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Research

The rise of new data centre growth markets

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01 Executive summary

2021 is likely to be the year where new market protagonists of China, India and Indonesia will lead the regional growth story.

Data centres and the associated real estate are thriving across Asia Pacific. Pre-pandemic, the sector was already coming into its own. 2021 is likely to be the year where new market protagonists of China, India and Indonesia will lead the regional growth story.

As COVID-19 intensified, the role and value of data centres shifted up a gear. Demand grew and continues to grow in lockstep with dramatic rises in data consumption, driven by increasing smartphone usage and internet access.

The regional drivers are elevating established markets along with the entire sector. Diving deeper we are also entering new phase for emerging markets as they embrace the growth of data centres. At this point, the big focus now is on identifying the right data centre opportunities in the region's emerging markets, as investors and operators are focused on the sector's future prospects.

The sheer scale of China, India and Indonesia – three of the world's four most populous countries – indicate the almost limitless potential of the sector. In 2017 forecasts, mainland China alone was expected to consume 181 million terabytes of data in 2020, compared to 30 in 2015¹. The scale of consumption in mainland China sets a precedent for the fast-growing ASEAN and South Asia markets where data centres are now mainstreaming as an asset class. The more mature markets such as Japan still have considerable upside on an already large base.

Cloud computing is fast becoming the corporate standard, as remote working spurs demand for video conferencing and other e-services. In people's everyday lives, faster data speeds enable seamless video streaming and online gaming, as well as improved user experiences for online retail, popular social media platforms, music streaming services and many others. The pandemic evidently has accelerated these growth drivers, as consumers stayed at home and shifted to e-commerce. Average monthly usage is expected to more than double from 5 GB per user in 2019 to 11 GB in 2024², as 5G networks roll out regionally.

In this paper, we examine the opportunities and market dynamics around the region. We also delve into important local considerations, such as marketspecific regulations and concerns about the sector's large-scale power requirements.

¹ Surfing the data wave, The surge in Asia Pacific's data centre market, PWC ² Asia-Pacific will lead 5G technology adoption by 2024, GlobalData

02 The time is now for investors and operators

Demand for data centres continues to grow exponentially in Asia Pacific, fueled by cloud computing and the consumer mobile internet. The market for hosting, storage and cloud computing services is expected to be worth USD 163 billion in 2021, which is an almost 30% increase over 2017³. Cloud traffic in Asia Pacific is set to grow by more than 150% over the same period⁴ (Figure 1).

COVID-19 hastened the adoption of e-commerce and finance technology (fintech). Both verticals created a new set of growth of opportunities for data centres, by revolutionizing the way people shop and pay. Asia Pacific online retail sales (as a share of total retail sales) grew from just over 8% in 2014 to more

³ Hosting, storage, and computing cloud services market revenue in the World from 2016 to 2021 (in billion U.S. Dollars), Statista

⁴ Cisco Global Cloud Index 2018, Cisco Systems

Figure 1

Global cloud traffic worldwide from 2016 to 2021, by region (in exabytes per year)



Source: Cisco Systems, Statista *Based on forecast than 20% in 2019⁵. In 2020, e-commerce made up more than 15% of total retail sales in mainland China. Taiwan - Greater China and South Korea (Figure 2). Increasing sophistication in well-established markets such as mainland China and Australia, as well as the development of e-commerce from the ground up in emerging markets such as India and Indonesia, have driven data centre growth significantly. On top of these strong historical growth rates, there is still considerable room for future expansion. Japan reported a surge in elderly consumers who started to engage with e-commerce – a whole new consumer group that was never a target before⁶. A global consumer survey by McKinsey & Company reports a more than 30% increase in online orders for food and household categories on the back of the pandemic⁷. Some of these changes in consumer habits are likely here to stay for the long term.

Growing internet usage and smartphone adoption (Figures 3 and 4), as well as social media, e-gaming, video streaming and big data applications are all fueling requirements for extra data centre capacity across the region. Asia Pacific is home to three of the world's four most populous countries (mainland China, India and Indonesia) and the sheer scale of these markets makes them attractive locations for data centre operators.

The introduction of enhanced wireless technologies such as 5G mobile networks, provide a gateway to increased data consumption. Although 5G is not necessarily a driver of data usage, it is a potential enabler for more efficient data transmission with its larger network capacities, low latency and increased reliability. These improvements could lead to higher mobile data usage, particularly from

Figure 2

E-commerce share of total retail sales in 2020



Source: PPRO, Statista

Figure 3 Internet users per 100 people



Source: Oxford Economics * Based on forecast

 $^{^{\}scriptscriptstyle 5}\,$ E-commerce share of total retail sales in Asia Pacific from 2014 to 2019, Zugara

 $^{^{\}rm 6}\,$ E-commerce in the times of COVID-19, OECD

 $^{^{\}rm 7}\,$ Consumer sentiment and behaviour continue to reflect the uncertainty of the COVID-19 crisis, McKinsey

Figure 4 Mobile phones per 100 people



video streaming and online gaming, while also meeting demands for efficient remote business communications for rising flexible workforces. 5G adoption could facilitate opportunities for expansion through the establishment of edge data centres, to complement these networks for a stronger ecosystem.

However, the 5G journey has a long way to go. The fact that the roll out of 5G thus far has largely consisted of non-standalone architecture (rather than standalone) limits its effectiveness. Political considerations have also put the brakes on 5G rollout in many cases.

Despite the challenges, markets like South Korea⁸ are still expected to rollout 5G and by 2025, it is expected to account for more than two-thirds of their mobile connections. Emerging markets India and Indonesia will follow suit and represent the next wave of 5G growth (Figure 5).

⁸ Share of 5G mobile connections of total connections in the Asia Pacific region in 2019 with a forecast for 2025, by country, GSMA

Figure 5

Share of 5G mobile connections of total connections (%)



Source: GSMA, Statista *Based on forecast



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03 Strength in diverse demand

Mainland China is a high growth data centre market backed by diverse domestic demand and opportunities for scalability. However, the market is fragmented and generally dominated by local operators that typically have a pricing advantage over international operators.

High network densities in Shanghai and Beijing make these locations attractive to operators, despite power limitations. Some operators are migrating outwards to surrounding areas such as Nantong, Wuxi and Nanjing (from Shanghai) as well as Tianjin (from Beijing) to access power. In the near term, operators may start adopting the use of renewable energy instead, due to the country's commitment to achieving carbon neutrality before 2060. India is an underserved market. It offers sizable opportunities due to its scale, reinforced by global operators actively seeking local partners. Delhi and Bengaluru are evolving, but Mumbai alone accounts for 41% of current capacity with its submarine landing stations and power capacity supporting growth. Almost 60% of total additional capacity over the next five years in India is likely to be in Mumbai and many hyperscale operators are likely to base operations in the city.

Indonesia is home to a huge young and tech savvy population and they have recently relaxed their position on data protection. Largely due to cost effectiveness, cloud providers and operators are increasingly demonstrating their desire to establish a presence in Indonesia, with Greater Jakarta as a key market. Instead of trying to serve the market from Singapore, deployment of facilities locally would prove to be most cost effective.





In the near term, operators may start adopting the use of renewable energy instead, due to the mainland China's commitment to achieving carbon neutrality before 2060.

Japan is a mature but growing market with international operators looking to increase their exposure, especially in the Greater Tokyo and Osaka areas. Power supply is also an issue in Japan, with long waiting lists even after a site has been acquired. A new focus on renewable energy is likely.

Australia is far from other Asia Pacific markets, so data centres deployed there typically cater to the local market and to a lesser extent, to New Zealand. It is a competitive market with well-established groups, although new-to-market operators are also sourcing local partners. Sydney and Melbourne are the key Australian markets and more and more operators are ramping up development there, raising concerns that there may be short-term over-supply.

South Korea is traditionally a localised market dominated by the major Korean conglomerates but significant interest is now coming from international groups as well as boutique investment houses. International groups typically focus on the immediate area around Seoul; although land availability is more favourable further afield, delivery of power and fibre sometimes becomes an issue. International groups also need to navigate complex ownership structures and difficulty sourcing suitable land due to both geographical challenges and a supply/demand imbalance. In terms of demand, however, the market remains extremely strong. Private data consumption, as in other APAC markets, is driven by video streaming, online gaming and e-commerce while video conferencing and cloud storage also boost business requirements.

Hong Kong - Greater China is a mature market and there is strong interest from mainland Chinese data centre operators, to enter the market as a base for their operations further afield in Asia Pacific and the rest of the world. Location is paramount in Hong Kong and the Tsuen Wan, Kwai Chung and Tseung Kwan O areas of the city are the most popular. However, their new national security law has created some uncertainty pertaining to privacy laws for technology companies.

Singapore is a mature market with a depth of local and global operators, and a recognized status as one of the most global data centre hubs in Asia Pacific. Google and Facebook have also established, or are in the process of developing large scale data centre campuses. Currently, there is a moratorium on new data centres in Singapore through 2021 and this may extend into 2022 as the Singapore government actively reviews its economic priorities and pursues its climate change targets. 04 Regulatory and data localization considerations vary

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While localisation laws are in play almost everywhere, enforcement is challenging. Rules generally dictate that information about that country's citizens should be stored onshore but checks and balances are difficult given that data flows around the world.

At the same time, more markets are seeing the need to impose stricter policies around data protection. On a global level, countries are coming together to put in place policies governing cross-border data flows to facilitate trade and global economic interdependence.

> Source: Asia Pacific Data Protection and Cyber Security Guide 2020, Hogan Lovells

Click on country for more details.

05 Power supply and microlocation factors

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There are other considerations governing market entry, such as the availability of water and fibre networks and connectivity to cable landing stations. In Japan, for example, it is extremely challenging for data centre operators to secure power and even after a site is acquired, there is a waiting time of up to several years for power supply, especially if the operators decide to tap into ultra-high voltage transmission and infrastructure. Micro-location factors for all markets include a need to be located away from the flight paths of airports and areas prone to natural disasters, where they need to be outside of 100-year flood plains or earthquake faults.



06 Renewable energy's evolving role

Amid rapid data centre expansion, their carbon emissions are becoming an increasingly significant challenge; as capacity grows, so does energy usage. This is clearly a cause for concern as Asia Pacific already produces just below half of all global carbon emissions¹⁰. However, some markets around the region are proactively addressing this.

Singapore, Shanghai and Beijing have started to impose restrictions on new power provisions for data centres. This has restricted the flow of upcoming supply in Singapore in particular. A growing number of governments including those in mainland China, Singapore, South Korea and Japan are already making 'Net Zero' pledges with the aim to be carbon neutral by the second half of the century. This has clear implications for data centres and operators are increasingly likely to look at renewable energy sources to meet their power supply needs. Conversely, more needs to be done in order for India and Indonesia to meet their 2030 carbon emission pledge, primarily curbing reliance on coal consumption.

While governments around the region become progressively concerned with green energy, corporates are also doing the same. Recent commitments from major cloud players Amazon, Microsoft and Google to achieve carbon neutrality will also help to drive the market towards a more sustainable future.

¹⁰ IEA, based on 2018 data



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07 Operating models and market dynamics



Over time, the colocation market has gradually evolved, and the market share of retail businesses is likely to be limited going forward as enterprises have been consolidating their requirements. Modern applications and other business needs demand higher computing and storage power. Therefore, larger capacity often also means that wholesale colocation makes more economic sense. At the same time, the movement towards hybrid and cloud deployments has also contributed to a higher degree of interest in the wholesale business. Several established operators have embraced the trend and are actively pursuing opportunities in the hyperscale market. New platforms and investors tend to look at this segment as well, since it is easier to understand and provides speed to market and scale.

08 The 5G Effect



The introduction of 5G might require the market to again re-evaluate and redefine how the infrastructure ecosystem should be set up to address market demand. Edge computing and other models may be necessary especially in markets where geographical distances and latency become a critical factor - no consumer likes the idea of intermittent connectivity with constant buffering or loading. Eventually, we may see the emergence of a new breed of specialist operators that focus on edge computing to complement large centralized data centres. However, they will need to have a clear roadmap or network of partnerships to roll out sites quickly to be able to achieve some scale. Mainland China will be the best candidate to lead the region, given the size of the market, and its progress on 5G and other fields in technology and applications. The presence of a variety of stakeholders across different operators, investors, and cloud providers should also give them an edge over others. Japan and Australia with similar market characteristics could also provide interesting case studies on how the operating model and digital infrastructure may evolve to suit future demand. Indonesia is developing its artificial intelligence and 5G capabilities, and India has hinted that there may be possible 5G roll out in the second half of 2021.

09 Colocation and partnership

While some cloud providers or social media giants prefer to develop data centres themselves, others have chosen to start with suitable colocation operators, either to test out new markets, or because of higher complexities associated with real estate and construction in certain markets. Colocation rates for hyperscale contracts seem to be rather uniform and could range from USD 100 – 180 per kilowatt per month, depending on the market, capacity, and tenure. Indicative rates in mainland China and India are at the lower end of the range, along with Australia given the supply pipeline. Rates in Indonesia, Singapore, Hong Kong - Greater China and Japan will tend towards the higher end of the range due to various constraints on supply due to power availability and approvals from authorities.







Figure 6

Estimated development cost allocation for data centres



Source: JLL

Many operators looking to expand to new markets choose to partner with local developers as international groups may require joint ventures for development and/or operation from a regulatory standpoint. Local developers also bring marketspecific expertise to the table, such as access to land banks, the ability to navigate complex approval processes and sourcing adequate power supplies. A local partner will be experienced in building up the superstructure and carrying out the necessary civil works. The operator brings on expertise for the design and build of data centre infrastructure from the perspective of the data hall design and mechanical and electrical (M&E) fit out.

Operators expanding to new markets choose to partner with local developers as they bring market specific expertise to the table and help navigate complex approval processes.

10 Surge in data centre investment: Mainland China, India and Indonesia

In recent months, we have seen a surge in investor and operator activities around mainland China, India and Indonesia. These markets have been earmarked as high-growth markets, but are currently being underserved by existing supply and facing strong demand from a variety of end users.

Mainland China has more existing and upcoming supply than any other market in Asia Pacific. In June 2020, Blackstone announced an investment of USD 150 million in Chinese data centre provider, 21vianet¹¹. Separately, Telstra and Chayora entered into a partnership to deliver both retail colocation and build to suit hyperscale services¹². Chindata, a Chinese operator, which has ByteDance as its anchor tenant, was recently listed in the US, while GDS and GIC announced a partnership in 2019 to build and operate data centres in China¹³. GAW Capital is working with Centrin to expand their data centre footprint across mainland China¹⁴.

In India, the Adani group has plans to invest around USD 10 billion in data parks, and have inked a memorandum of understanding with the US-based Digital Realty in 2019¹⁵. Colt DCS also broke ground for a new hyperscale facility in Mumbai in 2020¹⁶, which will be one of the largest hyperscale facilities in India. Equinix has announced its entry into India in 2020 through the acquisition of GPX India¹⁷. Operators like Netmagic, STT, Yotta are also looking to expand their footprint.

Meanwhile in Indonesia, the new INDIGO cable landing in Jakarta connecting Singapore to Sydney adds to Indonesia's attractiveness as a data centre market¹⁸. In November 2020, we saw Space DC open its first Indonesian data centre¹⁹. Separately, Keppel Group has partnered with the Salim group to jointly develop a data centre²⁰, while the Princeton Digital Group has entered the market from its acquisition of majority stakes in XL Axiata's data centre portfolio²¹.

 ¹¹ 21Vianet announces US\$150 million investment from Blackstone, 21Viatnet
¹² Telstra International and Chayora enter into strategic partnership to delivery world-class colocation and network connectivity services in China., Chayora
¹³ GDS and GIC form unique strategic partnership to develop and operate hyperscale build-to-suit data centers in China, GDS

¹⁴ Gaw Capital partners forms JV partnership with Centrin Data, Gaw Capital

- ¹⁵ Adani partners with US based Digital Realty to build India data center infrastructure, Adani
- ¹⁶ Colt DCS is opening a new data centre in Mumbai, Colt DCS
- ¹⁷ Equinix expands to India with acquisition of GPX India, Equinix
- ¹⁸ INDIGO subsea cable system between Australia and South East Asia now commissioned and is ready for use, Singtel
- ¹⁹ GIC-backed SpaceDC launches data centre in Jakarta, Business Times
- ²⁰ Keppel and the Salim Group to jointly develop and operate data centre in Indonesia, Keppel Corporation
- ²⁰ PDG to acquire majority stake in XL Axiata's data center portfolio in Indonesia, Princeton Digital Group

11 Capitalizing on the emerging market investment opportunity

There are clear opportunities across the Asia Pacific data centre growth story, in both emerging and mature markets. Indonesia and India present budding opportunities for in-market data centre deployment, while current dynamics indicate that mainland China will likely drive the growth of data centres regionally.

The sheer scale of growing data consumption makes data centre infrastructure a compelling global and regional opportunity for both investors and operators. However, there is also a strong local component to the investment evaluation criteria, which needs to be taken note of. Data localisation laws and other regulations as well as factors such as proximity of markets served and access to power supply, require a nuanced view of the sector.

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