The TRPC Data Centre Security Index 2020

Measuring Asian countries'
exposure to multi-faceted risks

TRPC

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I. About TRPC

TRPC is a boutique consulting and research firm with over 25 years' experience in the telecommunications and ICT industries in the Asia-Pacific. We offer specialised advisory, research, and training services, with a focus on regulatory and strategic business issues, and possess an extensive network of industry experts and professionals throughout the region.

Our research focuses on the economic impact of the emergence of new business models and the developments in telecommunications and information technologies, as well as the policy and regulatory issues associated with the above. Our expertise encompasses both the more developed ICT countries (e.g. South Korea, Japan, and Hong Kong) and those with fast-growing and emerging ICT industries (e.g. Indonesia, Philippines, and Vietnam).

Our recent work covers a range of up-and-coming areas such as blockchain and cryptocurrencies, digital identities, cloud computing and healthcare, cross-border data flows, and data analytics and credit ratings systems, among others. Our work is across 3 pillars:

- Private Sector consulting and 'thought leadership' engagements (e.g. Google, Microsoft, Netflix)
- Government advisory and consulting work (e.g. Malaysia (MDEC, MCMC), Australia, Japan (MIC))
- Multi-lateral contracts, participation, and work (e.g. ADB, APEC, ASEAN, PECC, World Bank)

We provide an intersection between academia, businesses, and relevant policy makers for the technology, telecommunications, and the ICT industries broadly defined, including the impact upon, and opportunities generated by, the use of new digital technologies in non-tech industries.

We are also part of several industry groups such as the Asia Cloud Computing Association (ACCA) and the International Institute of Communications (IIC). As key stakeholders in these industry groups and through our combined experiences, we have amassed a large network of contacts related in the telecommunications and ICT space around Asia-Pacific.

TRPC has offices in Hong Kong, Melbourne, and Singapore with on-the-ground presence or associates throughout the Asia-Pacific region.

More details can be found at: https://trpc.biz

II. Introduction

The digital economy runs on data.

With 2.5 quintillion bytes of data created each day,[1] it is estimated that the world's data will grow to 175 zettabytes by 2025.[2] Global data flows are expected to contribute to a 3.5% rise in global GDP, the equivalent of US$ 2.8 trillion.[3]

And this will only accelerate as hyper-connected digital innovations such as the Internet of Things (IoT) and artificial intelligence (AI) make it faster and easier for both individuals and organisations to create and consume data.

The more data-intensive digital devices, platforms, and services become, the more important it is to ensure that data is securely stored, managed, and disseminated.

In this sense, data centres – the facilities that house organisations' IT operations, equipment, and data – are vital parts of the digital economy. From servers and storage systems to databases and access networks, data centres host all the components that allow enterprise systems, government services, and consumer applications to function.

Modern data centres are much smaller and modulable than even a decade ago. Most data centres today do not consume a lot of power, do not occupy much space, and do not require highly specialised personnel to operate optimally.

But they still need a number of key elements in place to ensure they can keep the data entrusted to them safe.

This report presents the main findings of the TRPC Data Centre Security Index (DCSI) 2020, assessing and comparing APAC countries' risk profiles as they impact data centres' effectiveness. It also analyses the likelihood of the different types of risks hindering or supporting countries' competitive advantages as they race to become digital leaders. The report concludes by exploring some potential policy responses that can help address some of the strengths and weaknesses highlighted throughout.

III. Main Findings

The TRPC DCSI 2020 is a composite statistical measure of the different risks that can impact data centres' activities.

Comprising 32 indicators, TRPC DCSI 2020 provides a snapshot of data centres' exposure to elements that can threaten their integrity, disrupt their activities, and jeopardise their reputation when they operate in a given country.

The indicators are grouped under six major types of risk – Infrastructure Risk, Energy Risk, Natural Risk, Business Risk, Political Risk, and Legal Risk – providing a holistic assessment of an economy's risk profile.

TRPC DCSI 2020 examines the risk exposure of 18 Asia-Pacific (APAC) economies – Australia, Brunei, Cambodia, China, Hong Kong, India, Indonesia, Japan, Laos, Malaysia, Myanmar, New Zealand, the Philippines, Singapore, South Korea, Taiwan, Thailand, and Vietnam.

It also includes the risk profiles of 12 non-APAC economies – Brazil, Canada, Chile, Estonia, Germany, Mexico, Peru, Russia, South Africa, United Arab Emirates, United Kingdom, and the United States.

A lower score denotes the existence of a range of risks that can hinder, weaken, or even jeopardise a data centre's operations. A higher score demonstrates a well-rounded environment in which a data centre can expect stable and continuous operations.

3.1 Findings by country

With an overall TRPC DCSI 2020 score of 8.8, Singapore ranks first out of 18 APAC economies. It is followed by Hong Kong (score of 8.0), New Zealand (7.8), Australia (7.4), and Taiwan (7.3). At the other end of the spectrum are the Philippines and Myanmar, both ranked last with a score of 4.8. Cambodia (5.2), Laos (5.4), and India (5.5) are among the least secure locations for data centres.

### Overall TRPC DCSI 2020 scores and ranks, APAC economies

Economy	DCSI Score	DCSI Rank
Singapore	8.8	#1
Hong Kong	8.0	#2
New Zealand	7.8	#3
Australia	7.4	#4
Taiwan	7.3	#5
Malaysia	7.2	#6
Japan	7.1	#7
South Korea	7.0	#8
Brunei	7.0	#9
Thailand	6.2	#10
China	6.0	#11
Indonesia	5.8	#12
Vietnam	5.6	#13
India	5.5	#14
Laos	5.4	#15
Cambodia	5.2	#16
Myanmar	4.8	#17
Philippines	4.8	#18

Source: TRPC Research, based on several secondary databases.

At 6.5, the APAC-18 average segments the APAC region quite evenly: 9 economies are above the average, and 9 economies are below it. It is worth noting that the former are largely mature economies, while the latter are mostly emerging economies – indicating that a location's exposure to risk may be less about its intrinsic attributes and more about the resources it can devote to mitigating their effect.

Regarding non-APAC economies, the United Kingdom tops the charts with a score of 7.9. It is closely followed by Germany, Canada, and Estonia (all at 7.8). With a score of 5.6, Peru ranks last among non-APAC economies, tailed by Mexico (5.7), Russia (6.1), South Africa (6.3), and Brazil (6.4).

Overall TRPC DCSI 2020 scores, APAC and non-APAC economies (0-10)
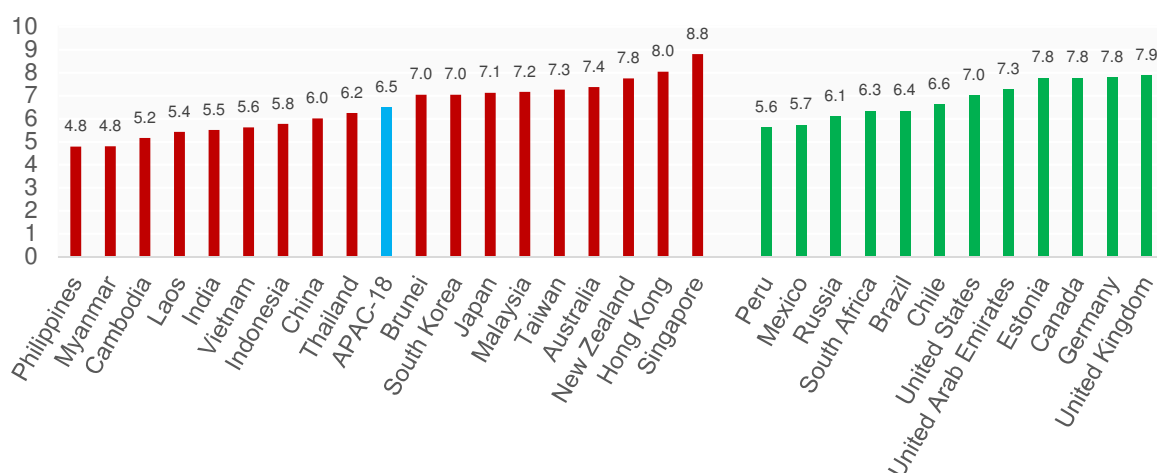
Source: TRPC Research, based on several secondary databases.

3.2 Findings by risk category

Overall, Political Risk is the lowest type of risk for the region (average score of 7.0 for 18 APAC economies). It is followed by Legal Risk, Business Risk, and Energy Risk (all three tied at 6.7). Across the APAC region, Natural Risk is the highest form of risk (5.3).

Infrastructure risk is lowest in Singapore (score of 8.9), Hong Kong, and Japan (both at 8.7) and highest in Laos (3.3), Cambodia (4.2), and Myanmar (4.6).

Energy risk is lowest in New Zealand (9.1), Hong Kong, and Singapore (both at 8.1) and highest in Cambodia (4.7) and Myanmar (5.1).

Natural risk is lowest in Singapore (10) and Laos (6.7) and highest in the Philippines (2.8), China, Myanmar (both at 3.2), and Japan (3.3).

Business risk is lowest in Singapore (8.5), New Zealand (8.1), Hong Kong, and Australia (both at 8.0) and highest in Myanmar (4.6), the Philippines (5.1), and Laos (5.2).

Political risk is lowest in New Zealand (8.5), Singapore, and Japan (both at 8.4) and highest in India (4.6) and the Philippines (4.7).

Legal risk is lowest in Singapore (9.0) and Hong Kong (8.8) and highest in Cambodia (4.7) and Vietnam (4.9).

Overall TRPC DCSI 2020 scores for APAC economies, by risk category (0-10)

	Infrastructure Risk	Energy Risk	Natural Risk	Business Risk	Political Risk	Legal Risk
Australia	7.6	7.3	5.7	8.0	8.0	7.7
Brunei	5.4	7.2	8.3	7.4	7.9	6.1
Cambodia	4.2	4.7	6.2	5.4	6.0	4.7
China	6.7	6.7	3.2	6.5	6.8	6.1
Hong Kong	8.7	8.1	6.5	8.0	8.1	8.8
India	6.5	5.8	3.7	6.2	4.6	6.2
Indonesia	6.7	5.8	3.5	6.0	6.6	6.0
Japan	8.7	7.7	3.3	6.5	8.4	8.1
Laos	3.3	5.9	6.7	5.2	6.5	5.0
Malaysia	7.7	6.9	5.9	7.2	7.3	8.0
Myanmar	4.6	5.1	3.2	4.6	6.0	5.3
New Zealand	6.7	9.1	5.6	8.1	8.5	8.6
Philippines	4.9	5.9	2.8	5.1	4.7	5.3
Singapore	8.9	8.1	10.0	8.5	8.4	9.0
South Korea	7.8	7.2	5.8	7.1	7.4	6.9
Taiwan	7.9	6.8	6.5	7.1	7.9	7.3
Thailand	6.1	6.7	5.1	7.2	6.0	6.3
Vietnam	5.8	5.9	4.3	6.3	6.6	4.9
APAC-18	6.6	6.7	5.3	6.7	7.0	6.7

Source: TRPC Research, based on several secondary databases.

3.3 Correlations

TRPC DCSI 2020 reveals an important divide between emerging and mature markets, suggesting that exposure to risk is not necessarily linked to flaws inherent to countries, but to the amount of resources they can devote to mitigating the impact of those flaws.

A correlation analysis seems to corroborate this. All the different types of risks – with the exception of Natural Risk – are strongly correlated with quantitative measures of economic development and prosperity.

- Infrastructure Risk is strongly correlated with the Readiness for the Future of Production score, as well as with the Global Innovation Index (GII) score. This suggests that digital infrastructure is closely linked to an economy's capacity for innovation, as well as its ability to leverage that innovation to drive and support industrial productivity.

- Energy Risk is strongly correlated with the Human Development Index (HDI) score, as well as with the E-Government Survey score. This suggests that smart and future-proof energy management strategies are important for governments' ability to provide a high quality of life to citizens, including timely and useful government services.

- Natural Risk is moderately correlated with GDP per capita, as well as with the Human Development Index (HDI) score. This suggests that the exposure to natural hazards and catastrophes negatively impacts populations' overall well-being, including their economic prosperity.

- Business Risk is strongly correlated with the Human Development Index (HDI) score, as well as with GDP per capita. This suggests that a stable and conducive business environment contributes to populations' overall well-being, including their economic prosperity.

- Political Risk is strongly correlated with the Human Development Index (HDI) score, as well as with GDP per capita. This suggests that socio-political stability – based on institutional and regulatory continuity – is vital to populations' overall well-being, including their economic prosperity.

- Legal Risk is strongly correlated with the Readiness for the Future of Production score, as well as with the Human Development Index (HDI) score. This suggests that a stable, reliable, and comprehensive regulatory framework contributes to an economy's industrial capabilities, as well as to a population's overall well-being.

Correlation of six types of risks with five measures of economic development

		Infrastructure Risk	Energy Risk	Natural Risk	Business Risk	Political Risk	Legal Risk
GDP per capita[4]	Pearson Correlation	.693**	.652**	.504**	.816**	.727**	.761**
	Sig. (2-tailed)	0	0	0.005	0	0	0
	N	29	29	29	29	29	29
Human Development Index (HDI)[5]	Pearson Correlation	.825**	.877**	.373*	.846**	.759**	.844**
	Sig. (2-tailed)	0	0	0.046	0	0	0
	N	29	29	29	29	29	29
Global Innovation Index (GII)[6]	Pearson Correlation	.875**	.693**	0.266	.671**	.672**	.829**
	Sig. (2-tailed)	0	0	0.18	0	0	0
	N	27	27	27	27	27	27
E-Government Survey[7]	Pearson Correlation	.828**	.799**	0.309	.810**	.591**	.783**
	Sig. (2-tailed)	0	0	0.11	0	0.001	0
	N	28	28	28	28	28	28
Readiness for the Future of Production[8]	Pearson Correlation	.932**	.750**	0.339	.787**	.724**	.912**
	Sig. (2-tailed)	0	0	0.091	0	0	0
	N	26	26	26	26	26	26

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

Source: TRPC Research.

IV. Country Highlight: Singapore

4.1 Risk Profile

With an overall DCSI score of 8.8 out of a maximum of 10, Singapore stands out as one of the region's most conducive environments for data centres.

Energy and Political Risk are its two biggest weaknesses. Namely, its level of renewable energy sources (a factor of long-term sustainability for data centres and many other industries) and the share of resources devoted to its military (indicating a propensity to consider both its domestic and foreign situations as under constant threat).

Conversely, Natural and Legal Risks are its two strongest assets. Namely, its very small degree of exposure to natural catastrophes (demonstrating an environmental stability that is favourable to continuous digital services) and its unwavering adherence to the rules and regulations it has set forth (indicating the existence of strong institutions and a resolute political leadership).

Detailed TRPC DCSI 2020 scores for Singapore, by indicator

Category	Indicator	Score
Infrastructure Risk	Quality of Roads	9.2
	Efficiency of Train Services	8.3
	Airport Connectivity	8.5
	Efficiency of Seaport Services	9.2
	Secure Internet Servers	9.3
Overall Infrastructure Risk		**8.9**
Energy Risk	Electrification Rate	10.0
	Quality of Electricity Supply	9.8
	Renewables in Electricity Production	3.0
	Reliability of Water Supply	9.8
Overall Energy Risk		**8.1**
Natural Risk	Physical Exposure to Earthquakes	9.9
	Physical Exposure to Floods	9.9
	Physical Exposure to Tsunamis	10.0
	Physical Exposure to Tropical Cyclones	10.0
	Population Affected by Natural Disasters	10.0
Overall Natural Risk		**10.0**
Business Risk	Tax Attractiveness	6.6
	Ease of Paying Taxes	9.2
	Ease of Enforcing Contracts	8.5
	Soundness of Banks	9.2
	Ease of Starting a Business	9.8
	Ease of Getting Credit	7.5
Overall Business Risk		**8.5**
Political Risk	Terrorism Incidence	10.0
	Absence of Corruption	9.1
	Order & Security	9.3
	Social Safety and Security	7.5
	Militarisation	5.9
Overall Political Risk		**8.4**
Legal Risk	Property Rights	9.1
	Judicial Independence	8.1
	Efficiency of Legal Framework in Settling Disputes	8.8
	Intellectual Property Protection	9.0
	Quality of Land Administration	9.7
	Strength of Auditing and Reporting Standards	9.0
	Conflict of Interest Regulation	9.3
Overall Legal Risk		**9.0**

Source: TRPC Research, based on several secondary databases.

4.2 Beyond Security

It is worth noting that there is a disconnect between the overall TRPC DCSI 2020 rankings and the number of data centres currently operating in the region. The DCSI finds that Singapore is the least exposed to multi-faceted risks in the APAC region, and is therefore the most desirable location for data centres.

Yet Singapore is not first when it comes to the number of data centres effectively operating within its borders. According to data from Cloud Scene, Singapore ranks 5th with 85 data centres, tailing Hong Kong (108 data centres), India (118), Japan (200), and Australia (248).[9]

Top 5 APAC economies, ranked by exposure to risk and by number of data centres in operation

DCSI Rankings (by Exposure to Destabilising Risks)		Cloud Scene Rankings (by Number of Data Centres in Operation)	
Singapore	1	Australia	1
Hong Kong	2	Japan	2
New Zealand	3	India	3
Australia	4	Hong Kong	4
Taiwan	5	Singapore	5

Source: TRPC Research and Cloud Scene, https://cloudscene.com/datacenters-in-asia-pacific (retrieved October 2019).

This suggests that exposure to risk is not the only factor that data centre providers examine when choosing a location to open a data centre. Other factors include:

- Market factors: Current and projected size of the market, i.e. demand from consumers and companies. Singapore is largely shielded from major risks, but it remains very small compared to other APAC markets. This limitation is highlighted by many companies – including SMEs – when exploring growth opportunities.[10] Start-ups find Singapore's business-friendly environment an advantage when launching their operations, but they are quickly faced with the need to expand beyond Singapore if they are to survive.[11] This constraint does not yet hinder the scope and pace in which digital products and services are developed and adopted in Singapore, but it will become an important challenge as neighbouring markets become attractive destinations for digital investors and innovators.

- Financial factors: Current and projected size of the digital economy, i.e. dynamism of digital products and services). Singapore is a strong and viable digital economy, with a digitally savvy population and a digitally enabled government. But its population of 5.8 million is no match for Malaysia's 32.6 million, Thailand's 69.6 million, and Indonesia's 270 million – all rapidly growing digital economies. Even if only 20% of these markets' populations can be considered an actual consumer of digital products and services, it is still comparatively more than Singapore. By sheer growth potential alone, these markets are becoming attractive destinations for companies and capital, a reality that will fast shift regional dynamics[12] for digital businesses and the data centres that power them as well.

- Geographic factors: The physical size of the market, which impacts the raw cost of land and materials, and determines the possibility to occupy remote, less populated – but still reliably connected – areas. Singapore economic dynamism sometimes eclipses the simple reality that it is a very small territory. And as aggressively as it reclaims land, it cannot expand indefinitely. This has a major impact on land and property costs,[13] which in turn affects the performance of resource-intensive buildings such as data centre facilities. The more expensive land becomes in Singapore, the more likely data centre providers are to find that the exposure to certain unlikely risks in Hong Kong or Australia outweighs the exorbitant cost of setting up shop in Singapore. Singapore has started addressing this challenge by exploring virtual expansion mechanisms; via offshore "floating" data centres[14] and via locally hosted data "embassies".[15]

- Manpower factors: The availability of a skilled but affordable workforce to operate and maintain the data centre. Having the right talent with the right skills and the drive to promote innovation and risk-taking is a major challenge for all rapidly digitising economies. The Singapore government has started to recognise this is a priority area and has launched a number of initiatives aimed at skilling, training, and educating all levels of its domestic workforce.[16] It has also begun filling this gap among the government itself, hiring specialised technical talent (data scientists, cybersecurity experts, machine-learning programmers, user-interface designers, software engineers, business developers) to capacitate its institutions.[17] The question is whether these efforts will effectively make Singapore's workforce competitive as other APAC economies "leapfrog" into success.

These are complex elements that are not easily addressed via policy-making alone, but that will require careful examination if Singapore is to becomes the region's data centre hub.[18]

V. Concluding Remarks

The Asia-Pacific data centre services market was worth US$14.13 billion in 2016, and it is expected to grow at a compound annual growth rate (CAGR) of 14.7% by 2022, reaching US$31.95 billion at the end of 2022.[19]

To fully seize these economic benefits, APAC markets must reduce their exposure to the 6 types of risks covered in this report. This will allow them to mitigate any negative impact these risks can have on data centres' ability to operate sustainably and continuously. Six broad recommendations will help overcome each of the 6 types of risks and the associated issues they engender.

5.1 Drive access to safe and secure connectivity

Secure internet services is the weakest-performing indicator in the Infrastructure Risk category. This reflects the two major challenges that the APAC region is facing in terms of connectivity.

First, the fact that access to digital technologies is largely uneven and fragmented. The penetration of digital communications is at an all-time high – 2.8 billion people in APAC subscribed to mobile services in 2018[20] – but close to 417 million people cannot yet access basic Internet services, most of them in Cambodia, Laos, Myanmar, and Vietnam.[21] In fact, some 47 million people in the region still live in extreme poverty (USD1.90 or less per day),[22] putting e-commerce, e-payments, and even smartphone ownership far from their day-to-day priorities. Second, the fact that the region is both a prime target for cyber-crime and an ideal launchpad for cyber-attacks. A diverse region with a fragmented approach to cybersecurity, it comprises hyper-connected financial hubs in which millions of digital transactions take place in a given day, as well as vulnerable hotbeds of unsecured digital infrastructure. For example, Singapore has been the target of numerous high-profile data breaches these past few years,[23] while Vietnam has recorded some 19 million online attacks in the first six months of 2019 alone.[24]

Together, these two challenges make it difficult for data centres to support the growth and expansion of digital innovations. To ensure data centres contribute to their growing digital economies, APAC countries will have to strengthen the access to affordable and reliable connectivity, as well as develop effective cybersecurity frameworks to keep data safe and secure in the face of rising and evolving cyber-threats.

5.2 Enable renewable and sustainable energy

Renewable energy in electricity production is the weakest-performing indicator in the Energy Risk category. This reflects one of the region's main environmental challenges in the digital age; how to meet rising demand for energy while lowering reliance on "dirty", unsustainable sources of energy.

From power-hungry devices to data-enabled services, the demand for energy is set to grow as larger segments of the population adopt digital innovations. According to the IEA, global energy consumption growth was nearly double the average rate of growth that has been recorded since 2010 – with China, the United States, and India accounting for nearly 70% of the increase in global energy demand.[25] Projections see most of the world's oil and gas exports headed to the APAC region by 2040, and almost half of the region's gas demand satisfied by LNG imports.[26] In this context, countries' ability to adopt and deploy renewable forms of energy ((hydro, wind, geothermal, and solar) will determine the sustainability of their industrialisation and digitalisation efforts.

This challenge makes it difficult for data centres to cleanly and sustainably provide continuous and uninterrupted data services. To ensure data centres consume energy in an optimal manner, APAC countries need to make the production and consumption of "clean" energy sources into their national and regional agendas.

5.3 Mitigate the economic impact of natural hazards

The physical exposure to floods and to tsunamis are the two weakest-performing indicators in the Natural Risk category. This reflects the region's natural disposition towards big and frequent natural hazards, as well as its difficulty in mitigating their impact – engendering both human and material costs.

According to the United Nations, in the period between 2014 and 2017, 870 million people from 160 countries either lost their lives, their livelihoods, or were displaced from their homes because of disasters caused by natural hazards.[27] Climate change, rapid population growth, and haphazard urbanisation are contributing to an increase in both the number and severity of disasters, with the APAC region particularly hit. In 2018, the region suffered economic losses of over USD89 billion, with tropical cyclones, floods, and drought driving these costs.[28] This includes everything from the cost of destroyed homes and buildings to the cost of disrupted networks, damaged computers, and lost data.

This challenge makes it difficult for data centres to calculate the socio-economic impact a given catastrophe will have on their staff, operations, and bottom-line. To ensure data centres can operate in an environment that is as

risk-free as possible, APAC counties must ensure they have disaster risk assessment and response systems in place to mitigate the negative effects of unpredictable – but manageable – natural disasters.

5.4 Foster a rules-based, business-friendly environment
Tax attractiveness and enforcing contracts are the two weakest-performing indicators in the Business Risk category. This reflects the region's disparate and fragmented approach to fostering a business-friendly environment in the digital age.

The cross-border nature of the Internet and the digital economy makes it difficult to design and implement holistic and comprehensive rules and regulations. Digital technologies are fast transforming industries and businesses, changing the roles people, products, and platforms play in key economic sectors and bringing down the cost of doing business. As industries and markets are transformed, the traditional industry-specific approach to policy-setting is increasingly failing to enable expected economic growth and social development outcomes. This is also true for fast-changing dynamics in terms of prices. taxes, and competition. Across the APAC region, policy-makers and regulators are struggling to regulate fast-evolving, multi-faceted digital platforms and services.

This challenge makes it difficult for data centres to operate in an increasingly borderless, trans-national global economic environment. To ensure they can both drive and benefit from the global digital economy, APAC countries cannot try to apply old rules to new platforms. They must instead consolidate efforts, mandates, and priorities to ensure they address the right challenge in the right manner.

5.5 Shield citizens from corruption and destitution
Social safety and corruption are the two weakest-performing indicators in the Political Risk category. This reflects the region's difficulty in developing social protection systems that leave no one behind, including the application of laws and regulations in a fully transparent and accountable manner.

According to the United Nations, about 60% of people in the APAC region are still excluded from adequate social protection coverage and remain greatly exposed to the economic and social risks related to old-age, illness, and recurrent natural disasters. And while public expenditure on social protection has been increasing in the past two decades, it remains about a third of the global average of 11.2%.[29] At the same time, the region is making little progress in the fight against corruption; persistent and widespread corruption continues to plague most countries in the region, reflecting the weakening of rule of law and democratic institutions, as well as a rapidly shrinking space for civil society and independent media.[30]

This challenge makes it difficult for data centres to operate in conditions that do not create additional security costs and compliance constraints to their operations. To ensure they provide an optimal environment in which citizens, consumers, businesses, and public institutions thrive, APAC countries must enact national programmes that focus on increasing social safety and security, as well as on mitigating the spread of corruption – from improved access to information laws and stronger anti-corruption agencies to effective prosecution of corrupt individuals.

5.6 Strengthen institutions to ensure laws and regulations are applied and followed
The efficiency of legal framework in settling disputes and the quality of land administration are the two weakest-performing indicators in the Legal Risk category. This reflects the region's difficulty to streamline and coordinate institutions' efforts and initiatives, especially when it comes to delivering government services and enforcing legally binding agreements.

E-government is the use of information and communication technology (ICT) to promote more efficient and cost-effective government, more convenient government services, greater public access to information, and more government accountability to citizens. A digital government provides citizens with ready and convenient access to government services and transactions. By offering inter-operable and Internet-based platform, the digital government is able to provide unparalleled connectivity and transparency that can transform government processes between departments for citizens and organisations. In this sense, most APAC countries have some way to go before being truly digitally enabled.

This challenge makes it difficult for data centres to overcome the hurdles that come with conducting legally and bureaucratically rigorous work. To ensure they remain attractive and competitive in the face of increasingly global competition, APAC countries must ensure their institutions and administrations can support and enforce the foundational principles of digitally driven economies: encouraging innovation while protecting citizens.

VI. Methodology

TRPC DCSI 2020 comprises 32 indicators, drawn from established, globally recognised databases.[31] The indicators are grouped under six major risk categories: Infrastructure Risk, Energy Risk, Natural Risk, Business Risk, Political Risk, and Legal Risk.

Each indicator has been normalised to a scale from 0 to 10. The total TRPC DCSI 2020 score is also out of a total maximum of 10.

A lower score denotes the existence of a range of risks that can hinder, weaken, or even jeopardise a data centre's operations. A higher score demonstrates a well-rounded environment in which a data centre can expect stable and continuous operations.

Infrastructure Risk	1.1	Quality of Roads
	1.2	Efficiency of Train Services
	1.3	Airport Connectivity
	1.4	Efficiency of Seaport Services
	1.5	Secure Internet Servers
Energy Risk	2.1	Electrification Rate
	2.2	Quality of Electricity Supply
	2.3	Renewables in Electricity Production
	2.4	Reliability of Water Supply
Natural Risk	3.1	Physical Exposure to Earthquakes
	3.2	Physical Exposure to Floods
	3.3	Physical Exposure to Tsunamis
	3.4	Physical Exposure to Tropical Cyclones
	3.5	Population Affected by Natural Disasters
Business Risk	4.1	Tax Attractiveness
	4.2	Ease of Paying Taxes
	4.3	Ease of Enforcing Contracts
	4.4	Soundness of Banks
	4.5	Ease of Starting a Business
	4.6	Ease of Getting Credit
Political Risk	5.1	Terrorism Incidence
	5.2	Absence of Corruption
	5.3	Order & Security
	5.4	Social Safety and Security
	5.5	Militarisation
Legal Risk	6.1	Property Rights
	6.2	Judicial Independence
	6.3	Efficiency of Legal Framework in Settling Disputes
	6.4	Intellectual Property Protection
	6.5	Quality of Land Administration
	6.6	Strength of Auditing and Reporting Standards
	6.7	Conflict of Interest Regulation

TRPC DCSI 2020 indicators, definitions and sources

Indicator	Definition / Description	Source
Quality of Roads	Measures the quality (extensiveness and condition) of road infrastructure.	World Economic Forum, Global Competitiveness Report - EOSQ057 indicator
Efficiency of Train Services	Measures the efficiency (i.e., frequency, punctuality, speed, price) of train transport services.	World Economic Forum, Global Competitiveness Report - EOSQ485 indicator
Airport Connectivity	Measures the degree of integration of a country within the global air transport network.	World Economic Forum, Global Competitiveness Report - IATACONNECTIDX indicator
Efficiency of Seaport Services	Measures the efficiency (i.e., frequency, punctuality, speed, price) of seaport services (ferries, boats).	World Economic Forum, Global Competitiveness Report - EOSQ487 indicator
Secure Internet Servers	Measures the number of distinct, publicly-trusted TLS/SSL certificates found in the Netcraft Secure Server Survey.	World Bank, Indicator Database - IT.NET.SECR.P6 indicator
Electrification Rate	Measures the share of the population with access to electricity.	World Economic Forum, Global Competitiveness Report - ELECRATE indicator
Quality of Electricity Supply	Measures the reliability of the electricity supply (lack of interruptions and lack of voltage fluctuations).	World Bank, TCdata360 database - indicator 548
Renewables in Electricity Production	Measures the ratio between the electricity production from renewable energies (hydro, wind, geothermal, and solar) and the total electricity production.	Enerdata, Global Energy Statistical Yearbook 2019
Reliability of Water Supply	Measures the reliability of the water supply (lack of interruptions and flow fluctuations).	World Economic Forum, Global Competitiveness Report - EOSQ488 indicator
Physical Exposure to Earthquakes	Measures the absolute and relative exposure to MMI VI and VIII category earthquakes.	INFORM, Global Risk Index 2018
Physical Exposure to Floods	Measures the absolute and relative exposure to floods.	INFORM, Global Risk Index 2018
Physical Exposure to Tsunamis	Measures the absolute and relative exposure to tsunamis.	INFORM, Global Risk Index 2018
Physical Exposure to Tropical Cyclones	Measures the absolute and relative exposure to tropical cyclones and storm surges.	INFORM, Global Risk Index 2018
Population Affected by Natural Disasters	Measures the share of the total population affected by natural disasters in the last 3 years.	INFORM, Global Risk Index 2018
Tax Attractiveness	Measures the attractiveness of a country's tax environment.	LMUTax, Tax Attractiveness Index - Overall score
Ease of Paying Taxes	Measures the taxes and mandatory contributions that a medium-sized company must pay in a given year, as well as measures of the administrative burden of paying taxes and complying with procedures.	World Bank, Ease of Doing Business Index 2019
Ease of Enforcing Contracts	Measures the time and cost for resolving a commercial dispute through a local first-instance court, and the degree to which good practices are adopted to promote quality and efficiency in the court system.	World Bank, Ease of Doing Business Index 2019
Soundness of Banks	Measures the soundness of banks (banks are generally healthy with sound balance sheets).	World Economic Forum, Global Competitiveness Report - EOSQ087 indicator
Ease of Starting a Business	Measures all procedures officially required for an entrepreneur to start and operate an industrial or commercial business.	World Bank, Ease of Doing Business Index 2019
Ease of Getting Credit	Measures the legal rights of borrowers and lenders with respect to secured transactions through one set of indicators and the reporting of credit information through another.	World Bank, Ease of Doing Business Index 2019
Terrorism Incidence	Measures the number of terrorism-related casualties (injuries and fatalities) and the number of terrorist attacks.	World Economic Forum, Global Competitiveness Report - TERRORISMINCIDENCEIDXGCI4 indicator
Absence of Corruption	Measures the absence of corruption in government (three forms of corruption: bribery, improper influence by public or private interests, and misappropriation of public funds or other resources).	World Justice Project (WJP), Rule of Law Index 2019
Order & Security	Measures how well a society ensures the security of persons and property. Security is one of the defining aspects of any rule of law society and is a fundamental function of the state. It is also a precondition for the realisation of the rights and freedoms that the rule of law seeks to advance.	World Justice Project (WJP), Rule of Law Index 2019
Social Safety and Security	Measures the level of harmony or discord within a nation (low crime rates, minimal terrorist activity, low violent demonstrations, harmonious relations with neighbouring countries, and a stable political scene).	Institute for Economics and Peace (IEP), Global Peace Index 2019
Militarisation	Measures the link between a country's level of military build-up and access to weapons and its level of peacefulness, both domestically and internationally.	Institute for Economics and Peace (IEP), Global Peace Index 2019
Property Rights	Measures the extent to which property rights, including financial assets, are protected.	World Economic Forum, Global Competitiveness Report - EOSQ051 indicator
Judicial Independence	Measures the independence of the judicial system from influences of the government, individuals, or companies.	World Economic Forum, Global Competitiveness Report - EOSQ144 indicator
Efficiency of Legal Framework in Settling Disputes	Measures the efficiency of the legal and judicial systems for companies in settling disputes.	World Economic Forum, Global Competitiveness Report - EOSQ040 indicator
Intellectual Property Protection	Measures the extent to which intellectual property is protected.	World Economic Forum, Global Competitiveness Report - EOSQ052 indicator
Quality of Land Administration	Measures five dimensions of land administration: reliability of infrastructure, transparency of information, geographic coverage, land dispute resolution, and equal access to property rights.	World Economic Forum, Global Competitiveness Report - DBREGPROPADMINQUAL indicator
Strength of Auditing and Reporting Standards	Measures the strength of financial auditing and reporting standards.	World Economic Forum, Global Competitiveness Report - EOSQ097 indicator
Conflict of Interest Regulation	Measures the protection of shareholders against directors' misuse of corporate assets for personal gain.	World Economic Forum, Global Competitiveness Report - CONFINTREG indicator

Source: TRPC Research, based on several secondary databases.

TRPC DCSI 2020 comprises 32 indicators grouped into six major risk categories. The tables below provide the detailed indicator scores for APAC and non-APAC economies.

Overall DCSI scores, by indicator and by risk category, APAC economies (0-10)

	Infrastructure Risk					Energy Risk				Natural Risk					Business Risk						Political Risk					Legal Risk						
	Quality of Roads	Efficiency of Train Services	Airport Connectivity	Efficiency of Seaport Services	Secure Internet Servers	Electrification Rate	Quality of Electricity Supply	Renewables in Electricity Production	Reliability of Water Supply	Physical Exposure to Earthquakes	Physical Exposure to Floods	Physical Exposure to Tsunamis	Physical Exposure to Tropical Cyclones	Population Affected by Natural Disasters	Tax Attractiveness	Ease of Paying Taxes	Ease of Enforcing Contracts	Soundness of Banks	Ease of Starting a Business	Ease of Getting Credit	Terrorism Incidence	Absence of Corruption	Order & Security	Social Safety and Security	Militarisation	Property Rights	Judicial Independence	Efficiency of Legal Framework in Settling Disputes	Intellectual Property Protection	Quality of Land Administration	Strength of Auditing and Reporting Standards	Conflict of Interest Regulation
Australia	6.8	6.1	9.7	6.7	8.4	10.0	8.1	2.0	9.1	6.0	4.7	2.8	5.2	10.0	3.6	8.6	7.9	9.1	9.6	9.0	9.9	8.1	8.7	7.0	6.4	8.6	8.8	6.8	8.3	6.7	8.6	6.0
Brunei	7.0	5.1	3.4	5.9	5.6	10.0	7.7	3.0	8.0	9.9	8.6	5.0	8.1	10.0	4.3	7.4	6.1	7.1	9.5	10.0	10.0	8.0	8.7	6.6	6.1	6.1	5.6	5.5	6.3	6.0	6.3	6.7
Cambodia	4.8	3.1	5.4	5.1	2.4	6.0	5.0	1.5	6.2	9.9	0.5	4.8	6.0	9.6	3.2	6.1	3.2	6.4	5.3	8.0	10.0	2.4	6.6	4.9	5.9	5.8	3.6	4.3	4.7	2.5	5.2	6.7
China	6.5	6.5	10.0	6.5	4.1	10.0	7.1	2.6	7.0	2.1	1.6	0.7	1.9	9.8	2.6	6.8	7.9	6.4	9.4	6.0	9.6	5.5	7.9	5.0	6.0	6.5	6.4	5.9	6.4	6.1	6.5	5.0
Hong Kong	8.7	9.1	8.8	8.8	7.9	10.0	9.8	3.0	9.8	5.7	5.8	4.4	6.9	9.9	4.9	10.0	6.9	9.0	9.8	7.5	10.0	8.4	9.3	6.6	6.1	8.8	8.8	8.4	8.5	9.2	9.0	9.0
India	6.3	6.4	10.0	6.6	3.2	8.2	6.7	1.9	6.7	2.1	1.6	1.9	2.8	9.9	3.8	6.5	4.1	6.6	8.1	8.0	2.6	4.3	5.9	5.3	4.9	6.9	6.6	6.5	6.6	2.7	6.8	7.3
Indonesia	5.6	6.7	10.0	6.1	5.2	9.1	6.3	1.2	6.6	1.5	1.9	0.3	3.9	10.0	2.4	6.8	4.7	7.0	8.1	7.0	9.7	3.8	7.0	5.5	7.1	6.8	6.3	5.9	6.6	3.8	6.8	5.7
Japan	8.6	9.5	10.0	8.1	7.4	10.0	9.5	1.8	9.5	0.5	6.1	0.0	0.0	9.9	3.2	7.1	6.5	8.3	8.6	5.5	10.0	8.2	9.2	7.4	7.1	8.6	8.7	7.6	8.4	8.2	8.3	7.0
Laos	4.6	3.3	3.6	3.9	1.0	9.1	6.9	1.5	6.2	6.0	0.9	10.0	6.5	10.0	3.2	5.4	4.2	6.2	6.1	6.0	10.0	4.0	6.6	5.6	6.6	5.6	5.5	5.8	5.5	3.5	5.6	3.3
Malaysia	7.8	7.4	8.9	7.6	6.7	9.9	8.4	1.4	7.8	5.9	3.4	2.9	7.1	10.0	5.2	7.6	6.8	7.9	8.3	7.5	9.9	5.8	7.7	6.0	7.3	8.0	7.1	7.5	7.7	9.2	8.0	8.7
Myanmar	5.1	4.6	7.6	5.4	0.2	8.5	3.9	1.5	6.5	0.6	0.1	1.1	4.4	9.9	3.2	6.4	2.5	6.6	7.7	1.0	7.5	4.7	6.6	4.3	6.9	6.1	5.2	5.3	5.8	3.6	6.1	5.2
New Zealand	6.7	5.6	6.2	7.3	7.8	10.0	9.3	8.3	8.6	1.7	6.2	2.9	7.1	10.0	3.4	9.1	7.1	8.7	10.0	10.0	10.0	8.7	8.9	7.2	7.6	8.6	9.1	7.6	8.6	8.7	8.6	9.3
Philippines	5.0	3.4	8.3	5.2	2.5	9.0	6.0	1.5	7.2	0.5	2.8	0.7	0.4	9.6	2.7	7.2	4.6	8.3	7.2	0.5	2.7	4.7	5.7	3.9	6.7	6.3	4.3	4.3	6.4	4.5	7.3	4.0
Singapore	9.2	8.3	8.5	9.2	9.3	10.0	9.8	3.0	9.8	9.9	9.9	10.0	10.0	10.0	6.6	9.2	8.5	9.2	9.8	7.5	10.0	9.1	9.3	7.5	5.9	9.1	8.1	8.8	9.0	9.7	9.0	9.3
South Korea	8.2	8.4	9.2	7.7	5.6	10.0	9.2	0.4	9.1	9.9	5.3	2.4	1.5	10.0	2.5	8.7	8.4	6.9	9.6	6.5	10.0	6.7	8.4	6.8	5.2	7.3	5.7	5.8	6.5	9.2	7.1	7.0
Taiwan	7.8	7.6	8.3	7.4	8.3	10.0	9.0	0.5	7.8	5.7	5.8	4.4	6.9	9.9	3.7	8.5	7.5	8.3	9.4	5.0	10.0	8.0	8.7	6.5	6.4	7.8	6.4	5.4	7.2	9.5	8.1	6.7
Thailand	6.2	3.8	9.9	5.8	4.9	10.0	7.4	2.0	7.4	6.6	1.2	2.8	5.1	9.7	4.5	7.8	6.8	8.1	9.3	7.0	7.0	4.9	7.1	4.2	6.9	6.0	5.8	5.8	5.2	6.0	7.0	8.3
Vietnam	4.5	4.8	8.6	5.4	5.5	9.8	6.2	1.5	6.2	6.9	0.0	2.6	2.1	9.7	3.7	6.3	6.2	5.3	8.5	7.5	10.0	4.0	7.7	5.8	5.8	5.5	4.9	4.7	5.0	4.7	5.1	4.3
APAC-18	6.6	6.1	8.1	6.6	5.3	9.4	7.6	2.2	7.7	5.1	3.7	3.3	4.8	9.9	3.7	7.5	6.1	7.5	8.6	6.6	8.8	6.1	7.8	5.9	6.4	7.1	6.5	6.2	6.8	6.3	7.2	6.6

Source: TRPC Research, based on several secondary databases.

Overall TRPC DCSI 2020 scores, by indicator and by risk category, non-APAC economies (0-10)

	Infrastructure Risk					Energy Risk				Natural Risk					Business Risk						Political Risk					Legal Risk						
	Quality of Roads	Efficiency of Train Services	Airport Connectivity	Efficiency of Seaport Services	Secure Internet Servers	Electrification Rate	Quality of Electricity Supply	Renewables in Electricity Production	Reliability of Water Supply	Physical Exposure to Earthquakes	Physical Exposure to Floods	Physical Exposure to Tsunamis	Physical Exposure to Tropical Cyclones	Population Affected by Natural Disasters	Tax Attractiveness	Ease of Paying Taxes	Ease of Enforcing Contracts	Soundness of Banks	Ease of Starting a Business	Ease of Getting Credit	Terrorism Incidence	Absence of Corruption	Order & Security	Social Safety and Security	Militarisation	Property Rights	Judicial Independence	Efficiency of Legal Framework in Settling Disputes	Intellectual Property Protection	Quality of Land Administration	Strength of Auditing and Reporting Standards	Conflict of Interest Regulation
Brazil	4.3	3.5	9.0	4.4	5.6	10.0	6.4	8.2	6.6	7.6	1.9	10.0	10.0	10.0	2.8	3.4	6.6	8.2	8.0	5.0	10.0	4.5	6.5	3.7	5.6	5.8	5.2	3.8	5.7	4.6	6.7	5.7
Canada	7.4	6.1	9.6	7.3	8.3	10.0	9.4	6.6	9.6	5.2	4.8	3.1	7.4	10.0	3.1	8.8	5.7	9.3	9.8	8.5	9.9	8.3	9.1	7.1	7.0	8.6	8.9	6.8	8.1	7.2	8.9	8.7
Chile	7.5	4.3	5.8	6.9	7.0	10.0	8.7	4.7	8.6	0.2	4.4	0.9	10.0	10.0	1.7	7.5	6.6	9.0	8.9	5.5	9.9	7.0	6.8	5.8	6.6	7.4	7.0	5.7	6.5	5.0	8.1	7.0
Estonia	6.7	6.7	3.3	8.0	8.8	10.0	8.3	3.0	9.0	9.9	6.4	10.0	10.0	10.0	5.9	9.0	7.4	8.1	9.5	7.0	10.0	8.0	8.9	6.0	6.9	7.7	7.8	6.1	7.7	9.2	7.8	5.7
Germany	7.8	7.8	10.0	7.6	8.9	10.0	8.8	3.6	8.6	7.3	3.9	10.0	10.0	10.0	4.7	8.2	7.0	7.5	8.4	7.0	9.7	8.2	8.9	6.7	6.1	7.9	7.7	7.4	7.9	7.3	7.8	5.0
Mexico	6.4	4.4	9.2	6.1	3.4	10.0	7.0	1.7	6.8	1.5	2.8	3.4	2.3	9.9	2.7	6.7	6.7	7.9	8.6	9.0	9.8	2.9	5.7	3.7	6.6	5.8	4.1	4.0	5.9	5.4	7.1	6.0
Peru	4.5	3.8	5.8	5.2	3.6	9.5	7.2	2.6	6.5	0.9	3.6	0.7	10.0	9.7	2.3	6.5	6.1	7.8	8.2	7.5	9.9	3.3	6.4	4.7	6.5	5.2	4.0	3.0	4.8	5.8	6.8	7.0
Russia	4.7	7.0	8.9	6.5	6.6	10.0	7.3	1.7	7.5	2.9	1.6	4.5	6.2	10.0	3.9	8.0	7.2	5.3	9.3	8.0	9.3	4.5	6.6	3.8	3.5	5.3	4.7	5.0	5.5	8.7	6.1	5.0
South Africa	6.1	4.7	6.3	6.4	7.4	8.6	5.6	0.5	6.2	9.5	5.0	5.1	9.6	10.0	4.0	8.1	5.4	7.4	8.1	6.0	9.7	4.8	6.1	3.4	6.2	5.6	6.3	6.0	6.2	4.5	7.0	8.0
United Arab Emirates	8.4	6.5	8.9	7.8	5.3	10.0	9.3	0.0	8.5	1.0	6.2	3.0	8.2	10.0	9.3	9.9	7.6	7.6	9.4	7.0	10.0	7.9	9.1	6.5	5.1	7.8	7.6	7.6	7.6	7.0	7.4	7.7
United Kingdom	7.4	6.6	10.0	7.7	8.2	10.0	9.5	3.4	9.6	9.9	5.2	5.1	10.0	10.0	5.4	8.7	6.9	7.9	9.5	7.5	8.8	8.3	8.5	6.2	4.9	8.8	8.5	7.6	8.7	8.2	8.3	8.3
United States	8.4	8.2	10.0	8.3	9.1	10.0	8.9	1.7	8.7	2.1	3.6	2.1	2.4	9.3	2.8	8.4	7.3	8.3	9.1	9.5	8.3	7.4	7.6	5.4	3.9	8.3	8.2	8.4	8.4	5.9	8.4	8.3

Source: TRPC Research, based on several secondary databases.
Note: All data is 2018-2019 where available. Some missing values for Hong Kong and Taiwan were calculated by extrapolating the data available for similarly sized and developed economies.

A correlation analysis was conducted to evaluate the significance of the relationship between each of the six risk categories and five quantitative measures of economic development and prosperity. These measures are:

- GDP per capita[32]
- Human Development Index[33]
- Global Innovation Index[34]
- E-Government Survey[35]
- Readiness for the Future of Production[36]

Correlations

		Infrastructure	Energy	Natural	Business	Political	Legal	Overallscore	GDPpercapita	HDI	GII	Egovt	Productiondrivers
Infrastructure	Pearson Correlation	1	.633**	.174	.735**	.591**	.871**	.798**	.693**	.825**	.875**	.828**	.932**
	Sig. (2-tailed)		.000	.367	.000	.001	.000	.000	.000	.000	.000	.000	.000
	N	29	29	29	29	29	29	29	29	29	27	28	26
Energy	Pearson Correlation	.633**	1	.383*	.702**	.743**	.778**	.840**	.652**	.877**	.693**	.799**	.750**
	Sig. (2-tailed)	.000		.040	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	29	29	29	29	29	29	29	29	29	27	28	26
Natural	Pearson Correlation	.174	.383*	1	.449*	.478**	.334	.634**	.504**	.373*	.266	.309	.339
	Sig. (2-tailed)	.367	.040		.015	.009	.077	.000	.005	.046	.180	.110	.091
	N	29	29	29	29	29	29	29	29	29	27	28	26
Business	Pearson Correlation	.735**	.702**	.449*	1	.684**	.808**	.872**	.816**	.846**	.671**	.810**	.787**
	Sig. (2-tailed)	.000	.000	.015		.000	.000	.000	.000	.000	.000	.000	.000
	N	29	29	29	29	29	29	29	29	29	27	28	26
Political	Pearson Correlation	.591**	.743**	.478**	.684**	1	.756**	.849**	.727**	.759**	.672**	.591**	.724**
	Sig. (2-tailed)	.001	.000	.009	.000		.000	.000	.000	.000	.000	.001	.000
	N	29	29	29	29	29	29	29	29	29	27	28	26
Legal	Pearson Correlation	.871**	.778**	.334	.808**	.756**	1	.909**	.761**	.844**	.829**	.783**	.912**
	Sig. (2-tailed)	.000	.000	.077	.000	.000		.000	.000	.000	.000	.000	.000
	N	29	29	29	29	29	29	29	29	29	27	28	26
Overallscore	Pearson Correlation	.798**	.840**	.634**	.872**	.849**	.909**	1	.838**	.898**	.799**	.824**	.879**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000
	N	29	29	29	29	29	29	29	29	29	27	28	26
GDPpercapita	Pearson Correlation	.693**	.652**	.504**	.816**	.727**	.761**	.838**	1	.806**	.631**	.688**	.863**
	Sig. (2-tailed)	.000	.000	.005	.000	.000	.000	.000		.000	.000	.000	.000
	N	29	29	29	29	29	29	29	29	29	27	28	26
HDI	Pearson Correlation	.825**	.877**	.373*	.846**	.759**	.844**	.898**	.806**	1	.836**	.952**	.893**
	Sig. (2-tailed)	.000	.000	.046	.000	.000	.000	.000	.000		.000	.000	.000
	N	29	29	29	29	29	29	29	29	29	27	28	26
GII	Pearson Correlation	.875**	.693**	.266	.671**	.672**	.829**	.799**	.631**	.836**	1	.841**	.935**
	Sig. (2-tailed)	.000	.000	.180	.000	.000	.000	.000	.000	.000		.000	.000
	N	27	27	27	27	27	27	27	27	27	27	26	26
Egovt	Pearson Correlation	.828**	.799**	.309	.810**	.591**	.783**	.824**	.688**	.952**	.841**	1	.844**
	Sig. (2-tailed)	.000	.000	.110	.000	.001	.000	.000	.000	.000	.000		.000
	N	28	28	28	28	28	28	28	28	28	26	28	25
Productiondrivers	Pearson Correlation	.932**	.750**	.339	.787**	.724**	.912**	.879**	.863**	.893**	.935**	.844**	1
	Sig. (2-tailed)	.000	.000	.091	.000	.000	.000	.000	.000	.000	.000	.000	
	N	26	26	26	26	26	26	26	26	26	26	25	26

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Source: TRPC Research

Number of data centres in 18 APAC economies

Country	Number of Data Centres
Australia	248
Brunei	1
Cambodia	5
China	83
Hong Kong	108
India	118
Indonesia	55
Japan	200
Laos	2
Malaysia	41
Myanmar	3
New Zealand	73
Philippines	29
Singapore	85
South Korea	21
Taiwan	12
Thailand	25
Vietnam	9

Source: Cloud Scene, https://cloudscene.com/datacenters-in-asia-pacific (retrieved October 2019).
Brunei: Korea Herald, www.koreaherald.com/view.php?ud=20121220000760; and E-Government National Centre (EGNC), www.egnc.gov.bn/SitePages/Data%20Centre%20Co-location.aspx.
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TRPC

This report presents the main findings of the TRPC Data Centre Security Index (DCSI) 2020, assessing and comparing APAC countries' risk profiles as they impact data centres' effectiveness. It also analyses the likelihood of the different types of risks hindering or supporting countries' competitive advantages as they race to become digital leaders. The report concludes by exploring some potential policy responses that can help address some of the strengths and weaknesses highlighted throughout.