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5G Infrastructure - owning the inevitable: update

US equities

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- When we launched this theme in February 2020, we expected that the inevitable build-out of global 5G infrastructure would support growth in the communication equipment and tower companies focused on 5G.
- So far, our thesis has played out as expected. Global 5G wireless infrastructure spend is expected to grow 96% in 2020 according to industry analyst Gartner, surpassing USD 8 billion. Earnings commentary from the communication equipment companies and towers point towards an acceleration of 5G deployment, even during the difficult spending environment caused by the coronavirus.
- Smartphone revenue will almost certainly improve in the second half of the year and in 2021, but more due to seasonality and a challenged 2020, not 5G causing an upgrade cycle, in our view. We continue to see more compelling investment opportunities in infrastructure relative to smartphones.

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5G is the next phase in the evolution of wireless technology, building upon the advancements in 4G LTE. These new networks should deliver unparalleled scale, flexible control and extremely low costs. This scale and flexibility in particular contrasts with prior wireless network generations that were generally purpose built for a narrow range of applications (1G/2G were voice-centric, 3G/4G focused on broadband data) and that scale linearly relative to traffic. 5G offers low latency, higher speeds, higher capacity, and flexibility.

We believe 5G will ultimately be more important than any prior generation as 5G will be an integral part of an emerging infrastructure along with artificial intelligence, cloud computing, big data, and virtual / augmented reality that will impact every industry in every part of the global economy.

Critically, 5G will be the first wireless network that supports multiple revenue streams at scale on a single network infrastructure, a point we believe is underappreciated by consensus.

US investors are well aware of 5G due to widespread coverage in the financial press along with aggressive marketing by US wireless carriers. The imbalance between marketing and reality, along with very real technical and economic issues that are still outstanding has driven increased skepticism among investors. In our view this is in keeping with prior wireless cycles, which have tracked a trajectory of wild-eyed optimism, followed by widespread skepticism as progress is rarely a straight line.

In contrast, we view 5G as inevitable, and just as importantly, investable. Global wireless revenues are under pressure across nearly every major market due to increasing saturation in developed markets and economic constraints in emerging markets. Average revenue per user (ARPU) declines in major developed markets are barely offset by increased connections. Healthy subscriber growth in emerging markets is typically driven by similar ARPU trends given the lower consumer income in these regions.

The incremental revenue opportunities made available to wireless by 5G underpin our view on its inevitability. 5G mobile service (i.e., the connectivity for smartphones) may or may not prove a significant growth opportunity, but we believe the potential revenue wireless companies can realize from fixed wireless access (i.e., the selling of broadband services to residences and business in competition to cable) and the massive IoT are simply too large to ignore. By design, 5G network technology was purpose built to support multiple revenue streams on the same infrastructure. We believe carriers will invest against this trio of revenue streams, particularly since much of the investment in 5G (e.g., fiber backhaul, virtualization of networks) will have an extremely long useful life.

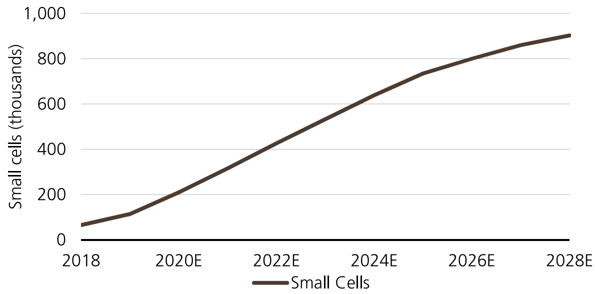
Every wireless generation rides an initial wave of excitement that crests with widespread skepticism, but inevitably carriers have moved forward their investments in next generation wireless networks.

In our view, we are exiting the trough of 5G skepticism, particularly with regards to infrastructure. Telecom operators have already begun deploying 5G globally, predominantly on a non-standalone basis (NSA) meaning it relies on the existing 4G network and equipment. Over the next 12 to 18 months, we expect to see increased roll outs of 5G networks in terms of both coverage, and subsequently, capacity. In the US, this will be seen as a return of the "map wars" of the 4G cycle in which they heavily marketed their coverage by painting the map of the US Verizon red, AT&T blue, and T-Mobile magenta.

To be clear, there will be coverage, with AT&T and T-Mobile US already marketing a coast-to-coast 5G wireless, but "coverage" should not be confused with capacity, and many 5G subscribers will likely spend much of their wireless lives operating on a 4G network for some time. Full realization of the 5G experience in mobile will require the use of additional spectrum, deployment of new 5G technologies such as dynamic spectrum sharing, and the build out of small cells (Fig 1) that provide massive bandwidth over relatively small areas.

Advertising for 5G by carriers has focused primarily on consumers, and for good reason given that consumers represent the majority of wireless subscribers. However, we expect 5G smartphone adoption will be slower than many investors expect for two primary reasons.

Fig. 1: Small cell deployment still at nascent stage, but high growth ahead



Source: Bloomberg estimates, UBS

First, while we are bullish on 5G longer-term for the multiple revenue streams it will support (mobile, fixed wireless access, and massive IoT), we believe most consumers will be underwhelmed by a lack of compelling new services.

Second, 5G device prices are expected to carry a significant premium to 4G devices, and this is expected to help drive a recovery in the smartphone market. However, we believe that premium priced devices will only serve to limit consumer demand broadly and ultimately necessitate lower ASPs than many currently expect for next generation devices. In our view, these factors likely mean that our thesis of "peak smartphone" is intact as a significant ramp in 5G unit demand will likely require lower ASPs, resulting in a continuation of overall tepid trends.

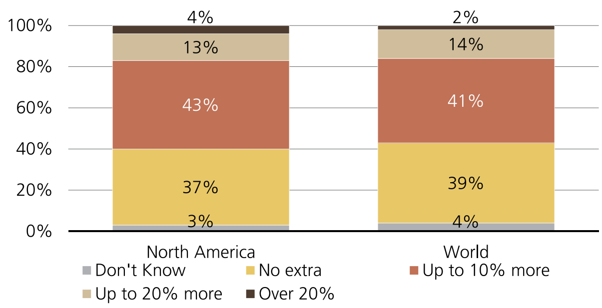
5G technology is ripe for adoption but we believe the industry will experience a slower ramp than previous cycles due to moderate consumer adoption. According to the GSMA Mobile Economy 2020 report, slightly more than 40% of North American consumers intend to upgrade to 5G. The US 5G awareness and upgrade intention rate falls below that of China and Korea but surpasses other developed countries in both awareness and intention by a large margin. Countries including Canada, Japan, and

Germany fall below the global averages on both 5G awareness and upgrade intention.

Additionally, many consumers are not overwhelmingly enthusiastic to get 5G. Out of those 40% of North Americans intending to upgrade to 5G, a significant portion is not willing to pay a premium (Fig 2). Based on the GSMA survey, we believe there is potential for 5G ARPU gains but the potential price increase would not be large enough to offset the decline in 4G ARPU.

Against this backdrop, we are much more bullish on 5G infrastructure companies relative to their smartphone focused peers. Quite simply, we think investor sentiment on these companies has put the cart (smartphones) before the horse (infrastructure).

Fig. 2: Of those who intend to upgrade to 5G, a majority of people would pay no more than a 10% increase



Source: GSMA Mobile Economy 2020 Report, UBS

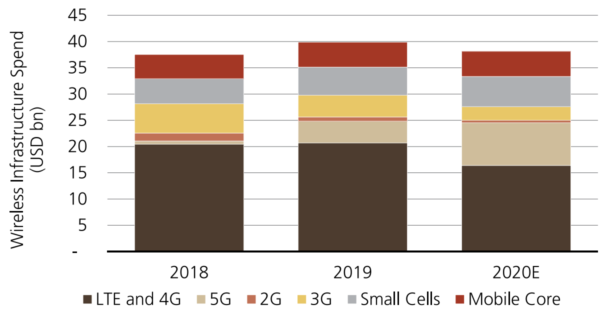
Theme drivers

Telecom network spending is focused on 5G. Gartner estimates that 5G infrastructure will triple over the next few years, more than offsetting the estimated -8% CAGR in legacy network spending.

Improving telecom cap-ex drives vendor revenue growth and margins. Equipment companies have generally tracked revenue trends. Telecom-focused vendors will benefit first and to the largest degree, followed by networking vendors and semiconductor providers. According to the GSMA Mobile Economy 2020 report, global wireless operators are expected to invest an astounding USD 1.1 trillion over the next five years (2020-2025) in mobile capex, with 80% focused on 5G networks. Equipment stock valuations should expand as revenue growth and margins improve.

Tower companies should continue to benefit from long-lived 4G networks as well as new 5G build-outs. While 5G networks will use a mix of small cells and macro base-stations, we expect there will be a very long tail of 4G network traffic (as seen in prior generations). Furthermore, tower companies have positioned themselves to provide small sites and other backhaul services.

Fig. 3: Wireless Infrastructure spending forecast



Source: Gartner estimates, UBS

Key Risks

There are several key risks that warrant monitoring in the months ahead. The companies included in our thematic list are exposed to a variety of factors that, if realized, could cause them to underperform.

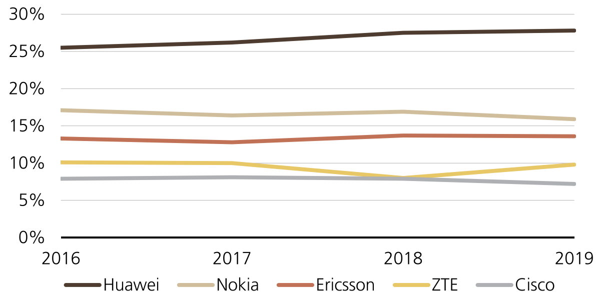
The first risk is that spectrum availability and cost may delay network build-outs. Globally, carriers and governments are wrestling with spectrum allocation. Spectrum has multiple trade-offs, but the best 5G experience will require high-frequency spectrum that is in the process of being auctioned. For example, the ongoing CBRS spectrum auction has a record number of bidders (271) and auction estimates have risen as high as USD 10 billion according to LightReading.

The second risk is the perception of investment opportunities. Telecom carriers have limited growth prospects and therefore will only invest aggressively in 5G if there are perceived new revenue opportunities. These could include premium 5G mobile pricing, success in fixed wireless access, or enterprise adoption of the internet of things on a substantial scale.

The third risk is competition. Although we believe the communication equipment industry's structure is much improved over the past 20 years, the industry is still competitive, and Huawei remains a significant potential disruptor given its scale and seeming willingness to accept lower margin revenue for the sake of share.

The last risk that we are watching is currency risk. The basket is unhedged, so there is currency risk relative to the Swedish krona and the euro.

Fig 4. Global telecom equipment market share



Source: Wall Street Journal, UBS

Appendix

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