

5G

Strategic importance, but lacking a near-term commercial driver

The elevation of 5G to the political agenda has less to do with the technology being more strategically important than in preceding generations and more to do with the fact that this is the first major technology transition cycle where China has leapfrogged the West.

Peak of the hype cycle?

Over the past 12 months, the profile of 5G has risen spectacularly. In part, this is just the (usual) hype cycle for TMT vendors and operators pushing the virtues of their latest technology refresh. More recently, 5G has taken on the mantle of a key strategic platform, as witnessed by Donald Trump's proclamation that 5G is a 'race the US must win' and the furore over Huawei being given permission to supply into the UK's 5G networks.

Still immature and a slow adoption cycle is likely

Despite this elevated profile, we believe that adoption and roll-out of 5G will take longer than many anticipate. Hopes that it will drive a major handset refresh cycle are fading into the more distant future as the reality of immature technology, high cost, lack of network coverage and a compelling use case becomes apparent. This has, by default, shifted the narrative to 5G as a crucial enabler of major technology themes such as autonomous transport, industrial automation, edge computing, AR/VR and fixed wireless access. However, the extent to which these use cases need 5G is debatable and the implementation cycle is likely to be long.

Government intervention shaping the supply chain

Given the lack of an obvious near-term catalyst to spur investment from the private sector, it will be a challenge for the West to catch up given the extent of Chinese government backing. Banning Huawei may or may not make our networks safer, but it will certainly slow their progress and reduce their influence (an observation not a recommendation). From an investment standpoint, it looks like winners and losers in the supply chain will be determined by who has access to the markets deploying the technology soonest, rather than by who has the best technology.

Conclusions

In our view, the current hype and strategic significance attributed to 5G belies a technology that delivers only modest benefits to end-users. We suspect that any disruption to service provider models, eg the boost to fixed wireless access (FWA) and Internet of Things (IoT) markets, will only be apparent in the long term and the lack of an obvious 'killer app' is likely to result in a slower roll-out than 4G. In the near term, investors should focus on the potential disruption to the hardware supply chain. We see little to prevent China from leapfrogging the US and Europe in network deployment and Huawei consolidating a leadership position. If current geopolitical tensions cannot be resolved, the polarisation of the global supply chain into 'China-based' and 'China-banned' regions could have a significant impact.

Edison themes



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Edison themes

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Analysts

Dan Ridsdale	+44 (020) 3077 5729
Dan Gardiner	+44 (020) 3077 5700

tech@edisongroup.com

5G – Peak of the hype cycle?

The wider strategic debate about 5G risks over-inflating the significance of the technology. In our view, enhanced speeds or differentiated service plans will offer little tangible benefit for most users; fewer still will be prepared to pay a premium. Costs and partial coverage make it very unlikely to be the platform of choice for IoT platforms for years to come. FWA models will need to be priced aggressively to compete with established fixed platforms. 5G is unlikely to open the floodgates for increased end-user spending.

The pioneer service launches highlight the commercial reality of the technology.

The first commercially available 5G services were launched with much fanfare by Verizon and three Korean operators (SK Telecom, KT and LG Uplus) last month. However, the Korean launch appeared to extend only as far as six Korean celebrities. The Verizon service requires users to have a clunky 5G Moto Mod handset accessory and reviews indicate patchy coverage, even within the 'select areas of Chicago and Minneapolis' with network availability.

Every generation of mobile technology has faced similar coverage and hardware cost issues, but the context for 5G is different. In a declining handset market with lengthening replacement cycles, the industry already has a bill of materials problem. We estimate that 5G currently adds \$100 to the handset cost. While Samsung and OnePlus have committed to launching US devices in 2019, Apple has conspicuously avoided a similar announcement and appears to be concluding that the current business case/price premium is unjustifiable.

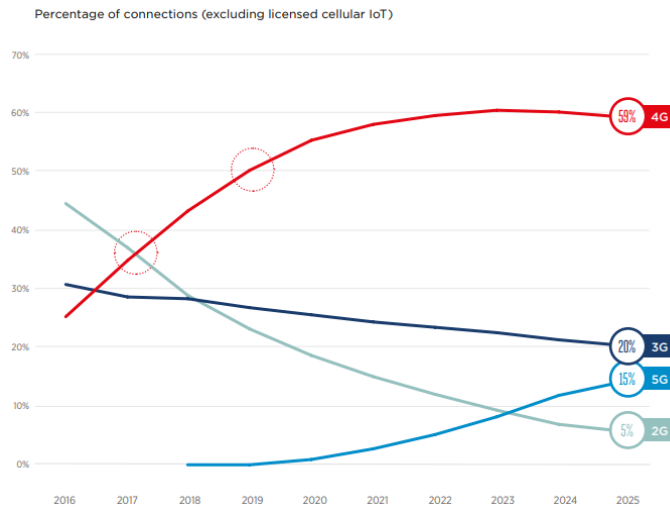
In addition, rolling out 5G network coverage in mid-range frequency bands (ie 3.5Ghz in the US) requires a significantly denser network infrastructure. Qualcomm estimates that 5G base stations must be around 100–200 metres apart to deliver the same coverage as 4G. Operators will essentially need to double base station density, substantially increasing the cost and deployment time. 5G technology, when accompanied by additional spectrum, could play an important role in alleviating congestion in network hotspots. This suggests a tactical roll-out rather than blanket coverage. 5G is likely to remain an urban phenomenon for the foreseeable future.

The elephant in the room – the lack of a compelling use case

Both the handset and network issues will be resolved over time as the cost of technology falls and older infrastructure is depreciated. However, the rate at which this happens ultimately hinges on end-user demand, driving scale economics. The lack of an obvious 'killer application' suggests this will be nowhere near the pace of LTE (4G).

4G (LTE) enjoyed a rapid uptake cycle, surpassing one billion subscribers within three years of launch, in a growing smartphone market with rising social media-driven video usage. LTE and Wi-Fi are already good enough for 4K video when coverage is good, and capacity and coverage are the main constraints, not the bearer technology. The adoption cycle for 3G, which lacked a killer application, was much slower, taking around seven years to reach one billion subscribers. While the GSMA's forecasts already imply an uptake cycle much more akin to 3G than 4G, expectations in some industry and investment circles seem significantly more optimistic.

Exhibit 1: Mobile connections by generation



Source: [GSMA Intelligence](#)

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There is some promise for 5G operating as FWA, a replacement for broadband in underserved low-density (rural) markets, where the economics will never justify the costly fibre deployment. However, in most countries this is a niche market and experience suggests that dislodging incumbent suppliers requires substantial pricing discounts.

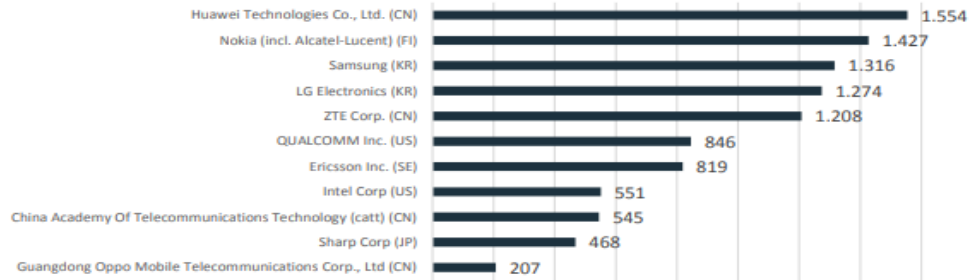
A reshaping of the industry nonetheless

If the consumer experience and benefits of 5G are modest, the impact of the shift to the technology on the supply chain, even if it is gradual, could be more profound. The first victim was announced last week: after years of trying to establish its handset business, the settlement between Apple and Qualcomm is forcing Intel to walk away from 5G modems (the shares rallied modestly on the day). Ericsson has already warned investors that securing 'strategic' 5G contracts will compress gross margins in 2019, with the benefits (hopefully) recouped later. The transition to 4G/LTE decimated modem competition in semiconductors, with Qualcomm emerging the victor. The transition to 5G opens up similar opportunities for large share shifts in both the handset and network supply chain.

Governments shaping the landscape

Potentially the most significant shift is the rise of the Chinese infrastructure and handset industries to the status of genuine market leaders, IP holders and agenda setters. Huawei is the biggest contributor to 5G standards and now the largest 5G patent holder. ZTE, Oppo and others are also prominent. 5G is a central element of the China government's drive to establish global technology leadership. It is embedded in the Made in China 2025 and Five-Year Plan initiatives, and is backed by a US\$400bn investment budget. The pace of deployment in China, together with the infrastructure vendors and suppliers chosen, will play a huge role in shaping the global roll-out of the technology.

Exhibit 2: Top 5G standard essential patent owner as to the number of patent families



Source: [IPlytics](#)

In the battle for supremacy between China and the US, 5G – and Huawei in particular – has taken centre stage. US operators are banned from deploying Huawei on security grounds, but the government is now lobbying its allies hard to adopt a similar stance. The recent sacking of Gavin Williamson as UK Defence Secretary for (directly or indirectly) leaking plans to allow Huawei to help build the UK's 5G network highlights the extent to which this has been elevated on the political agenda.

Trade barriers will potentially affect supply chains at the component level. While overseas infrastructure vendors are not precluded from selling into China, in reality they will be feeding off the domestic providers' scraps. Conscious of the US being left behind, Donald Trump has proclaimed 5G as a 'race the US must win' and announced an accelerated 5G spectrum auction. Short of rekindling the nationalized roll-out idea, a commercially driven 5G deployment is likely to lag substantially behind peers. A recent Deloitte study highlighted that other Asian countries including Japan and South Korea are also outpacing the US in deploying 5G. Ericsson believes that Europe is even behind the US in the pace of deployment.

Conclusion

In our view, the current hype and strategic significance attributed to 5G belies a technology that delivers only modest benefits to end-users. We suspect that any disruption to service provider models, the boost to FWA and IoT markets for example, will only be apparent in the long term, and the lack of an obvious 'killer app' is likely to result in a slower roll-out than 4G. In the near term, investors should focus on the potential disruption to hardware supply chains. We see little to prevent China from leapfrogging the US and Europe in network deployment and Huawei consolidating a leadership position. If current geopolitical tensions cannot be resolved, the polarisation of the global supply chain into 'China-based' and 'China-banned' regions could have a significant impact.

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