



DATA CENTRES

IN SOUTHEAST ASIA POISED
FOR RAPID GROWTH

AUGUST 2019



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Data Centres in Southeast Asia to Lead Growth

The Southeast Asia (SEA) region including Singapore, Indonesia and Malaysia will be the fastest growing region for co-location data centres over the next five years, with its market size expanding by a compounded annual growth rate (CAGR) of 13 per cent between 2019 and 2024.

This trend is underpinned by the rapid pace of digitalisation and surge in demand for cloud-based services across the region, which prompted big corporates such as Google, Alibaba Group, Amazon Web Services (AWS) to expand their cloud infrastructure footprint to facilitate the expansion.

The second fastest growing region is Asia Pacific, which is expected to grow steadily at around 12 percent CAGR over the same period, based on analysis of data from Structure Research. North America is the largest co-location data centre by market size, at US\$17.2 billion currently but the Asia Pacific region is expected to take over the top position by as early as 2021. The total market size for Asia Pacific co-location data centres is forecast to be around US\$28 billion by 2024, 20 per cent higher than the US\$23.4 billion market size projected for North America.

SEA Region Snapshot

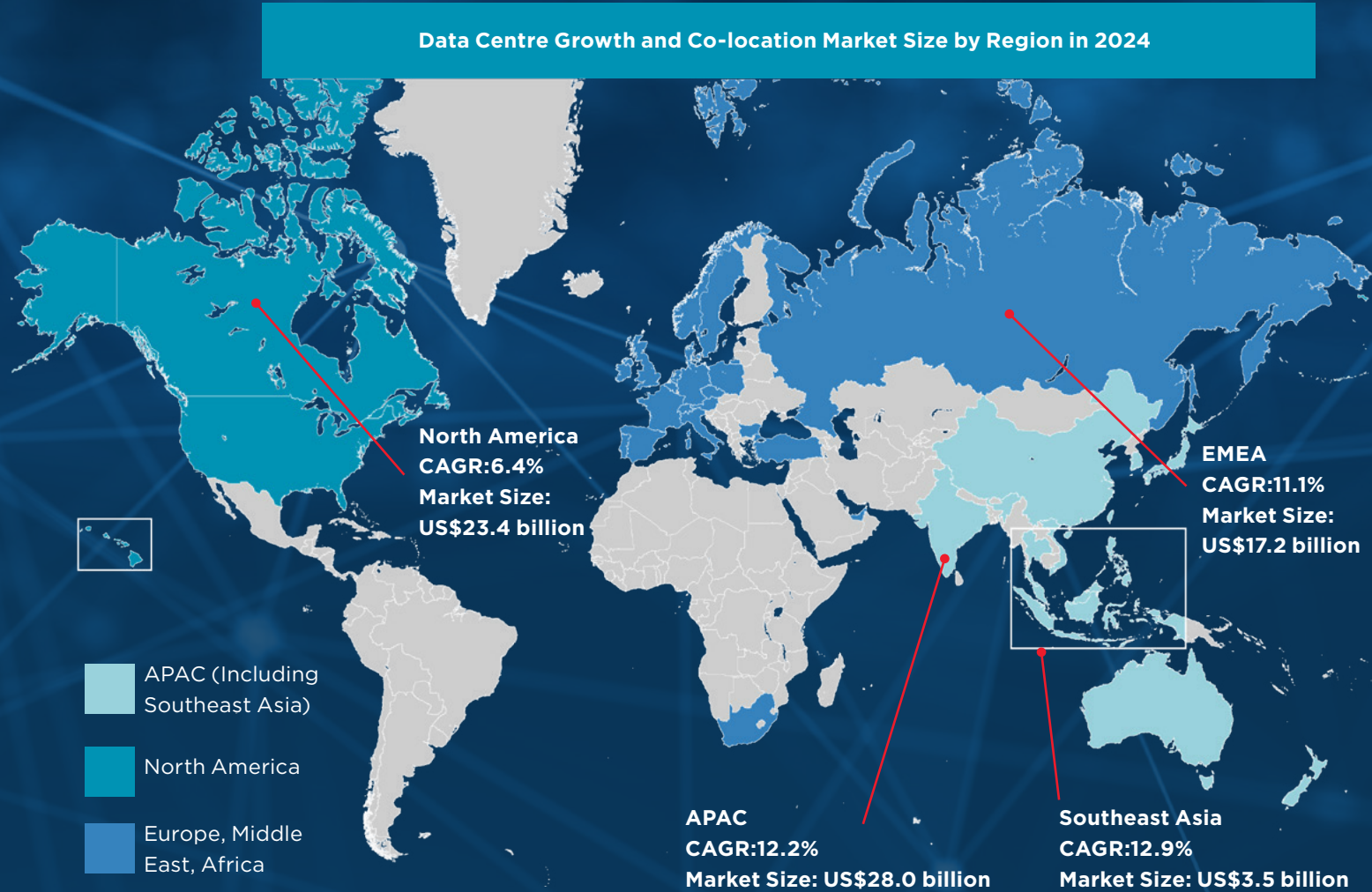
Based on the latest edition of Cushman & Wakefield's Data Centre Competitive Index 2019 (formerly known as the Data Centre Risk Index), Singapore is ranked the third most robust data centre market globally across 38 countries. It is the only mature data centre market in Southeast Asia. Its ranking jumped four spots from 7th to 3rd in the latest edition and retained the top spot in the Asia Pacific region. The index identifies the top competitive factors such as physical, economic and social attributes like connectivity, ease of doing business, political stability, corporate tax rate, natural disaster and energy security that are likely to affect the successful operation of a data centre.

Singapore's rise in the index comes on the back of its improved high-speed connectivity, political stability and low risk of natural disasters relative to other countries.

Although the rest of the SEA countries such as Malaysia, Indonesia, Thailand and Vietnam rank relatively lower in the competitive index, the potential commercial upside for data centre players is significant.

With large swathes of young populations, increased IT consumption and explosive growth in e-commerce and digital banking, demand for data storage across SEA is appealing to data centre players. Nevertheless, the infrastructure in these markets is not fully developed, posing some challenges for data centre providers. As such, well-located data centres that are built with redundancies will therefore be in high demand. Data centre service providers should weigh the commercial opportunities against the risks and put in place appropriate measures to mitigate and manage risks accordingly.

Data Centre Growth and Co-location Market Size by Region in 2024



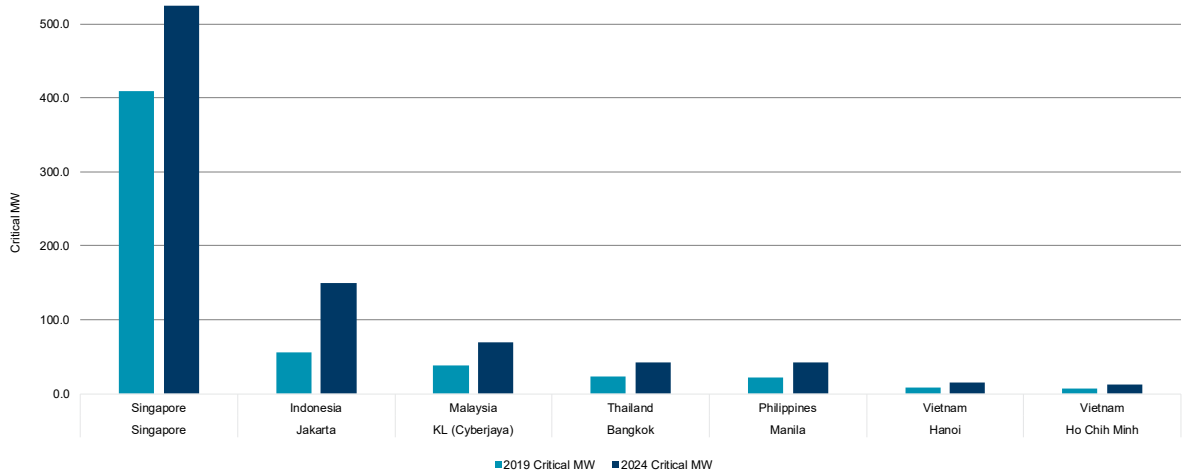
Source: Structure Research, Cushman & Wakefield

2019 RANKING	COUNTRY/CITY	2017 RANKING	CHANGE IN POSITION	2019 RANKING	COUNTRY/CITY	2017 RANKING	CHANGE IN POSITION
1	Iceland	1	0	11	Qatar	15	+4
2	Norway	2	0	12	South Korea	8	-4
3	Singapore	7	+4	13	Ireland	20	+7
4	Sweden	5	+1	14	Netherlands	12	-2
5	Switzerland	3	-2	15	France	17	+2
6	Finland	4	-2	16	Spain	26	+10
7	United States	10	+3	17	Germany	16	-1
8	Canada	6	-2	18	Malaysia	24	+6
9	Hong Kong	11	+2	19	Russia	27	+8
10	United Kingdom	9	-1	20	Czech Republic	18	-2

Cushman & Wakefield Data Centre Competitive Index (Asia Pacific Ranking)

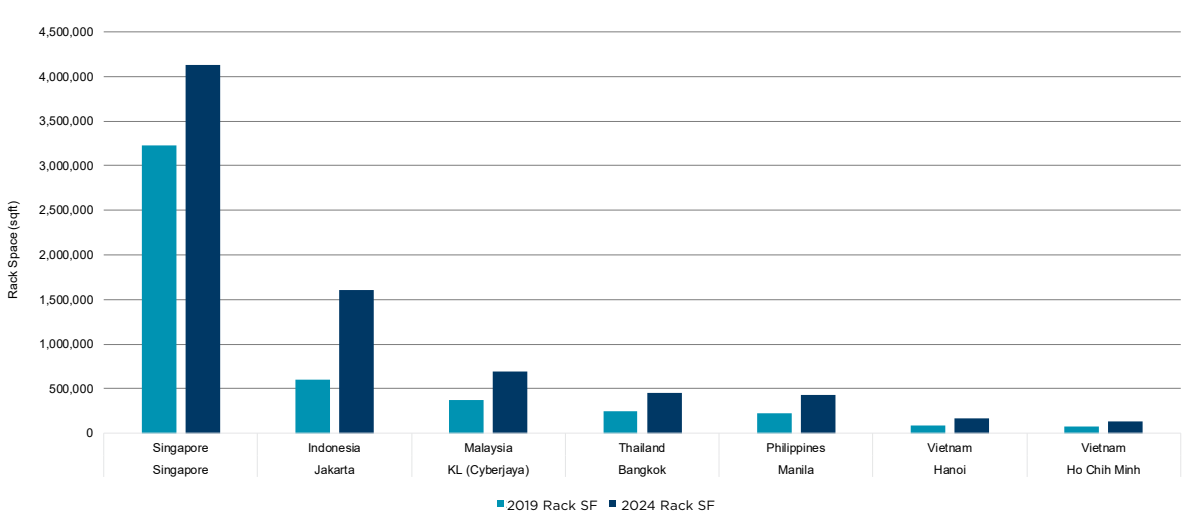
RANK	COUNTRY/CITY	RANK	COUNTRY/CITY
1	Singapore	6	China
2	Hong Kong	7	Thailand
3	South Korea	8	Japan
4	Malaysia	9	Vietnam
5	Australia	10	India
		11	Indonesia

Critical Megawatt of Data Centre in Southeast Asia



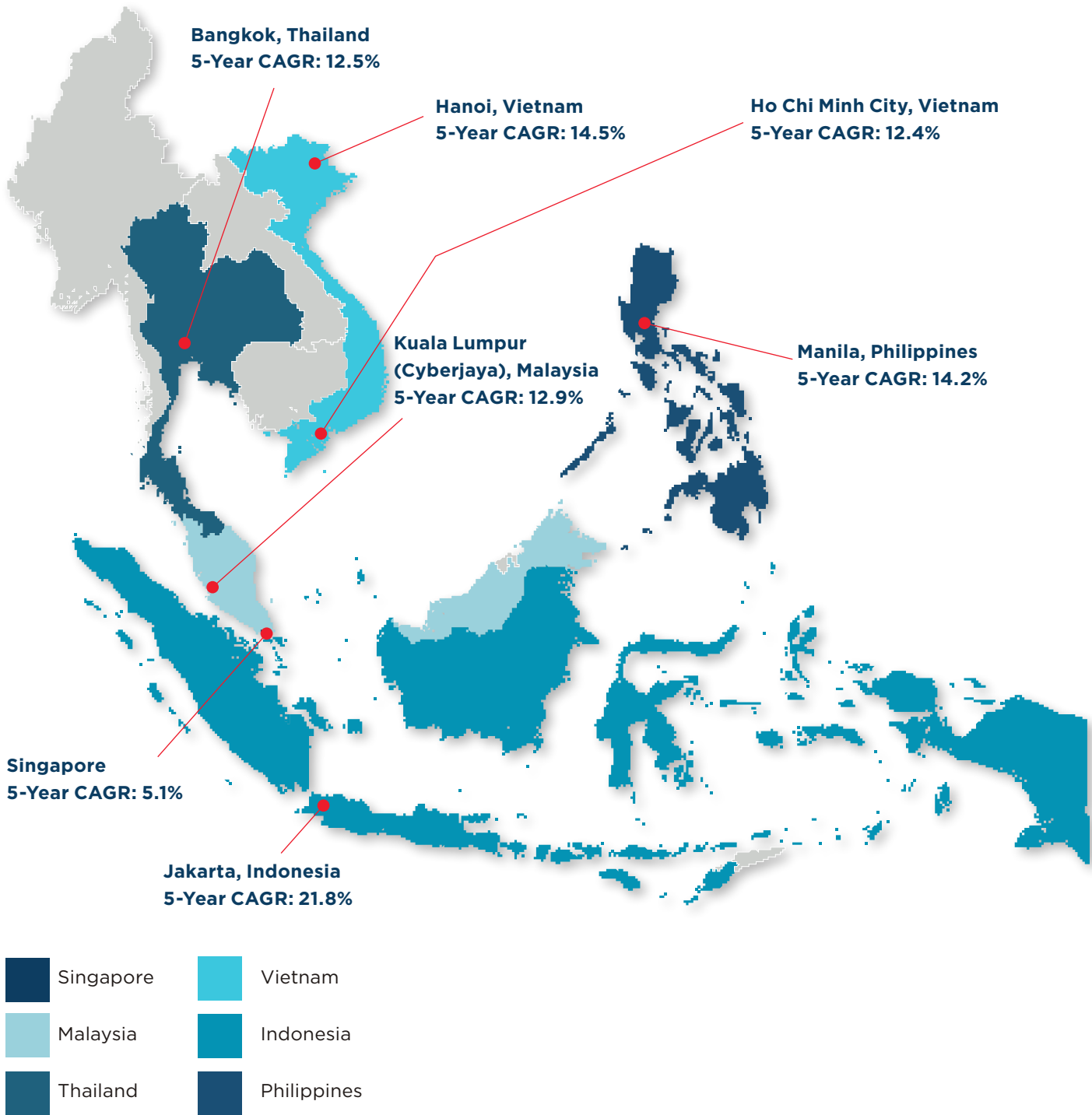
Source: Structure Research, Cushman & Wakefield


Rack Space of Data Centre in SEA Region



Source: Structure Research, Cushman & Wakefield

5-Year CAGR of Data Centre Market Size in SEA Region





Over time, demand for data centres may also shift to edge locations such as secondary markets and smaller nodes in major cities, as architectures start to decentralise.

The growth story for SEA data centres is hardly surprising. Singapore, the only mature data centre market in SEA has been hogging the lime-light since late last year with Facebook setting up its US\$1 billion data centre in the city state. It would be its first in Asia, and 15th in the world, a strong testament to Singapore's continued strength as a global data centre powerhouse. Apart from Facebook, we also saw Equinix, Digital Realty, ST Telemedia and at least two other operators having successfully tendered for land plots from Jurong Town Corporation (the state landlord) to build data centres.

Besides Singapore, hyperscale cloud operators, which typically include Alibaba Cloud, AWS, Microsoft Azure, Oracle Cloud Infrastructure and Google Cloud, also gravitate more and more towards data localisation. That is driven by a combination of regulations around cybersecurity, the e-commerce boom and ride-hailing industry, as well as on-demand access to cloud services by numerous local enterprises. For example, Alibaba Cloud has by far the largest infrastructure footprint in the Asia Pacific region, with 15 availability zones outside mainland China covering the Singapore, Malaysia, Indonesia, India, Hong Kong and Japan markets. It is also the sole global cloud provider with local data centres in Indonesia and Malaysia.

Microsoft through its local partner Telkomtelstra, has also progressively expanded its cloud solution known as the Azure Stack in Indonesia. Others also continued to lease more data centre capacity from co-location providers in major cities, especially in emerging markets like Indonesia and Malaysia, after these markets upgraded the connectivity infrastructure.

Over time, demand for data centres may also shift to edge locations such as secondary markets and smaller nodes in major cities, as architectures start to decentralise. This could boost the demand for colocation data centres in the secondary markets. That said, cloud maturity in SEA region is still in its early stage due to evolving regulations, local cost of labour and the availability of workforces familiar with cloud technologies.

Given that the local infrastructure will need time to mature, it will take a few years before the SEA markets achieve self-sufficiency. There are still uncertainties and geopolitical risks on the horizon over the medium term in these less developed markets. For instance, to lay fibres and power cables on privately-owned land parcels in Indonesia, one will have to obtain permission from all other land owners who control adjacent roads.

Since data centres are required to operate 24/7, it is imperative that they do not experience any power outage. However, basic infrastructure is still lacking in emerging markets, leading to unstable power supply. As such, power outage becomes even more prevalent, resulting in downtime, additional costs and loss of business. As reported by Information Technology Intelligence Consulting in 2018, an estimated cost to data centre operators for an hour of downtime was US\$260,000.

Although there is much room for improvement in the infrastructure sector in SEA, the investment potential far outweighs the teething issues. For one, large domestic consumption, young demographics and an accelerating level of industrialisation are attractive to data centre operators. The rise in affluence, and increasingly tech-savvy young population precipitated the increase in mobile usage in SEA. According to Bain & Co., by 2022, 50 million new consumers will be elevated to middle-class status in Indonesia, Malaysia, Philippines, Thailand and Vietnam, driven by rising income. Disposable income within the region will rise to US\$300 billion, contributed by 350 million people. This number will only surge going forward.

In addition, more than half of SEA's population is aged 30 and below, spurring various technological advancements and innovations. Data centre service providers are attracted to the idea that they will be bringing data

and cloud storage closer to the consumers, who access voluminous data daily to watch movies, upload photos and videos, play games and make cashless payments. These trends have caught the attention of Alibaba and Tencent, major players in fintech and cashless payment systems, who are now sharpening their focus on locating data centres in second-tier cities.

Indonesia ranks first as having the greatest mobile e-commerce penetration rate, while the highest number of mobile banking usage is observed in Thailand. A study by Google and Temasek Holdings approximated that SEA's internet economy will expand expeditiously from US\$72 billion in 2018 to a staggering US\$240 billion by 2025, driven by mobile internet services. SEA's internet penetration rate was only 25 per cent five years ago. This figure has since improved tremendously and stands at 63 per cent currently. Approximately 415 million people in SEA are able to access the Internet, which was a huge contrast to the 380 million people just a year ago. Compared to the United States and the United Kingdom, which have rates of above 90 per cent, mobile usage in SEA has huge potential for expansion.

Vietnam's long coastline makes it a natural gateway and landing point for sub-sea cables to the other landlocked SEA cities. As sub-sea cables are developed in these markets, the second and third tier markets become more connected to the global marketplace as the data centres are now domiciled in their home country.

While data centre service providers have to work through the teething problems of fibre connection, incurring costs of engaging a local agent to iron out bureaucracy and powering land parcels with water and electricity, several have in fact found a workaround by entering local joint ventures.

They have also gone one step further to invest in subsea cables which allow them to do away with having to pay annual usage costs to telecommunication companies who operate them. The initial set-up costs are still prohibitive, but as the data centre market matures, operators are navigating a path to managing costs efficiently.

Comparisons across Various SEA Markets on Data Centre's Operating Environment

COUNTRIES	STRENGTHS	WEAKNESSES	COST OF BUILDING DATA CENTRES, INCLUDING REAL ESTATE (1-5, 5 BEING THE HIGHEST)	OPERATING COST INCLUDING STAFFING, POWER, AND UTILITIES (1-5, 5 BEING THE HIGHEST)	INDUSTRY DEVELOPMENTS
SINGAPORE	Superior connectivity and power infrastructure Talent pool of skilled workers	High capital and operating costs Lack of secondary markets to absorb growth Increasingly complex compliance regime Muted business climate with increased difficulty to secure land and approval for builds	5	5	Facebook to invest S\$1.4 billion to construct its first data centre in Asia.
MALAYSIA	Lower capital and operating costs Emerging young population with increasing data needs	Oversupply of data-centre space	2	3	Increased efforts to improve connectivity while keeping costs low make Malaysia a favourable host for new builds One such hub could be the Sedenak Iskandar Data & Research hub, where Keppel is building a data centre for a cloud giant
THAILAND	Strong government support to attract new data centre investments Favorable tax regime under the Board of Investments	Rising building and operating costs	3	3	Announcement of 7 cloud service firms with total investment of 1.14 billion baht, includes the likes of Japan's Digital Port Asia, SUPERNAP from US, and TCC Technologies owned by Thai Tycoon

Source: Structure Research, Cushman & Wakefield

COUNTRIES	STRENGTHS	WEAKNESSES	COST OF BUILDING DATA CENTRES, INCLUDING REAL ESTATE (1-5, 5 BEING THE HIGHEST)	OPERATING COST INCLUDING STAFFING, POWER, AND UTILITIES (1-5, 5 BEING THE HIGHEST)	INDUSTRY DEVELOPMENTS
INDONESIA	Favourable demand-supply dynamics due to Indonesia's data localisation policy	Power infrastructure still unstable, may be required to build own power generator Complicated regulatory structure	3	2	Alibaba Cloud opened its second data centre. Google Cloud and Amazon Web Services have also announced plans to set up new data centres.
VIETNAM	New law on cybersecurity and emerging population should drive demand for data centres Potential connection gateway to the other landlocked SEA cities	Data centre industry still in its nascent stages Power challenges persist	2	2	Apple are mulling plans to invest USD 1 billion in a new data centre

ASEAN-6 Digital Population 2018

CATEGORIES	INDONESIA	THAILAND	MALAYSIA
Population	265.4M	69.11M	31.83M
Internet Users	132.7M	57.00M	25.08M
Social Media Users	130.0M	51.00M	24.00M
Mobile Users	177.9M	55.56M	21.62M
Mobile Social Users	120.0M	46.00M	22.00M

CATEGORIES	SINGAPORE	PHILIPPINES	VIETNAM
Population	5.75M	105.7M	96.02M
Internet Users	4.83M	67.0M	64.00M
Social Media Users	4.80M	67.0M	55.00M
Mobile Users	4.71M	61.0M	70.03M
Mobile Social Users	4.30M	62.0M	50.00M

Source: WeAreSocial, Hootsuite Jan 2018

The Case of Singapore

Being sheltered from natural disasters and boasting extensive infrastructure, many content operators continue to take advantage of Singapore's prime geographical location to service their regional clients in Malaysia, Indonesia and Thailand. With slightly over 410 critical MW and 3.2 million square feet (msf) of rack spaces, Singapore is unequivocally a top data centre destination in the Asia Pacific region. It also has the highest Watts per capita globally.



Due to the tropical weather in Singapore, more energy is needed to keep data centres cool compared to temperate countries. Data centres are kept consistently cool in a tightly-controlled environment that is operational round the clock. Alongside fully redundant back-up systems for emergency system failure, data centres require large amount of electricity to operate. According to Infocomm Media Development Authority, a typical 20MW data centre in Singapore consumes as much electricity daily as about 60,000 HDB households. By 2020, about 12 per cent of Singapore's electricity demand comes from data centres, as the sector continues to expand. Singapore has pledged to reduce carbon emission by 36 per cent, based on 2005 levels under the 2015 Global Paris Agreement. As such, the likelihood of obtaining regulatory approvals to convert green or brown field industrial sites into data centres will be limited. The next and probably the last wave of data centre supply to hit Singapore will be in the second half of 2020, at approximately 150MW, bringing total supply in the market to slightly over 500MW.

The lack of data centre supply means that demand should keep the pricing and rates favourable for data centre operators. The government's effort to become a

Smart Nation also boosts demand for data storage and servers. In such a climate, owners of existing data centres in Singapore can expect a relatively rich premium on existing assets.

The progressive roll out of 5G networks across the world is expected to fuel demand for data centres. A 5G network could be up to 20 times faster than the current 4G networks and would spur massive consumption of data and unlock new capabilities such as self-driving cars, cloud gaming and a thriving ecosystem of smart appliances that require a constant connection. In Asia Pacific, Singapore is one of the early adopters of 5G and is on track to roll out 5G mobile networks by 2020.

Escalating US-China trade tensions which has led to a pushback against Chinese telecoms equipment giant Huawei should have limited impact on the impending rollout of Singapore's 5G network. Singapore's three major telcos, namely Singtel, Starhub and M1 are working with multiple vendors, such as Sweden's Ericsson and Finland's Nokia, and not just Huawei in building their 5G networks. Singapore's diversified approach could help her stay ahead in the 5G adoption race.

Asia Pacific on the 5G Curve

Global rating agency Moody's expects 5G to gain some traction in these countries in 2019 - 2020

- PIONEERS**
Australia, Japan and South Korea
- EARLY ADOPTERS**
China, Hong Kong, Singapore, The Philippines
- LATE ADOPTERS**
Bangladesh, India, Indonesia, Malaysia

Sources: GSM ASSOCIATION (GSMA), MOODY'S INVESTORS SERVICE STRAITS TIMES GRAPHICS



In sum, Singapore is still undeniably the leading data centre hub in the region but its position may be challenged by neighbouring countries over the medium-term.

Indonesia is set to be the fastest growing market for data centres in SEA, with a growth rate of 22 per cent per annum over the next five years. Google's entry into Indonesia also demonstrates a developing interest in the country as a substitute to Singapore. Besides Indonesia, the governments in Thailand and Malaysia are also pushing data centre investments pro-actively alongside infrastructure improvement works to make them a favourable host for data centre players. Land owners and real estate landlords are increasingly open to cater to the development of data centres in strategic markets where they own large industrial and warehouse portfolios.

It will take a while longer for the emerging SEA countries to mature. Subsea cable networks and other infrastructure require considerable investments amounting to billions of dollars. Until the level of infrastructure is sophisticated enough to support the smooth operation of data centres in these markets, data centre players will continue to leverage the twin strengths of Singapore and the emerging markets of SEA to navigate the next wave of data centre development. They will favour Singapore for its relatively secured environment to store mission critical data and store the business-as-usual non-mission critical data in the neighbouring countries. As a whole, SEA as a region offers many advantages for data centre players.

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