2019

TRENDS TO WATCH
ASIA

5G AND IOT GAIN MOMENTUM, BUT ECOSYSTEM FRAGMENTATION THREATENS

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Summary

Catalyst

The finalization of Release 15 of 3GPP standards in September 2018 will be a catalyst for 5G launches in 2019. Spectrum is already available in several markets, and operators are announcing plans for network investment, including sharing of infrastructure. Talk is turning to action.

The Internet of Things (IoT) already has momentum in Asia, which dominates IoT rollout of vertical industry applications. The launch of 5G will eventually provide a new and better platform for IoT, and allow for new industrial use cases to emerge. 5G is the basis of an ecosystem, not just a technology. It will support a host of industrial applications in agriculture, manufacturing, transport, and smart city management that can help boost Asia's sluggish national productivity performance.

The emerging threat to this ecosystem is the fragmentation of technology markets. Australia recently blocked Chinese vendors from participation in 5G, and Canada and India are rumored to be considering the same move. The risk here is that the global ecosystem for 5G industrial applications could ultimately be split, eroding economies of scale and other synergies. This would raise 5G network costs and make it harder to develop the new "Industry 4.0" applications needed to boost industry efficiency.

Ovum view

5G and IoT will be major platforms for the next generation of industrial innovation, and their progress in Asia are two of the trends to watch that we have selected for 2019. They are key elements of the emerging ecosystem for enterprise digitization that will drive productivity improvement through so-called "Industry 4.0" transformation. Asia's launch of 5G and its outsized presence in IoT development (especially in China) make Asia the epicenter of this change.

Asia is also the epicenter of a potential fracture of this ecosystem. Rising concerns about national security of networks have led Australia to effectively ban Chinese vendor participation in 5G networks, and it may not be the last country to take this step. This is a step back from the globalization that has driven efficiency and innovation in the global telecoms industry over the last few decades, and one that may have significant and negative consequences for global technology development if not managed carefully.

Key messages

- **5G rollout will begin at last.** The finalization of standards and the resolution of spectrum access have laid the foundations for a 5G push in 2019 and 2020.

- **Asia will retain and deepen its IoT leadership.** Asia is a clear global leader on IoT, with China alone accounting for around half of global machine-to-machine (M2M) cellular connections. Scale and a head start will ensure Asia retains this lead.

- **Security issues and geopolitics are putting pressure on the global technology ecosystem.** Recent decades have seen the emergence of a global market for technology, which has lowered costs and accelerated innovation. This could be threatened if vendors are excluded from supply chains.

Recommendations

Recommendations for operators

When 5G is launched, the initial business case for investment will include data offload from 4G networks and fixed wireless access. Both are niche propositions, and we do not anticipate new revenue from 5G initially. Later, stronger consumer data demand and new use cases for enterprises will emerge. This all means that 5G rollout economics will take time to develop.

Operators should therefore consider how to pace and organize 5G rollout. We do not recommend rapid national-scale rollouts; rather, we expect staged rollouts driven by actual and predictable demand. Operators should also seriously consider engaging in infrastructure sharing with other MNOs to improve network economics and accelerate 5G coverage.

Operators also need spectrum to launch 5G. While some markets have seen 5G spectrum allocated or auction dates announced, others are lagging in this area. Operators need to maintain pressure on regulators to expedite 5G spectrum allocation.

Recommendations for vendors

Much of the technological work to integrate 5G and IoT will come from the vendors. However, in addition to technological excellence, vendors can contribute to operator adoption of 5G by demonstrating use cases and business cases for vertical applications. The B2B2C perspective that has informed vendor investment in IoT technologies must also be carried into 5G. This will work most effectively if vendors are part of larger industry collaborations. If necessary, vendors should initiate and promote such collaborations.

Successful global collaborations have contributed greatly to the success of technologies such as 3G, 4G, and now 5G, and of the vendors who implement them. The same will be true of IoT. The emerging tendencies toward fracturing of the global technology ecosystem threaten long-term growth prospects for the tech industry and for the global economy in general. While national security is important, it is also important to understand the costs of different approaches. As key players in the technology industry, vendors should place themselves at the forefront of this debate.

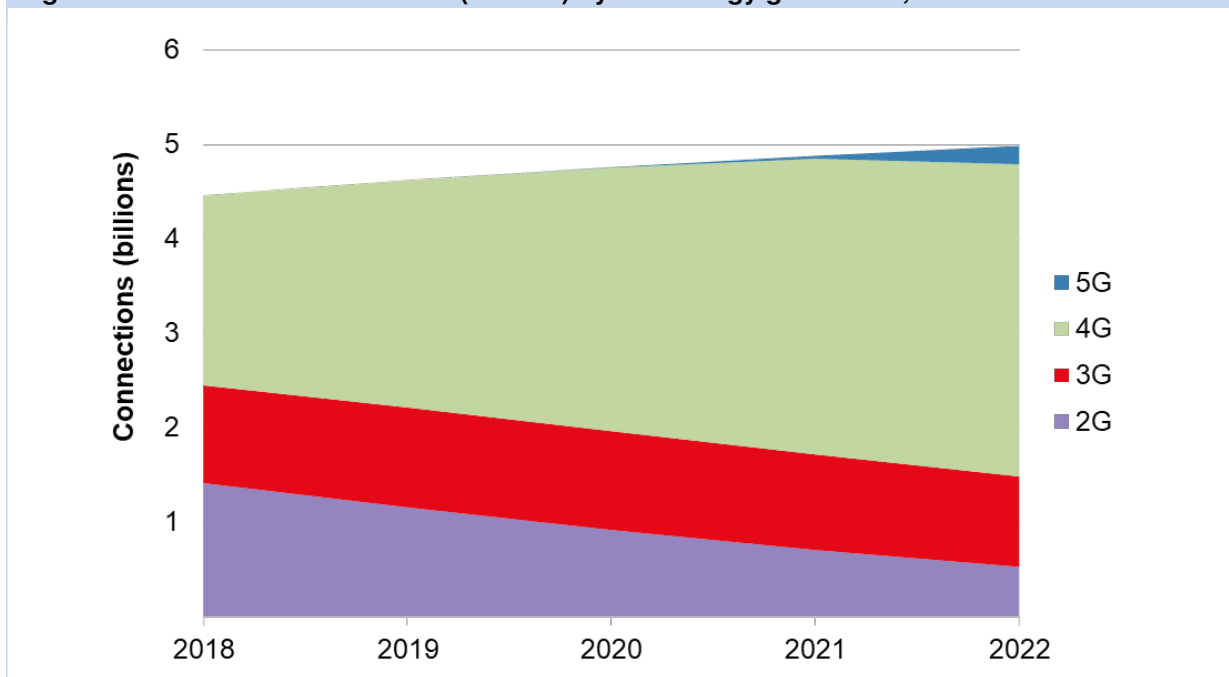# 5G hits the market

5G growth will be slower than LTE

The region's first 5G network is expected to launch in 2019. Leading markets will be Australia, China, the Philippines, South Korea, and Taiwan. In 2020, we expect a larger number of launches as spectrum, network equipment, and devices become more widely available.

The picture that emerges from Ovum's forecasts is that 5G will be primarily a developed market phenomenon until after 2022. Among the largest Asian markets, we forecast that Japan, South Korea, and China will lead deployment in the medium term, hitting 22%, 20%, and 8% 5G penetration by 2022, respectively. In contrast, we expect India and Indonesia to remain focused on expanding and deepening their 4G networks over the next five years.

While 5G will launch in 2019–2020, actual 5G connection numbers will rise slowly to 2022, reaching only 4% of connections across Asia. The main reason for this is that business cases for industrial applications that can exploit 5G's capabilities for network slicing, lower latency, and high reliability will take several years to fully emerge. Until they do, the business case for the underlying 5G infrastructure will rely on established services such as consumer connectivity and fixed wireless access, which are currently being met by LTE in many Asian markets.

This means that we will not see the same rush to 5G national coverage that we saw with LTE. Firstly, the higher frequencies being used for 5G make it much harder to gain wide area coverage without extra base stations. Secondly, 5G's initial role as an LTE offload technology will see early rollouts focus on high traffic areas where LTE networks are under strain.

Figure 1: Asia mobile connections (billions) by technology generation, 2018–22

Source: Ovum

Operator lessons from 4G

A slow expansion of 5G means that being first to market with 5G is less important than having a long-term strategy for 5G investment that creates value for customers. The rollout of 4G holds some important lessons.

Competition in the rollout of LTE showed the importance of maintaining a network advantage in terms of coverage, capacity, and speed. Because the quality of the mobile broadband experience relies heavily on network capability and capacity, network tests and consumer mobile broadband satisfaction tests will be even more important in the 5G world than for 4G or 3G. 5G devices will take time to roll out and become affordable, so customers can afford to wait to see whose 5G network provides the best experience. Who launched 5G first will be much less important than the long-term performance of the network.

The most successful LTE operators by subscriptions either quickly moved to price LTE at the same level as 3G after the first launch of the network, or launched LTE at no premium to 3G. LTE operators

have successfully signed subscribers up to higher-priced plans by including tangibly more value beyond an increase in speed (e.g. more data).

Operators have to communicate the enhanced 5G network experience effectively to end users. The most successful LTE marketing messages focused on the higher speeds of LTE, but this was most effective when it focused on improvements in user experience, such as faster website downloads, rather than emphasizing actual measured speed. In the case of 5G, improved video performance will be a key selling point.

Infrastructure sharing back on the agenda

In April 2018, South Korean operators SK Telecom, KT, LG U+, and SK Broadband announced their intention to jointly build a nationwide, shared 5G infrastructure to save an estimated KRW1 trillion ($935m) in capex over the next decade. This came after encouragement from the South Korean government to accelerate the 5G rollout and the commercialization of "Industry 4.0" innovations.

Infrastructure sharing for 5G is something operators should seriously consider, depending on their own circumstances. Since the business case for 5G is currently limited to LTE offload and fixed wireless access, infrastructure sharing is one way to improve ROI and accelerate rollout. In South Korea, rollout requirements brought this issue to a head, but it may also make sense in parts of markets where population density is lower and competing networks cannot be justified.
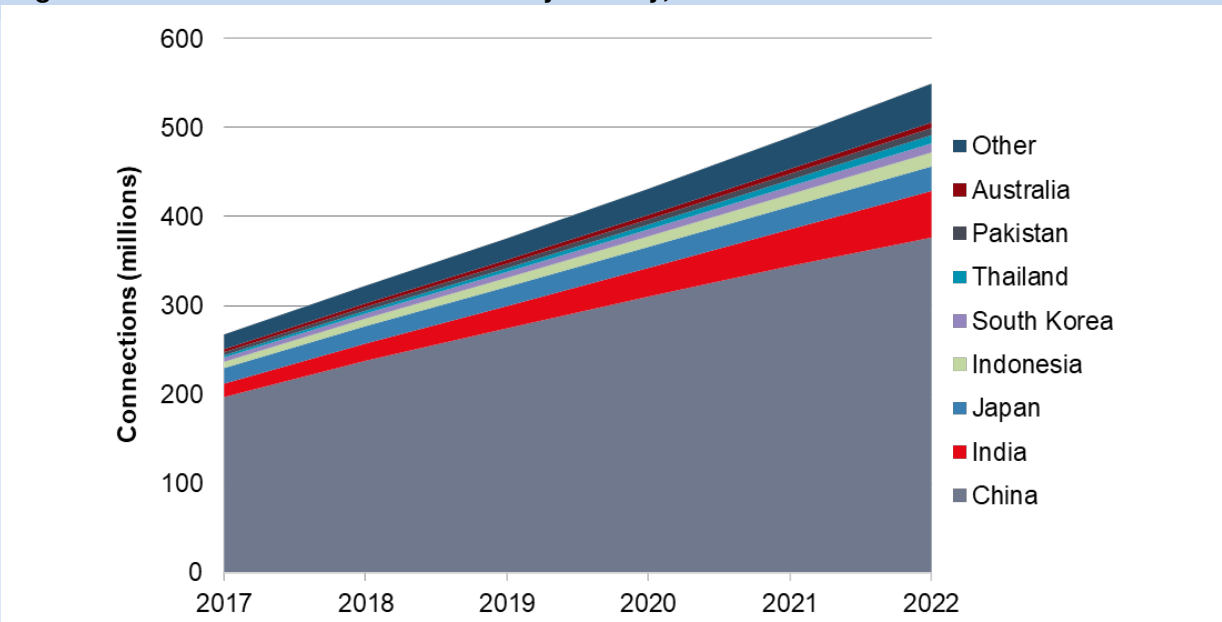
Spectrum is still needed

5G launches require spectrum. While some Asian markets have either auctioned spectrum (South Korea) or are close to doing so, others are lagging behind. There is a lack of urgency among some Asian regulators. Compared to the clear purpose that drove the APT 700 plan for LTE spectrum in Asia, 5G spectrum allocation appears slow and piecemeal. Given the long preparation time for auctions, this could lead to delays in 5G launches that extend well past 2020. It is important for both operators and key industry verticals such as transport and manufacturing to keep up pressure on regulators to deliver spectrum management that recognizes and supports the long-term economic potential of 5G.

IoT market development

Asia's IoT opportunity

Asia currently dominates IoT, and is being targeted by operators as a revenue opportunity. The scale of the opportunity in Asia is huge, and China drives the bulk of it.

Ovum estimates that Asia is the biggest region for M2M connections, with 52% of the global total at the end of 2017. China's M2M connections accounted for 74% of the Asian total and 36% of the global total, highlighting its importance as a global center of IoT innovation. Other M2M early adopters include Australia, India, Indonesia, Japan, New Zealand, South Korea, Thailand, and Pakistan.

Figure 2: Asia cellular M2M connections by country, 2017–22

Source: Ovum

In 2022, Ovum estimates that Asia will have retained this leadership, having essentially the same share of global M2M connections as in 2017. China will still account for the bulk of connections. This underlines China's leadership of IoT development in Asia.

Ovum's assessment is that the top IoT service providers in the region are currently Microsoft, IBM, Cisco, Huawei, GE, SAP, Vodafone, Oracle, Orange, and Nokia. Only two of these are telcos, and neither is Asian in origin. In contrast, the underlying M2M connectivity is dominated by telcos globally, and in Asia by the "big three" of China Mobile, China Telecom, and China Unicom.
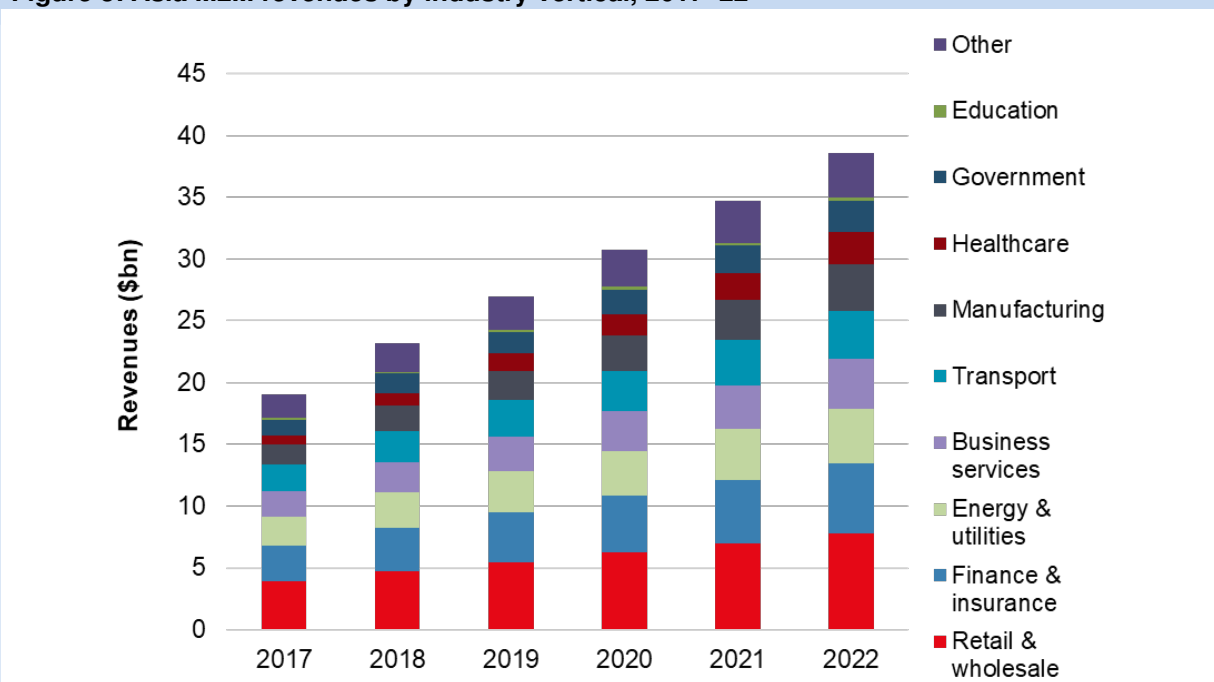
Opportunity for telcos

IoT offers several opportunities for telecoms operators. Network services and managed connectivity will constitute 25% of global M2M revenues in 2022, with applications development at 25% and systems integration at 50% making up the balance. Network and connectivity are core telco opportunities that can be pursued either as an input to large enterprise integrations or in partnership with platform providers and systems integrators.

Operators with capabilities in applications development and integration can aspire to bigger things, but will struggle to compete with the major platform providers outside niche markets where connectivity is central to operation. The biggest IoT opportunities are in integration between apps, back-end systems (legacy or otherwise), and supply chains, and these opportunities are highly competitive with many service integrators in the field. With big platform providers dominating large enterprise deployments, it is the mid-market that will be contested.

Vertical priorities in Asia

Ovum's forecasts for vertical M2M revenues (including basic network, managed connectivity, application development, and systems integration) show that retail and wholesale, finance and insurance, energy and utilities, and business services account for just over half of Asian M2M revenues, followed by transport and a long tail of verticals making up the balance.

Figure 3: Asia M2M revenues by industry vertical, 2017–22

Source: Ovum

It is important for telcos to think in terms of verticals because vertical specialization, along with scale, is key to telco IoT strategy. Certain industry verticals are driving growth in telco IoT contracts. Ovum's *IoT Service Provider Contracts Tracker* shows that the greatest number of publicly announced IoT contracts for telcos during 2017 came from a handful of areas, with smart cities, fleet and logistics, and asset tracking together making up more than 50% of announced contracts.

The rise of smart cities from fifth position in 2016 to first for announced service provider contracts last year reflects the increasing interest and investment in this area. Smart cities are providing telcos with opportunities to move up the value chain and deliver value beyond connectivity.

The further a service provider moves away from a pure connectivity and platform offer, the more vertically specific each service layer becomes. Most leading telcos are now narrowing down the number of verticals they address, recognizing the challenges of gaining a deep understanding of multiple industries. Typically, leading telcos are supporting the development of these vertical specializations through a combination of acquisitions, partnerships, and in-house innovation.

Those service providers that have achieved the greatest IoT success so far have utilized their scale for horizontal connectivity (and in many cases, platform) plays, alongside co-creating IoT solutions for specific enterprise use cases in certain verticals.

NB-IoT to play a strong role in Asia

As the M2M communications sector evolves to serve IoT, operator and vendor communities have ramped up efforts to meet the low-power, long-range needs of next-generation technologies optimized for certain M2M use cases. Existing unlicensed low-powered wide area (LPWA) network technologies, such as Sigfox and LoRa, were designed solely for machine-type communications and offer limited throughput and reliability.

NB-IoT, an LPWA network technology that leverages existing LTE networks for connectivity, is designed to support both massive IoT deployments and critical IoT use cases. Ovum's view is that NB-IoT has a good chance of becoming the dominant Asian technology for LPWA, though other standards for cellular and non-cellular IoT networks will still have implementations in niche segments. There has been significant commitment to the technology from telecoms operators and utilities, particularly in the dominant China market. Large chipset manufacturers such as Huawei, Qualcomm, Intel, ZTE, HiSilicon, Nokia Networks, NEC, Panasonic, MediaTek, Sony, and Quectel, and module makers U-blox, Telit, Sierra, and Gemalto have also committed to the development of NB-IoT.

While NB-IoT take-up in China is still small compared to the overall M2M connections base, we estimate that it reached around 10 million connections by the end of 2017, helping to fuel a 120% year-on-year IoT connection growth in China. The Chinese government has thrown its weight behind the technology and is targeting 600 million NB-IoT connections by 2020.

Emerging cracks in the global technology ecosystem

Security concerns restrict vendor market access

Australia's recent decision to effectively exclude Chinese telco vendors from 5G may be a harbinger of similar moves in other markets. Canada and India are also reviewing Chinese vendor participation in their telecoms networks.

The security concerns that have motivated these considerations are now being openly discussed. At a September 2018 meeting in Australia, the "Five Eyes" nations (Australia, Canada, New Zealand, the UK, and the US) agreed to "work together to protect critical infrastructure and support the development of secure critical infrastructure supply chains that are advanced, affordable, reliable, and trusted." It is not clear whether "securing supply chains" will mean complete exclusion of Chinese vendors, but events are pointing in that direction.

Of course, this kind of initiative cuts both ways. While non-Chinese vendors may benefit from Huawei and ZTE's exclusion from the Australian market, they should also be concerned about the possible implications for their own access to the China market and to other Asian markets where China's influence is growing.

In the background is the reality that 21st-century China will be the source of a growing share of new technologies and intellectual property. China is already the leading nation for IoT deployment, with around half of the world's IoT connections, and is a leader in the development of related enterprise applications.

Whatever the security issues (they are not all imaginary by any means), the telecoms industry will bear the brunt of any moves to restrict vendor choice and technology access. In Australia, it is acknowledged by telcos (off the record) that the decision to ban Chinese vendors will result in higher 5G costs as vendor competition will be muted. If this decision were replicated elsewhere, these costs will in turn flow through into vertical industries that rely on that infrastructure. This would disproportionately affect smaller markets that rely on a global vendor community to generate the economies of scale they cannot generate domestically.

Fragmentation of the global tech ecosystem?

This trend could lead to the emergence of political and technological spheres of influence that would fragment the global technology ecosystem. This would unquestionably be bad for global competition and for the technology ecosystem – and Asia will be at the epicenter of any future fracture.

Global competition between vendors has resulted in falling technology costs and higher rates of innovation for the telecoms industry, both inside and outside China. Apart from global competition, global cooperation on standards (such as the 3GPP process) has also increased economies of scale and reduced costs.

The balkanization of the global technology industry will place those benefits under threat. However, the world has not yet committed itself to this path. If it does so, either deliberately or thoughtlessly, the consequences will be large, and will hit the telecoms industry and its vertical industry clients hardest.

Appendix

Methodology

This report is based on desk research, interviews with Asian operators, vendors, and government agencies, and Ovum forecasts of key market trends.

Further reading

"Scale and vertical specialization are key to CSP IoT success," IOT003-000006 (March 2018)

5G: Regional and Global Approaches to a Technology Step Change, GLB007-000092 (July 2018)

IoT Service Provider Contract Tracker: 3Q18, IOT003-000013 (September 2018)

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