analysys mason

ANALYSYS MASON

QUARTERLY

Consulting and research specialists in telecoms, media and technology

ISSUE 4 OCT-DEC 2020

Contents

Established and emerging internet giants are driving demand for hyperscale data centres in China

Hamish Peddie, Manager, Consulting and Lim Chuan Wei, Partner, Consulting

Hyperscale data centre markets are driven by a select group of high-value, data-hungry customers. In China, this pool of companies is widening, while capacity demand from established companies shows no signs of slowing. As data centre builds move to satellite cities, operators must fulfil crucial success factors to thrive.

China is experiencing unprecedented and sustained growth in unicorn start-up companies

Unicorns are emerging in China at a faster rate than anywhere else in the world. These start-up companies that are valued at over USD1 billion are distributed across the country – the Greater Beijing area accounts for the largest concentration, with over 50 of these companies headquartered in the region. Meanwhile, there is no shortage of unicorns in the other data centre hubs of Greater Shanghai and the Greater Bay Area. This provides opportunities for regional and national operators to capture capacity demand that tends to originate locally before expanding geographically.

Opportunities for hyperscale operators exist across the lifecycle of these businesses

As these unicorn start-ups become successful companies, capacity requirements evolve and increase. Throughout the

Country	Development		
Public cloud	●●●●	●●●●	●●○○
	Single vendor	Multi-vendor	Multi-vendor
Direct colocation	○○○○	●●○○	●●●●
		Single vendor	Multi-vendor
Customer approach	Direct adoption of public cloud services from a single vendor for all systems and applications. Cost effective and rapidly scalable.	Adoption of multi-cloud approach for expanding service set and cloud needs. Migration of some services and systems to private cloud via colocation with single vendor.	Commissioning of BTS facilities from data centre operators, or significant hyperscale colocation demand in existing facilities. Diminishing use of public cloud.
Level of opportunity for data centre vendors	**Low** Aggregation of long tail of SMEs driving cloud service provider demand. Low single-company impact.	**Medium** Material impact of single-company public cloud demand. Moderate hyperscale demand directly from the customer – opportunity to grow with customer.	**High** Opportunities for multiple vendors to benefit from significant direct capacity demands. Vendor from growth phase is likely to be at an advantage initially.

Increasing capacity dependence
○○○○→●●●●

FIGURE 1: ILLUSTRATIVE CAPACITY OUTSOURCING TRAJECTORY OF A CHINESE UNICORN [SOURCE: ANALYSYS MASON, 2020]

lifecycle of these businesses, hyperscale data centre providers can benefit both directly and indirectly from this growth (see Figure 1). Early-stage ventures are unlikely to have cause or means for hyperscale colocation, but an estimated 85% of small and medium-sized enterprises (SMEs) in China go directly into the public cloud. In aggregate, this creates a long tail of cloud demand and drives notable hyperscale capacity demand from the cloud service providers. In the growth phase of these unicorns, capacity demands justify direct hyperscale colocation agreements and public cloud becomes less attractive as costs continue to scale with demand. Upon reaching sufficient scale, these unicorns are likely to commission built-to-suit (BTS) facilities or act as large anchor tenants in hyperscale facilities. The primary vendor from the growth phase stands to benefit greatly if it can defend its share-of-wallet (most customers will follow a multi-vendor approach to some extent).

Established names still drive most of the demand for hyperscale capacity in China

Data centre providers can grow alongside these emerging internet companies. Meanwhile, demand among the most established Chinese giants also continues to increase – Alibaba's data centre demand has increased by an estimated 220MW since 2016. With several hyperscale BTS facilities currently under construction, this shows no sign of decelerating. Internet giants in China increasingly favour an outsourcing approach to data centre construction over self-building, as it allows them to focus on core business and to reduce time-to-market. Over time, these customers tend to favour a multi-vendor strategy, providing opportunities for new customer acquisition by DC vendors and increasing pressure on existing vendors to maintain share-of-wallet.

Regulation and ROI are driving providers to build data centres in satellite cities

Scarcity of land and power consumption of data centre facilities has prompted Chinese authorities to limit further builds in Tier 1 cities, for example banning development and expansion of facilities in six districts in central Beijing. This regulation has encouraged growth of data centre clusters in satellite cities outside these Tier 1 cities. The internet giants are regularly commissioning BTS facilities in Zhangjiakou in Greater Beijing and Nantong in Greater Shanghai, among several other clusters.

increasingly favour these satellite cities. Wider availability of cheaper land, good connectivity options and abundant power supply also make regions like Zhangjiakou attractive, as potential returns on investment appear greater. As has always been the case, ambient temperature and correlated power usage effectiveness also play a significant role in the location decision.

Time-to-market is now the single greatest success factor

Emerging and established internet giants, and cloud service providers, will continue to drive hyperscale demand in China – Analysys Mason forecasts ~30% CAGR growth in hyperscale capacity demand to 2024. Several factors will determine data centre operators' ability to capture market share:

- **Time-to-market.** Capacity demands of hyperscale customers evolve rapidly, while provisioning timelines including shell construction and fit-out are shortening (now often less than 6 months in China). This has become the primary success factor in customer acquisition and defending share-of-wallet.
- **Location.** For customers, this is important in terms of the availability of connectivity and power and, to a certain extent, proximity to operations and end users. However, latency requirements can generally be met nationwide from each regional data centre hub.
- **Customer relationships.** Even in China, hyperscale customers are scarce due to scale requirements. As a result, success is often contingent on the ability to nurture and maintain close relationships with a select group of companies.
- **Specification.** Hyperscale customers have much higher requirements in terms of power density, PUE and facility design.
- **Pricing.** This is generally not the primary driver of vendor choice but the ability to provide significant volume discounting can be advantageous.

A comprehensive assessment of market opportunities should consider the positioning of operators across these criteria.

Analysys Mason has conducted multiple due diligence exercises and market studies on data centres in China and Asia–Pacific for investors and has a strong understanding of the key drivers and challenges that need to be evaluated.

Questions? Please feel free to contact Hamish Peddie, Manager, Consulting at hamish.peddie@analysysmason.com or Lim Chuan Wei, Partner, Consulting at lim.chuan.wei@analysysmason.com

Oslo Metro will use commercial mobile networks for signalling and train control

Jon Ivar Kroken, Principal, Consulting

The Oslo Metro is moving from conventional railway signalling to a modern, communication-based signalling system that uses radio communication to transfer information for real-time train control. Communications-based train control (CBTC) is the choice of mass-transit metro operators today, with over a hundred systems currently installed worldwide. Oslo Metro's new system will replace the old signalling systems, some of which date back to the 1960s, enabling increased line capacity by allowing shorter distances between metro trains travelling on the same line. This safety-related, time-critical application for train control imposes stringent reliability, availability and quality requirements on the radio communication technology used. IEEE 802.11 Wi-Fi has so far prevailed as the preferred radio technology for CBTC, despite being originally developed for stationary use. The Wi-Fi solution comes with a proprietary solution for hand-over between cells along the metro line. More recently we have seen that an increasing number of metro operators in China are using private LTE networks for CBTC.

One of the main reasons for choosing Wi-Fi as the radio communication technology is the freely available industrial, scientific and medical (ISM) frequency bands (CBTC suppliers most commonly use the 2.4GHz and 5GHz bands). This means that metro operators do not have to acquire a licence from a regulatory body. A serious drawback is that if a metro operator can use it for free, so can everybody else (including train passengers using Bluetooth headsets, for example). Observations from other metro operations have raised concerns about interference. Hence, the level of availability of service using these frequency bands cannot be guaranteed.

In contrast, mobile operators typically have exclusive licences over several frequency bands, which enables them to secure the quality of its services for wide-area use. In addition, the use of several frequency bands provides diversity, which can increase the robustness of the solution.

Compared to proprietary solutions for hand-over between cells in a Wi-Fi system, a standardised 3GPP mobility solution already exists and is considered by Oslo Metro as a more robust and future proof choice. These mobile networks are already built and will be maintained for all users, not only Oslo Metro. Hence, the cost is shared between numerous customers (rather than just CBTC users).

The Oslo Metro considers using existing mobile networks to be 'more future-oriented, more reliable and less costly'

The Oslo Metro awarded the main contract for wireless communication in its new CBTC system to the public mobile operator Telia on 19 June 2020. The contract includes strict availability and service-level requirements that require Telia to ensure full mobile coverage at all times across the entire metro and that signalling data is prioritised. In addition, the Oslo Metro will make use of additional public mobile networks to ensure system reliability.

At the public announcement of this contract, the Oslo Metro CEO, Cato Hellesjø, said: 'The level of mobile network coverage in Norway is world-class, and its mobile networks are characterised by their advanced services, good coverage and high level of stability. By controlling our new signalling over an existing mobile network, we will be using a tried-and-tested technology in a smart way. Norway's mobile networks have already been built and the cost is shared among numerous customers. Sporveien (the Metro) will benefit from technical and commercial developments in the mobile market.'

Sporveien delivers tram, metro and bus transport services, principally in Oslo and Viken. The company also owns and manages the tram and metro systems' real estate and infrastructure. Sporveien is Norway's largest provider of public transport by number of journeys, and delivered 269 million passenger journeys in 2019. The group has around 3350 employees and reports annual revenue of NOK4.8 billion.

"It has been important for Sporveien to have access to leading competence in telecoms solutions, market experience and contract management."

Oslo Metro has co-operated with CBTC suppliers, mobile operators, the telecoms regulator, the government and other stakeholders that are considering the use of commercial networks for their communication solutions. As part of the process, the Oslo Metro has conducted a coverage test on all metro lines, testing signal strength, signal-to-noise ratio, how many cells cover each point on the metro line, round-trip delay and packet loss statistics. In addition, CBTC suppliers have conducted integration tests with the mobile operators.

Contract design is instrumental in achieving the benefits of using commercial networks for specialised services

The CBTC system requires reliable and high-quality radio communication, and mobile operators will need to invest in order to offer the required service. A CBTC operator may decide to use more than one network to allow for lower requirements imposed on each network. The simple reason is that the system can accept more errors from a single network as the error is not likely to happen at the same time on the other network. Hence, the service offered from the MNOs will be closer to ordinary mobile usage and potentially at a much lower cost for the MNOs. The total cost to cover the requirements for a CBTC system can therefore be much lower by using several networks. However, it introduces a new challenge. The number of potential contractors will affect the intensity of competition. This can be critical in most markets where there may be only three to four MNOs that can offer the service. This means that the market situation must be taken into consideration when deciding on the required network performance, contract design and procurement design.

Analysys Mason's Oslo office is involved in this project. Jon Ivar Kroken is the project manager for the datalink solution to the new signalling system.

Questions?
Please feel free to contact Jon Ivar Kroken, Principal, Consulting at jon.ivar.kroken@analysysmason.com

Mobile network operators have an opportunity in the 5G/LTE private network market

Jacopo Pichelli, Manager, Consulting and Malek El Damouri, Associate Consultant, Consulting

Enterprises in the industrial sector are undergoing digital transformations to improve the customer experience and the agility with which they can do business. Private networks that use LTE and/or 5G have the potential to provide reliable, high-performance, secure wireless communications, thereby fulfilling enterprises' business-critical and mission-critical needs.

Private LTE/5G networks can provide significant benefits to industrial users

A private network uses localised network infrastructure (such as small cell access points) to provide coverage and connectivity for private use. It functions similarly to a scaled-down version of a public cellular network and can be based on licensed, unlicensed or shared spectrum. Some international spectrum authorities have set aside spectrum for localised services to further enable private networks, while others have promoted spectrum leasing and have made other non-mobile bands available for sharing. For example, the regulator in Germany has allocated 100MHz of spectrum in the 3.5GHz band for localised services,[1] while the regulator in the UK has promoted spectrum sharing by making spectrum in the 3.8–4.2GHz band, part of the 1800MHz band and part of the 2300MHz band available on a shared basis for localised use.

Private networks (sometimes referred to as campus networks) can potentially deliver several advantages to industrial users in terms of efficiency and security, depending on the requirements of those users and the network architecture employed. Figure 1 below outlines the potential benefits of private networks.

Large enterprises in the countries that are leading ICT development have shown interest in private networks

Companies such as Bosch, Daimler and Siemens argue that the high performance, low latency, reliability and security of private networks enables a whole host of new use cases to be addressed, which in turn allows industries to tap into business- and mission-critical applications that might not have been feasible otherwise. Some of these applications are common to industries in a number of countries. Figure 2 shows a non-exhaustive list of such applications.

Several globally renowned enterprises have started to use private networks, particularly those in the USA, Germany, Finland and Japan. Some vendors and enterprises are working with operators to deliver private LTE and 5G networks to the industrial sector, while others are working independently.

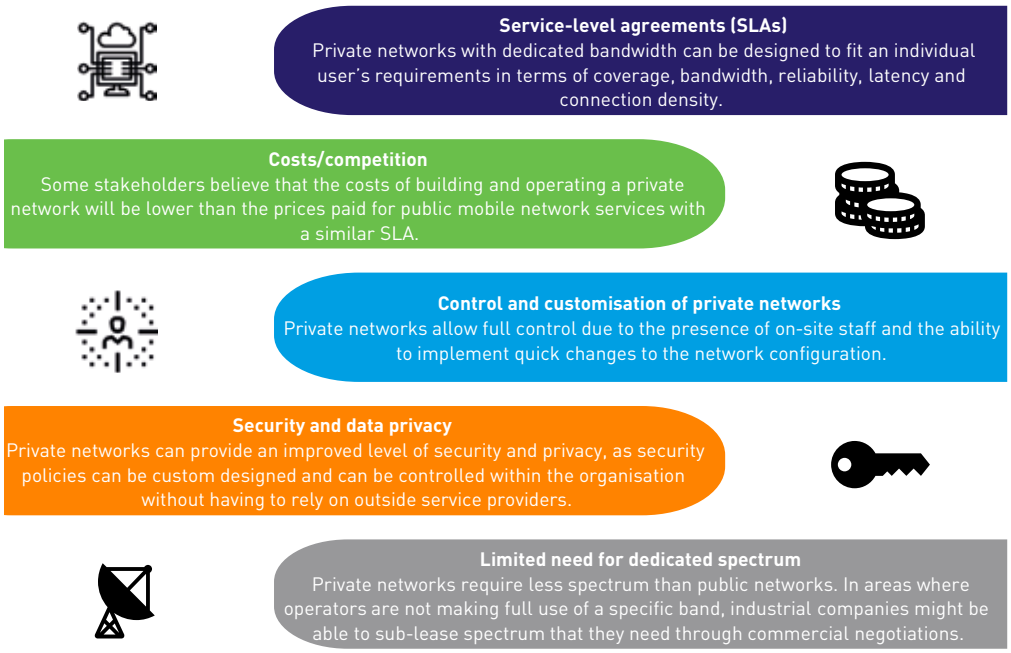


FIGURE 1: POTENTIAL BENEFITS OF PRIVATE NETWORKS [SOURCE: ANALYSYS MASON, 2020]

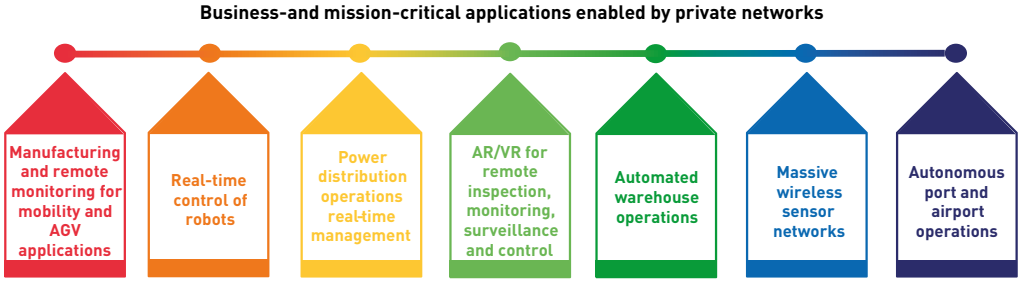


FIGURE 2: EXAMPLES OF BUSINESS- AND MISSION-CRITICAL APPLICATIONS THAT ARE ENABLED BY PRIVATE NETWORKS
[SOURCE: ANALYSYS MASON, 2020]

Early market observations indicate that there is an appetite for private networks

There have already been over a hundred announcements of LTE/5G private network launches. Initial market observations suggest that there is an appetite for private networks among enterprises, particularly those in industries such as manufacturing, transport, mining, the public sector and utilities. Indeed, these industries account for close to 90% of all publicly announced private networks worldwide. Additionally, 16% of the networks that have already been announced will be led by operators.

Operators must use their dedicated commercial teams and industry knowledge to offer competitive private network solutions

Industrial users and large enterprises are interested in investing in their own private networks in order to have control over their own infrastructure. Coupled with vendors' ability to help them to set up their own private LTE and 5G networks, this could potentially remove operators from the equation altogether. Enterprises may still consider partnering with mobile network operators to build their private networks, but they may similarly consider infrastructure vendors, small cell vendors or specialist system integrators. Operators must therefore be able to provide industrial users with a competitive and attractive proposal.

The four leading attributes that give operators a competitive advantage and enable them to tap into this market are as follows. –

- **The ability to use licensed spectrum.** Operator-licensed spectrum is available and unlikely to suffer from interference. This is currently operators' biggest advantage because unlicensed/enterprise-licensed spectrum options have not yet become available for private networks in most countries.
- **Route to market.** Operators already have relationships with many potential private network customers.
- **Deep knowledge of mobile network design and operations.** Operators have expertise in the mobile workforce and in the delivery of evolving network architecture and its operation.
- **The ability to integrate with wide-area public cellular services.** This is particularly important for customers that are seeking wide-area mobility services.

To make the best use of these advantages, operators will need to develop private network solutions that satisfy enterprise demands for a range of network characteristics (such as security, SLAs and flexibility), while also balancing the costs and benefits from the enterprise's point of view. If the ownership and operation of private networks is outsourced to operators, enterprises can focus entirely on their core competencies.

To be in a position to capture this opportunity, operators need to initiate and execute research, and complete technical, architectural and product development. It is critical that operators effectively leverage assets and know-how in order to tap into this market; to do so, they may need to implement dedicated commercial teams with significant industry knowledge of the latest technologies and use cases, both from a technical and a financial point of view. This will ultimately allow operators to develop attractive enterprise private network solutions, thereby ensuring them a place within the ecosystem.

Analysys Mason works closely with stakeholders across the private network value chain, including regulators, vendors, system integrators and operators. Recent consulting projects conducted include providing commercial support in the enterprise private network segment (identifying sectors, needs and clients) for enterprises across Europe and the Middle East, and providing commercial support for pricing and negotiations between operators and enterprises (including an engagement with a leading mobile operator to support commercial negotiations with an infrastructure player). Extensive research on private network-related topics is also available through Analysys Mason Research.

Questions? Please feel free to contact Jacopo Pichelli, Manager, Consulting at jacopo.pichelli@analysysmason.com or Malek El Damouri, Associate Consultant, Consulting at malek.damouri@analysysmason.com

[1] 80MHz of the 100MHz allocated for localised services is shared with fixed-wireless access (FWA) connectivity providers.

Supply meets demand: how internet companies' investment in submarine cables is improving connectivity in Asia-Pacific

David Abecassis, Partner, Consulting

We have written for several years about how infrastructure investments by internet companies are benefiting consumers and telecoms operators by improving the performance of content delivery, and how this investment is driving consumers' willingness to pay for internet access. In Africa, Facebook and Google are already investing in connectivity infrastructure projects alongside traditional operators such as Liquid Telecom. More submarine cables are in the works, driven by demand for internet and cloud services, developed either as private cables (for example, Google's Equiano) or consortia with telecoms operators (such as 2Africa, in which Facebook is an investor).

In a recent paper for Google, Analysys Mason looked at the network infrastructure that Google has been building since 2010 across Asia–Pacific (APAC). A large proportion of the investment that Google made over this 10-year period focused on international capacity, which (in a region where most countries are coastal and/or archipelagos) largely means submarine cables. We worked with Professor Neil Gandal of Tel Aviv University, who developed a robust economic analysis that linked Google's investment in cables with connectivity outcomes for countries where Google-invested cables land today.[1]

The larger internet companies (content and application service providers or CASPs) serve a significant proportion of internet traffic – up to 43% in 2019. Over the last 10 years, these companies' infrastructure investments have helped to bring their content close to end users, primarily in caches within operators' networks, and in regional points of presence (PoPs). In order to connect these PoPs to their networks and, in particular, to their data centres, these companies have long invested in capacity in the form of long leases or IRUs[2] on terrestrial and submarine cables deployed and operated by telecoms operators. Internet companies (CASPs) have been investing directly in new submarine cables over the 10 years (see Figure 1). The capacity created by these investments is significant, and during this same period, has amounted to 34% of the new potential capacity brought in by new cables.

This means that large internet companies are, in practice, increasingly self-supplying their bandwidth needs. These companies contribute a large and growing share of demand for international capacity, investing directly to satisfy part of this demand, even as they continue to lease large amounts of capacity from telecoms operators. Their position in both the demand and the supply side of the international capacity market helps to accelerate the supply of new capacity (Figure 1) and help reduce prices.

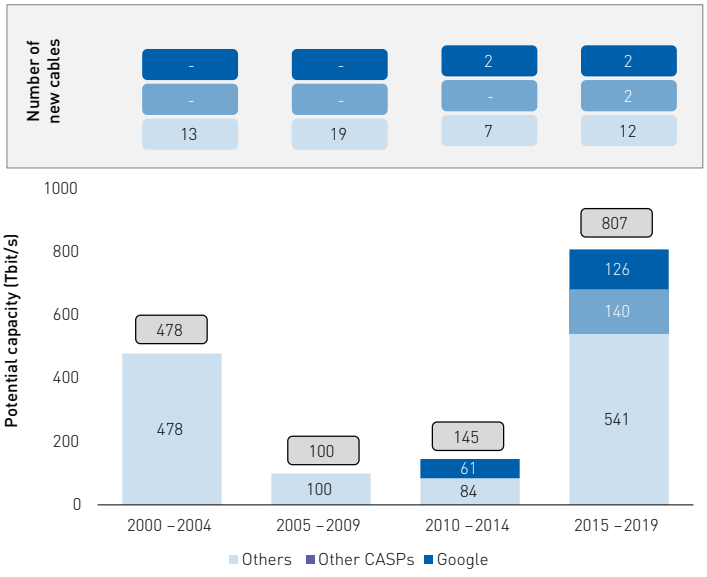


FIGURE 1: NEW INTERNATIONAL SUBMARINE CABLES AND POTENTIAL CAPACITY, BY OWNERSHIP, 2010–2019 [SOURCE: ANALYSYS MASON, 2020]

We found that these dynamics are having a material, statistically significant effect on demand for data in APAC. Based on our statistical analysis, we found that the bandwidth and latency benefits from Google's investment in cables were significant and fuelled demand for data. The analysis demonstrated that internet traffic in the APAC region was about 10% higher than it would have otherwise been if the cables had been built without Google's involvement. This is a strong result, which we further correlated to about USD65 billion in incremental GDP between 2010 and 2019.[3]

As consortium members including telecoms operators, internet companies and investors work with government and regulators to improve the digital infrastructure in more places, these results provide further evidence that international connectivity matters and that opening up submarine cables to large users of bandwidth leads to better outcomes.

Analysys Mason supports stakeholders worldwide through business planning, financing and regulatory processes. For more information about our services, please contact David Abecassis.

[1] In chronological order, Google-invested cables landed in the following APAC countries (listed in chronological order): Japan, Singapore, Hong Kong, the Philippines, Brunei, Thailand, Taiwan, Indonesia, Australia and Guam.
[2] Indefeasible rights of use, effectively open-ended leases that last for the whole lifetime of an asset.
[3] This is based on an endogenous growth model developed for this paper, which is up-to-date and more statistically robust than equivalent results developed in 2012 and before.

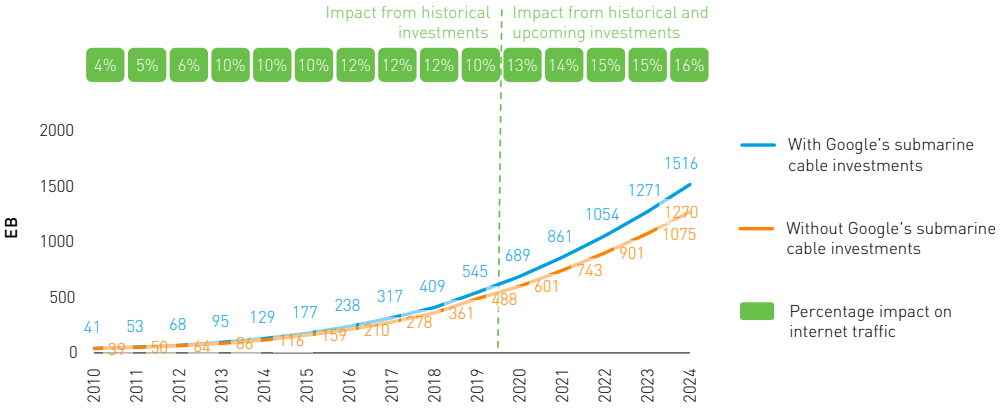


FIGURE 2: IMPACT OF GOOGLE'S INVESTMENTS IN SUBMARINE CABLES ON INTERNET TRAFFIC, APAC, 2010–2024
[SOURCE: ANALYSYS MASON, 2020]

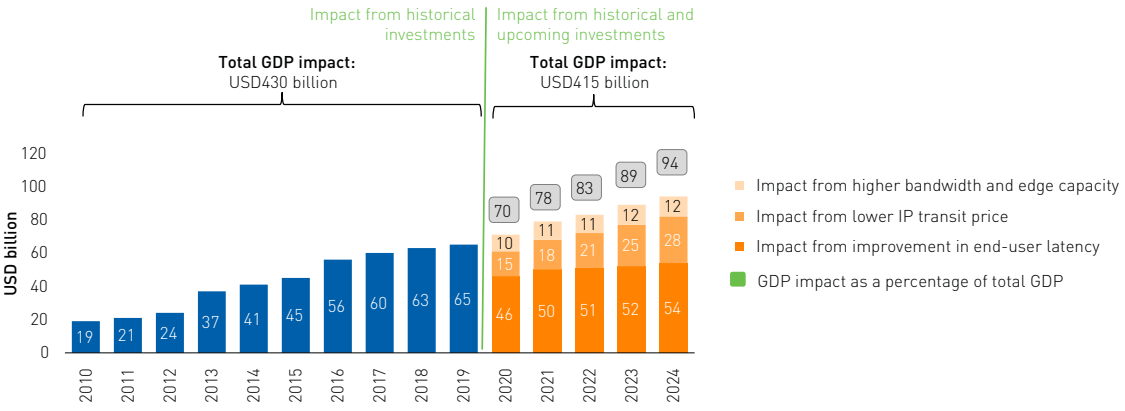


FIGURE 3: INCREASE IN REAL GDP ATTRIBUTABLE TO GOOGLE'S NETWORK INFRASTRUCTURE INVESTMENTS, 2010–2024
[SOURCE: ANALYSYS MASON, 2020]

Questions?

Please feel free to contact David Abecassis, Partner, Consulting at david.abecassis@analysysmason.com

Spectrum in the 26GHz band will be important, but its value remains uncertain

Mark Colville, Principal, Consulting and Gentiana Shiko, Manager, Consulting

Regulators in EU member states were mandated to award at least 1GHz of spectrum in the 26GHz band for mobile use by 31 December 2020 by an EC Implementing Decision.[1] Most regulators will not meet this ambitious timetable and the COVID-19 pandemic may further slow the process, but they (and mobile operators) must still work to value the appropriate spectrum ahead of any awards. Such valuations are important, despite the inherent difficulty, to allow regulators to understand how much spectrum to allocate and how best to assign it, and to enable operators to assess how much to pay.

Price benchmarks provide some useful indications of spectrum value in other bands. However, there is a very limited number of relevant benchmarks for mmWave spectrum (including the 26GHz band) from prior assignments for mobile broadband use. These are summarised in Figure 1.

In several cases, spectrum was sold at close to the reserve price (for example, in South Korea and Italy), so care should be taken when using benchmarks for mmWave spectrum because they may not reflect the full valuation of the bidders. It is also not yet clear how best to normalise the benchmarks. There is still some uncertainty over the target use cases and their bandwidth requirements, so a simple normalisation by population may be as appropriate as the often-favoured 'per MHz per member of the population' (/MHz/pop) metric used in traditional bands for mobile use. This difference in normalisation metrics could lead to quite different conclusions about spectrum value in a given country, as Figure 1 suggests.

Spectrum value is generally considered to be determined by the savings that can be made in network costs as a result of deploying the spectrum ('technical value') and by the commercial performance improvements that are realised due to improved network performance ('commercial value'). In the past, technical value has often been the biggest contributor to spectrum value. However, commercial value is becoming increasingly important, particularly in Western Europe.

Spectrum in the 26GHz band can also be valued by assessing the technical value and the commercial value, though the estimation of each component still presents challenges.

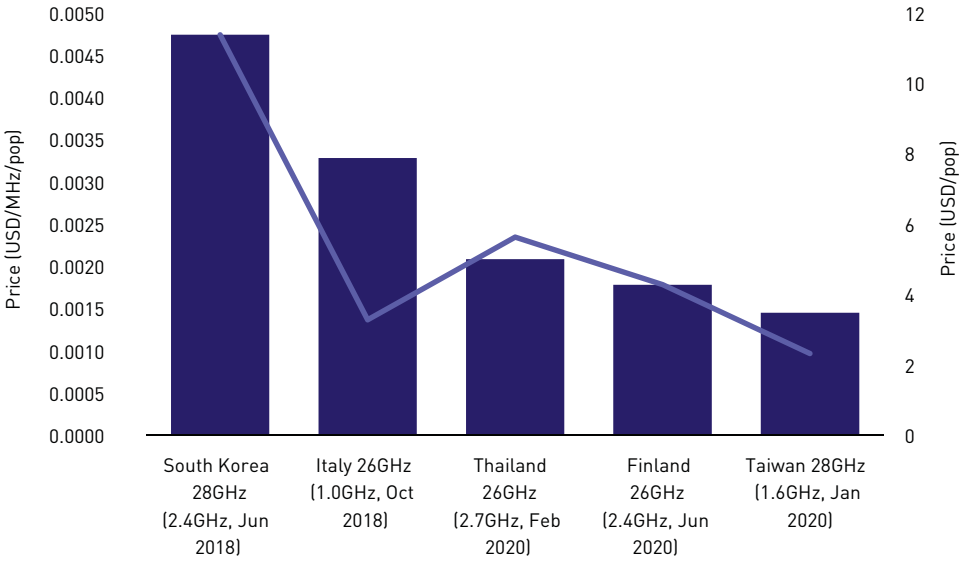
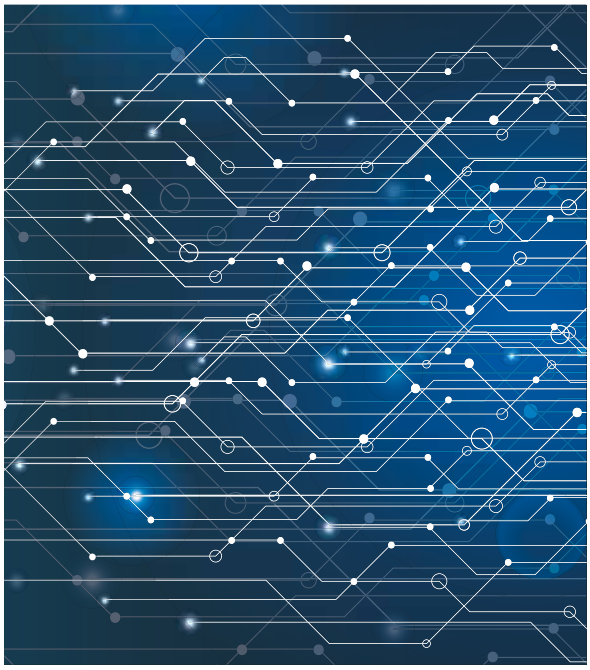


FIGURE 1: PRICES FOR RECENT SPECTRUM AWARDS IN THE 26GHZ AND 28GHZ BANDS, NORMALISED FIRST BY 'MHZ/POP' AND THEN BY POPULATION ONLY ('/POP')[2] [SOURCE: ANALYSYS MASON, 2020]



Technical value will come from the additional small cell capacity that can be used to offload traffic from existing networks in a cost-effective way

The cost-effectiveness of a 26GHz small cell solution will depend on the cost differential relative to the deployment of additional macro sites, or the relative costs of using other spectrum bands or technology upgrades.

These cost differentials depend inherently upon the cost of deploying 26GHz small cells, which remains uncertain. One simple example (and we note that there are many other technical approaches) considers 26GHz outdoor small cells that are co-located with existing macro sites and that use existing towers and backhaul. This removes the complexity for MNOs of having to find additional sites and backhaul for street-level small cells. This may limit costs, but such an approach also constrains the maximum traffic that the 26GHz band could divert away from the main macro network due to its relatively short range.

The 26GHz band is likely to be added to the sites on the network that carry the most traffic (subject to physical constraints and/or planning permission) and is limited to addressing only the fraction of the traffic that is located in the centre of each such macro cell. We would therefore expect that most commercial deployments will initially occur in dense urban areas, extending to suburban areas over time; future deployments will be tailored to the geographical demand for capacity.

Commercial value may be considerable in the future, but it is uncertain at present, so is best viewed as a potential upside

The contiguous bandwidth offered by the 26GHz band is unprecedented and is expected to enable a number of novel commercial use cases. Commercial value could arise from several sources, including through value added services resulting in an increase in ARPU, through attracting an increased share of subscribers interested in high quality of service of a type that only mmWave spectrum can provide, or through new services resulting in new revenue streams (such as AR/VR users). Additionally, if operators can use the 26GHz band to provide fixed-wireless services to business customers, there is a potential to capture a higher share of mobile connections from businesses (alongside this fixed traffic), which tend to have a higher ARPU.

The value of 26GHz spectrum will become more tangible as the device ecosystem evolves and use cases become clearer. In the meantime, valuation can focus on the quantifiable aspects of the cost-savings that 26GHz deployments are likely to provide by effectively relieving macro networks of a portion of their increasing traffic levels, with a range of potential commercial upsides.

The uncertainty surrounding potential use cases means that it is difficult to gauge what constitutes a 'sufficient' bandwidth. The way in which spectrum valuations translate into auction prices is a function of the relative supply and demand (among other things). The amount of contiguous bandwidth made available for award in the 26GHz band is therefore likely to impact the price of the spectrum in a given market. However, scarcity is unlikely to be an immediate problem given the large amount of spectrum in the band, assuming that most or all of the 26GHz spectrum is made available for nationwide licences. Operators are likely to focus on contiguous blocks of at least 200–400MHz in order to enable initial commercial deployments. However, greater bandwidths may be desirable to some operators, which could lead to scarcity if a substantial portion of the 26GHz band was not made available for MNOs (for example, through reservations for private networks). Regulators should therefore carefully consider the total bandwidth to be awarded, alongside reserve prices and other parameters of an award, to ensure that value uncertainties do not compromise a 26GHz award or otherwise limit the potential benefits of this spectrum.

Analysys Mason offers services including spectrum valuation and auction support, as well as advice on business planning and spectrum management issues, to operators and regulators around the world.

[1] EUR-Lex (2019), Commission Implementing Decision (EU) 2019/784 of 14 May 2019. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019D0784.
[2] Normalising to a licence duration of 20 years, assuming a 6.0% WACC and adjusting to 2020 real terms; ALFs are included where applicable.

Questions? Please feel free to contact Mark Colville, Principal, Consulting at mark.colville@analysysmason.com, Gentiana Shiko, Manager, Consulting at gentiana.shiko@analysysmason.com or Janette Stewart, Principal, Consulting at janette.stewart@analysysmason.com

Intensifying competition in the unified communications market presents new threats for network operators

Catherine Hammond, Principal Analyst, Research

Unified communications (UC) providers have achieved significant revenue growth over the past few years and have also benefited from an acceleration in service adoption during 2020 due to the impact of COVID-19. Many providers are now expanding their portfolios and geographical reach to sustain revenue growth and to increase market share. This is intensifying competition in what is already a complex and crowded market. In particular, UC vendors pose an increased threat to telecoms operators, as these vendors extend PSTN integration and PBX replacement services. This article highlights some key findings from Analysys Mason's report *Unified communications technology providers: case studies and analysis*, which provides full profiles of the vendors discussed.

The potential for revenue growth and service breadth in the unified communications market has attracted a diverse range of players

UC services integrate multiple communication features including voice, video, chat, file sharing, customer relationship management (CRM) and business process tools. UC services are also closely related to the delivery of contact centre services and omni-channel communications platforms. The rapid revenue growth potential of the UC market has attracted a diverse range of players with expertise in one or more of these areas.

Many providers report strong revenue growth for their cloud-based UC services (see Figure 1), though for those with an on-premises heritage this may come at the expense of falling revenue from legacy solutions.

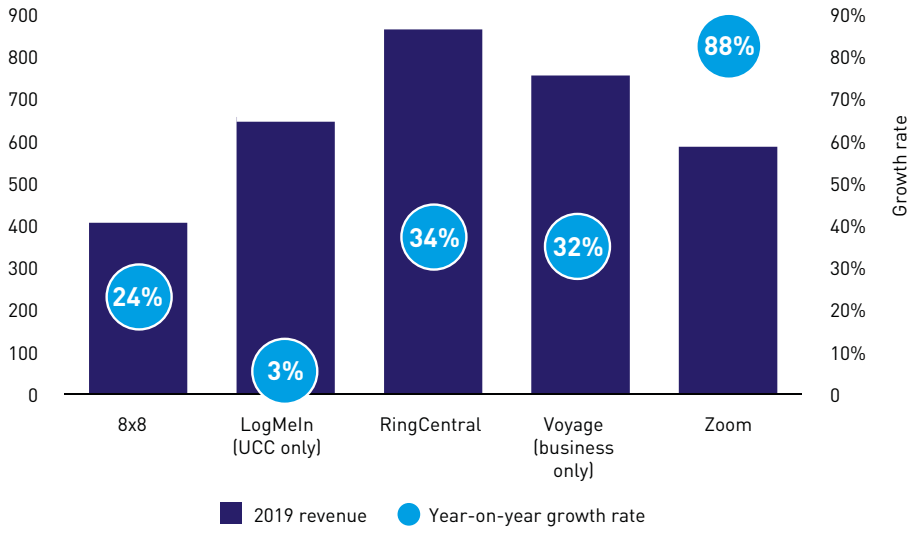


FIGURE 1: UC SERVICE REVENUE GROWTH AND YEAR-ON-YEAR GROWTH RATES, SELECTED PROVIDERS, CALENDAR YEAR 2019[1] [SOURCE: COMPANY REPORTING, 2020]

UC providers' revenue growth strategies present new threats to network operators

Many UC providers are expanding their proprietary portfolios and geographical reach to sustain the rapid revenue growth that they have experienced to date. This tends to bring them into more-direct competition with one another and with network operators. The threats to network operators are clear: UC specialists are offering cloud-hosted voice solutions to rival those of operators, coupled with full PBX replacement in a growing number of countries. Portfolios are expanding to a breadth that few operators have the scale to compete with. New players are also challenging in the contact centre market, traditionally a point of strength for many network operators.

Many UC providers are seeking to expand geographically into new markets and are investing heavily in their channel strategy, particularly those that lack an existing customer base of on-premise or other solutions. For example, 8x8 grew its number of channel partners from around 100 in 2018 to more than 1000 by mid-2020. RingCentral has struck a series of deals over the last 12 months with ALE, Atos and Avaya to exclusively market a RingCentral-powered UCaaS solution to their installed PBX bases.

A growing number of UC providers offer PSTN integration and PBX replacement services to rival those of network operators. Many cloud-native voice providers were already active in this market in the USA but are expanding to new geographies; 8x8, RingCentral and Vonage each now provide full PSTN replacement services in 30–40 countries. Since 2018, businesses that purchase Microsoft Teams are able to add a cloud–PBX solution and PSTN integration to their Teams installation. This is often done via a third-party service provider but Microsoft also offers its own calling plans in 12 countries. Zoom Phone, launched in 2019, is currently available in more than 40 countries.

A significant number of UC providers are developing proprietary solutions for services that have previously relied on partner technology, providing them with greater control over user experience and costs. For example, Mitel (in March 2020) and RingCentral (in April 2020) launched their own video meetings services. Many providers have also extended their in-house capabilities via acquisition. For example, Vonage's acquisition of NewVoiceMedia in 2018 provided enhanced contact centre capability.

There is also a trend towards the delivery of a converged user experience across UC, contact centre and other adjacent services such as CRM tools. Cloud-native voice providers such as 8x8, RingCentral and Vonage are particularly active in this area, with an emphasis on proprietary solutions for UCaaS and omni-channel contact centres, integrated with third-party applications via their open API platforms.

Operators should evaluate new partnership opportunities in the context of their broader UC strategy and market position

Network operators make attractive partners for UC specialists because operators have established customer relationships, local sales channels and control of the underlying connectivity on which UC services depend. Many operators already partner with Cisco to deliver hosted voice solutions and also offer PSTN integration for Microsoft Teams. It makes good sense to build further partnerships with UC providers that are relatively weak in PSTN integration, and smaller operators may be able to offer a much-expanded portfolio through partnership with specialist providers, even when they present a competitive threat in the voice market.

Network operators can also deliver multi-vendor solutions. At its simplest level, this can merely mean acting as a point of sales for multiple different solutions. Many operators already offer hybrid on-premise/cloud solutions and support technology from multiple UC specialists. Some operators, however, are seeking to go further in terms of integration. For example, BT Global's Connected Workplace solution is built around Zoom but is also intended to provide a fully integrated user experience across Cisco Webex and Microsoft Teams platforms and its own global voice network.

Some operators are attempting to compete more directly with UC providers by further establishing their own proprietary capabilities. Verizon, for example, has a suite of UC solutions integrated with its mobile network, global voice backbone and contact centre capabilities. Its acquisition of Blue Jeans in April 2020 extends its capabilities in meetings, events and rooms, and its retention of the Blue Jeans brand and web presence enables Verizon to offer the 'try-before-you-buy' sales strategy adopted by many over-the-top (OTT) UC providers.[2] This is an interesting acknowledgement of the value of both OTT and network-integrated solutions for different use cases and channels.

Further information about the ways in which operators are developing their own UC strategies is available in our report *Operator approaches to unified communications: ten case studies.*

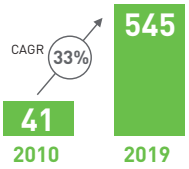
[1] The data is for the year ending 31 January 2020 for Zoom.
[2] More than 90% of Blue Jeans sales leads are from free trials.

Questions?
Please feel free to contact Catherine Hammond, Principal Analyst, Research at catherine.hammond@analysysmason.com

Economic impact of Google's network infrastructure in APAC

DATA TRAFFIC IN APAC IS GROWING STRONGLY, DRIVEN IN PART BY THE POPULARITY OF GOOGLE'S SERVICES

APAC data traffic growth 2010–2019 (EB)



12% Google services' share of APAC internet traffic

GOOGLE INVESTED OVER USD2 BILLION IN NETWORK INFRASTRUCTURE ACROSS APAC, WHICH SUPPORTS THE GROWTH OF THE INTERNET

>$2bn

Google's APAC network infrastructure investment

- **6** submarine cables invested into and deployed
- **15** cities across **8** countries with Google PoPs
- **~2/3** of bandwidth purchased from telcos
- **278** cities where GGC caches are deployed

GOOGLE'S INFRASTRUCTURE INVESTMENT HELPS APAC ECONOMIES REALISE STRONG ECONOMIC BENEFITS FROM INCREASED INTERNET USAGE

Last 10 years (2010-2019)	Next 5 years (2020-2024)
1.1m Jobs	**1.8m** Jobs
$430bn in GDP	**$415bn** in GDP

THESE INVESTMENTS IMPROVE THE CONNECTIVITY ECOSYSTEM WHICH BENEFITS CONSUMERS AND BUSINESSES

2024

4.6 million internet users

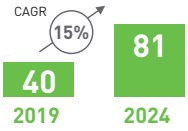
246 Exabytes internet traffic

- **367Tbit/s** in additional capacity
- **4.1x** faster download speeds in countries with strong submarine cable supply vs. rest of APAC
- **12-49%** reduction in end-user latency
- **74%** lower IP transit prices in countries with strong submarine cable supply vs. rest of APAC
- **3** new use cases supported
  - Video Conference
  - Commerce and Transactions
  - Cloud Services

Download the report at:
https://www.analysysmason.com/impact-of-google-network-APAC-2020

APAC CLOUD SPEND IS EXPECTED TO GROW STRONGLY DRIVING ADDITIONAL ECONOMIC BENEFITS

APAC cloud spend (USD bn)
2019–2024



Benefits of cloud adoption

- supports digital transformation agenda
- generates additional jobs and GDP

NETWORK INFRASTRUCTURE IS IMPORTANT FOR CLOUD – IT IMPROVES:

"[GCP] provides low end-to-end latency, fully managed infrastructure with 99.9% system availability, along with auto-scaling of storage and compute"
traveloka
Country: Indonesia

"[GCP] processes data in the scale of hundreds of gigabytes to speed up analytics... Delivers network performance 10 times faster between data centres."
ninjavan
Country: Singapore

"[We] migrated [our] infrastructure to GCP for its reliable subsea cable network and load balancing."
17 Media
Country: Taiwan

REGULATORY AND INVESTMENT REGIMES NEED TO SUPPORT FURTHER INVESTMENT IN NETWORK INFRA DEPLOYMENT TO GENERATE ADDITIONAL ECONOMIC BENEFITS

Deployment and landing of submarine cables

- Transparent and clearly laid out procedure to obtain licences / permits
- Central point of contact to lead the process for licence / permit applications
- Non-discriminatory and cost-oriented access to CLS
- Open investment policy allowing majority submarine cable ownership by foreign investors

Protection and maintenance of submarine cables

- Fast-tracked permit application process for inspection and repair works
- Exemption of submarine cable works from cabotage laws
- Implementation and effective enforcement of cable protection laws

Supported by

Strong respect for the law and effective regulatory enforcement

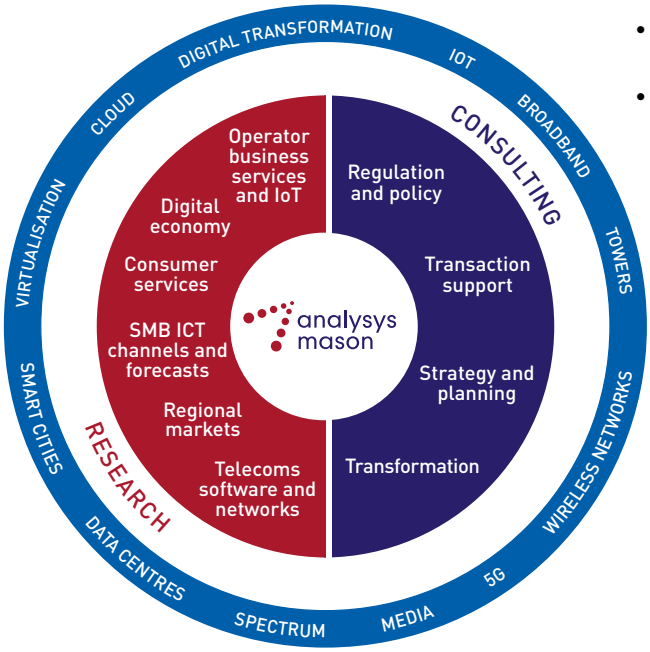
- Government regulations are effectively enforced without improper influence
- Administrative proceedings are conducted without unreasonable delay
- Due process is respected in administrative proceedings

Questions? Please feel free to contact David Abecassis, Partner, Consulting at david.abecassis@analysysmason.com, Dion Teo, Principal, Consulting at dion.teo@analysysmason.com or Michael Kende, Senior Adviser, Consulting at michael.kende@analysysmason.com

Analysys Mason's consulting and research are uniquely positioned

Analysys Mason is the global specialist adviser on telecoms, media and technology (TMT). Since 1985, Analysys Mason has played an influential role in key industry milestones and helping clients through major shifts in the market. We continue to be at the forefront of developments in the digital economy and are advising clients on new business strategies to address disruptive technologies.

See what clients have to say about working with us: www.analysysmason.com/client-testimonials



About our services

At Analysys Mason, we understand that clients in the TMT industry operate in dynamic markets where change is constant. Our consulting and research has helped shape clients' understanding of the future so they can thrive in these demanding conditions.

Consulting

- We deliver tangible benefits to clients across the telecoms industry
- Communications and digital service providers, vendors, financial and strategic investors, private equity and infrastructure funds, governments, regulators, broadcasters and service and content providers
- Our sector specialists understand the distinct local challenges facing clients, in addition to the wider effects of global forces
- We are future-focused and help clients understand the challenges and opportunities new technology brings.

Research

- Our dedicated analyst team tracks and forecasts the services accessed by consumers and enterprises
- We offer detailed insight into the software, infrastructure and technology delivering those services
- Clients benefit from regular and timely intelligence, and direct access to analysts.

"Analysys Mason is the global specialist adviser on telecoms, media and technology (TMT). Since 1985, Analysys Mason has played an influential role in key industry milestones and helping clients through major shifts in the market. We continue to be at the forefront of developments in the digital economy and are advising clients on new business strategies to address disruptive technologies."

analysys mason

Stay connected

You can stay connected by following Analysys Mason via Twitter, LinkedIn and YouTube.

@AnalysysMason

linkedin.com/company/analysys-mason

youtube.com/AnalysysMason

analysysmason.podbean.com