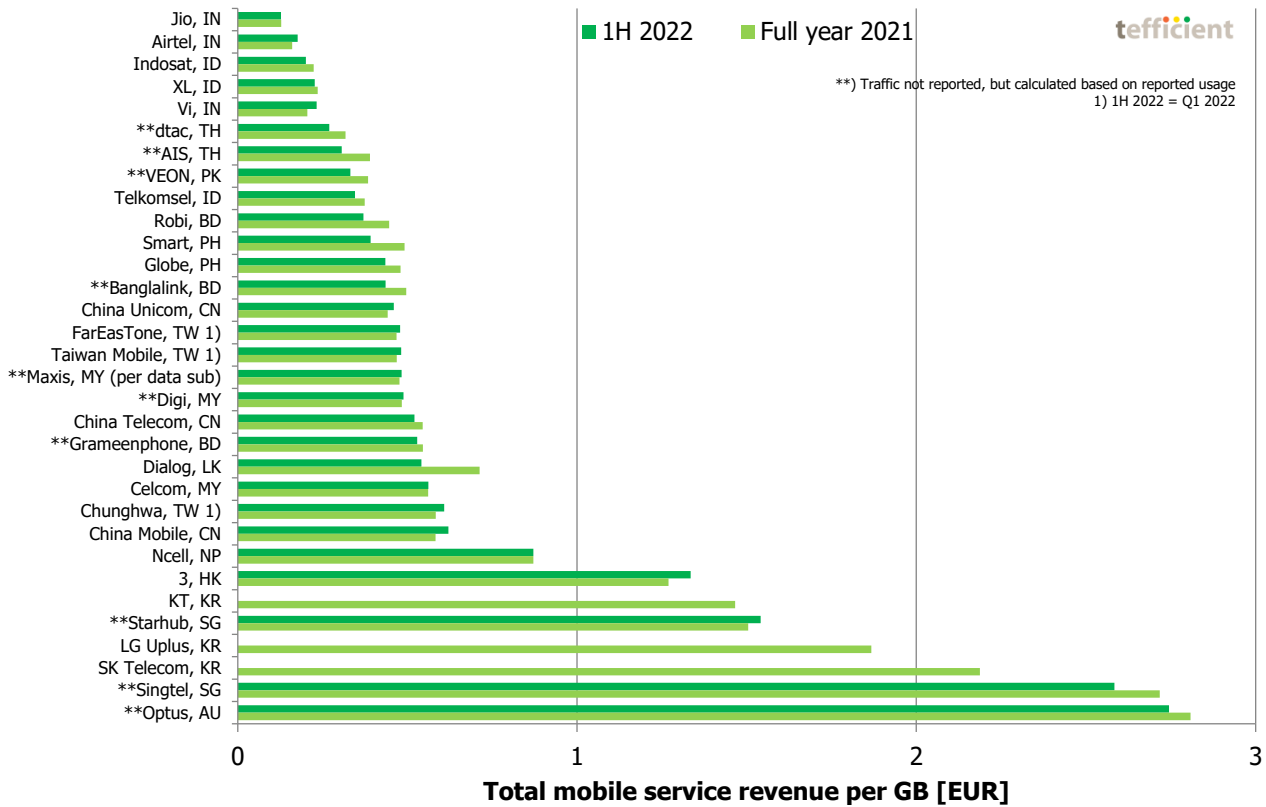


Figure 14. Total mobile service revenue per gigabyte – Asian and Chinese operators

The erosion in revenue per gigabyte in Asia/China is not at all as quick as it has been in our previous reports. It even started to grow here and there. All operators in **India** and **Taiwan** had higher revenue in the first half of 2022 than in 2021. Also **3** Hong Kong and **Starhub** Singapore had growing revenue per GB.

**RoW: Erosion in the revenue per GB almost everywhere**

We are ending this section with Figure 15 – showing the operators in the rest of the world alongside a few groups that separate out mobile service revenue in their reporting.

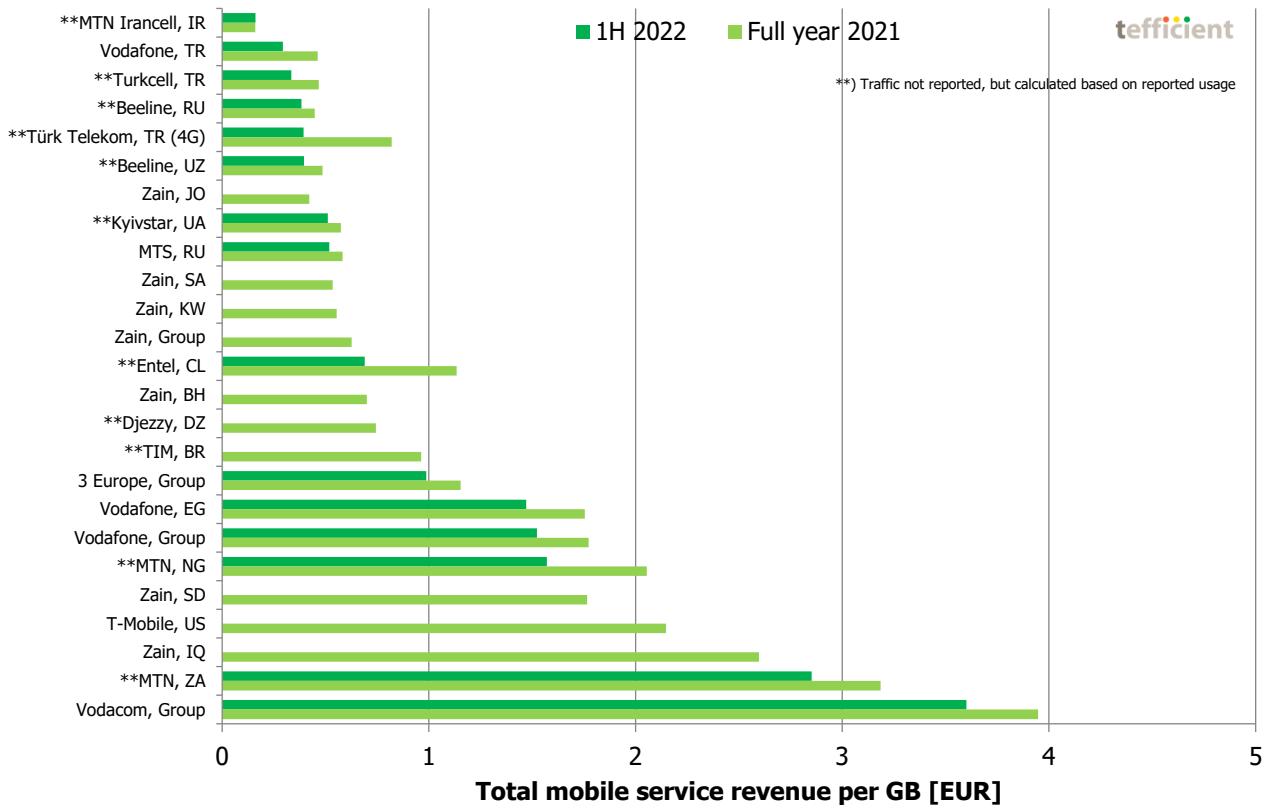


Figure 15. Total mobile service revenue per gigabyte – rest of world operators

MTN Irancell, Turkish operators and Russian operators make up the top of the chart where revenues are the lowest per gigabyte. Latin American operators are in the middle of the chart whereas **sub-Saharan operators** populate the bottom of the graph – alongside Zain Iraq and Sudan and T-Mobile USA.

One only of the RoW operators had higher revenue per GB in 1H 2022 compared to 2021: **MTN Irancell**.



### The revenue per GB vs. usage charts

Let us now combine the revenue per gigabyte with the usage. Those of you that have read our data usage and revenue analyses before are familiar with the **revenue per GB vs. usage** chart. Since we did not publish a pure 2021 operator analysis, we here publish two charts – one for 2021 and one for 1H 2022. We start with 2021, see Figure 16.

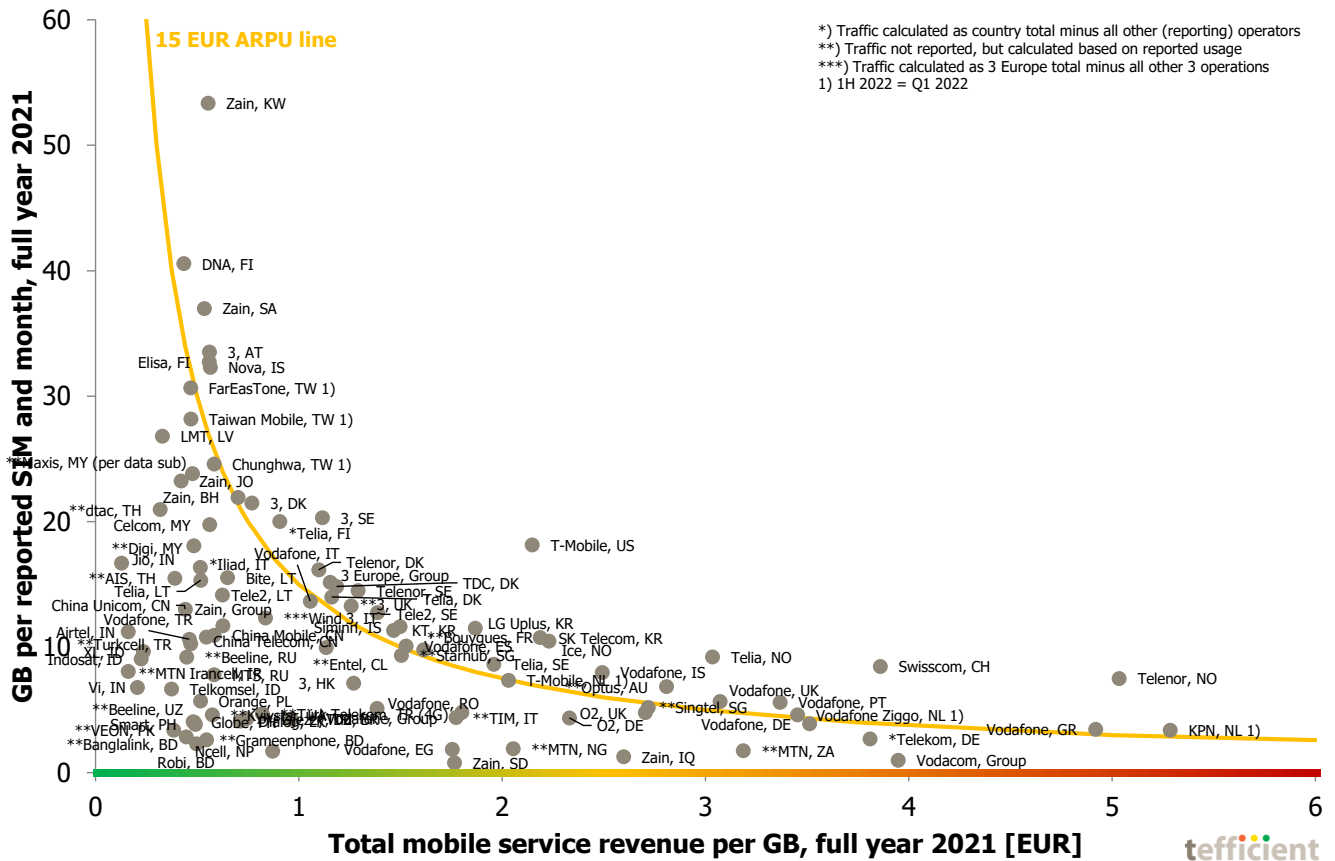


Figure 16. Mobile data usage vs. total mobile service revenue per gigabyte – 2021

With all those markers, readability is so-so. The amber line is not a regression line but illustrates where 15 EUR of ARPU is earned. Operators above the line earn more – and operators below the line less than 15 EUR.

Most mature markets operators operate with an APRU of around 15 EUR. Many operators in maturing markets clutter in the southwest or south parts of the chart.

The operators with the highest revenue per GB in 2021 are – from right – **KPN**, **Telenor** Norway, **Vodafone** Greece, **Vodacom** Group, **Swisscom** and **Telekom**. The operators with the lowest revenue per GB are – from left – **Jio**, **Airtel** India, **MTN** Irancell and **Vi**. The operator with the highest usage is – from the top – **Zain** Kuwait.

Figure 17 shows the same graph but for operators reporting 1H 2022. The sample is smaller, but we kept the scaling to allow an easier comparison between the two graphs.

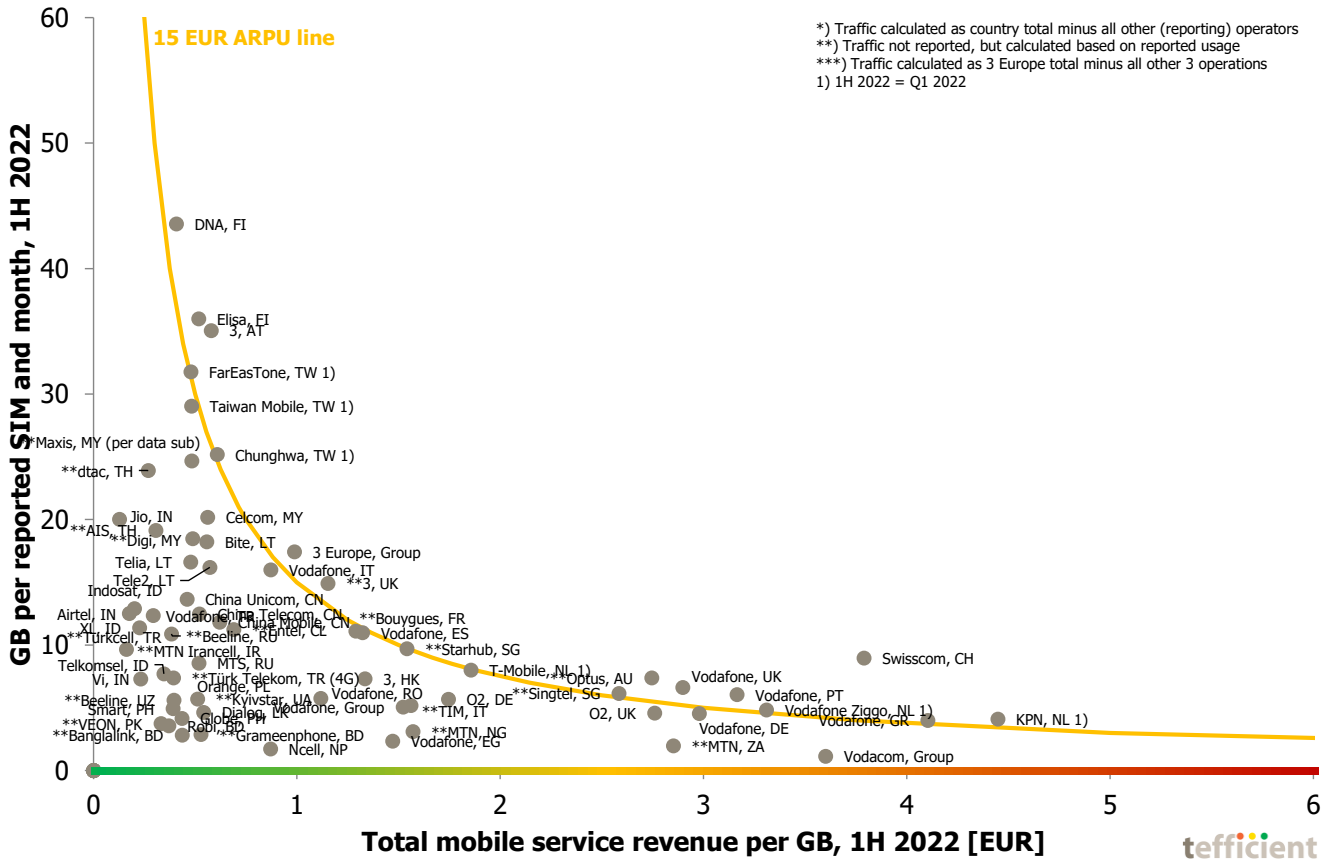


Figure 17. Mobile data usage vs. total mobile service revenue per gigabyte – 1H 2022

The operators with the highest revenue per GB in 1H 2022 are – from right – **KPN**, **Vodafone** Greece, **Swisscom** and **Vodacom** Group. The operators with the lowest revenue per GB are – from left – **Jio**, **MTN Irancell**, **Airtel** India and **Indosat**. The operator with the highest usage is – from the top – **DNA**.

### The ARPU vs. usage charts

One could criticise the previous charts for comparing the number of gigabytes with something that relates to it – the revenue per gigabyte. Our next charts, Figure 18 and 19, are therefore comparing the number of gigabytes with the revenue per subscription, i.e. the ARPU. And that is perhaps even more interesting.

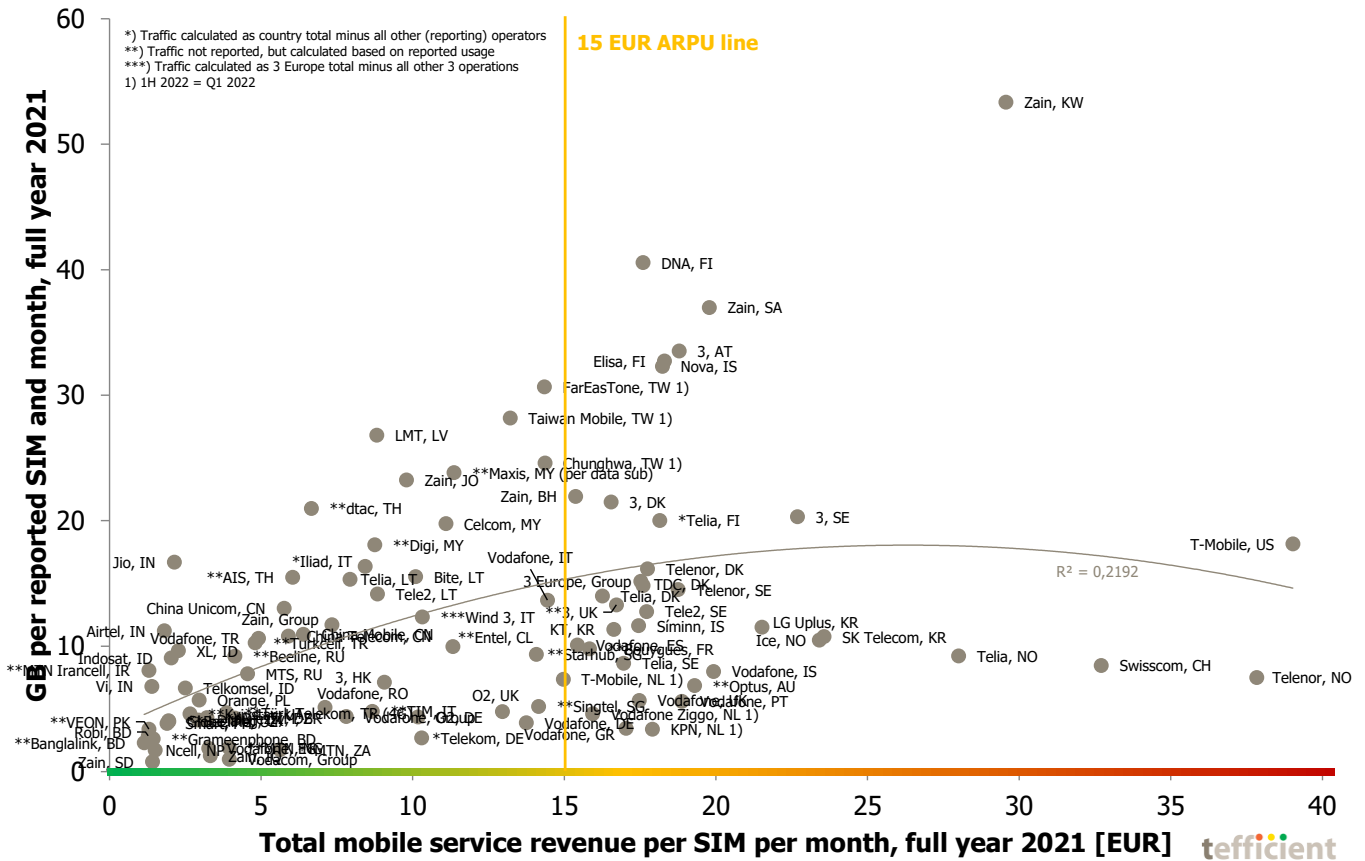


Figure 18. Mobile data usage vs. total mobile service revenue per SIM – 2021

Of all the operators there are five (from right) – **T-Mobile USA**, **Telenor Norway**, **Swisscom**, **Zain Kuwait** and **Telia Norway** – that enjoy much higher total mobile service revenue per SIM than all other operators. In the case of Zain the data consumption is also the highest in the world. T-Mobile’s customers use relatively much data, but neither Telenor Norway’s, Swisscom’s or Telia Norway’s customers are keen data users – yet the ARPU is high.

In the middle upper part of the graph there is a cluster of operators with very high average data usage but moderate ARPU of about 13-20 EUR. Here we find the **Finnish** and the **Taiwanese** operators together with **Drei (3) Austria**, **Zain Saudi Arabia** and **Nova** from Iceland. **LMT** from Latvia has a favourable position from a consumer perspective.

That is true also for **Jio**. Its ARPU isn't the lowest – and it's growing – but considering an average data usage of close to 17 GB per month, Jio is still the affordability leader of the world.

The grey regression line suggests that **operators with higher data usage have higher ARPU**. At least up to an ARPU of about 25 EUR.

International trend:  
Operators with higher data usage tend to have higher ARPU

To moderate this, one must realise that the adherence to this line (shown by a  $R^2$  value below 1) isn't perfect. And we should also remember that the line visualises an international – not a national – trend: It is quite difficult to find national examples showing that operators with higher data usage enjoy higher ARPU. If anything, it's rather the opposite. It's typically the challenger operator that has the customers with the highest data usage and challenger operators tend to have lower ARPU than incumbents.

After this discussion, let's look at the same graph for the first half of 2022:

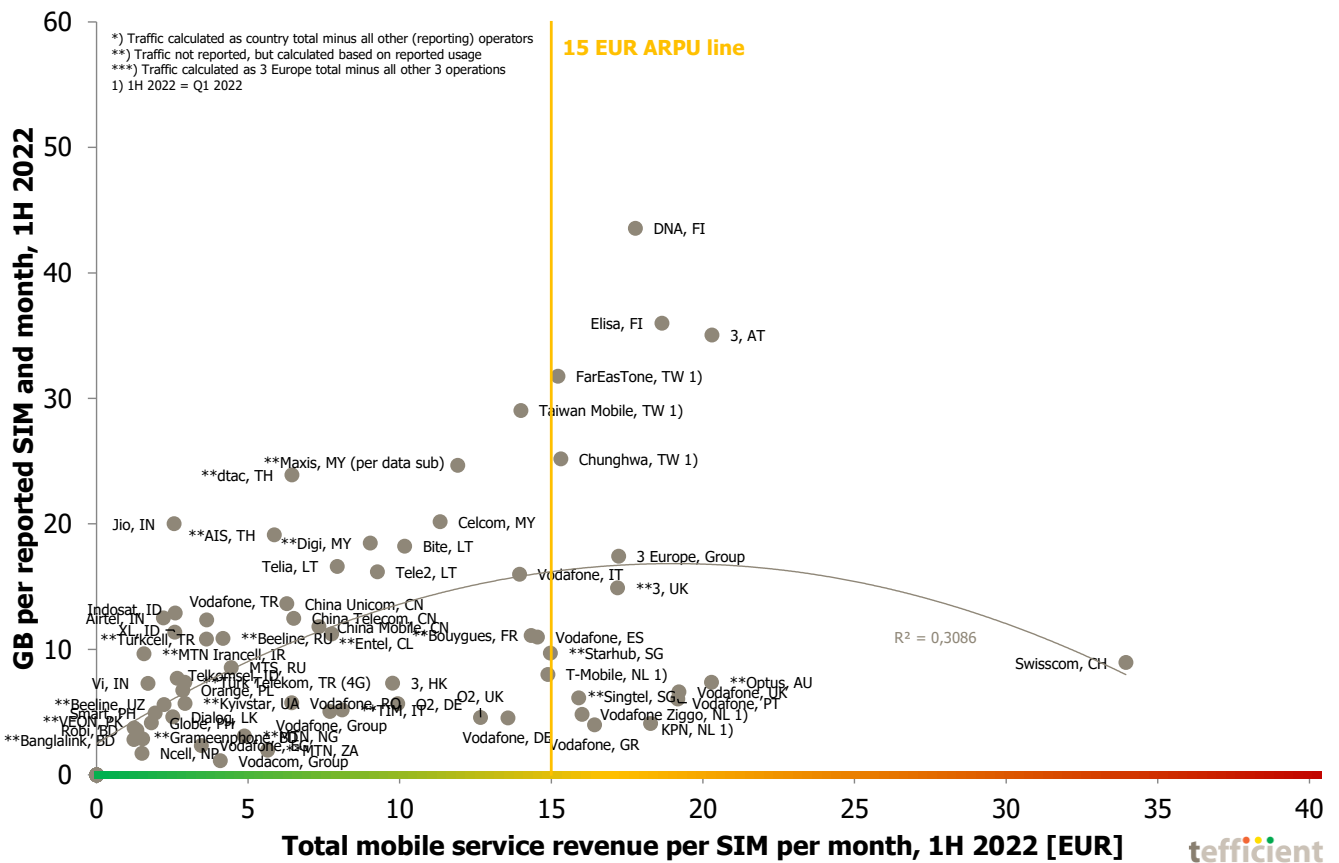


Figure 19. Mobile data usage vs. total mobile service revenue per SIM – 1H 2022

It's less populated because less operators report mobile data traffic more frequently than annually, but it still shows that operators with higher data usage tend to have higher ARPU – at least up to about 20 EUR.

### Dressing the Christmas trees

Absolute ARPU aside, how many of the operators have been able to deliver on “more for more” i.e. been able to increase ARPU while increasing data usage? And how many are just following the “more for less” stream, giving users more data but not being able to charge anything more?

This isn't the prettiest Christmas tree you've seen, but it is surprisingly well looking given the influence of the pandemic: When data usage increased, **62% of operators could grow ARPU** (with branches growing to the right) – only 38% could not. This is a major improvement compared to our [2020 report](#).

2021: Data usage grew for 97% of operators

ARPU grew for 62% of operators

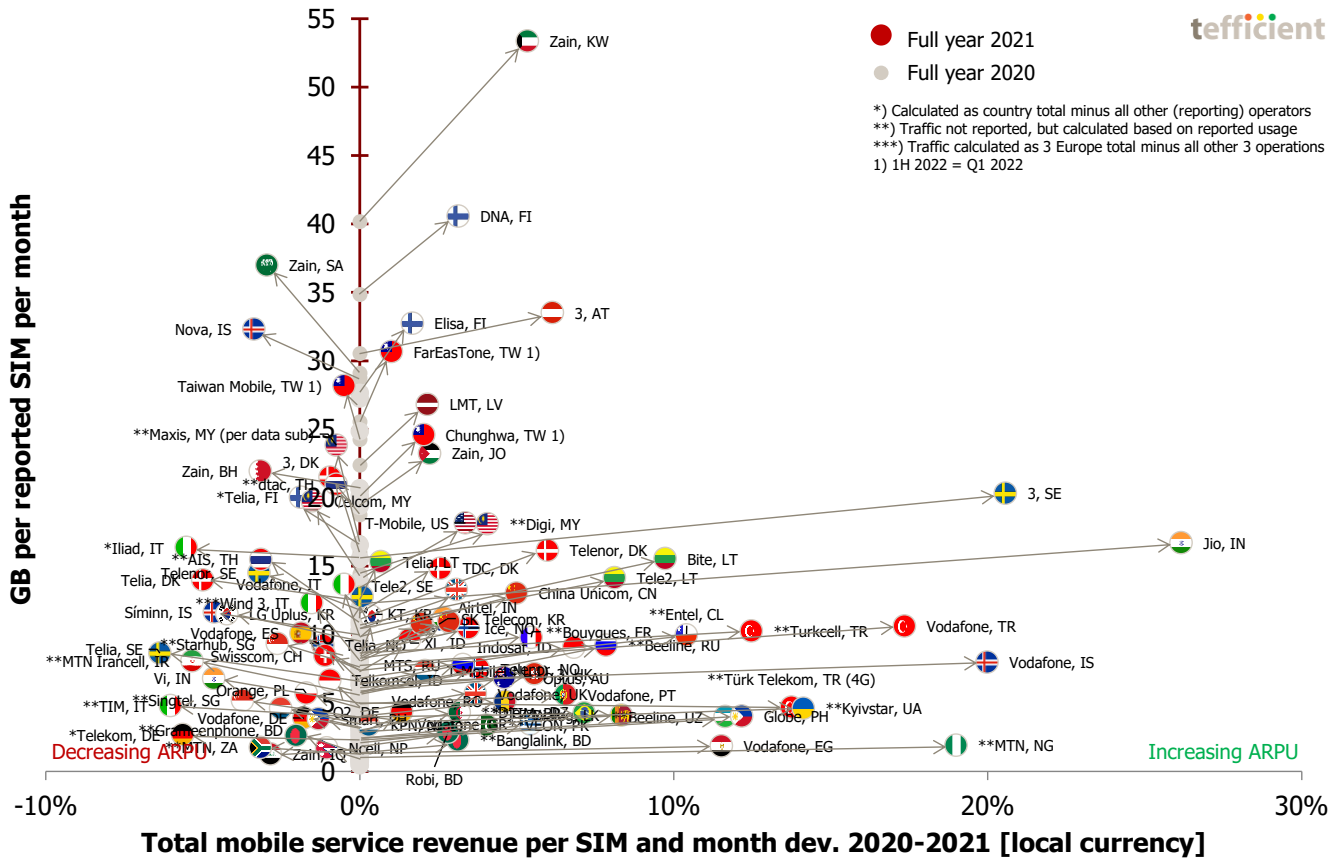


Figure 20. Mobile data usage development vs. ARPU<sup>15</sup> development – 2020 to 2021

<sup>15</sup> ARPU is calculated as the reported total mobile service (non-equipment) revenue incl. interconnect & roaming divided with the average number of reported SIMs. It can differ from the definition of operator reported ARPU.

Let's highlight a few best practices of successful "more for more" operators in 2021:

- Our global usage leader, **Zain** Kuwait, could grow ARPU following an explosion in data usage likely following onto the introduction of 5G and 5G fixed routers.
- The Finnish operator **DNA** has been able to grow ARPU thanks to more customers upgrading to faster (and more expensive) speed tiers on their unlimited plans. Competitor Elisa had a similar, but weaker, development whereas Telia lost ARPU although data usage grew.
- Although the Austrian operator **Drei** (3) had a quite weak development in usage, Drei could grow its ARPU significantly.
- Unlike Maxis and Celcom, **Digi** in Malaysia could increase ARPU in 2021.
- Our only American operator, **T-Mobile**, could increase ARPU in 2021 following an increase in usage.
- Although we are a bit sceptical to the service revenue reporting of CK Hutchison, **3** Sweden had a good development in 2021. Also Tele2 could grow ARPU (just) but both Telia and Telenor had negative ARPU development.
- **Telenor** Denmark outpaced all of competition in both data usage and ARPU growth in 2021. TDC has a similar, but weaker, development, but 3 and Telia both ended up on the wrong side of the Christmas tree.
- **Bite** and **Tele2** Lithuania could turn the fast usage growth into ARPU increase in 2021. Telia had a development in the same direction, but much weaker.
- **Jio** continued to improve its ARPU in 2021. Airtel had a similar, but weaker, development while Vi lost ARPU.

The mobile data traffic was resilient in 2021. If averaging all our operators, it grew **32%**. The narrative that no mobile data would be used when people stay at home (and on Wi-Fi) during COVID restrictions didn't prove right.

Let's now look at the Christmas tree for the first half of 2022. It's good looking too.

Although data usage increased at a slower rate, **61% of operators could grow ARPU** (with branches growing to the right) – only 39% could not. If 2021 was a major improvement compared to 2020, the first half of 2022 is a continuation of this shift to a better monetisation of mobile data.

1H 2022: Data usage grew for 98% of operators

ARPU grew for 61% of operators

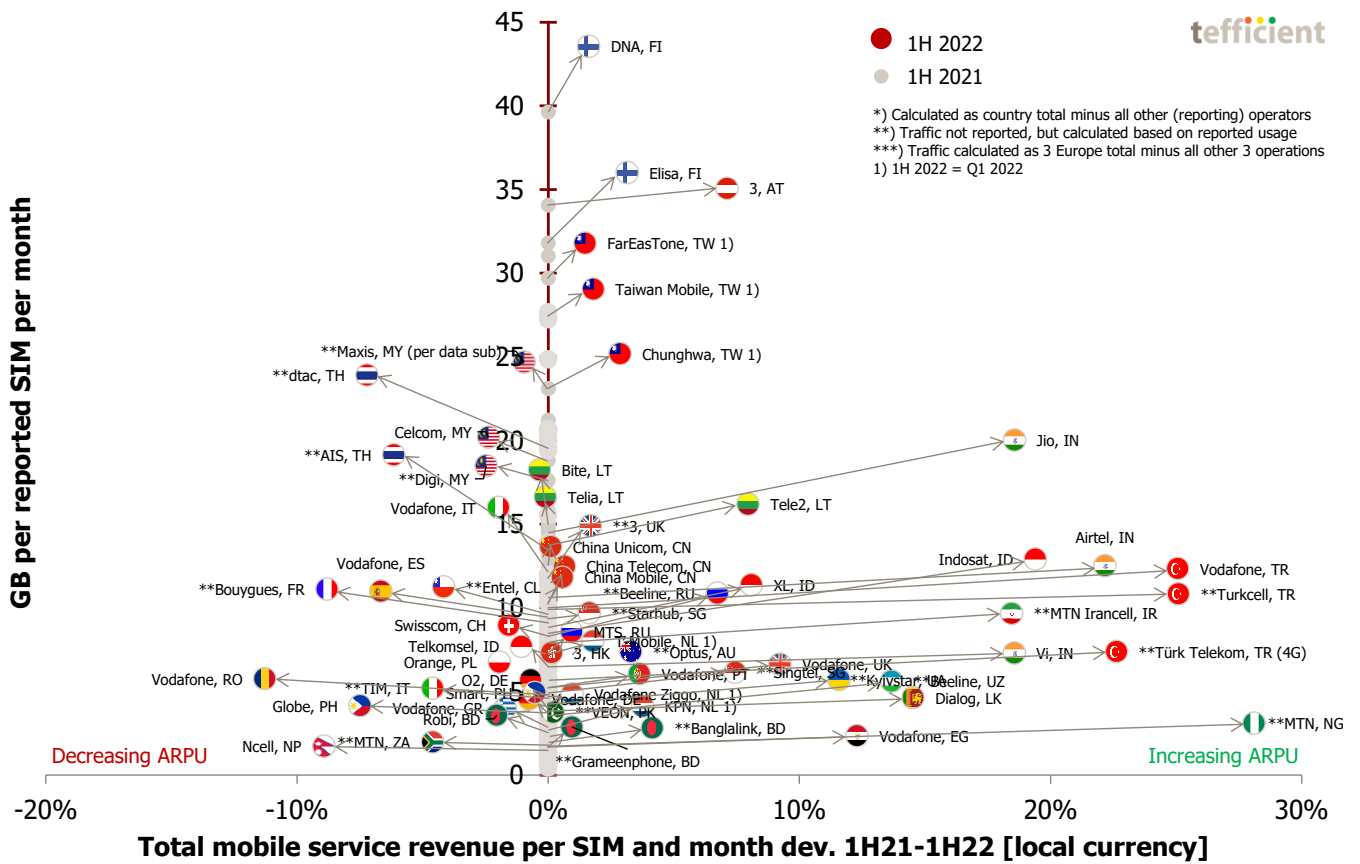


Figure 21. Mobile data usage development vs. ARPU development – 1H 2021 to 1H 2022

Although Figure 21 isn't as populated as the 2021 Christmas tree, let's still highlight a few best practices of successful "more for more" operators in the first half of 2022:

- The Finnish operators **DNA** and **Elisa** have both been able to grow ARPU thanks to more customers upgrading to faster (and more expensive) speed tiers on their unlimited plans.
- Although the Austrian operator **Drei** (3) had a quite weak development in usage, Drei could grow its ARPU significantly.
- After a few years of being on the wrong side of the Christmas tree, the three Taiwanese operators **FarEasTone**, **Taiwan Mobile** and **Chunghwa** are now on the right side – where ARPU grows. The 5G-led reformulation of the Taiwanese unlimited offerings has turned the situation around.
- **Tele2** Lithuania could continue to turn the usage growth into ARPU increase in 1H 2022. Bite and Telia weakened vs. 2021.
- **Jio** and **Airtel** continued to improve its ARPU in 1H 2022. **Vi** is now back to ARPU growth.

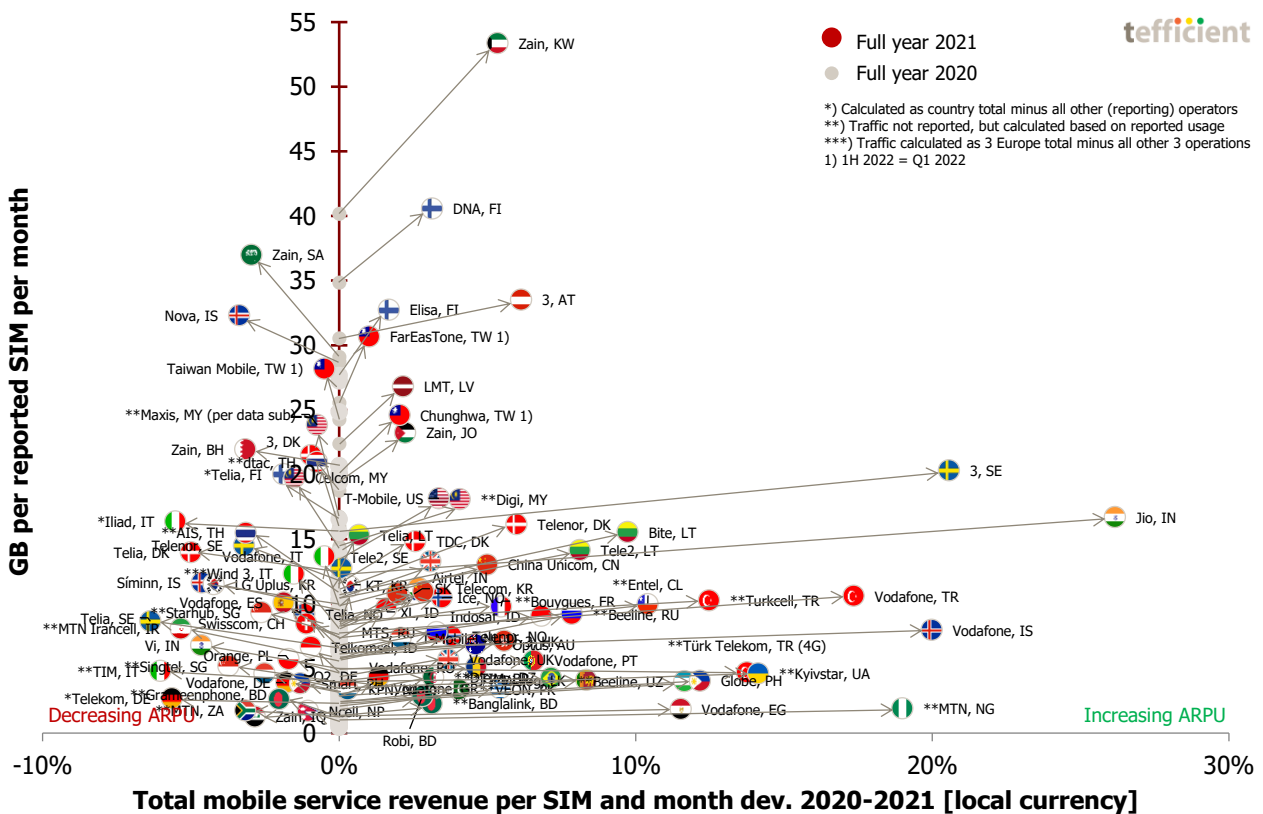
The mobile data traffic didn't grow as quickly in the 12 months from June 2021 to June 2022 as it did in the full year of 2021. If averaging all our operators, it grew **27%** (vs. 32% in 2021). The relaxation of COVID

restrictions have likely affected mobile data traffic negatively (who thought that on beforehand?). But what's positive is that a majority of operators – 61%, basically unchanged vs. 2021 – could grow ARPU even though the data traffic growth slowed.



## Conclusion

In this analysis, we have presented fourteen updated ranking charts and six updated correlation plots, and we hope these are helping you to understand how **mobile data usage, traffic** and **service revenues** develop globally. Generally speaking, data usage and traffic grew – no news there – but a majority of operators were now able to monetise it in the form of higher ARPU. If averaging all our studied operators, they carried **32% more gigabytes** in 2021 compared to 2020 – and **27% more gigabytes** in the first half of 2022 compared to the first half of 2021.



Our darling graph, the Christmas tree (here in the 2021 version), shows that data usage grew for 97% of the operators – and that **62%** of these operators were able to turn that into ARPU growth; they delivered on a “more for more” promise. This is a higher share than in our operator report for 2020. And it stayed stable at **61%** in the first half of 2022 although traffic growth slowed.

Congratulations, cellcos. You need this improved monetisation of mobile data now that the world – after what seems to have been a long break – faces **inflation** again.

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