

stations, thereby reducing field engineer jobs. See MTN Consulting’s August 2020 report, “[Automation’s rise and the telecom engineer.](#)”

## Forecast to 2025

We forecast the following metrics for the telco industry: total revenues; capex (software and all other); Employees; Labor costs; M&A spending; Opex (Opex ex-D&A, and D&A). We also forecast several categories of operating expenses: Network operations (“Netops”); Network infrastructure (“Netinfra”) rental/ leasing/ interconnect/roaming; Utilities; and, all other opex.

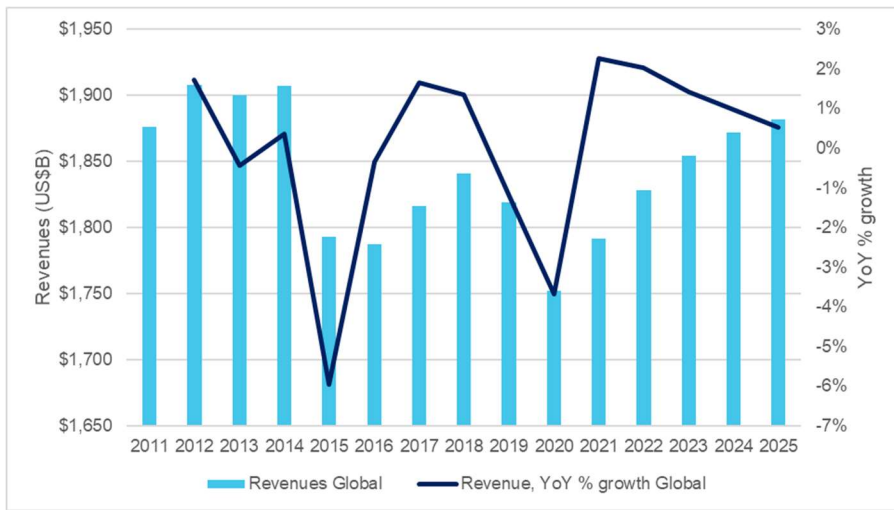
Note that labor costs, which we forecast as a stand-alone data series, are in fact spread across multiple categories of opex, including Netops, Sales & Marketing, etc.

### Telco revenues fall to \$1.75 trillion in 2020 but will rebound modestly and reach \$1.88T in 2025

Telecom revenues have been flat for most of the last decade despite a rapid adoption of higher-speed, higher value services such as 4G broadband. In 2011-19, average annual growth was -0.4%. Revenues will dip approximately 3.7% in 2020, due largely to economic dislocations from the COVID-19 pandemic. This will be followed by two positive years, however. We expect revenues to grow 2.3% in 2021 as economies open up again, and another 2.0% due to a blend of 5G-based services beginning to scale and continued opening of economies post-COVID-19.

Figure 10 below shows telco industry revenues from 2011 through 2025 and the YoY % growth.

**Figure 10: Telco revenues from 2011-25 (US\$B) and YoY % growth**



Source: MTN Consulting

Note: figures above are based upon actual (market-based) currency exchange ratios. The market’s dip in 2015 was in large part due to a strengthening of the US dollar (up 20% and 15% YoY versus the Euro and Yen, respectively).

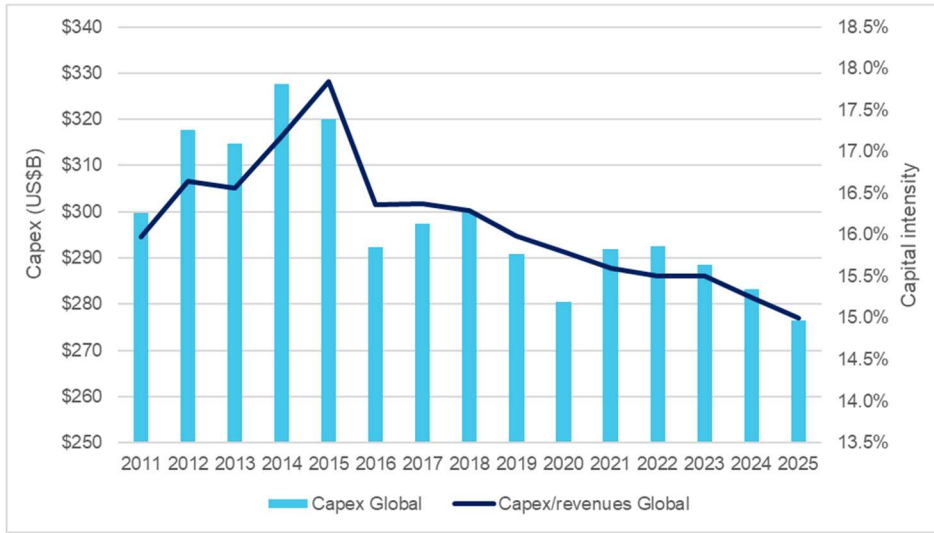
### Capex will climb slightly in 2021 but steadily fall after 2022 to \$277B in 2025

During the 2011-15 period, LTE buildouts supported capex of over \$300B per year. Spending moderated in 2016-17 as telcos absorbed capacity, and surged slightly to exceed \$300B again in 2018. The 2018 growth was due to a mix of Jio’s huge buildout in India, fixed broadband upgrades in developed markets, and 4G expansions in emerging markets. Capex fell again slightly in 2019, and then COVID-19 hit earlier this year.

We don't expect telco capex to again see \$300B during our forecast period. Total capex for 2020, even with China's 5G push, should amount to roughly \$280B (from \$290B in 2019). Economic recovery from the worst of COVID-19 and 5G buildouts on newly issued spectrum will power modest capex growth in 2021 and 2022. After that, we expect capex to gradually decline to roughly \$277B by 2025.

Figure 11 shows actual capex from 2011-19 and our projected capex for the 2020-25 period, along with the implied capital intensity (capex/revenue) ratio.

**Figure 11: Telco capex from 2011-25 (US\$B) and capex/revenue ratio**



Source: MTN Consulting

One major factor behind the capex moderation is telcos' willingness to work with webscale operators more actively. Some of these collaborations result in avoided capex for the telco as it instead relies on the cloud provider's network infrastructure. Platforms like Google Cloud's Anthos and Amazon's AWS Wavelength are proving popular. Telcos are also relying more on webscale cloud providers for application development, some of which is capitalized as a software development investment.

Another big factor in the capex decline is telco spinoffs of more of their network assets – cell towers, in particular, but also some data centers – to the carrier-neutral sector. These spinoffs turn capex into opex as telcos now lease more of their infrastructure from external sources rather than procure and maintain through their own network departments. (For more on this topic, see the "Carrier-neutral market forecast" section, further in this report).

There are also a number of factors which tend to lift prospects for telco capex. The most important of these is the sudden fall of Huawei and ZTE over the last 2 years. Many large markets continue to choose to ban these Chinese vendors from at least part of their 5G network buildouts. MTN Consulting has expected this shift for several years and considers it a positive development, with national security justification. However, it does reduce price competition and choice, and tends to result in more expensive networks. In some countries, carriers are being forced to rip and replace Huawei/ZTE gear, an effort which is usually subsidized; this also tends to inflate future capex.

A neutral factor is the increased maturity of open RAN as an alternative way of building mobile networks. The open RAN ecosystem has been given a boost by Chinese vendors' troubles, and by US government efforts to create alternatives to relying solely on Ericsson or Nokia for 5G builds. Microsoft acquired two suppliers in this space, Affirmed and Metaswitch, and companies like AltioStar, Mavenir and Parallel Wireless are getting serious, large scale commitments from telcos. Nokia has embraced open RAN, as

much as an incumbent supplier can do, anyways, and a range of systems integrator options are emerging for telcos to get external help in cobbling together a RAN not procured from a single supplier. It's not clear, though, that a shift to open RAN will lower capex for telcos. A greenfield operator choosing open RAN from the start has a clear advantage relative to picking an end-to-end solution from Ericsson, Nokia, Huawei, Samsung, or ZTE. However, a telco with a large complex footprint already in place faces a more complicated set of costs and pressures. The benefits of open RAN are harder to quantify and further down the road.

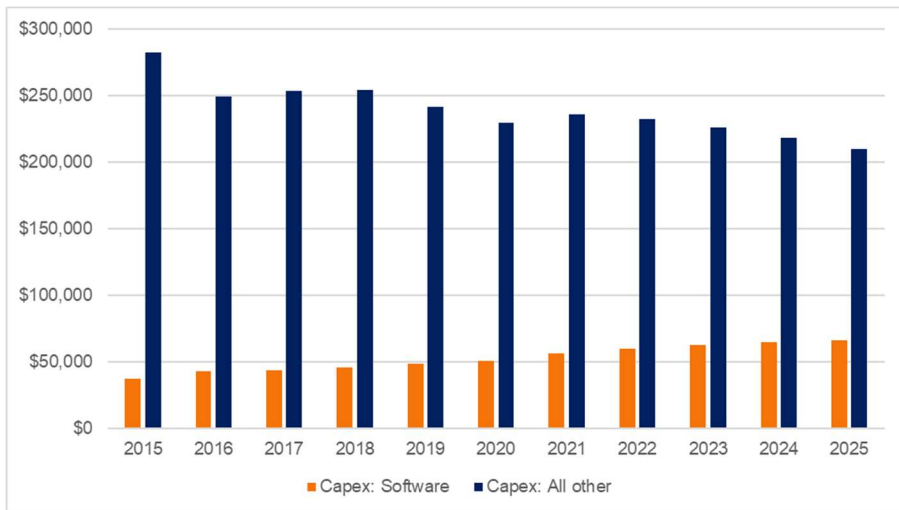
Software capex continues to rise

In May 2020, the MTN Consulting publication “[Telco capex on the rise](#)” described how software has become the key ingredient to delivering value in networks, a long-term trend which has accelerated in the last five years. Enablers of increased telco software spending include:

- Vendors, who have invested heavily in software-defined networking and network functions virtualization. A broad range of hardware products are now engineered to provide functions, features and capacity through software. That change has many benefits: it allows a pay as you grow approach to investment, lowers maintenance and installation costs, simplifies customer management, and enables new service offerings.
- Telco employees, through internal software development. Building your own software is a challenge for all but the largest few companies with access to the right talent pools, however. Most smaller telcos would prefer to rely on vendors when possible, benefiting from their scale.
- Webscale operators, as telcos are spending more on cloud-based software solutions, including software-as-a-service (SaaS) and similar offerings from the webscale sector. These transactions are evolving into large multi-year arrangements where a telco effectively outsources key network functions to cloud providers. Telcos’ growing interest in mobile edge computing (MEC) to complement 5G is driving some of this partnership activity.

Software is the one large chunk of capex which is actually growing, and that will continue. In 2019, software investments represented 16.8% of telco capital expenditures (capex), from 11.7% in 2015. This upwards trend coincides with telcos’ increased adoption of SDN/NFV, and preparatory work for 5G deployment. SDN/NFV and 5G will continue to drive up telco software spending over time. Software will account for 24% of capex by 2025; see Figure 12, below.

**Figure 12: Software Capex vs. All other Capex, Telco market, 2015-25 (US\$M)**



Source: MTN Consulting