

THE STRAITS TIMES

# Asia report

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INDEPENDENT • INSIDER • INSIGHTS ON ASIA

- US-China trade war
- Age of Artificial Intelligence
- E-sports boom

# FEELING THE HEAT

## Climate crisis flares up

Rising temperatures, rising sea levels, rising CO2 emissions from the combustion of fossil fuels – can mankind stem the tide?



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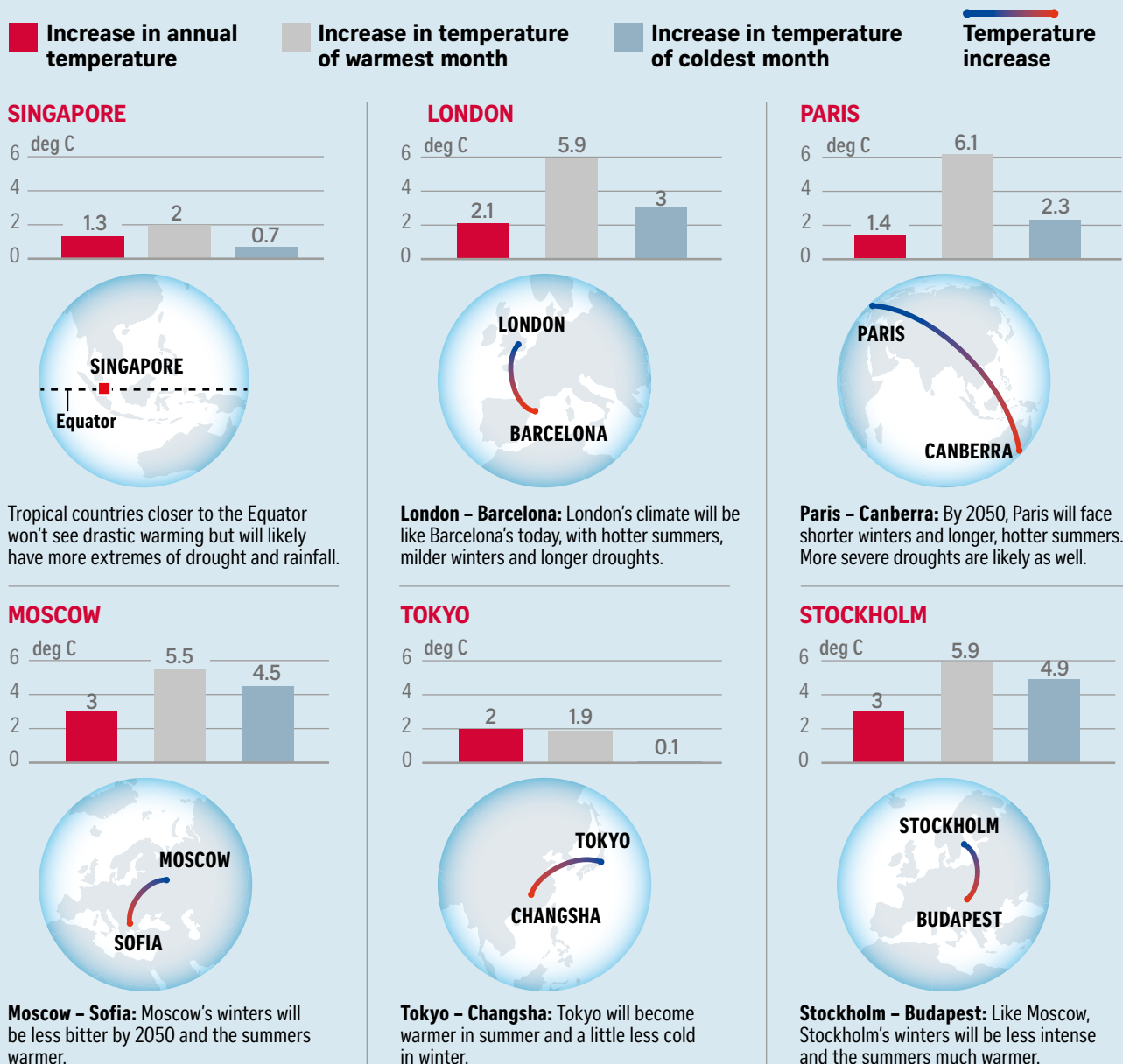
# Changing climates

Cities are on the front line for climate change impacts, such as rising sea levels, heatwaves, droughts and threats to food security. Many of the world's major cities expect sharply different climates, with those in the tropics such as Singapore and Jakarta facing conditions they have never experienced before.

To visualise how climate change will affect major world cities, researchers at ETH Zurich university in Switzerland ran computer simulations on 520 cities for what the climate would be like in 2050. The team built up a picture of cities' current climate by selecting 19

climate variables centred on rainfall and temperature. A future climate was then projected by using a series of existing computer climate models and taking an average of the findings.

They found that by 2050, the climate of cities in the far Northern Hemisphere will become milder, with hotter summers and shorter winters, resembling the climate today farther south. And that 77 per cent of cities in 2050 will likely experience a climate closer to that of another city. Here's a closer look at some major changes that we can expect.



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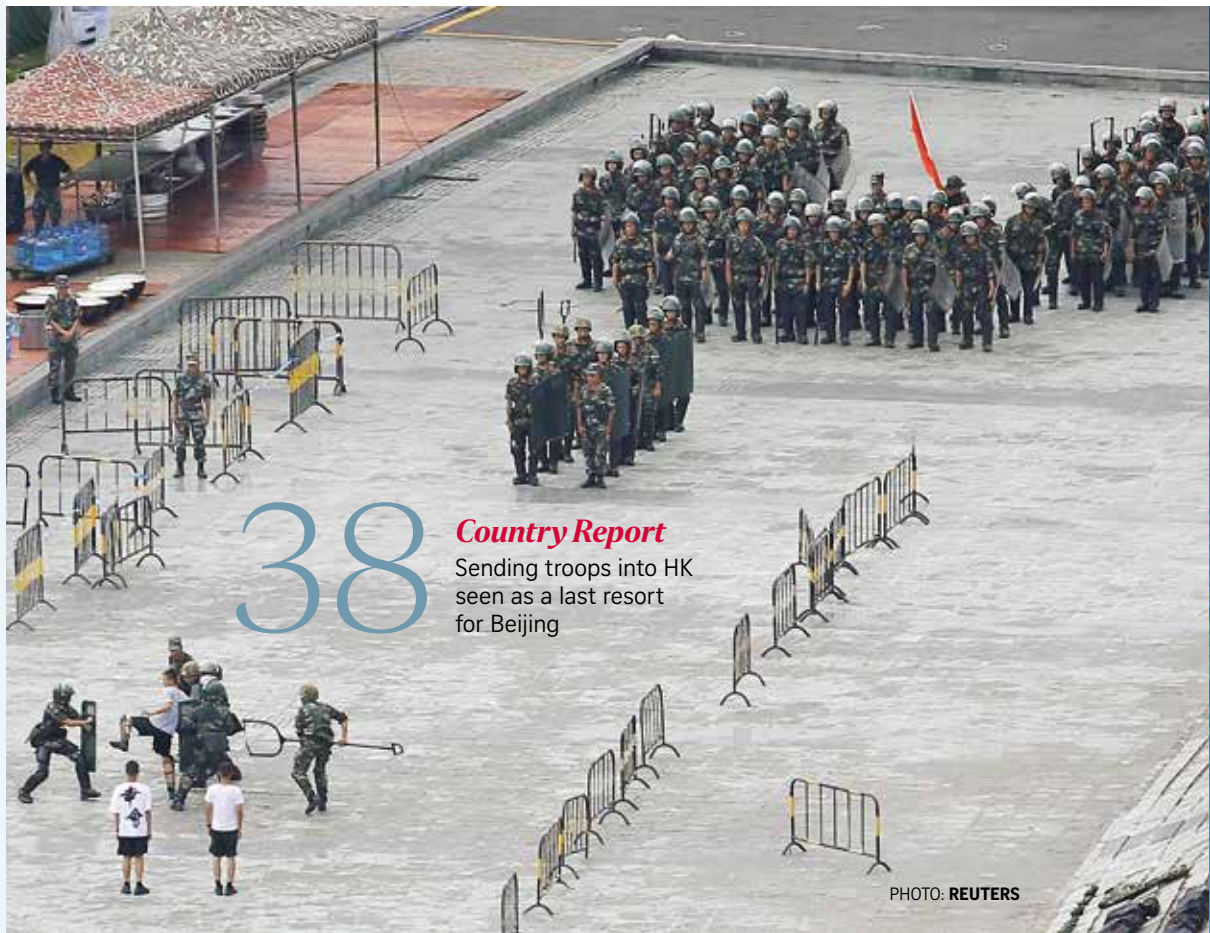
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PHOTO: REUTERS

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Desert sightseers  
find their oasis



A photograph of a forest fire. In the foreground, there are dark, silhouetted trees. In the middle ground, a line of trees is engulfed in bright orange and yellow flames. A massive plume of thick, grey smoke rises from the fire, filling the upper half of the frame and obscuring the sky. The overall tone is dramatic and urgent, illustrating the environmental crisis discussed in the article.

Cover Story

# Pushing the planet to the brink

Mankind's growing appetite for resources is driving increasing destruction of the planet. The United Nation's leading science panel, the IPCC, has laid out the risks and the solutions and on Sept 23, the UN Secretary-General is holding a special climate summit to galvanise global action to go green.

PHOTO: EPA-EFE



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LIKE A DEBT THAT ONLY GROWS LARGER, mankind is fuelling economic growth at the expense of the planet and living on borrowed time as a consequence, scientists say.

And increasingly, the impacts of our actions are becoming alarmingly clear.

Since July, raging forest fires have burnt large parts of the Amazon, Arctic boreal forests and, to a lesser extent, Indonesia.

The fires in the Amazon, the world's single largest tropical rainforest, have captured global attention, and condemnation, because they are testimony to the damage mankind is doing to nature and the escalating threat from climate change.

The Amazon is a huge carbon store and breathes in large amounts of carbon dioxide, the main greenhouse gas, and releases life-giving oxygen. It also stores about a fifth of the planet's non-frozen freshwater and pumps large amounts into the atmosphere. Think of it as a giant sponge and rainmaker.

The Amazon, like all forests, is an essential, natural tool for curbing the pace of climate change because it slows the rate at which CO<sub>2</sub> accumulates in the atmosphere. That means it can help slow the pace at which the planet is warming up.

Yet, mankind is cutting down the Amazon and other tropical forests, grasslands and mangroves for agriculture, mining, infrastructure and expanding cities. This is reducing the effectiveness of these ecosystems as carbon sinks and instead is turning them into additional sources of CO<sub>2</sub>, exacerbating climate change.

All the while, CO<sub>2</sub> emissions from burning fossil fuels keep rising, hitting another record in 2018.

This is fuelling more extreme weather, such as floods, droughts and storms, more intense wildfires, and sea level rise.

The UN Intergovernmental Panel on Climate Change (IPCC) last October looked at the steps needed to limit global warming to 1.5 deg C, a key goal of the Paris Climate Agreement. It concluded that deep emission cuts are needed before 2030.

The world has already warmed 1 deg C since pre-industrial times and is on track to warm by more than 3 deg C by the end of the century based on current emission reduction pledges globally.

To galvanise global action to step up efforts to cut emissions, UN Secretary-General António Guterres will host a Climate Action Summit on Sept 23. He is encouraging world leaders and business to step up commitments to cut emissions or risk spiralling costs from extreme weather and rising seas if they don't.



# Earth in crisis

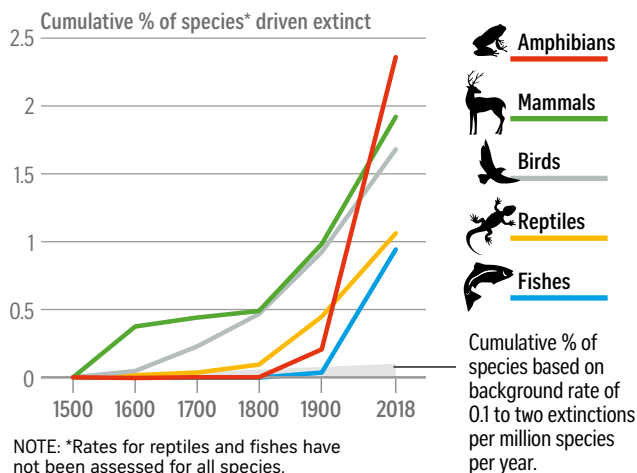
A UN panel of scientists has warned in a new study that human expansion is threatening up to one million species of plants and animals with extinction, with serious implications for human survival

**Above:** The Bali mynah, native to the island of Bali in Indonesia, is classified as critically endangered by the International Union for Conservation of Nature Red List. It has been driven to near-extinction due to unsustainable trapping for the illegal pet trade.

**Right:** This 25mm-long white spotted bush frog of India is one of the amphibian species threatened with extinction, with 40 per cent of all amphibians at risk.

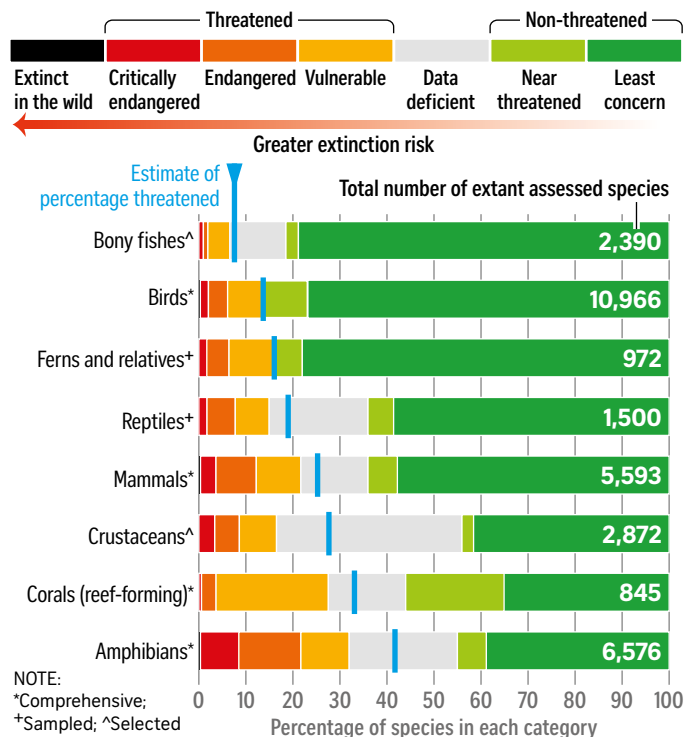


## EXTINCTIONS SINCE 1500 (VERTEBRATE GROUPS)



Source: INTERGOVERNMENTAL SCIENCE-POLICY PLATFORM ON BIODIVERSITY AND ECOSYSTEM SERVICES  
PHOTOS: WILDLIFE RESERVES SINGAPORE, COURTESY OF K. S. SESHADRI  
STRAITS TIMES GRAPHICS

## CURRENT GLOBAL EXTINCTION RISK IN DIFFERENT SPECIES GROUPS



## BY THE NUMBERS

### Climate change

**100%** Increase in greenhouse gas emissions since 1980, raising average global temperature by at least 0.7 deg C

### Plants and animals

**Up to one million**

Species threatened with extinction, many within decades

### Oceans and fishing

**Up to 300 million**

People in coastal areas face increased risk due to loss of coastal habitat protection

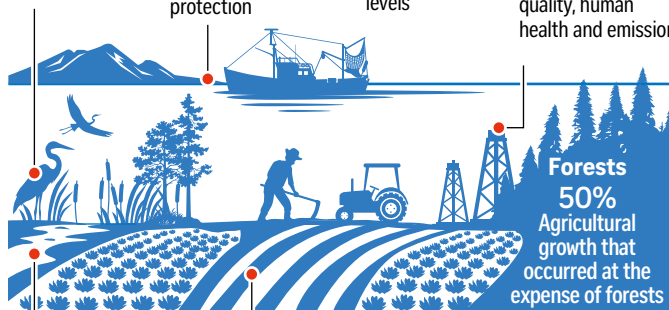
**33%**

Marine fish stocks in 2015 being harvested at unsustainable levels

### Mining and energy

**<1%**

Total land use for mining, but the industry has notable negative impacts on biodiversity, water quality, human health and emissions



### Wetlands

**>85%**

Wetlands present in 1700 that had been lost by 2000. Loss of wetlands is currently three times faster, in percentage terms, than forest loss

### Food and agriculture

**300%**

Increase in food crop production since 1970

**Up to US\$577b (\$\$786.6b)**

**>33%**

World's land surface devoted to crop or livestock production  
Annual value of global crop output at risk due to pollinator loss



Countries increasingly understand the threat, though have yet to enact tougher policies to switch to cleaner energy, green their transport fleets or plan ahead to adapt.

Among the nations most at risk are low-lying small island states in the Pacific, Caribbean and Indian Oceans which face being wiped off the map by rising sea levels and more powerful storms.

The Singapore Government has placed the nation on a war footing.

In his National Day Rally speech, Prime Minister Lee Hsien Loong said climate change was an existential threat to Singapore and that around S\$100 billion or more might be needed over the long term to protect Singapore against rising sea levels.

He said climate change defences should be treated like the Singapore Armed Forces – with utmost seriousness. While he hoped Singapore will never go to war, having to deal with the effects of climate change is a sure thing, he said.

Sea levels will rise, the only question is when. He noted that current projections are that sea levels will rise by up to 1m by the end of the century, but scientists' estimates have been going up.

Much of Singapore lies only 15m above the mean sea level, with about 30 per cent of the island less than 5m above the mean sea level.

A clearer picture of the global threat from sea level rise will come on Sept 25.

The IPCC will be releasing its second special report this year on oceans and the parts of the world covered in ice, such as glaciers and ice caps.

The report will examine the latest science and projections around melting rates for the ice caps in Greenland and Antarctica as well as glaciers in other parts of the globe.

Greenland is a growing concern because the ice cap there is melting at an increasing rate as temperatures rise. Record summer heat this year has led to a marked increase in melting.

A Nasa satellite found that Greenland's ice sheet lost about 255 billion tonnes of ice a year between 2003 and 2016, with the loss rate generally getting worse over that period.

By the end of this year's summer, about 400 billion tonnes of ice – maybe more – will have melted or calved off Greenland's giant ice sheet, scientists estimate. That's enough water to flood the US state of Pennsylvania or the country of Greece about a foot (30cm) deep, the Associated Press reported.

The threat from rising seas is a key reason mankind needs to rapidly cut greenhouse gas emissions.

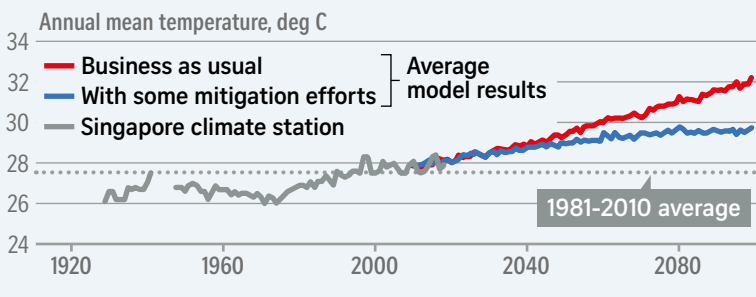
Another is ending destruction of natural ecosystems such as rainforests and degradation of soils – or face greater threats to food supplies.

The IPCC said in a landmark report in August that humanity must urgently change the way it grows food.

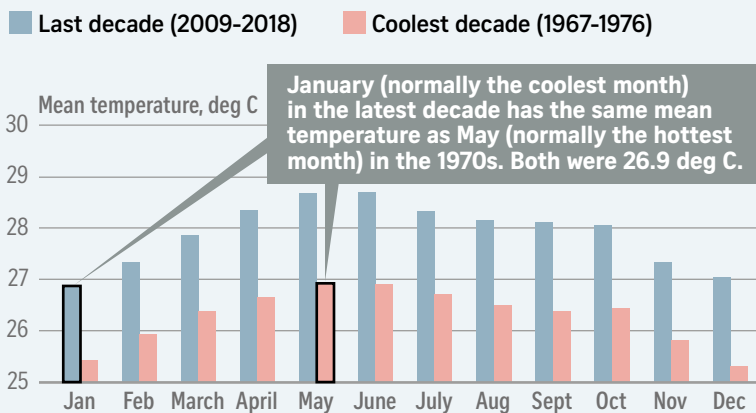
The authors of the study, nearly three years in the

## July 2019: hottest month on record

### Observed and projected temperatures



### Annual cycle of mean temperature for the latest decade (2009-2018) compared with the coolest decade on historical record (1967-1976) for the climate station



Source: METEOROLOGICAL SERVICE SINGAPORE STRAITS TIMES GRAPHICS

making, said climate change and poor management practices threaten the world's farmlands and food security.

Deforestation, loss of peatlands, mangroves and grasslands for large-scale agriculture are degrading life-giving soils that humanity needs to feed and clothe itself, cutting yields, threatening the food supplies for millions of people and risking mass migration, it said.

Land clearing and land degradation are exacting a huge toll and it is only set to get worse unless farming practices are overhauled to become more sustainable and food waste eradicated, the IPCC said.

At present, agriculture and forestry produce about a quarter of mankind's greenhouse gas emissions and the IPCC said that it is vital to reduce emissions from agriculture and forestry if mankind is to have any chance of limiting global warming to 1.5 deg C.

That requires a radical shift in the way food is grown, changing diets, ending food waste and rehabilitating damaged farmlands.

All of that is doable, scientists say. But so far, the damage continues.

Last year, primary forests covering 3.6 million

hectares, an area larger than the size of Belgium, were chopped down, according to a study released in April by Global Forest Watch.

Brazil lost 1.3 million hectares, Democratic Republic of Congo 481,200 hectares and Indonesia 339,900 hectares.

Globally, about a third of the Earth's soil is badly degraded from agriculture, cutting land productivity and increasing soil loss, a 2017 report backed by the UN Convention to Combat Desertification said. This

raises the risks of conflict and migration to more productive lands elsewhere.

Already, more than 820 million people do not have enough to eat, the UN Food and Agriculture Organization says. That's about one in every nine people in the world.

Unless food production becomes more sustainable and fairer, the risks of greater mass migration are set to increase, driven by resource-intensive economies, the IPCC said. [SI](#)

## Key findings of IPCC report

THE UN INTERGOVERNMENTAL PANEL ON Climate Change's special report on land use that was released on Aug 8 points to an urgent need to reform the way food is grown. Here's a look at some of the key findings:

### URGENT PROBLEM



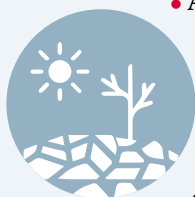
- Humans directly use more than 70 per cent of the Earth's ice-free land surface for food, feed, fibre, timber and energy. The land and ecosystems such as forests play a vital role in regulating the climate and watersheds essential for mankind. Booming demand for food means it is a major source of planet-warming emissions.

- Data since 1961 show that rapid population growth and changing diets have caused unprecedented rates of land and water use - agriculture accounts for about 70 per cent of global fresh water use.

- About a quarter of the Earth's ice-free land area is subject to human-induced degradation. For example, soil erosion from agricultural fields is estimated to be 10 to more than 100 times higher than the natural rate of soil formation. This has made the land more vulnerable to further erosion and greater extremes of heat, drought and floods. This in turn will affect yields and food security for millions more people in coming decades.

- The IPCC says there is an urgent need to reform the way food is grown to drastically reduce farming's environmental footprint, boost efficiency and to cut food waste to ensure there's enough food for all in the future.

### MOST VULNERABLE



- Asia and Africa are projected to have the highest number of people vulnerable to increased desertification. North America, South America, the Mediterranean, southern Africa and central Asia may be increasingly affected by wildfire. The tropics and subtropics are projected to be most vulnerable to crop yield decline.

- Since pre-industrial times, the land surface air temperature has risen nearly twice as much as the global average temperature. Already, about 821 million people, many of them in poorer dryland areas, are undernourished.

### EMISSIONS AND FOOD WASTE



- Agriculture, forestry and other land uses are responsible for about 23 per cent of mankind's greenhouse gas emissions during the period 2007-2016. Add in emissions associated with all parts of agriculture, forestry and other land uses and the percentage is even higher.

- Data available since 1961 shows the per-capita-supply of vegetable oils and meat has more than doubled and the supply of food calories per capita has increased by about one third. Currently, 25-30 per cent of total food produced is lost or wasted, leading to higher greenhouse gas emissions.

### SOLUTIONS



- Steps including sustainable food production, improved forest management, ecosystem conservation and land restoration, reduced deforestation and cutting food waste.
- Preserving and restoring wetlands, mangroves and peatlands can also lock away large amounts of carbon dioxide and can offer quick benefits.
- Other steps include improving access to markets, securing land tenure for farmers, factoring environmental costs into food, empowering women and indigenous peoples and better public health policies to improve nutrition, such as increasing the diversity of food sources.

- However, while land can mitigate climate change by soaking up CO<sub>2</sub>, there are limits to the use of land-based solutions, such as bioenergy crops or afforestation. Widespread use at the scale of several million square kilometres globally for such crops and forests could increase risks for desertification, land degradation and food security.. [SI](#)

Source: IPCC

– David Fogarty and Audrey Tan





# When climate change hits home in Singapore

PRIME MINISTER LEE HSIEN LOONG MADE IT clear at the National Day Rally last month that Singapore is deadly serious about tackling climate change, and that billions of dollars need to go into fortifying the country's defences against rising seas.

Ideas being looked at range from reclaiming offshore islands to building polders.

"How much will it cost to protect ourselves against rising sea levels? My guess is probably \$100 billion over 100 years, quite possibly more," he said.

Like the Singapore Armed Forces (SAF), climate change defences are vital to Singapore's existence, he said.

That got people talking.

Ever pragmatic, the first response of many Singaporeans was the effect on property prices if the sea encroached.

But many have also begun to realise that their homes may not even survive the rising tides.

Singapore is already experiencing some of the effects of climate change, including more intense rainfall and prolonged dry spells, and worse is to come. But the ills brought about by a warming planet had remained abstract concepts to many.

PM Lee's speech – with its stark warning about

flooding – could mark a turning point when climate change becomes part of the national consciousness.

A poll of over 1,000 people by The Straits Times and market research firm Milieu Insight seems to bear that out. Four in 10 respondents who watched or read about the rally said that they were now more concerned about climate change than they were before. More than half (57 per cent) said they were just as concerned as previously.

About 65 per cent said that their main takeaway from the part of the speech on climate change was that Singapore is vulnerable to sea-level rise.

Long-term plans to address climate change also struck home in a Blackbox Research poll: 21 per cent – the highest proportion of over 800 people who followed the rally – said this was the most impressive part of the rally speech.

The Government is tackling global warming on many fronts and has ambitious plans spanning years, if not generations.

But given that climate change is a multi-faceted issue, there are other areas that Singapore should address going forward, in terms of adapting to other aspects of climate change and what the Republic is doing to reduce its emissions in the first place.

Singapore is already experiencing some of the effects of climate change, including more intense rainfall and prolonged dry spells.

ST PHOTO: LIM YAOHUI

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Singapore Management University's Associate Professor Winston Chow, a lead author for the upcoming report by the Intergovernmental Panel on Climate Change, said that while sea-level rise is an existential threat for Singapore in the long term, there are other significant climate risks that could be felt sooner. These include heat discomfort from higher temperatures as well as unpredictable regional rainfall patterns that could affect Singapore's water supply and food security, as well as increase the spread of vector-borne diseases.

"These heat-and water-related hazards, while not existential in nature, are more immediate in scope and can also severely affect our way of life," he said.

Moreover, other than a nod to the carbon tax that Singapore introduced last year, there was also scant mention of how Singapore intends to scale up its pledge under the Paris Agreement to reduce emissions.

As Mr Tan Seng Chuan, past president of The Institution of Engineers, Singapore, and chairman of the International Outreach Committee, pointed out, another strategy of dealing with the effects of climate change such as sea-level rise is implementing climate mitigation measures.

Granted, Singapore contributes but 0.11 per cent to global emissions.

But considering how climate change would disproportionately affect island states such as Singapore, the nation needs to show that it is doing its best so it has greater leverage to push for larger emitters to take stronger mitigation strategies.

In his speech, PM Lee had called on citizens to do their part. Singapore must do the same. As he said: "Although Singapore may not be able to stop climate change by ourselves, we can contribute to solutions, and we must do our fair share." **ST**

## Major engineering works under consideration to tackle threat

RISEING SEA LEVELS ARE AN EXISTENTIAL THREAT for Singapore, and the Republic is considering major engineering works to tackle this.

Strategies being looked at include carrying out empoldering, a land reclamation technique, along Singapore's eastern coast, as well as reclaiming a series of offshore islands there, said Prime Minister Lee Hsien Loong.

Emphasising that all options will be carefully considered, Mr Lee also highlighted why sea-level rise is an issue that Singapore has to prepare for in earnest.

He said: "We cannot lose a big chunk of our city and expect the rest of Singapore to carry on as usual."

Other than tackling the threat of rising sea levels, the strategies that Mr Lee highlighted could have other benefits for Singapore, such as boosting the nation's water security and increasing land availability.

Reclaiming a series of offshore islands from Marina East to Changi could, for example, help increase Singapore's water resilience, said Mr Lee. "(We could) connect them up with barrages and create a freshwater reservoir, similar to Marina Reservoir. National water agency PUB will like

this solution, because it will enhance our water resilience," he said.

Polders built along Singapore's eastern coastline could also protect the Republic from sea-level rise in a way that would allow it to gain more land as well.

Polders refer to tracts of land that lie below sea level. They are constructed by first building a dyke around the area to be reclaimed and then draining water from it. Water levels in the polder are controlled by drains and pumps. "(This is) new land which we can use for housing and other purposes," Mr Lee said.

Similar to how adding ice cubes to a glass of water raises the water level, melting land ice could substantially contribute to sea-level rise as the world warms.

Singapore's Second National Climate Change Study has predicted that the mean sea level is estimated to rise by up to 1m by 2100.

But Mr Lee cautioned that scientists' estimates for this timeline have been going up. "Sea levels may quite possibly rise higher and faster than that," he said.

Already, PUB has planned for a second pump house at Marina Barrage, the dam enclosing the Marina Reservoir, he said. The existing pump house has seven pumps which help to pump water out of the reservoir and into the sea when it rains heavily during high tide. This protects the city from flooding, as the falling rain can then drain into the reservoir.

"When sea levels rise, the pump house will not be enough. We will need to build a second pump house on the opposite end of the Barrage," Mr Lee said. He added that while engineering solutions are available, they will come at an estimated price tag of \$100 billion or more. **ST**

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Below: Polders in the Netherlands. Polders built along Singapore's eastern coastline could also protect the Republic from sea-level rise in a way that would also allow it to gain more land.

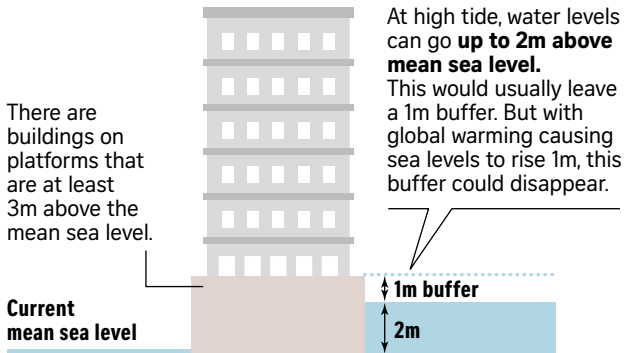
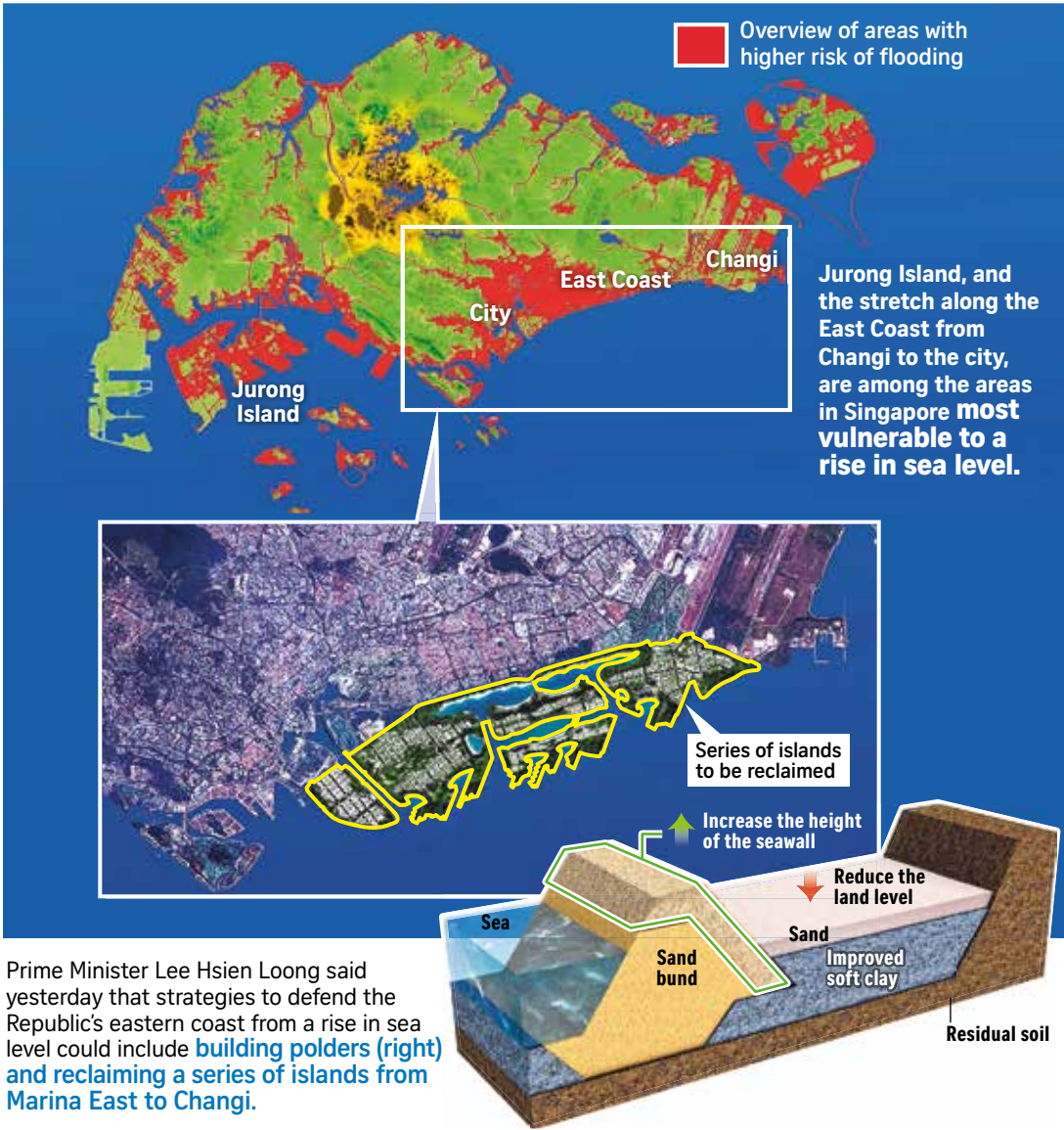
PHOTO: MINISTRY OF  
COMMUNICATIONS AND  
INFORMATION





# Getting ready for rise in sea level

As the world warms, rising sea levels will pose a grave threat to small island states like Singapore. But the Republic is well aware of this vulnerability, and is taking early measures.



**With global warming, if sea levels rise by 1m, then... if heavy rain coincides with a high tide, the water will have nowhere to go.**



PRIME MINISTER LEE HSIEN LOONG

Other than tackling the threat of rising sea levels, the strategies that Mr Lee highlighted could have other benefits for Singapore, such as boosting the nation's water security and increasing land availability. Reclaiming a series of offshore islands from Marina East to Changi could, for example, help increase Singapore's water resilience, said Mr Lee.



# Battle against rising tides

## *How 5 cities are tackling rising sea levels*

Singapore is moving on a war footing to tackle the consequences of rising sea levels and powerful storms. Meanwhile, here's a look at five cities where rising sea levels and flooding are an issue



Breakwaters have been placed about 2km from North Jakarta's shores to help coastal residents, many of whom are traditional fishermen or poor families.

ST PHOTO: WAHYUDI SOERIAATMADJA

### JAKARTA

## *Indonesian capital eyes giant wall to counter rising seas*

LAST MONTH, MS CIN HUA, A RESIDENT OF Kerang Hijau village in North Jakarta, almost lost her granddaughter to a flood caused by seawater overflowing onto land.

"Luckily, I can swim. She could have drowned," said Ms Cin, a 65-year-old shrimp seller who was also caught in the flood.

Low-lying coastal plains such as those at Kerang Hijau village are vulnerable to storm surges, coastal erosion and flooding.

In Indonesia, even cities like Jakarta have to save themselves from the curse of climate change, which has caused global sea levels to rise over the past century.

President Joko Widodo, in August, called on Parliament to support and approve his plan to relocate the country's administrative capital from Jakarta to Kalimantan.

Indeed, Jakarta is burdened by frequent floods,

overcrowding and also excessive pumping of groundwater, causing land subsidence.

The country's Environment and Forestry Ministry in its 2017 report estimated that Indonesia could see average sea-level rises exceeding 30cm in the next 40 years.

The government has started taking countermeasures. In the past two months, breakwaters have been placed about 2km from North Jakarta's shores to help coastal residents, many of whom are traditional fishermen or poor families.

These breakwaters will complement a planned 20km of dykes due to be installed on the coastline, a quarter of which has been completed.

However, these are temporary measures which will be used for only the next 15 to 25 years, according to Mr Firdaus Ali, a public works minister's special aide in charge of overseeing the projects.

In 2021, construction is due to begin on a giant sea wall with a huge pumping system, which will cost 560 trillion rupiah (\$55 billion).

Experts from the Netherlands, South Korea and Japan are currently working on its design.

Jakarta's neighbouring provinces of Banten and West Java are also facing rising sea levels. **ST**

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## MUMBAI

# Indian city faces double whammy of heavy rain, high tides

EVERY TIME MUMBAI FLOODS, THE ROADS become rivers, train services come to a halt, and there is a citywide power shutdown. This has happened nearly every year in the past decade, with dozens having lost their lives in swirling waters.

Home to nearly 22 million people, the financial capital of India is demanding more durable fixes from its policymakers.

While floods often occur during the rainy season which starts in June, even normal levels of rain are trapped by excessive construction and crumbling drainage systems that cannot deal with the flow.

In addition, the sea has moved further inland, with the waves having eaten away the coastline – a result of mangroves having been destroyed for highways and housing.

Many of the city's beaches are heavily eroded.

Mr Devang Patel, a 30-year-old architect who grew up in Mumbai, said: "Because Mumbaiites somehow survive and have a positive outlook, the government is taking us for a ride."

In July last year, when the tide reached 4.96m (4.5m is considered high tide) and mixed with torrential rain, water crashed into slums and gushed into affluent suburbs.

Global studies have found enough evidence that high tides will be even higher because of climate change and its impact on sea levels. Multiple studies by the World Bank, as well as the state and central government, mark the high-density urban sprawl of Mumbai as highly vulnerable, with the city facing the double whammy of heavy rain and high tides.

The Intergovernmental Panel on Climate Change predicts that by 2100, the sea level on India's west coast – where Mumbai is situated – will rise by 400mm to 800mm. It rose only 1mm a year for most of the 20th century.

The National Institute of Oceanography expects sea-level rise to flood about 40 per cent of the city in the next century. Mumbai could lose 25 sq km.

Like in many coastal cities in India, the Mumbai authorities have responded by planning to build four sea walls along the coastline. The sea walls, or bunds, in India are usually built by piling tetrapods or large rocks called membranes along the seaside. They are expected to dissipate the energy of high-intensity waves and allow sand to sieve through them to reduce erosion.

"But the lifespan of bunds is only around six years," said Dr E. Vivekanandan, a former scientist in the Central Marine and Fisheries Research Institute. "It will make the sea surface haphazard, which affects fishing. Moreover, the sea blocked here will enter aggressively through another place."

Marine scientists suggest more eco-friendly alternatives such as tree planting and artificial reefs.

Meanwhile, Mumbai is reclaiming more land and constructing a coastal road costing 120 billion rupees (\$2.3 billion) by filling 90ha of land into the sea.

Mr Nikhil Anand, a climate and urban studies scholar, found that of the 40 chronic flooding locations across Mumbai, many are on reclaimed land. **ST**

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Men attempt to start a water pump at a flooded road after heavy monsoon rains in Mumbai.

PHOTO: AGENCE FRANCE-PRESSE

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## NEW YORK

### *Extending Manhattan's shoreline into East River*

THE WALL STREET BANKERS WHO WALK TO THEIR offices in the gleaming skyscrapers of New York may not want to be there in 2100.

By the turn of the century, higher tides caused by sea-level rises could submerge portions of Lower Manhattan's edge by up to 90cm a day, leaving any pedestrian still there waist-deep in water.

Coastal storms and hurricanes, which are likely to become more frequent, would hit even worse.

Storm waters could surge to between 2.7m and 4.8m throughout the district, putting nearly half of its buildings – valued at US\$14 billion (S\$19.4 billion) – at risk.

The dire warnings came from the city's Lower

Manhattan Climate Resilience Study, released in March.

On the same day, New York Mayor Bill de Blasio unveiled a US\$10 billion plan to extend its shoreline two blocks into the East River.

Another US\$500 million will go towards other coastal protection projects, including flip-up barriers, deployable dams and storm walls, which will be ready sooner.

"The only question is where to build the barriers to protect us from rising seas and the inevitable next storm, and how fast we can build them," Mr de Blasio wrote in a New York Magazine commentary when the plan was announced.

But the existing land is so crowded with utilities, sewers and subway lines that new land has to be built to house flood protection measures, he said.

Protecting Lower Manhattan from rising sea levels is critical because half a million jobs are located there, not to mention some 90,000 residents.

And although the district comprises less than 1 per cent of New York City's land area, it generates almost 10 per cent of its total economic output, meaning that any climate effect on the district will have a ripple effect throughout the city and the tri-state area beyond.

The city had a taste of what the future would be like when Hurricane Sandy flooded nearly a fifth of the city's land in 2012, causing power outages lasting weeks, infrastructural damage, and thousands of job losses in the district.

The disaster was a wake-up call for New York, which injected billions of public, private and federal dollars into recovery and resilience projects.

Other coastal cities are also preparing to shell out big bucks to tackle more frequent flooding. [ST](#)

Parts of Lower Manhattan in New York City are under threat from rising sea levels. In a move to counter the threat, New York Mayor Bill de Blasio in March unveiled a US\$10 billion (S\$13.9 billion) plan to extend Manhattan's shoreline two blocks into the East River.

PHOTO: AGENCE FRANCE-PRESSE



## PENANG

### *Heavier rainfall worsens perennial flood problems*

THE WATER LEVEL WAS CHEST HIGH AND furniture in many homes was wrecked, while large trees were uprooted by strong winds and torrential rain.

A week of flash floods in November 2017 saw thousands of people displaced in Penang.

Flood mitigation has become a pressing issue for the state, which suffered more than 110 flash floods between 2013 and October 2017.

The federal government has committed RM150 million (S\$49.6 million) of the RM600 million needed for a flood mitigation project on Penang island's longest river, Sungai Pinang.

Mr Zairil Khir Johari, chairman of the state government's public works, utilities and flood mitigation committee, said: "We've spent half a

billion on ongoing flood mitigation projects. Half of that sum is from the state government."

Flooding in Malaysia is a perennial problem. Official figures note that there are 189 river basins nationwide that flow out to sea, of which 85 are prone to recurrent flooding.

The previous Barisan Nasional government kicked off a massive three-phase flood mitigation project for Penang in 1990, but it has stalled since 1999 after funding came to a halt, with only two of the three phases completed.

The Pakatan Harapan administration has promised to complete the work on Sungai Pinang. This includes widening and deepening portions of the river, and constructing tube wells and

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## SHANGHAI

# Sponge cities, walls to manage water levels

THE FIGHT AGAINST RISING WATERS IS AN existential one for China's economic heart of Shanghai.

The megacity's location on the Yangtze River Delta – straddling the Yellow and the East China seas – is what propelled it to become the world's busiest container port and a global financial hub.

But its low-lying geography, just 4m above sea level, has also made it uniquely vulnerable to rising sea levels and periodic flooding.

Scientists have long warned that Shanghai is at high risk of being swallowed up as sea levels rise.

A 2012 study found that it was the most vulnerable of nine cities around the world built on river deltas, partly because the authorities had invested less in flood protection than counterparts in Osaka and Rotterdam.

Another study by British researchers last year found that Shanghai was actually sinking due to groundwater depletion.

These factors have threatened to speed up the inundation as higher sea levels worsen the effect of storm surges, even as intruding seawater taints the city's freshwater supply from the Yangtze.

While officials initially dismissed such findings as “neither objective nor comprehensive”, they have in recent years prioritised flood prevention, particularly after President Xi Jinping made ecological protection a key part of his political vision.

A masterplan unveiled last year is the city's first that prioritises environmental protection, stating the need for the authorities to respond to rising sea levels through greater use of “sponge



city” techniques, while improving monitoring and prevention of further city sinking.

Sponge cities help withstand flooding and rising sea levels by making areas better able to absorb rain and floodwaters through the use of landscape features such as permeable pavements, artificial ponds and green roofs.

Shanghai's shoreline today is also protected by more than 500km of sea walls, while control measures regulate the Huangpu River, which flows through Shanghai.

A new deep-water drainage system that upgrades the creek's flood defences will be completed next year, increasing its drainage capacity by 50 per cent.

The city also spent four billion yuan (\$5782 million) on completing a 174km-long dam wall in Jinshan district last year which officials said could withstand a once-a-century catastrophic flood.

But some experts want officials to better factor in the effects of climate change on sea levels. Researchers fear that half of the city's sea walls and levees could be breached by the year 2100. **ST**

The Huangpu River in Shanghai. A deep-water drainage system that upgrades its flood defences will be completed next year. PHOTO: AGENCE FRANCE-PRESSE

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underground rainwater storage ponds.

Other measures involve rainwater harvesting via rooftop gardens and recreational parks doubling as water retention spaces.

Environmentalists say climate change has caused rainfall to increase over the years. In 2016, Penang's highest rainfall in a day was 130mm, but it went up to 315mm in the 2017 floods.

Activists argue that while more rain cannot be avoided, the Penang government can control the number of hillslope projects.

Kuala Lumpur also faces flash flooding. In 2003, the government built the Smart Tunnel to redirect water from Sungai Klang during heavy rainfall.

Apart from heavier rainfall, coastal areas are in danger of seeing sea levels rise by as much as 1m by 2100, with Sabah – and towns such as Tawau and Lahad Datu – expected to be the worst hit. **ST**

Flooding in George Town, Penang, in September 2017. Flood mitigation is now a pressing issue for the Malaysian state. PHOTO: THE STAR/ASIA NEWS NETWORK



*Special Report*

# Latest tariffs take US, China to the trenches in trade war

ST ILLUSTRATION: MANNY FRANCISCO



The competition between the two is systematically and culturally asymmetrical.

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LAST MONTH'S ESCALATION OF TARIFFS imposed by China and the United States on each other, and President Donald Trump tweeting "We don't need China", has raised questions whether the two powers even want to – let alone can – find an off-ramp in an accelerating struggle for global ascendancy.

This is notwithstanding a more recent call for calm by China's top negotiator Vice-Premier Liu He, and attempts by President Trump at the G7 in France to talk up the prospect of a deal.

Trade is just part of the struggle.

The competition is systemically and culturally asymmetrical. Both parties are very far apart on fundamentals, and have different criteria and expectations of the other. China has a sense of historic purpose and does not see making a few concessions on trade as making a difference to the great power competition.

To China, President Trump's tariff threats are a sign that he wants a deal – which is a sign of weakness. Mr Trump faces an election in 14 months. China's President Xi Jinping does not. Beijing thinks it has Mr Trump's measure – he takes it to the brink to drive the other party to talks, but he will not go over the edge.

"The Chinese see it as a part of his 'maximum pressure' and... feel they have seen it too many times and know the pattern, like his war threats to DPRK (North Korea) and Iran," says Ms Yun Sun, director of the China Programme at Stimson Centre, a Washington think-tank.

"But for China, compromising with him on trade doesn't mean the great power competition stops, so there will be more (trade) wars coming regardless of whether there is a trade deal. So why should they undermine their own position by compromising with him?"

Tactically, the Trump administration, with the President harping on the pain the trade war is causing to China, has considerably underestimated China, many analysts say. In fact, the public rhetoric has been counterproductive, strengthening hard line nationalism in China.

And the US has made a mistake by not assembling



## *From phone makers to farmers, the toll of Trump's trade wars*

Here are some of the costs of US President Donald Trump's push to rewrite the terms of global trade with China and other top trade partners:

### GLOBAL ECONOMY

Fitch Ratings estimated in August that extending tariffs to cover another US\$300 billion (S\$416 billion) in Chinese goods would chop 0.4 per cent from world economic output. The International Monetary Fund said in July that global trade in the first quarter of 2019 was the slowest since 2012, noting big downside risks for world growth moving forward.

### FARMING

American farmers have been among the hardest hit so far. China is the top market for many of their biggest crops and Beijing hit those crops with retaliatory tariffs. The single biggest agricultural export from the US are soya beans, most of which went to China before the trade war. US soya bean exports to all countries fell to about US\$15 billion in the period from July 2018 to May 2019, down 27 per cent from US\$20.6 billion in the same period a year earlier, the most recent US Department of Agriculture data show. Exports to China alone were down 77 per cent at just US\$2.5 billion, versus US\$11.2 billion from July to May a year earlier.

Soya bean farmer Raymond Schexnayder Jr at his farm outside Baton Rouge, in Erwinville, Louisiana. Even if Beijing and Washington make peace in the current tariff war, the effects of the 2018 soya bean showdown will endure.

PHOTO: REUTERS



A security personnel checking steel products at a steel market in Shenyang in China's northeastern Liaoning province. Mr Trump's steel and aluminium tariffs have added billions of dollars to the cost of assembling US vehicles, and tariffs on Chinese-made parts have also hiked costs.

PHOTO: AGENCE FRANCE-PRESSE

## TECH

Chinese telecommunications giant Huawei warned US restrictions on its business will impact short-term revenue growth. Previously, the company's founder said the restrictions would cost the company around US\$30 billion. Tariffs are costing the US tech sector US\$1.3 billion a month, the Consumer Technology Association said in a written statement to the United States Trade Representative in June. Products for 5G mobile technology were hit by US\$122 million of tariffs in the month of October 2018 alone, surging from just US\$65,000 a year earlier, the trade group said.

## VEHICLES, EQUIPMENT

Mr Trump's steel and aluminium tariffs have added billions of dollars to the cost of assembling US vehicles, and tariffs on Chinese-made parts have also hiked costs. General Motors, the largest carmaker in the US, has projected it will incur US\$1 billion in extra costs for tariffs and raw materials. Fiat Chrysler Automobiles NV has said it expects dramatically increased costs for commodities due to tariffs, costing the carmaker 750 million euros (\$1.14 billion).

## OTHER RISING COSTS

Steel and aluminum tariffs were among the first to be levied by the US in early 2018 and included imports from almost the entire world. The move benefited US steel producers, but not the manufacturers that process the metal. The tariff burden on US steel and aluminum buyers was almost US\$5 billion last year, according to the American Action Forum. **ST**

– REUTERS

a global coalition, but going it alone – a natural outcome in some respects, of President Trump's "America first" doctrine. This was "not just for America, but for the rest of the modern world," a senior administration official told journalists.

But Mr Trump has shown he can knife allies too. Some European countries are worrying about recession – a worry also for many in America, where business and markets are shaken, certainly by the direct effects of tariffs on value chains and bottom lines, but sometimes by the even more lethal uncertainty spawned by the President's seemingly erratic public rhetoric on China.

There is an ideological element to the United States' strategy on China. "This is about God, country and the American working class," Dr Peter Navarro, the President's director of Trade and Manufacturing Policy, told Fox Business, as he played down the tit-for-tat tariffs, saying their effect would not be huge in economic terms.

Anti-China ideologues in Washington envisage not only a "decoupling" of the Chinese and American economies, but a separation of the global economy,

# *Time to get used to slower growth in China*

Trade war and global slump provide Beijing justification to change gears to a more sustainable growth rate

CHINA'S ECONOMIC GROWTH HAS CONTINUED to slow in recent months, and may even dip below 6 per cent in the second half of the year amid a general downturn in the global economy and an escalation in the US-China trade conflict.

Despite these pressures, Beijing looks disinclined to stimulate the economy. What looks to be happening is that China is prepared to embrace slower but more sustainable growth, and 2019 is going to be remembered as the year China "shifted gears" in the management of its economy.

It is true that total export value to the US is down 8 per cent year on year in the first seven months in US dollar terms, but this has largely been offset by exports to Europe and emerging Asia, making total export growth still up 0.1 per cent in US dollar terms, beating neighbouring economies such as South Korea and Taiwan.



by trade and technology, into blocs, with Western democracies and allies keeping China out.

"It is no longer acceptable for China to have a path to becoming the world's dominant economy and industrial power," said Mr Jonathan Ward, author of China's Vision Of Victory, a new book on Chinese global strategy (whose cover depicts a Statue of Liberty drowning in deep red waves) and the founder of the consultancy Atlas Organisation.

This, contend some foreign policy experts like Dr Robert Manning, resident senior fellow at the Atlantic Council's Scowcroft Centre for Strategy and Security, shows the Trump administration has "no idea how to manage competition."

Mr Trump projects unrelenting bullishness on the economy, even wondering at one point who the greater "enemy" is, President Xi, or his own Federal Reserve chairman Jerome Powell (for not lowering interest rates to stimulate the economy).

Despite talks set to resume, few expect any meaningful outcome. In the short term, the issue is how long will this trade war continue, and will there be some relief, and soon enough, to restore

confidence and head off the worst consequences. But In the long term, a few agreements and a truce or two is unlikely to make a difference.

At home it suits President Trump to show his base that he is out there in the trenches fighting for America. But the line he walks will become increasingly thinner, and the competition is now in the trench warfare phase. And trench warfare is grueling, bloody and long.

"China is now focused on a resilience strategy that chiefly aims to wait out Trump, while leaving open the door to the small chance that Trump offers a favourable trade deal as the political and economic costs of the trade war mount," the Eurasia Group said in an e-mail.

Said Ms Yun Sun: "The Chinese can tolerate the economic pain of tariffs. They don't like it, but their ability to handle it is considerable. As long as they can maintain some level of growth, they will have a lot of problems, but they will survive.

"China's assessment is that decoupling is going to happen anyway (and) President Trump in the end is looking for a deal." [ST](#)

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**To China,  
President  
Trump's tariff  
threats are a  
sign that he  
wants a deal –  
which is a sign  
of weakness.**

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Thanks to the currency depreciation, in yuan terms, China's exports during this period is actually up 7 per cent.

China's trading partners and financial markets are closely watching the health of the world's second-largest economy as the US-China trade war gets longer and costlier.

PHOTO: [AGENCE FRANCE-PRESSE](#)

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**CHEN LONG**

For The Straits Times



**In fact, by preparing for a slower growth, Beijing is in a firmer position to confront the US administration and play a long game, even as Mr Trump threatened over the weekend even higher tariffs and to accelerate the pullout of American companies from China.**



The property market, which is arguably China's most important economic sector, is still holding up well. After several years of expansion, property sales volumes are down just 1.3 per cent year on year in the first seven months, and construction starts are still strong, up by 10 per cent. Real estate investment is also the strongest component in overall fixed-asset investment and it is up 11 per cent, much faster than infrastructure or manufacturing.

After posting the first annual decline (minus 3 per cent) in sales last year after 27 years of positive growth, the automobile market has yet to recover. In the first seven months, both car sales and production fell by double digits from a year ago. Mobile phone production, which is another very big industry in China, is down 5 per cent in the first seven months, with sales also falling from a year ago.

Beijing has adopted a very measured policy response to the current slowdown. There have been a few rounds of tax cuts benefiting low-income individuals, corporates and exporters, and government expenditure has grown faster, especially at the local level. There are also rumours that there would be some targeted policies such as boosting car sales.

### CREDIT GROWTH

However, the most important indicator – the growth of total credit – has picked up very slightly from last year and not gone beyond 11 per cent in the past few months.

To be clear, this still means China's total leverage ratio is going to expand this year after two years of stabilisation. But the scale of credit expansion is still way smaller than previous episodes. Total credit growth went up 16 per cent in the slowdown during 2015 to 2016, and exploded by 35 per cent as a result of the "great stimulus" of 2009.

It looks like Beijing is not interested in substantially boosting growth. The State Council did not give any sign of easing property policies. The latest comments from the central bank reiterated that the interest rate of mortgages would not decline.

In fact, the top task for financial regulators at this moment is still resolving the risks in the financial system as three medium-sized banks have recently been taken over either directly or indirectly by the government.

As long as employment and the financial system are not seriously affected, the thinking of China's economic managers seems to be that there is not too much need for policy stimulus.

### GLOBAL ENVIRONMENT

The global situation also makes it more convenient for Beijing to justify slower growth.

Almost all the developed economies are heading for slower growth, and countries like Germany even face risks of recession, which is why many central banks are adopting more accommodative policies.

And then there is the conflict between China and the US. I am using the word "conflict" because it has become obvious that it is far beyond a trade war.

The conflict has extended beyond trade to technology, investment, energy, currency and geopolitics. US President Donald Trump's tariff wars as well as restrictions on Chinese firms would surely harm China's economic growth outlook, but Beijing could easily argue that any damage done is the work of the Trump administration and that China could not be faulted for holding the line in its negotiations with the US.

In fact, by preparing for a slower growth, Beijing is in a firmer position to confront the US administration and play a long game, even as Mr Trump threatened over the weekend even higher tariffs and to accelerate the pullout of American companies from China.

### NEW TARGETS

To be sure, China's gross domestic product (GDP) growth target of 6 per cent to 6.5 per cent for this year can assert its own pressures on Beijing's policies, but people should also remember that China can be quite flexible in adjusting the growth target to make sure it is not unrealistic when it becomes necessary, or inevitable.

For instance, in 2012, the growth target was lowered from 8 per cent to 7.5 per cent; in 2015, the target was lowered to 7 per cent; since 2016, the key figure has been 6.5 per cent; its role has also changed from the floor to the midpoint, and to the ceiling.

It is very likely that China's leadership will shift gears again next year and beyond, particularly as it looks set to achieve one of its long-term development goals next year by doubling the country's output from 2010. This achievement will give the current leadership much more flexibility in setting goals for the future.

One plausible option is to downgrade the importance of GDP growth rate and increasingly prioritise other targets associated with "high-quality growth", such as environmental improvements for the next few years.

It would not be hard to sell domestically, but the rest of the world needs to get ready for a China growing at 5 per cent to 6 per cent in the next few years. [ST](#)

*The writer is an independent economist based in Beijing. He writes extensively on China's monetary policy, exchange rate policy, banking system and financial markets.*





HEADING OFF A GLOBAL CLASH

# A challenge for The Straits Times readers

**Calling for steps and actions to manage a transition to a new global order.  
An essay contest organised by The Straits Times,  
in partnership with Harvard's Kennedy School.**

How the United States and the world relate to a rising China is one of the great challenges today.

This is your opportunity to help suggest pathways that might be taken to manage a transition to a new global order and make the world a safer place to live in.

Write an essay in no more than 600 words on "Can the US and China escape the Thucydides Trap?".

The trap refers to the power dynamic that comes into play when an incumbent power is made anxious by an emerging rival.

ST editors will pick the top entries to be sent to Professor Graham Allison, an American political scientist and professor at the John F. Kennedy School of Government at Harvard, and author of the bestseller *Destined For War: Can America And China Escape Thucydides's Trap*, for his review.

The best essay wins a \$3,000 cash prize from The Straits Times.

The winner will also get two places to The Straits Times Global Outlook Forum in November.

Send your entry for this ST contest to <http://str.sg/oV6P> by Oct 27, 6pm.

Details on the essay format and recommended background readings can be found here:  
[www.belfercenter.org/publication/searching-grand-strategy-meet-china-challenge](http://www.belfercenter.org/publication/searching-grand-strategy-meet-china-challenge)

THE STRAITS TIMES

An aerial view of the PSA Tanjong Pagar container terminal, with a container vessel about to berth alongside. Second-quarter figures showed that falling output in the electronics cluster led to a year-on-year contraction of 3.1 per cent in the manufacturing sector, much deeper than the first quarter's 0.3 per cent contraction, in Singapore. ST PHOTO: ALPHONSUS CHERN

## Opinion

# Recession or not, there will be more pain ahead

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## Singapore seems set for a tough year for the economy

AS THE GLOBAL ECONOMY GOES, SO GO THE forecasts for Singapore's gross domestic product growth. At the start of the year, when the US-China trade conflict was already under way, the Government was predicting 1.5 per cent to 3.5 per cent growth – a wider-than-usual range, given the uncertainties that lay ahead.

On May 21, the Government shaved the upper end of that forecast, which was revised to 1.5 per cent to 2.5 per cent. Then, in mid-August, came the most aggressive revision, to 0 per cent to 1 per cent because of new risks, including the possibility of another round of tariffs by the US on an additional US\$300 billion (S\$416 billion) worth of Chinese goods; a further economic slowdown in China, which would impact the region; a no-deal Brexit, which would hurt Britain and the European Union, which are among Singapore's major trading partners;



and an escalating trade dispute between Japan and South Korea. A potential currency war could be added to the list.

With quarter-on-quarter growth having contracted 3.3 per cent in the second three-month period and no relief from the trade war in sight, the chances of a technical recession (two consecutive quarters of negative growth) have shot up.

The main source of the problem is the global trade shock.

The tit-for-tat tariffs between the US and China, the aborted trade negotiations and then the threats from the US of even more tariffs in September have wreaked havoc on supply chains. The manufacturing sector – especially the electronics segment – has borne the brunt of the pain, shrinking 3.4 per cent in the second quarter after a 6.4 per cent decline in the first.

Already in recession, the sector is in danger of experiencing a full year of negative growth: The global electronics cycle has yet to bottom out; another round of tariffs from the US on China would prolong the industry's downturn and the Japan-South Korea trade spat will further disrupt supply chains, especially in the key semiconductor segment of electronics.

Singapore's manufacturing-led downturn shows early signs of spreading to parts of the service sector – the largest in the economy, which eked out growth of 1.1 per cent year on year in the second quarter. The wholesale trade segment, which deals in machinery and equipment and is sensitive to the performance of the electronics cluster, was especially hard hit, although retail and business services were also weak.

The Singapore economy grew by 1.2 per cent in the first quarter of 2019, moderating from the revised 1.3 per cent growth in the fourth quarter of last year.

But the service sector has some bright spots – notably information and communications – thanks partly to the spread of digitisation – as well as finance and insurance. Construction is also holding up, growing at an annual rate of 2.9 per cent, led by public works.

Looking at the overall picture, the economy's weakness is not across the board but concentrated in a few key areas, particularly within the manufacturing sector. Moreover, the unemployment rate is holding steady at 2.2 per cent. In these circumstances, it might be premature for the Government to launch an economy-wide fiscal stimulus. Instead, it could provide more targeted support to companies in the sectors most affected by the downturn through its regular loan, grant and other support schemes, while at the same time ramping up its own public infrastructure spending. However it should keep a sharp eye on the risks of the trade war escalating further.

Those risks shot up and, on August 23, US President Donald Trump threatened to hike the



ST ILLUSTRATION: MIEL

**The main source of the problem is the global trade shock. The tit-for-tat tariffs between the US and China, the aborted trade negotiations and then the threats from the US of even more tariffs in September have wreaked havoc on supply chains.**

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rates on all existing and planned tariffs on imports from China, which now include some US\$300 billion worth of goods – including consumer products – that have not been tariffed so far. This would be another body blow to Singapore's manufacturing sector and would raise the chances of the economy going into a technical recession – an issue on which the jury of economists is still undecided. But technical recession or not, it's going to be a tough year for the economy, with more pain ahead. The only questions are: how much pain, how far it will spread and how long will it last. [ST](#)

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# China, Russia and North Korea benefit from Seoul ditching intel pact: Experts

Ending of South Korea-Japan agreement will reduce US influence in the region, they say

SOUTH KOREA'S TERMINATION OF A MILITARY intelligence-sharing pact with Japan is a "strategic miscalculation" that will only benefit China, Russia and North Korea as it diminishes the influence of the United States, their joint ally, in the region, according to observers.

The treaty, known as the General Security of Military Information Agreement (GSOMIA), was brokered by the US and fosters direct intelligence-sharing between the two Asian countries.

Tokyo immediately denounced Seoul's move as "completely misjudging the current regional security environment" and "disproportionate in nature" to its removal of South Korea from its white list of trusted trading partners over what it sees as lax export controls.

Kobe University security expert Tosh Minohara told The Straits Times that the move marks a new low in bilateral ties as it also drags the US into the picture.

"GSOMIA marks an intelligence triangle, and you cannot complete a triangle when one party is absent," he said, noting that Seoul relies on Japanese intelligence to monitor North Korean submarine and missile movements.

"This is tantamount to taking a gun and shooting yourself in the foot," added Dr Minohara, who also chairs the Research Institute for Indo-Pacific Affairs think-tank.

"The South Koreans seem to be very irrational from the perspective of their own national interests, though the move maybe is practical in terms of populism."

Stanford University international policy lecturer Daniel Sneider told The Nelson Report newsletter: "There is no question regarding the strategic stupidity of this decision... (as) it undermines Korean national security and is a direct challenge to the US."

Dr Mira Rapp-Hooper of the US Council on Foreign Relations, meanwhile, said on Twitter that the loss of the GSOMIA weakens defence and deterrence.

"It is a win for North Korean leader Kim Jong Un, the Chinese Communist Party and anyone else who wants weaker US alliances," she said. "It is a consequence of hostility and neglect at the highest levels."

Conservative South Korean dailies urged caution, with the JoongAng Ilbo warning that relations with Japan would "fall into a bottomless pit".

The Chosun Ilbo said in an editorial: "North Korea, China and Russia must be popping the champagne right now."

It added that this is because the GSOMIA was a "stalwart symbol of three-way security cooperation that kept in check China's military ambitions in North-east Asia as well as North Korea's missile provocations", and scrapping it sends the message



Under the pact, originally signed in 2016, South Korea and Japan directly share military secrets, particularly over North Korea's nuclear and missile capacity.:  
PHOTO: REUTERS

South Korea's pullout came against the backdrop of a series of six North Korean short-range missile tests in quick succession.

Perhaps even more alarming, Japan also plans to acknowledge – for the first time, in its annual defence White Paper this month – that Pyongyang has succeeded in miniaturising nuclear warheads that can be loaded onto missiles.



that South Korea “wants out.”

Still, an editorial in the liberal Hankyoreh newspaper described the move as a “strong warning to Japan”, adding that Tokyo “paid the consequences” for imposing trade restrictions on South Korea last month which in turn has led to tit-for-tat measures.

Dr Lee Seong-hyon of the Sejong Institute think-tank told The Straits Times that the termination of the GSOMIA will be seen as a “natural geopolitical gain by China” as it marks the dissolution of the Washington-Tokyo-Seoul trilateral security cooperation.

In this regard, the real loser is Washington, Dr Lee added, noting that the US has refused to mediate in the Seoul-Tokyo discord.

Dr Masashi Nishihara, president of Japan's Research Institute for Peace and Security, agreed that the US reluctance to step in earlier has backfired, and added that South Korean President Moon Jae-in appears to be prioritising relations with North Korea at the expense of longstanding alliances.

Other experts suggested that Mr Moon's administration may have wanted to distract the media and

public from a snowballing domestic scandal involving new Justice Minister Cho Kuk, who is facing accusations ranging from corruption to nepotism.

Professor Kim Jae-chun of Sogang University said Mr Moon “took a big gamble”, noting that despite security concerns, local polls have indicated that more South Koreans are in favour of scrapping the deal. Anti-Japanese sentiment has surged in South Korea, where there is a widening boycott campaign against Japanese goods.

“Domestic politics must be weighing heavily in Moon Jae-in's mind when he made this rash, ill-conceived, ill-fated decision,” he told The Straits Times. “Our relations with the US are now in a very, very precarious position.”

Dr Bong Young-shik of Yonsei University added that the decision allows the Moon administration to “maintain its ideology as a nationalist government”, but warned that it has also lost leverage over Japan.

Japan's Mainichi daily blamed both countries for their disintegrating ties, noting missteps by both parties in the breakdown of diplomacy. **ST**

## Tokyo seeks to allay concerns over US-Japan trade pact

Japan seen as getting raw deal as it fails to secure concessions on vehicle tariffs from the US

JAPAN DID NOT GIVE IN TOO MUCH IN ITS TRADE talks with the United States, its top government spokesman said on Aug 26 as he sought to cool rising concerns that Tokyo got the short end of the stick.

In the broad agreement struck by US President Donald Trump and Japanese Prime Minister Shinzo Abe on Aug 25, Tokyo will gradually reduce levies on American agricultural produce but won no concessions from Washington on its tariffs on Japanese vehicles.

Still, Chief Cabinet Secretary Yoshihide Suga told a routine news conference that it was “extremely meaningful” that the two leaders had reached a broad agreement.

He, however, dithered when asked if the US had dropped its threat to impose more tariffs on Japanese cars.

The two leaders said they hope to sign the deal, which covers agriculture, industrial tariffs and e-commerce, in New York this month.

Working-level talks will continue to iron out the text for the intended deal, under which Tokyo will lower tariffs progressively on US agricultural produce such as beef and pork to levels agreed in the Trans-Pacific Partnership (TPP) deal that Mr Trump jettisoned.

This places US farmers on a competitive playing field with those from countries such as Canada, New Zealand and France.

Still, these have been politically hard-won deals by Mr Abe, as rural Japanese agricultural cooperatives are worried that an influx of cheap foreign goods will erode demand for domestic produce.

Meanwhile, Tokyo did not manage to secure any removal of US import taxes on Japanese vehicles, now at 2.4 per cent on large motorcycles, 2.5 per cent on cars, and 25 per cent on trucks.

It also did not win any US reassurances that it will not set import quotas, or jack up tariffs on Japanese cars on national security grounds, as Mr Trump had threatened to do under Section 232 of the Trade Expansion Act.

The Nikkei reported that the US, however, agreed to remove tariffs on car parts, and will abolish tariffs on other manufactured goods.

Mr Ichiro Fujisaki, the former Japanese ambassador to the US, told Bloomberg: “If you say ‘win-win’, it's a capital letter ‘Win’ for the US and a small-letter ‘win’ for Japan.”

He added: “In Japan's case, a small win plus non-negative assurance that no unilateral measures will be taken by the US, like on limiting car importations or some relations with security issues.” **ST**



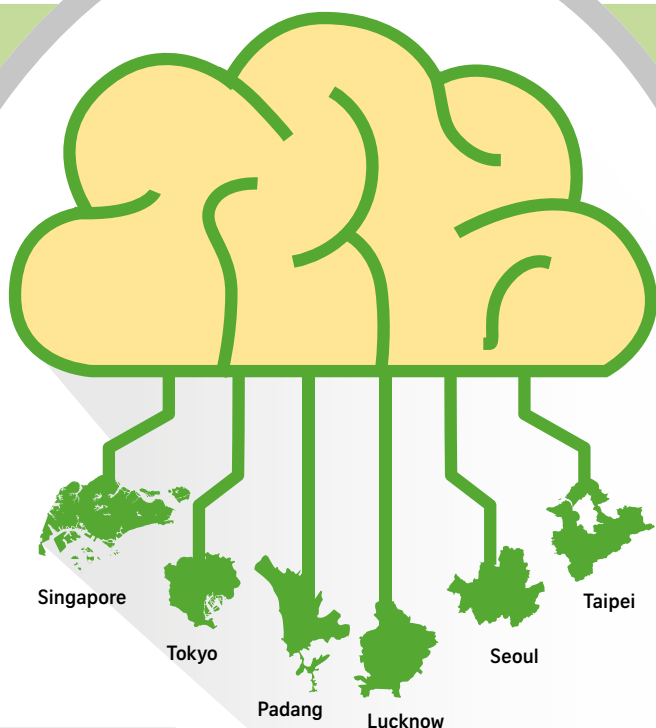
Under the proposed deal, Japan will buy excess US corn, which will supplement domestic corn crop damaged by pests.  
PHOTO: REUTERS

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## Insight

### AI: THE DEFINING COMPETITIVE EDGE OF CITIES

# The age of artificial intelligence: Cities and the A.I. edge

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IN PADANG, WEST SUMATRA, SAN FRANCISCO-based non-profit organisation Rainforest Connection is mounting used cellphones on trees to detect sounds that originate from chainsaws or trucks belonging to illegal loggers. Rangers, villagers and law enforcement agencies are then alerted to the illegal activities and can take action.

In Singapore, DBS Bank is predicting when employees will quit, so management can intervene and retain staff.

In Taipei, Taiwan's performing arts centre National Theatre and Concert Hall is using technology to provide automatic surtitling so that people with hearing disabilities can also enjoy performances.

What unites the three cities in their cutting-edge exploits is a new frontier technology known as artificial intelligence (AI).

Tipped to power the fourth industrial revolution, AI is a technique that allows machines to learn from enormous sets of data.

AI is now able to do a lot more, and at a quicker pace, allowing cities and the way people live and work in them to be shaped.

## COMPUTING LEAPS

So what has changed since the 1950s?

"It is the increasing power of computation that allows an enormous amount of data to be processed in milliseconds," said retired Israeli major-general Isaac Ben-Israel, who is in charge of developing his country's national AI strategy.

For instance, 200,000 hours of the sounds of the ocean can be analysed in hours to detect humpback whales and chart their migration patterns. It would take years to do the analysis without AI software powered by fast computers.

Over the past five years, big American tech firms Google, Amazon and Apple as well as China tech giants Huawei and Alibaba have contributed to quantum leaps in computing power by developing their own AI chips to allow for faster and cheaper data processing for machine learning, much of which takes place on systems hosted on the Internet.

As a result, AI researchers can rent online computing power for 10 hours for US\$50 (S\$69) or less per computer to process data, cutting the need to own their own super machines.

Access to cheap computing resources and free open-source tools has allowed engineering students in New Delhi, India, to develop an app to let people assess air quality in real-time, simply by snapping a picture with their mobile phones.

AI is also fast becoming the defining competitive advantage for cities, said experts.

"It is an important competitive advantage as AI helps to improve air quality and public transport, which will make a city more liveable... These are in addition to traditional infrastructure like mobile networks and electricity," said Mr Sherif Elsayed-Ali, director of partnerships at Canada-based software firm Element AI.

ST ILLUSTRATION: JASTER NGUI



Mr Jeff Dean, head of AI at Google, added: "There will be a lot more opportunities to do things differently and do more things than you can do today."

## TRUST IN AI

But as with all new technologies, there is some level of mistrust.

For example, in "passive data collection", people out in public are having their bodies and faces scanned without their consent by security cameras for law enforcement purposes. "If misused, then it will erode a lot of trust in such technologies," Mr Elsayed-Ali said.

In China, home to the world's largest network of surveillance cameras and gait recognition technology for law enforcement, not many have raised concerns.

But San Francisco has earlier this year banned the use of facial scanning for administrative efficiencies or public safety, to prevent potential abuse, the city said.


Each city's level of tolerance and trust varies, an ongoing survey conducted by Switzerland-based business school the International Institute for Management Development (IMD) and the Singapore University of Technology and Design has found.

"In Chongqing and Bengaluru, people are 100 per cent comfortable, but people in Boston and Amsterdam do not want their faces scanned. People in Singapore and Dubai have mixed feelings," said Dr Bruno Lanvin, president of the Smart City Observatory at IMD.

The push for more privacy has led to a movement for federated machine learning, where AI machines are trained using millions of mobile devices, without extracting raw data from the devices.

Singapore's Senior Minister of State for Communications and Information and Transport Janil Puthucherry said that new technologies – whether they are chemical or biomedical engineering or aviation – bring with them risks as well as opportunities, and have subjected humanity to ethical binds before.

Dr Janil, who is also minister-in-charge of GovTech, the agency behind the Singapore public sector's technology transformation, said people need to accept that there are profit motives as well as social responsibility.

He added: "AI is already here and we are already on this path. We need to have a little bit of faith in humanity that we can deliver on this." 

## Staff planning to quit? System in Singapore can tell

EVEN BEFORE AN EMPLOYEE AT DBS BANK signals his intention to quit, the bank's human resource system would already know.

Its predictive algorithm analyses as many as 600 data points – from absenteeism, salary increases and rate of promotion to the birth of a child and training modules attended.

And it does this with every one of the bank's 11,000 Singapore employees. The system generates a monthly report and predicts every employee's resignation risk, and prescribes actions for managers to engage employees.

All this is done as part of efforts to solve an issue which plagues every bank in Singapore – a high turnover rate of up to 30 per cent, especially for sales people.

"Our focus is to make sure that we do not lose people for the wrong reasons," said Ms Lee Yan Hong, managing director and head of group human resources at DBS Bank.

Some employees leave for family reasons and the bank reasoned that it is not something that it can control. However, if people leave because they feel undervalued or underpaid, then the bank wants to intervene before it is too late.



ST PHOTO: KUA CHEE SIONG

She said that the bulk of the work for the system was data gathering and the development of an algorithm by four data scientists and three data analysts in the human resource department. The job was completed in 2016.

Now, the bank is focusing on change management – a process to get all its managers to act on the monthly reports.

South-east Asia's largest bank has estimated that it could save at least \$5 million in costs related to recruitment, training and operational downtime if it reduces its current annual attrition rate of 15 per cent bank-wide by just 1 per cent. It has a long-term goal of reducing that figure to a single digit.

Globally, the use of artificial intelligence in predicting employees' risk of leaving is still nascent. AI's use in predicting sales is more common.

AI in human resources is currently limited to

chatbots for employees to look up company policies or benefits, and for companies to scrape social media profiles to check on potential candidates.

DBS' predictive system, dubbed the Data Analytics Retention Model, is also being rolled out in Hong Kong, Taiwan and Indonesia where the bank has a presence. There are similar plans for China and India as well.

The HR system works with another AI-powered system called Jobs Intelligence Maestro (Jim), launched a year ago in Singapore.

Jim is designed to help the bank manage the screening of about 5,000 applications for wealth relationship manager roles annually. The bank believes that the right hires stay longer.

Designed together with a local start-up Impress AI, Jim comprises a chatbot that engages candidates during the initial interview. Jim is also integrated with online assessment tools for evaluating candidates' personalities and cognitive reasoning.

"AI takes away any bias that may be introduced if screening had been done by a human recruiter," said Ms Lee. For instance, temporary staff are often

hired to do the first round of screening. But they may exhibit a bias for schools or gender.

Ms Dragana Beara, Dell Technologies' director of portfolio messaging in Asia-Pacific and Japan, said employee retention is linked to good hiring practices and the goal is to create "more equitable workplaces by evaluating candidates based on their capabilities rather than gender, age or class." She specialises in technologies for digital and workforce transformation.

DBS has seen some indications of early success. Out of "hundreds" of employees predicted by its Data Analytics Retention Model to be at risk of leaving, almost all stayed when their managers intervened.

The impact is most keenly felt among wealth relationship managers as they tend to job-hop after a year. Since the system was introduced, the attrition among this group has gone down by about 40 per cent, said DBS.

This translates to better service for the banks' customers too. "Customers do not like to have to deal with a different relationship manager every few months," said Ms Lee. [ST](#)

## 'Guardians' in Padang send alerts when forests face threats

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Rainforest Connection CEO Topher White installing a Guardian in the Pasir Talang Timur forest. The device can pick up sounds within a 3km radius. The AI model is built to pick up sounds like those from chainsaws and trucks, and send real-time alerts with coordinates to the communities watching over the forests where the devices are installed.

PHOTO: NUR ASYIQIN  
MOHAMAD SALLEH

TREKKING THROUGH A FOREST OF WEST Sumatra eight years ago, engineer Topher White stumbled upon an illegal logger sawing away at a tree.

The riot of sounds from the forest – gibbons in constant chatter, birds shrieking in song, the heavy buzz of insects – drowned out the whirr of the chainsaw.

"The forest was just way too loud," Mr White recalled. "And I remember thinking, this can't be happening. Surely, there's a way we can use technology to listen to the forest, and protect it from men with chainsaws."

When he returned to San Francisco, Mr White started building a device to record and analyse the sounds of the forest. Just over a year later, he was back in West Sumatra, installing modified phones high up in the trees in a gibbon reserve.



These "Guardians" are old cellphones housed in a plastic box, and equipped with solar panels designed to capture the sporadic bursts of light through the forest canopy.

A powerful microphone allows the device to pick up sounds within a 3km radius, and stream them up to the cloud platform to be analysed.

Artificial intelligence (AI) models were built to pick up sounds like those from chainsaws and trucks, and send real-time alerts with coordinates to the communities watching over the forests where the devices are installed.

These instantaneous alerts help people pinpoint threats promptly, a stark contrast to systems such as satellite imaging, which reveal destruction only days or weeks later.

Since then, Rainforest Connection – the San Francisco-based non-profit organisation founded by Mr White – has deployed more than 100 of these old phones around the world.

Indonesia loses more than a million hectares of forest a year, according to the Rainforest Action Network, one of the highest deforestation rates in the world.

Rainforest Connection estimates that one of its listening devices can protect, from illegal logging, an area containing enough trees to "prevent 15,000 tonnes of carbon dioxide from being released" – an amount equivalent to the yearly emissions of 3,000 cars. [ST](#)



# Making driving safer for disabled, elderly in Seoul

SOUTH KOREAN YOUTUBER WE PARK COULD barely contain his excitement as he got behind the wheels of an autonomous car for the first time.

“Look, no hands!” he exclaimed, as the car moved itself in K-City, a town built to test such vehicles and said to be the largest of its kind in the world.

Powered by artificial intelligence over 5G mobile connections, self-driving cars have the potential to bring a lot of social good to the country’s disabled community.

Official data shows that there are 2.59 million people with some form of disability as of last year, making up 5 per cent of the country’s population of 51.8 million.

Though a relative latecomer in the field of automated vehicles, South Korea is the first country in the world to commercialise the ultra-fast 5G network nationwide. As of June, there were one million users of 5G mobile devices here.

The number of people subscribed to IoT-related services reached 18.6 million last December, while the sales of AI speakers – most notably telco giant KT Corporation’s Giga Genie – exceeded four million units as of March.

The number of autonomous cars has also



increased to 62 – up 41 per cent from last year.

K-City, located in Hwaseong city south-west of Seoul, plays a crucial role incubating these driver-less cars. Occupying 320,000 sq m, the test bed is modelled after South Korean roads and infrastructure such as bus lanes, tunnels, and even a school zone.

Since it was opened to the public in March, K-City has seen 295 tests conducted by 16 universities and 15 companies.

By next year, the government would have invested more than 31 billion won (\$\$35.3 million) in K-City, said Mr Ryu Do-jeung, director-general of the Korea Automobile Testing and Research Institute, which oversees K-City.

South Korea-based Renault Samsung Motors unveiled an AI in-car system called Easy Link for its QM6 sport utility vehicles last month. A joint collaboration with KT Corporation – a leader in 5G and vehicle-to-everything (V2X) communications – it can play music, access traffic information and even search the Internet when given verbal commands from the driver.

KT expects the widespread popularity of self-driving cars to bring significant changes in the future.

KT is currently working on smart mobility projects and in-car infotainment systems, and expects its connected car service to be as “popular and impactful as smartphones”

Mr Kim Su-sang from the Ministry of Land, Infrastructure and Transport told ST that autonomous cars will be a growth engine and core technology of the fourth industrial revolution. He added that the target is to complete testing by 2030.

YouTuber Mr Park, who drives now using one hand on the steering wheel and the other on special levers for the accelerator and brakes, can hardly wait.

“For people like me who cannot drive the usual way, this car gives us hope. I better earn a lot of money so I can be the first to buy it when it’s out,” he said. **ST**

South Korean YouTuber We Park, who is paralysed from the waist down, driving an autonomous car at K-City, in Hwaseong city. Powered by AI over 5G mobile connections that were launched in South Korea in April, self-driving cars have the potential to benefit those with disabilities. for autonomous vehicles.

PHOTO: CHANG MAY CHOON

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KT Corporation employees testing the company’s 5G Remote Cockpit, a remote control system for autonomous vehicles.

PHOTO: CHANG MAY CHOON





An afternoon recreation session led by Softbank's Pepper robot under way at the Shintomi nursing home, near Shinjuku in Tokyo. The nursing home is one of three elderly facilities run by Silverwing Social Welfare Coporation, which taps as many as 28 robots and sensors at its homes. PHOTO: WALTER SIM

## Helping seniors live longer, healthier in Tokyo

ONCE A WEEK, 86-YEAR-OLD TADASHI Komatsuzaki eats with a smart device around his neck that measures his swallowing ability.

The sensor, known as Gokuri, taps artificial intelligence to detect such factors as swallowing strength and time, his posture and whether he coughs when he eats or drinks.

This data is then fed onto a cloud service, where his caregivers at Carehouse Seele in the city of Tsukuba, about an hour north-east of Tokyo, can track his progress.

Improper swallowing can cause aspiration pneumonia, which accounts for 90 per cent of all pneumonia cases among seniors aged 75 and above in Japan. Pneumonia is one of the top causes of death.

Mr Komatsuzaki was a high-risk case and had to be hospitalised each month until his condition improved in May – with the help of the Gokuri device, said Carehouse Seele director Takuji Yamanaka.

“We can review the kind of food to provide each resident, and the best posture they should adopt when they eat to avoid falling ill,” he said. He added that using Gokuri, developed by start-up Plimes Inc, is “as easy as taking blood pressure”.

This is one example of how Japan, home to the world's fastest-ageing population, is poised to take the lead in building AI and Internet of Things (IoT) technologies that can benefit a silver generation, while easing the care burden on a shrinking workforce.

Major IT giants, start-ups and universities are working with local governments and nursing homes in an effort to address this pressing need.

One in five Japanese is already aged 70 and above, and the government foresees a shortfall of about 380,000 caregivers by 2025.

What is currently on the radar goes far beyond on-the-market communication robots like Softbank's Pepper, Fujisoft's Palro and Intelligence System's furry baby seal Paro, that have long made headlines.

Still, Fujisoft spokesman Yusuke Masaki told The Straits Times that Palro, developed in 2008 and now used in 1,300 facilities across Japan, will undergo upgrades to improve speech recognition for conversations with the elderly, and to add content for physical exercise.

Silverwing, which runs three elderly facilities in Tokyo, taps as many as 28 robots and sensors, including Nemuri scan by Paramount Bed that analyses real-time sleep data and sends urgent alerts when a resident tries to get out of bed in the middle of the night.

Silverwing president Kimiya Ishikawa, 63, said that while caregiving has long been seen as a human role, “burden sharing” with robots will boost the safety and health of the elderly.

### MANY TOOLS TO CHOOSE FROM

As trends go, he may be spoiled for choice. NEC is building an AI tool to predict one's vitals – including weight, blood pressure, sugar levels, cholesterol levels and fat percentage – based on current measurements and lifestyle habits.

Mr Akihiko Shibano, a manager at NEC's medical solutions division, said the tool is meant to help detect potential diseases early and, if need be, prompt behavioural change.

“Doctors who have tried the system say that the additional AI layer, above traditional health guidance, can give a sense of objectivity and lead patients to be more convinced of the prognosis,” Mr Shibano said.

Some, like start-up ValueCare, are going back to basics. It taps the Sigfox network by Kyocera Communication Systems – dubbed a “zero-G” network – for its no-frills sensors.

ValueCare chief Kiyoshi Ide said target users include the increasing number of elderly folk living alone. Each sensor can be attached to a frequent point of contact, such as a fridge or toilet door, and alerts are sent when the door is opened or closed.

This, he added, is a non-intrusive and cheap way for estate managers or a community to monitor for possible mishaps, such as when there is no activity for some time.

Dr Ikuko Tomomatsu, chief executive officer of medicine and healthcare research company Tomo Lab, said the suite of AI and IoT technologies – both on the market and undergoing trials – will help individuals live longer and healthier as Japan embraces the “100-Year Life” concept. **ST**

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# Agri-tech solutions reduce guesswork for farmers in Lucknow

GROWING UP, MR ANANDA PRAKASH VERMA watched with a heavy heart as his father tended to their family's cauliflower fields, knowing it was not guaranteed that their efforts would lead to a good harvest.

Like many other families in India's Uttar Pradesh region, Mr Ananda's family income is dependent on the south-west monsoon – which lasts from June to September – for rain, and their crops.

Mr Ananda, 29, said many farming families do not know how to properly plan for or react to the weather, pests and diseases that can destroy crops.

"Farming is largely driven by guesswork and intuition. Farmers follow what their parents and grandparents have done for years," he said.

But by using artificial intelligence, Mr Ananda and his friend Shailendra Tiwari are trying to reduce the reliance on guesswork.

The engineering graduates used their knowledge to develop a tool to allow farmers to maximise their yield and avoid unnecessary spending on pesticides, irrigation and chemicals.

The pair started their own company called Fasal to develop an app which uses Internet of Things (IoT) and machine-learning technologies powered by AI to monitor conditions such as temperature, humidity and rainfall, and recommend preventive actions.

Fasal is one of many agriculture technology (agri-tech) start-ups that have germinated in India in recent years, thanks to advancements in AI.

India's Economic Survey, a government document, showed the agriculture sector accounts for 16 per cent of the country's economy and almost half of its employment.

It is no surprise the sector has witnessed a mushrooming of agri-tech start-ups. According to a report by the National Association of Software and Services Companies of India, more than 350 agri-tech start-ups raised \$300 million in global investment in 2016.

Their technologies seek to improve efficiency across the farming process, be it before seeds are planted, while the crops are growing or during harvesting.

Some use AI to analyse real-time data from multiple sources to build an efficient supply chain, while others use it to predict the best time to harvest.

Fasal monitors conditions to ensure the crops are as healthy as possible.

Mr Ananda said the app, also called Fasal, works



A picture of the sensor from Indian agri-tech start-up Fasal. The company aims to reduce the reliance on guesswork in farming by using advanced Internet of Things (IoT) and machine learning technologies powered by Artificial Intelligence to monitor conditions such as temperature, humidity and rainfall and recommend preventive actions. PHOTO: FASAL

by taking regular readings of variables such as temperature, humidity, rainfall, wind direction, soil moisture and electrical conductivity.

Once uploaded on its cloud platform, the algorithms that engineers and agri-experts at Fasal built take over and process the data.

Farmers can learn through an app on their phones when their crops are at risk of pests or diseases, for example, and ready themselves to tackle the problems.

Separately, farmers using start-up Wadhvani AI's app take pictures of the pests caught on sticky traps and send them to the company's cloud platform to identify the insects. Its AI system can determine the severity of an infestation, and also recommend if spray pesticides are needed.

In May, the firm won an AI impact contest by Google, beating more than 2,500 other organisations from over 110 countries. Wadhvani AI received US\$2 million (\$\$2.8 million) to develop its solutions.

Big tech companies like Microsoft are investing in the use of AI in agri-tech. In 2017, it collaborated with the International Crop Research Institute for the Semi-Arid Tropics, a non-profit organisation that conducts agricultural research for development in Asia and Africa, to develop the AI Sowing app. A pilot scheme was run for 175 farmers.

This allowed the AI system to read weather patterns and predict the impact of climate change. **ST**

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Ms Liu Yi-Ruu, executive and artistic director of Taiwan's National Theatre and Concert Hall. PHOTO: CHONG KOH PING

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A pre-show discussion using voice-to-text application Yating at Taiwan's National Theatre and Concert Hall on July 14. Yating is hooked up to the speaker's microphone at one end and a projector at the other, and provides instantaneous translations from the spoken word to Chinese text.

PHOTO: TAIWAN'S NATIONAL THEATRE AND CONCERT HALL

# Voice-to-text app helps make the arts inclusive in Taipei

MS LIU YI-RUU WANTED TO MAKE THE performing arts more inclusive to people with disabilities, and decided to tap artificial intelligence technologies.

At first, the executive and artistic director of Taiwan's National Theatre and Concert Hall hired human transcribers to provide surtitles, after learning that people with hearing disabilities could not participate in post-performance talks and pre-show introductions.

But not many people in Taiwan can do live transcribing, which can also be costly if used frequently.

Then last year, Ms Liu read media reports about a locally developed voice-to-text application, Yating.

It was created by Taiwan AI Labs, a privately funded and non-profit research lab that focuses on developing AI technologies in human-machine interface, healthcare and smart city applications.

"Yating 'interned' at our theatre and concert hall for about six months," said Ms Liu, who added that the software was tapped about 20 times at various talks and discussions to practise transcribing.

Developers had programmed a stand-alone machine to handle instantaneous translations from the spoken word to Chinese text. It was hooked up to the speaker's microphone at one end and a projector at the other.

At an event in July, the performing arts centre officially used the technology, which it paid a nominal sum for, to provide surtitles at a discussion at a pre-show chat.

"It was well received. Its accuracy is now at 80 to 85 per cent. And because it's fast, the surtitles proved useful for those without hearing disabilities as well," she noted.

Mr Ethan Tu, founder of Taiwan AI Labs, told The Straits Times he started the research lab in 2017 to develop AI technologies for areas that "deeply

affect public interest."

Some of AI's applications, in areas such as healthcare and city management, are simply not suitable for private firms to undertake, said Mr Tu, a former principal development manager at Microsoft.

He claimed some firms cannot be trusted to be ethical and responsible with the data and information they have access to.

As a non-profit organisation, he aims to roll out AI technologies that can be trusted and are easily understood by people.

Last year, the government announced a four-year plan to pump in NT\$36 billion (S\$1.6 billion) to spur growth in the sector. As part of the plan, the government aims to train 10,000 AI technicians and application specialists each year.

Mr Tu, a software engineer by training, observed that the general perception of Taiwan is that it is very strong in hardware manufacturing. But he thinks that in the AI age, Taiwan is also "highly relevant."

"For example, a lot of the host devices, AI chips and AI-powered Internet of Things devices are made in Taiwan," he said, adding that the island of 23 million people also has a pool of highly trained software talents that could develop AI applications.

"When we started our AI Labs, many people didn't believe that Taiwan could do software and that it has sufficient talent to support such innovations," he recalled.

In the past two years, global tech giants such as Microsoft, Google, Amazon and IBM have announced plans to build AI research centres in Taiwan to tap its relatively inexpensive tech talents and leverage its hardware prowess.

Mr Tu said Taiwan AI Labs' Yating voice recognition app has achieved an accuracy level of between 90 and 95 per cent in sectors such as customer service, financial and legal services. Since its roll-out late last year, he has received many inquiries from both private and public organisations.

He said the arrangement with the National Theatre and Concert Hall fits in with Taiwan AI Labs' plans, in helping to push AI for social good. "There are also some overseas players who are interested in working with us," he said, explaining that there is a need for Chinese-language voice recognition technologies all over the world. "But due to national security sensitivities, they don't trust Chinese firms."

The research lab is working on the app to make it recognise the way Taiwanese speak, such as a mix of Mandarin and English, and a mix of Mandarin and the Minnan dialect (also commonly known as Taiwanese or taiyu). **ST**





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## Country Report

Indian security forces personnel patrolling a street in Srinagar, Kashmir. New Delhi's grip on the state has been weakening despite the presence of half a million Indian troops on Kashmiri soil.  
PHOTO: REUTERS

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# Indian move on Kashmir risks firing up regional tinderbox

The Indian government's move to strip the state of Jammu and Kashmir of its autonomy and special status risks firing up the South Asian subcontinent's tinderbox

THE INDIAN GOVERNMENT'S DECISION TO SPLIT Jammu and Kashmir into two federally administered territories and scrap the state's special status would not have surprised anyone except those who can't read the tea leaves of global politics and the seriousness with which the country's ruling party takes its election manifesto.

Article 370 of the Indian Constitution, which pretty much became infructuous on Aug 5, was introduced in 1949 and asserted that "Kashmir state" would have special powers to be excluded from the purview of the laws that the Indian Parliament would make, and also the power to make its own laws.

The area now stands to lose many of its special privileges, including its special flag. Now, all of India's Constitution is sought to be applied on the state, including, critically, rights of outsiders to buy property in the state – hitherto restricted to people of the state.

Until end-August, scrapping Article 370 was seen as a mere election promise of the Bharatiya Janata Party (BJP) to rally the support of the country's majority Hindu population, which looked askance at the separatist urges of the country's only Muslim-majority state, long coveted by Pakistan.

Now, in the muscular way in which Indian Prime Minister Narendra Modi approaches things – to ensure secrecy, he pretty much locked up his Cabinet before announcing the surprise demonetisation of November 2016 – New Delhi has now asserted its complete authority on its northernmost province.

It has arrested two former chief ministers, suspended cellphone and Internet services, and put the tightest security band on the province. Many in India are labelling it an undemocratic power grab by the Modi government, and there is merit to that argument.



Nevertheless, it also needs recalling that Kashmir's vaunted "special status" had been progressively whittled down over the decades. No fewer than 44 amendments – most of them passed when the Nehru-Gandhi dynasty-controlled Indian National Congress ran India – have been passed, including one that changed the title of the state's elected leader in the state assembly from "prime minister" to "chief minister".

The move, if anything, is not so much a show of strength as tacit admission by New Delhi that despite its best efforts, its grip on the state had been weakening, the presence of half a million Indian troops on Kashmiri soil notwithstanding.

Typically, New Delhi's assimilative instincts have gone the other way. For instance, Arunachal Pradesh, a north-eastern state claimed in its entirety by China, was once called North East Frontier Agency. Subsequently, it was proclaimed a federally administered "union territory" and, finally, given full statehood.

### THE BONE STUCK IN INDIA'S AND PAKISTAN'S THROATS

The picturesque Kashmir Valley once had a vastly admired syncretic culture; today, barring a few hundred families, most of the Hindu Pandit families have been forced to leave Kashmir. Most have become refugees in their own country, often having been forced to make distress sales of valuable Valley property to their Muslim brethren.

Periods of separatist violence alternating with a brittle peace have ensured that no serious investment has landed in Kashmir, leaving the state and the struggling tourism sector as the major employers.

Meanwhile, a handful of political families and clans of top separatist leaders are perceived to have enriched themselves substantially, with some elements playing both sides – India, all too happy to overlook their corruption in order to sustain their loyalty to the country, and Pakistan, ever so willing to lubricate their separatist instincts.

From their birth as independent nations in 1947, Kashmir has been the bone stuck in their mutual throats.

Pakistan has coveted control of all of Kashmir Valley, which it feels it was unfairly denied by the sleight of hand of the departing British, as well as a Hindu ruler who initially sought to stay independent, then opted for India. Its trenchant efforts to prise it from India's grip are born out of insecurity as much as indignation – its life-giving rivers rise in the India-held portion of the region, and while New Delhi has scrupulously adhered to international treaties on water sharing, there is always the fear that some ultra-nationalist government in New Delhi may turn off the tap.

With Pakistan, which claims an "all-weather friendship" with China, conceding a corner of the portion of Kashmir it holds to that country, there are effectively three parties to the dispute.

A part of the Karakoram Highway cuts through the territory ceded by Pakistan. Complicating things further, the China-Pakistan Economic Corridor, part of President Xi Jinping's signature Belt and Road Initiative, runs through a part of Pakistan-held Kashmir that is claimed by India. By the logic of the Partition of India, contiguous Muslim areas were to have gone to Pakistan, and the Muslim-majority Valley should probably have been Pakistan's.

But it did not happen that way and New Delhi quickly consolidated its grasp on the picturesque province.

India's Jammu and Kashmir state has three distinct regions; the Muslim-majority Valley, scene of the separatist unrest; the Buddhist area of Ladakh bordering China – and an area where Indians have frequently complained of Chinese incursions and aggressive patrolling; and mostly Hindu Jammu to the south.

Aside from the Valley, the other regions are strongly pro-India. The state will now be split into the Union Territory of Ladakh, which will not have a legislature, and the Union Territory of Jammu and Kashmir, which will have one but with curtailed powers.

Pakistan and India have fought three wars over the state, and came close to a fourth earlier this year after a terror attack on a security convoy in Kashmir took about 40 lives and New Delhi ordered an air strike inside Pakistani territory.

For years, Nehruvian India saw control of Muslim-majority Kashmir as essential for its secular narrative and to disprove the two-nation theory that spawned the birth of Pakistan – that Hindus and Muslims were "two nations" that could not subsist as one.

India's ruling BJP has no time for this idea of India bequeathed by Congress. Nevertheless, just as China has strengthened its hold over its autonomous regions like Tibet and Xinjiang, New Delhi is doing the same, not only for strategic reasons but also because it has the power and will to do so.

Meanwhile, Pakistani frustrations have mounted, especially as its power disparity with India became wider. Frequently it has fallen back on using "non-state actors" to weaken India's grip on the state. Some of the action has spilled over elsewhere, as witnessed in the November 2008 attacks on India's business capital Mumbai by Lashkar-e-Taiba terrorists trained inside Pakistan. That strike claimed 166 lives, including that of a Singaporean woman.

Diplomacy was also attempted at various stages. Pakistan's military ruler Pervez Musharraf and India's Prime Minister Manmohan Singh came close to clinching a deal that would help Kashmiris travel and trade across the military Line of Control, leading to a soft border.

But hawks on both sides – India's BJP, then in opposition, vehemently resisted the deal – killed the initiative.

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**Kashmir's  
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when the  
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dynasty-  
controlled  
Indian National  
Congress ran  
India – have  
been passed,  
including one  
that changed  
the title of the  
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leader in the  
state assembly  
from "prime  
minister" to  
"chief minister".**

”

## THE U.S. ANGLE

Today, Mr Modi's impetus to act possibly comes from the perceptible improvement in US-Pakistan ties and fears that President Donald Trump would sell out Indian interests as he tries to enlist Islamabad's influence to curb militant groups in Afghanistan in order to help him bring most US troops home before the next election.

"When Barack Obama tried a similar tactic in Afghanistan, General Ashfaq Kayani offered to help but in turn sent in a 57-page dossier of demands that was all about Kashmir, Kashmir," says an Asian diplomat who saw the dossier, referring to the Pakistani army chief who served from 2007 to 2013.

"Indians are signalling to Trump that Kashmir is a red line for them and they will not back off no matter how close the US-India strategic relations are these days."

A Trump suggestion that Mr Modi had sought his mediation on the Kashmir issue was vociferously denied by New Delhi, which is clearly prepared to dig in its heels on the matter.

"Faced with the prospect of renewed bonhomie with the Pentagon, the Pakistani elite have sought to sharpen their rhetoric on Kashmir," says Dr Sanjaya

Baru, a distinguished fellow at India's Institute for Defence Studies and Analysis.

"The BJP's leadership, buoyed by a landmark victory, was in no mood to indulge their pretence. It is significant that most Indian political parties, including many senior Congress leaders, have backed the government's action. They are not necessarily defending the government as defending the interests of the Indian state."

New Delhi is also aware that world attention is now focused on Hong Kong, where the widening protests have now taken on definite anti-China overtones. That cover, and the sinking ties with the US that has China's leadership fully occupied, gives it the space to manoeuvre, confident that it can face down any diplomatic or tougher retaliation by Pakistan.

For its part, Islamabad knows it has to do something, lest it loses credibility with the Kashmiri separatists it backs. This is what makes the South Asian situation such a tinderbox.

Once again, it looks as though the subcontinent is poised to take back the description it owned for decades before the North Koreans grabbed it from them – the most dangerous place in the world. **ST**

## Country Report

# East Kalimantan to be home of Indonesia's new capital: Jokowi

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Parliament nod needed to build new administrative centre to ease strain on Jakarta's resources

INDONESIAN PRESIDENT JOKO WIDODO HAS picked East Kalimantan as the location for Indonesia's new capital in order to relieve the strain on Jakarta.

"Jakarta has received overwhelming burdens as the centre of administration, business, finance, trade and services, as well as (housing) the country's largest airport and seaport," Mr Joko, popularly called Jokowi at home, told a media briefing on Aug 26.

The burden on Java Island, where Jakarta is, has been mounting, as it is home to 150 million people, or 54 per cent of Indonesia's population, and accounts for 58 per cent of its gross domestic product, Mr Joko said.

Shifting the capital outside Java would help make future economic development more equitable, he added.

But first, Parliament will have to pass a law to greenlight the President's plan, which could cost

billions of dollars and take shape over the next few years.

Under the relocation plan, Jakarta will be the commercial capital of South-east Asia's largest economy, while a new city will become Indonesia's administrative capital – akin to the roles played by Kuala Lumpur and Putrajaya respectively in Malaysia.

The Indonesian government had previously shortlisted two regions on the island of Borneo for the new capital: East Kalimantan and Central Kalimantan.

East Kalimantan is the largest province by land size after Papua and Central Kalimantan, and has vast eastern coastal areas.

These take up parts of its two largest cities, Balikpapan – which is a two-hour flight from Jakarta – and Samarinda, which faces the deep-sea Makassar Strait.

The new capital will be located between two regencies in the province – Penajam Paser Utara and Kutai Kartanegara – which also face the Makassar Strait.

East Kalimantan has low poverty levels, a good education base and a small population that could be receptive to newcomers. It is home to a mix of ethnicities.





The province has an international airport in Balikpapan and a domestic one in the neighbouring city of Samarinda, as well as a cargo seaport and six dams.

Also, a toll road linking Balikpapan and Samarinda is expected to be ready this year.

Jakarta has served as the administrative, financial and trade centre of Indonesia since 1949.

However, the city has suffered from traffic congestion, overcrowding, widespread pollution and regular flooding for decades.

Jakarta is also sinking by 10cm a year, and its water table is falling as its residents have dug deep wells to draw out raw water.

Public Works and Housing Minister Basuki Hadimuljono said on Aug 26 that the government

would complete the design work and masterplan in the middle of next year, around the same time that it plans to finish drafting a Bill to put before Parliament.

The move to shift the capital is expected to cost 466 trillion rupiah (\$\$45.4 billion).

Once the proposed Bill is ratified into law by Parliament, no future leader can scrap the move without parliamentary sanction.

“Construction should take three to four years, which includes dams, water sanitation, roads and buildings. God willing, by 2023 to 2024, we will start to move there,” Mr Basuki said.

Planning Minister Bambang added that the new administrative capital would initially occupy 40,000ha of land.

The protected forests in the area would not be touched, he stressed, as they would function as green belts for the new city, which is yet to be named. [ST](#)

Indonesian President Joko Widodo, flanked by his Vice-President Jusuf Kalla (right) and Agriculture and Land Planning Minister Sofyan Djalil, talks to the media as he announces the location of the country's new capital city during a press conference at the state palace in Jakarta, Indonesia, 26 Aug 2019. The President announced that East Kalimantan in Borneo will be the location for Indonesia's new capital.

PHOTO: EPA-EFE

## WHY EAST KALIMANTAN

Two regencies – Penajam Paser Utara and Kutai Kartanegara – in East Kalimantan have been chosen as the site for Indonesia's new administrative centre. Several reasons were cited for the choice.

### 1 SAFETY

They are sheltered from natural disasters such as earthquakes and landslides. Most other parts of Indonesia experience frequent seismic and volcanic activity due to its location on the Pacific “Ring of Fire”, where tectonic plates collide.

### 2 STRATEGIC LOCATION

They are situated relatively at the centre of the sprawling archipelago and close to the well-developed cities of Samarinda and Balikpapan.

### 3 ADEQUATE INFRASTRUCTURE

East Kalimantan boasts an international airport in Balikpapan and a domestic one in the neighbouring city of Samarinda, a cargo seaport, six dams and a toll road linking Balikpapan and Samarinda which should be ready this year.

### 4 AVAILABLE LAND

The districts have adequate government-owned land – up to 180,000ha – on which the capital can be built.

## Indonesia's new administrative capital\*



NOTE: \*The new administrative capital will be built between Kutai Kartanegara and Penajam Paser Utara

Sources: GOOGLE MAPS STRAITS TIMES GRAPHICS



Chinese police officers taking part in a drill in Shenzhen in China's southern Guangdong province, across the border from Hong Kong.  
PHOTO: AGENCE FRANCE-PRESSE

## Country Report

# Sending troops into HK seen as a last resort for Beijing

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Experts say military force a consideration only if party or Xi's authority is directly challenged

THERE IS NO DOUBT THAT CHINESE LEADERS are in the grip of an intense debate now, with unrest in Hong Kong escalating.

Should Beijing intervene directly and send in its troops?

As time goes on, military intervention has appeared more likely. As protests have grown more violent, Beijing has mustered paramilitary forces in Shenzhen, the mainland city bordering Hong Kong.

Beijing's condemnation of the city's demonstrators has also sharpened. Where they were once described as violent criminals, the central government has since said the protests show signs of terrorism.

But experts say military force still remains unlikely for now.

Instead, the likely scenario in the days ahead will involve stronger police action to curb the violence, and the Hong Kong government providing small concessions or incentives to residents in a bid to win over public support.

The Special Administrative Region (SAR) has been hit by protests for three months now.

In early June, protesters took to the streets against a now-suspended extradition Bill that would have allowed suspects from the city to be sent to the mainland to stand trial. But their demands have since morphed, with young protesters agitating for greater democratic rights.

In the eyes of Chinese leaders, the protest movement in Hong Kong has grown more violent and radical. Mass sit-ins at the city's airport left the air hub crippled for two consecutive days, and Chinese state media has highlighted violent protest tactics including the use of Molotov cocktails.

Describing China's approach, Professor Lau Siu Kai, vice-president of the Chinese Association of Hong Kong and Macau Studies, said Beijing was giving "full support to police and their offensive."

"Police are increasingly taking more drastic action and arresting many protesters. Beijing is also mobilising all people supportive of the mainland to back up the police and create a public opinion atmosphere unfavourable to the protests," said the Hong Kong-based Prof Lau.

Arrests have increased sharply, with over 750 protesters nabbed so far. The city government has also announced a raft of relief measures including fee cuts, subsidies and grants, in a bid to take the sting out of the disruptions.

Key in the calculus for not using military force is also the upcoming 70th anniversary of the founding



of the People's Republic of China, which falls on Oct 1.

China researcher Adam Ni, from Macquarie University in Australia, said that with Beijing facing complex internal and external challenges, including a trade war with the United States, the anniversary would be an opportunity for President Xi Jinping to showcase the country's confidence and national power.

"The last thing Xi wants is for Oct 1 to be marked by a bloodbath or a tragedy in Hong Kong," he said.

Even deploying a "small unit of armed police" in Hong Kong would further escalate tensions, said associate professor Li Mingjiang of the S. Rajaratnam School of International Studies in Singapore.

"It would create a very dramatic negative impression in international society and cause very serious deterioration in relations between China and the US, and other Western countries," said Prof Li.

A crackdown would cause untold economic damage to Hong Kong and give a boost to the independence movement in Taiwan, with which Beijing is pursuing reunification.

## MILITARY OPTION A BACKSTOP

Experts agreed that military force remains the backstop, if Chinese leaders perceive the situation is spiralling out of the SAR government's control.

In August, at a press briefing organised by the State Council Information Office, the office of the spokesman for the Chinese Cabinet, one expert said military intervention was clearly allowed under the law, repeating a point Beijing has made several times in the past few weeks.

Professor Han Dayuan, director of Renmin University's Institute for One Country Two Systems, said Article 18 of Hong Kong's Basic Law allows the National People's Congress, China's legislature, to declare a state of emergency in the city, which would allow troops to be deployed.

"There are two criteria. First, there must be a situation that endangers national unity or security, and that the situation is out of the control of the SAR government," he said.

Nationalist tabloid Global Times also warned in an August editorial that forceful intervention remained an option but it "won't be a repeat" of the Tiananmen crackdown of 1989.

"Beijing hasn't decided to forcefully intervene to quell the Hong Kong riots, but this option is clearly at Beijing's disposal," said the newspaper.

## Economic fallout from protests

Anti-government protests in Hong Kong are taking a sharp toll on an economy already hit by the US-China trade war. Here's a round-up of the mounting problems for the city's economy and the businesses operating there.

### MARKETS AND ECONOMY

↓ **US\$622b**

**Stock market losses** since July 2.

↓ **12%**

**Plunge in Hang Seng Index** since July 2.

↓ **0%**

**GDP growth** forecast by DBS for 2019.

### RETAIL AND TOURISM

↓ **27%**

**Plunge in Switzerland's exports of watches** to Hong Kong in June.

↓ **30-50%**

**Estimated drop in foreign visitors to stores in June.** Brands like Prada, Ralph Lauren and Levi Strauss see sales drop amid unrest.

↓ **3.5%**

**Fall in Macau casino revenue** in July amid protests, fears of crackdown on junkies.

### TRANSPORT

↓ **19%**

**Slump in subway operator MTR Corp's share price** since mid-July.

↓ **200**

**Flights cancelled by Cathay** during airport shutdown on Aug 12.

↓ **20%**

**Plunge in Cathay's stock** since mid-July.

### PROPERTY

↓ **10%**

**The drop in housing prices** Bank of America expects to see from the June peak. Firm expects government to propose bolder measures on land supply.

↓ **17%**

**Decrease in the main index of property stocks** since early July.

↓ **20%**

**Drop in share price of Sun Hung Kai** since mid-July, Hong Kong's largest developer by market value.

### TYCOONS

↓ **20%**

**Drop in the net worth of Henry Cheng**, chairman of jeweller Chow Tai Fook, and property developer New World Development.

↓ **12%**

**Fall in wealth of Li Ka Shing**, Hong Kong's richest man.

↓ **13%**

**Decline in fortune of Lee Shau Kee**, founder of real estate conglomerate Henderson Land.

### IPOs AND DEALS

↓ **38%**

**The slump in volume of follow-on share offerings** since the start of June compared with a year earlier.

↓ **74%**

**Hong Kong IPOs** since the start of June have raised US\$5.15 billion, down 74% from US\$19.63 billion a year earlier.

↓ **1**

**The number of IPOs** over US\$1 billion since June. The volume of deals is often low this time of year, but more than half of the summer's new listings are trading below their offer prices.

NOTE: Data relevant as of Aug 19

Source: BLOOMBERG STRAITS TIMES GRAPHICS

For now, the central government is using tough rhetoric to deter Hong Kong's pro-democracy camp, said Prof Li.

But Professor Steve Tsang, director of the SOAS China Institute in London, said this could change if either the party or Mr Xi's authority is being directly challenged.

"If and when (Mr Xi) sees that as for real, he will deploy whatever forces required, regardless of what the rest of the world may think or say," said Prof Tsang. **ST**

In the 12th consecutive week of protests, water cannons were deployed for the first time and multiple volleys of tear gas were launched in running skirmishes with protesters.

PHOTO: BLOOMBERG





*Inside Asean*

# Sea change for Batam, Bintan and surrounding islands thanks to upcoming bridge

7km sea bridge coming up in Riau Islands set  
to bring growth to 'forgotten' villages

Barelang Bridge, which connects the islands of Batam, Rempang and Galang in Riau Islands province. Separately, the 7km sea bridge set to take shape next year will link Batam and Bintan and pass through Tanjung Sauh and Buau in between. When completed in three to four years, it will be Indonesia's longest. ST PHOTO: KELVIN CHNG



A low-angle photograph of a cable-stayed bridge. Several thick black cables fan out from a central point on the left towards the right. In the lower foreground, a person wearing a red shirt and a white hard hat is riding a motorcycle on the bridge deck. The sky is a clear, bright blue.

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**ARLINA ARSHAD AND KELVIN CHNG**

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BATAM AND BINTAN, THE POPULAR INDONESIAN resort islands near Singapore, are buzzing with new developments ranging from beachfront villas to a technology park, but in the surrounding smaller islands, time seems to have stood still.

Bearing nondescript names such as Tanjung Sauh, Buau and Ngenang, there are no buses, cars, hospitals or grocery stores in these places, not even the ubiquitous street carts selling cheap gorengan, or fried snacks.

### **AT A STANDSTILL**

**We have been spectators all our lives,  
watching Bintan and Batam grow.  
But there's nothing for us, we can only  
bite our fingers in disappointment.**

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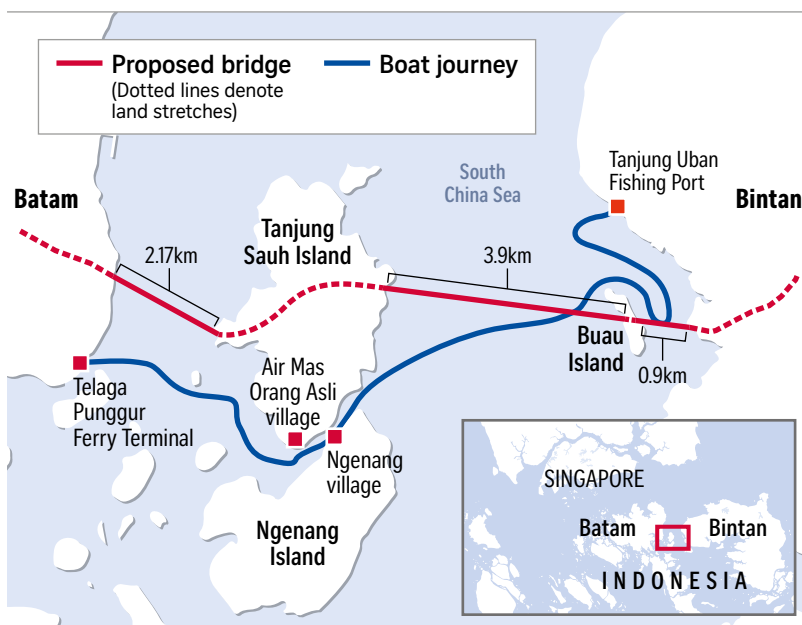
– **MR RAJA AZMAN**, chief of Ngenang village, where residents still draw water from wells and pump electricity from generators, while many of their children row boats to school.



Vocational students training at steel pipe firm Dwi Sumber Arca Waja. Firms in Batam are providing training to get these students ready to work – in line with President Joko Widodo's vow to raise the vocational skills of Indonesia's young workers. ST PHOTO: KELVIN CHNG

## Connecting the islands

The Straits Times travelled to Batam, Bintan and the surrounding islands on a traditional wooden boat, locally known as a "pompong", to find out how a proposed 7km sea bridge will serve the residents.



Source: BP BATAM STRAITS TIMES GRAPHICS

Many villagers still draw water from wells and pump electricity from generators, while many of their children row boats to school.

"We have been spectators all our lives, watching Bintan and Batam grow. But there's nothing for us, we can only bite our fingers in disappointment," Ngenang village chief Raja Azman told The Straits Times.

But change is on the cards, with a 7km sea bridge expected to take shape next year, linking Batam and Bintan and passing through Tanjung Sauh and Buau in between. When completed in three to four years, it will be the longest in Indonesia.

Estimated to cost up to four trillion rupiah (\$\$390 million) to build, the bridge is part of President Joko Widodo's grand infrastructure plan to improve connectivity in the sprawling Riau Islands province, boost sluggish growth in Bintan, and explore more trade cooperation with Singapore, which is only a ferry ride away.

Mr Edy Putra Irawady, chief of BP Batam, the state agency overseeing free trade in Batam, said the Public Works and Public Housing Ministry is finalising the bridge design. He hopes that the smaller islands will be able to catch up in growth and also enjoy economic prosperity.

"Singapore and Batam, together with the surrounding areas, are like a clump of bamboo trees, whereby every and each bamboo grows and develops together, achieving relatively similar height," he said.



## LACK OF DEVELOPMENT

In the Riau Islands, people typically get around by diesel-powered traditional wooden boats known as pompong. Often overloaded and unequipped with life jackets, it is not uncommon for them to capsize.

Those who need to see a doctor or shop for clothes and food staples often have to brave high waves and strong winds to make the 20-minute crossing to Batam to the west or Bintan to the east.

Islanders told The Straits Times – which visited the area on a pompong last month – that the proposed bridge would allow for safer and faster land travel, bring modern amenities, and create jobs in growth industries such as digital technology and tourism.

“We are the forgotten people,” said Ms Ramdia, 23, lamenting the slow pace of development in the indigenous Orang Asli enclave known as Air Mas on the southern tip of Tanjung Sauh. She also knows all about the horrors of sea travel.

She recalled having to row a small boat for 45 minutes every day to go to school in Galang, a more developed island nearby. “With or without storm, I would go. If I kept worrying about danger, I would never have got a proper education.”

Her pregnant sister had died in labour last year as the boat taking her to a hospital in Batam was stuck in mud due to low tide.

Ms Ramdia, who goes by only one name, got another scare early this year when her father fainted from a gout attack and had to be rushed to Batam for medical attention.

“We had to carry him onto the boat and luckily he survived the journey. With a bridge, we could have easily taken a car or motorcycle to Batam,” she said.

Meanwhile, in Ngenang village across from Tanjung Sauh, 34-year-old fisherman La Ode Utumudin made history last year for being the first islander to own a four-wheeled vehicle. He recalled how the villagers clapped and cheered when they saw his second-hand Suzuki Carry van balancing precariously on a bamboo raft as it was towed by two pompong from Batam. He had painted the van bright yellow and now uses it to ferry housewives to the market and children to school.

“They no longer have to walk in the rain. I’m doing my bit to bring progress,” he said.

From Ngenang, The Straits Times headed to Buau, a tiny uninhabited forest islet near Bintan. Large tankers and fishing vessels dotted the waters but no village was seen along the coast.

Boatman Rudi warned: “Strong currents here, we can’t stop or slow down or we will capsize.”

## ECONOMY HUB AND AIRCRAFT REPAIR AND MAINTENANCE

As the smaller islands struggle to get out of poverty, big plans are in the works for Batam and Bintan.

Mr Edy said his agency has proposed that the central government in Jakarta grant enhanced



Nuvasa Bay, a township development in Batam with an 18-hole international golf course. Plans are being made to turn the area into an integrated luxury residential and mixed-use development. It will become part of a 62ha “economy hub”. ST PHOTO: KELVIN CHNG

special economic zone status to three clusters on Batam, offering bigger tax breaks for businesses, including those in Singapore, as well as income tax relief for workers.

The three clusters are Nongsa Digital Park, Hang Nadim airport and Sekupang, which will be dedicated to digital economy, aircraft maintenance and healthcare services, respectively. Mr Edy hopes the decision will be made in October, when the new government led by Mr Joko is installed.

The tech park, which opened in March last year with the aim of being a “digital bridge” between Indonesia and Singapore, today boasts 750 tech workers and 70 international and local firms, including the Apple Developer Academy @ Infinite Learning due to open next March.

Dr Beh Swan Gin, chairman of the Singapore Economic Development Board, said Singapore-based

Ms Ramdia, from the Orang Asli village of Air Mas in Tanjung Sauh, knows all about the horrors of sea travel. She used to row a small boat like this for 45 minutes every day to go to school in Galang, a more developed island nearby. ST PHOTO: KELVIN CHNG



## CONNECTIVITY CRUCIAL

**We had to carry him onto the boat and luckily he survived the journey. With a bridge, we could have easily taken a car or motorcycle to Batam.**

”

– MS RAMDIA, a resident of Tanjung Sauh, who got a scare this year when her father fainted from a gout attack and had to be rushed to Batam for medical attention.





## SYNERGY

**Our overall design ethos is really about seeding a new tech community within the existing ecological context of Nongsa, and in the process synergising a new environment whereby people, business and nature come together in a unique setting.**



– **MR MARCO BARDELLI**, executive director of Nongsa Digital Park, on a 62ha “economy hub” which will be three times the size of the Singapore Zoo.

Air Mas village, an indigenous Orang Asli enclave on the southern tip of Tanjung Sauh island in Indonesia's Riau Islands province. It is one of the smaller islands surrounding the popular Indonesian resort islands of Batam and Bintan that do not have buses, cars, hospitals or grocery stores. There is hope that when the 7km sea bridge improves connectivity in the province, the smaller islands will be able to catch up in growth and also enjoy economic prosperity. ST PHOTO: **KELVIN CHNG**

firms could tap the fast-growing tech workforce in Indonesia while maintaining close proximity to their operations in Singapore, enabling “both countries to grow their technology sectors in a win-win manner”

Now, a 62ha “economy hub” three times the size of the Singapore Zoo is being developed in a joint venture by Indonesian conglomerates Sinar Mas Land and Citramas Group. Due to be completed in 2025, the hub will have digital industries as well as luxury residences, hotels and retail businesses. Asia-based urban and infrastructure consultancy group Surbana Jurong has been appointed the hub's master planner.

Mr Marco Bardelli, executive director of Nongsa Digital Park, which will be part of the hub, said: “Our overall design ethos is really about seeding a new tech community within the existing ecological context of Nongsa, and in the process synergising a new environment whereby people, business and nature come together in a unique setting.”

Another emerging industry is aircraft maintenance, repair and overhaul (MRO), for which Indonesian Foreign Minister Retno Marsudi is hoping for cooperation with Singapore. Separately, Reuters, in a Jan 17 report, said Garuda Indonesia and Lion Air Group were exploring an MRO joint venture in maintaining aircraft, engines, components and tyre retread.

Going into his second term, President Joko – or Jokowi as he is popularly known – has vowed to cut red tape hampering investments and raise the vocational skills of Indonesia's youth, which businesses say are still not on a par with those in India, Vietnam and the Philippines.

Batam Polytechnic has sent its teachers for training in information and communications

technology at several polytechnics in Singapore, its director Priyono Eko Sanyoto said, adding: “Companies trust Singapore polytechnics to work on research and development projects. Hopefully, our students will get such opportunities too.”

Firms in Batam are also providing training to get vocational students ready to work. Muhammad Hanafi, 17, who is undergoing an industrial attachment with steel pipe company Dwi Sumber Arca Waja, said he not only learnt welding from experts but also picked up English language skills.

“The foreign bosses and visitors speak English, how could I communicate with them? So I force myself to use English when I play online games,” he said.

As a leaders' retreat between Mr Joko and Singapore Prime Minister Lee Hsien Loong is set to be held in Singapore this year, the business community is excited about new agreements and joint projects, which have traditionally been borne out of these informal annual meetings.

ISEAS – Yusof Ishak Institute senior fellow Siwage Dharma Negara said: “It is good news for our bilateral relations. Jokowi and PM Lee have good chemistry.” **ST**

Fisherman La Ode Utumudin from Ngenang village with the second-hand Suzuki Carry he got last year, becoming the first on his island to own a four-wheeled vehicle. He now uses it to ferry housewives to the market and children to school. ST PHOTO: **KELVIN CHNG**







## Special Report

# Nations race to put infrastructure in place ahead of SEA Games

## Spotlight on e-sports' debut at region's biennial event

E-SPORTS' DEBUT AT THIS YEAR'S SEA GAMES (Nov 30 - Dec 11) has put the spotlight on the sports' budding national infrastructures in South-east Asia, with several countries in the region making key strides lately.

In November, the Malaysian federal government announced it would be allocating RM10 million (\$3.3 million) from its 2019 Budget to e-sports.

The move prompted Singapore gaming hardware company Razer to invest a matching amount, for Malaysia.

Malaysian e-sports marketing agency The Gaming Company has been roped in to organise national qualifiers alongside the national e-sports association and the national sports agency.

Qualifiers for the five SEA Games titles, beginning at the state level, have mostly been completed.

Mr Adrian Gaffor, managing director at The Gaming Company, said: "We sit in and help plan the qualifying framework for them, the rule sets (for each game) and regulations."

The players selected for the country's SEA Games team will be treated as national athletes, with all the perks enjoyed by their counterparts in other sports, such as allowances and accommodation.

Under Malaysia's monthly allowance scheme, for example, a SEA Games gold medallist gets RM2,000.

In Thailand, the e-sports industry is worth more than 10 billion baht (\$450 million) today, according to Thailand's Digital Economy Promotion Agency.

The Thai government believes that e-sports can be used to drive tourism.

Mr Siripakorn Cheawsamoot, deputy governor for digitalisation, research and development at the Tourism Authority of Thailand, said: "Thailand's key challenge today is about attracting first-time tourists from the younger generation.

"A lot of young people are playing games today and we want to engage them through digital content in games that promote Thai culture.

"You could add a tuk-tuk into a racing game or create racing tracks with Thai cultural landmarks."

Philippine officials said in July that the 9,450ha New Clark City venue, where the SEA Games will be held for this year's games, is nearly complete. Its Athletes' Village will be ready for occupancy by end-August, said president of MTD Philippines, Mr Patrick Nicholas David.

Clark will house an expected 3,000 athletes and feature a 13 billion-peso (\$350 million) sports

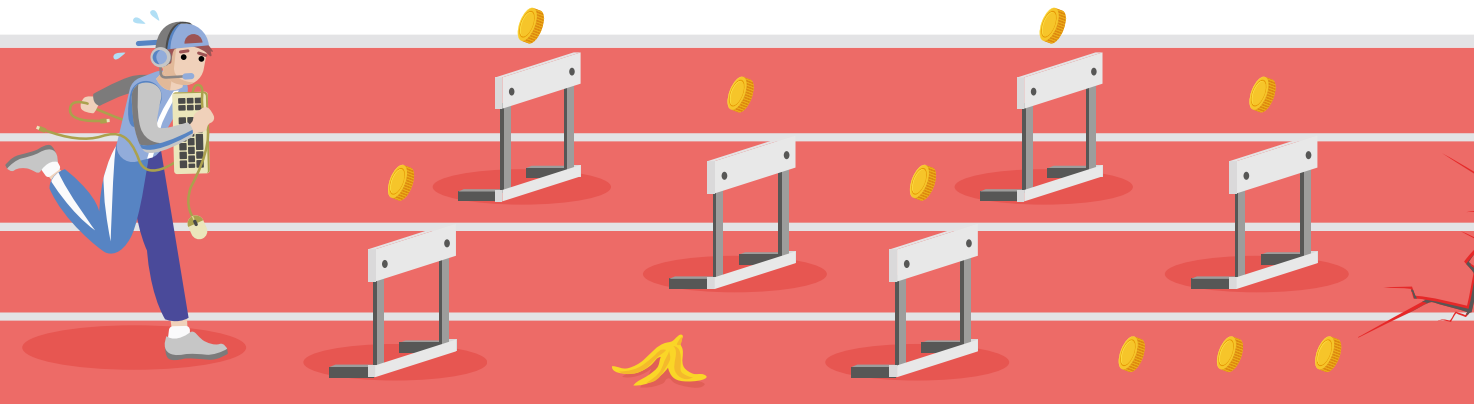
Large crowds soaking in the action for mobile game Arena of Valor at the Garena World e-sports tournament held at the Bangkok International Trade and Exhibition Center on April 7, 2019.  
PHOTO: GARENA

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## CURRENT MARKET

PC and mobile games revenues generated in 2017:

**US\$2.2 billion**  
(S\$3 billion)

End of 2018: Asia-Pacific accumulated over

**US\$66.2 billion**  
(S\$91.6 billion)  
or 49% of the world's gaming and esports revenues.

hub designed by Singapore consulting firm Surbana Jurong.

This year's SEA Games will feature six e-sports game titles, namely: Dota 2 and Starcraft II (PC), Tekken 7 (console), Arena of Valor (AOV) and Mobile Legends (mobile) and Hearthstone (mobile/PC).

Singapore's SEA Games e-sports contingent is likely to be 18-strong. Sixteen players were confirmed on Aug 1 while the last two are pending approval by the Singapore National Olympic Council.

The Dota 2 team from Singapore will join regional counterparts at an e-sports bootcamp organised by Razer from Sept 1-3, where they will be trained by star players from Evil Geniuses, one of the top three Dota 2 teams in the world.

As Singapore gets ready to send a contingent of players to the Philippines to compete for the first e-sports SEA Games medals, the main hurdles it faces are infrastructure, funding, e-sports' lingering image problem and governance.

Unlike most National Sports Associations (NSAs), the Singapore Esports Association (SGEA) is not receiving government funding at this point as it has not attained charity status in order to be eligible for funding.

Furthermore, e-sports in Singapore has yet to fully untangle itself from being associated with the negative aspects of gaming culture, posing as e-sports' biggest challenge at the moment, said SGEA president Ng Chong Geng.

The association, formed last November, is working closely with sponsor Singtel and SEA Games official e-sports partner Razer to provide support

## POTENTIAL BY 2022

Estimated revenue:

**US\$1.8 billion**  
(S\$2.4 billion)

Audience size: Grow by 14%

E-sports to reach:

**645 million people.**

such as training facilities and sparring partners, Mr Ng told The Straits Times.

Vietnam, meanwhile, is preparing to position itself as a strong contender and potential representative for the e-sports competition at the SEA Games. Team Flash AOV Vietnam is the first e-sports team in Vietnam to be crowned the world champion for the AOV/Lien Quan mobile e-sports competition.

Terence Ting, CEO of Team Flash from Singapore, said: "Considering that Vietnam has just been crowned World Champions which includes the wider APAC region and even North America, I believe Vietnam will be the favourite going into the SEA games, provided we keep up the form and momentum from our AWC (World Cup 2019) win." [ST](#)

- Additional reporting by Nicole Chia, Raul Dancel, Manila Standard and Vietnam News

## Singapore to host Asian edition of gaming festival

IN AN EPIC WIN FOR THE VIDEO GAMING AND e-sports scene here, Singapore will play host to the first Asian edition of the world's largest gaming festival, gamescom.

To be held from Oct 15 to 18, gamescom asia will consist of a two-day industry gaming conference

and a three-day trade and public exhibition.

It will include e-sports events, a showcase of emerging technologies in video games, as well as gaming workshops, meet-and-greet sessions and cosplay theatrics.

Visitors can also look forward to a launch of



# Razer has eye on growing e-sports in region

WHAT HAS RAZER, THE OFFICIAL E-SPORTS partner for the SEA Games, been up to here?

Much excitement was generated in November when its chief executive Tan Min-Liang announced it would match the Malaysian government's RM10 million (\$3.3 million) investment into the country's e-sports.

However, people who work in the gaming industry in Singapore questioned why an equivalent investment had not been made for Singapore e-sports.

Responding to The Straits Times' queries, Razer's global e-sports director David Tse said the company "equally supports every SEA Games country, (according to) each country's unique nature."

He said Razer provides financial support and product support in the form of gaming products for national qualifiers.

He also pointed to the gaming hardware company's ongoing efforts to bring the various national sports associations and games publishers to the same table to hash out scheduling and the presentation of each of the five SEA Games titles, among other issues.


"I think the bigger picture we should talk about is how Razer is getting into the nitty-



Tan Min-Liang, co-founder, CEO and creative director of gaming hardware company, Razer Inc. Much excitement was generated when Mr Tan announced Razer would match the Malaysian government's RM10 million investment into the country's e-sports. ST PHOTO: DESMOND FOO

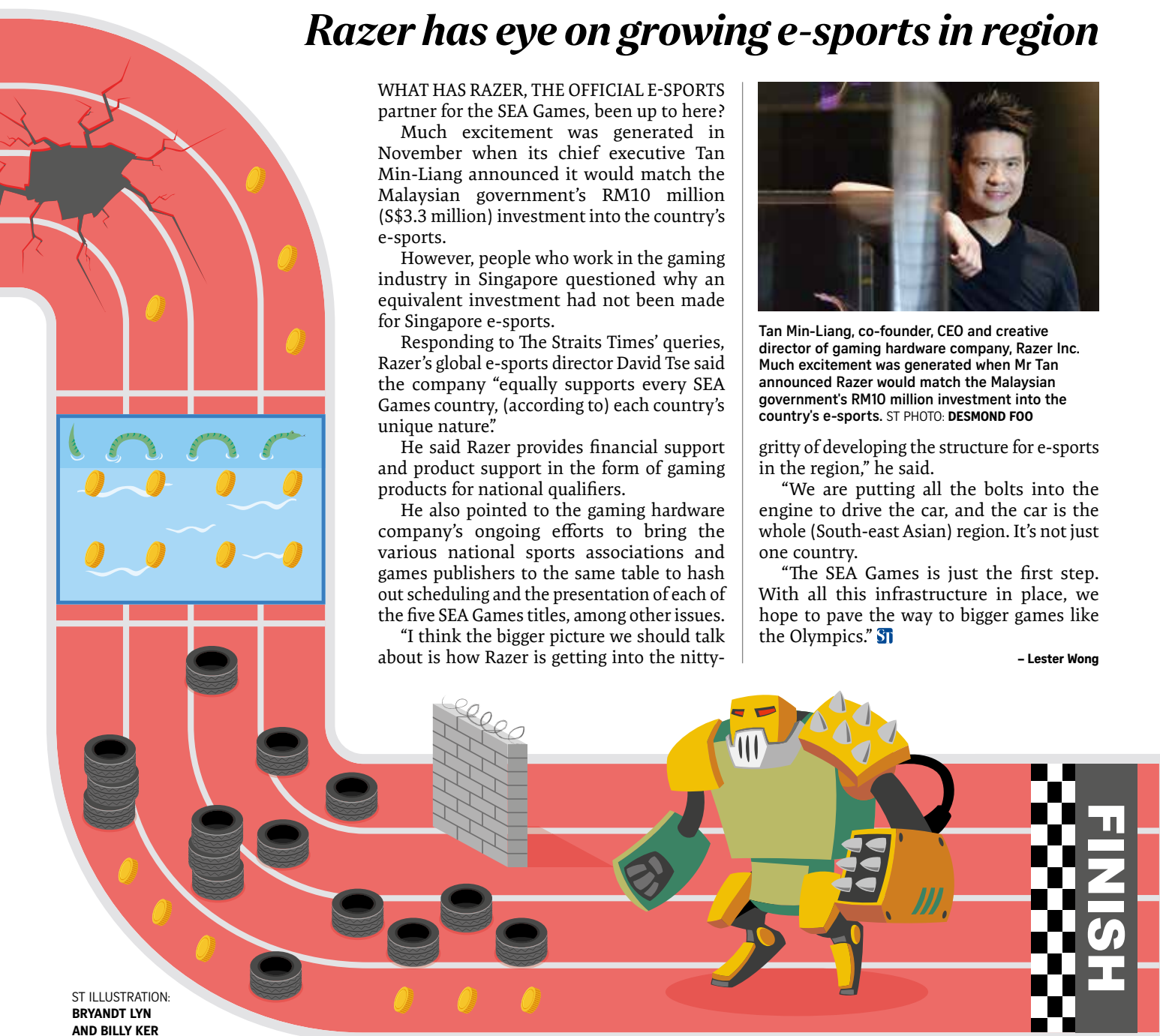
gritty of developing the structure for e-sports in the region," he said.

"We are putting all the bolts into the engine to drive the car, and the car is the whole (South-east Asian) region. It's not just one country.

"The SEA Games is just the first step. With all this infrastructure in place, we hope to pave the way to bigger games like the Olympics." 

– Lester Wong

ST ILLUSTRATION:  
BRYANDT LYN  
AND BILLY KER



global titles and an extensive showcase of gaming-related offerings.

Held in Cologne, Germany, yearly since 2009, gamescom is one of the highlights of the gaming world.

Sponsored by the Association for the German Games Industry, it is the industry's largest event measured by exhibition space and number of visitors, with 370,000 visitors and 1,037 exhibitors from 56 countries attending last year. 

– Hariz Baharudin

German Chancellor Angela Merkel posing for a photo with a gamescon robot figure during her government's Open Door Day in Berlin on Aug 18.

PHOTO: REUTERS

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THE STRAITS TIMES

# Asian Insider

MONDAY, JAN 17 2019



## 1 | Crunch time for Jokowi



By all accounts, Indonesian President Joko Widodo should win the upcoming presidential elections: He [holds a big lead in the polls](#) in his rematch with challenger Prabowo Subianto and enjoys the built-in advantages of incumbency.

## 2 | Trade woes



There was a bloodbath in December 2018. This week, as economies around the region total up the numbers for last month, many are finding export figures well below expectations.

## 3 | The wait goes on for Thai polls







## Lifestyle

# Asian faces and their ageing advantage

With ageing filters all the rage, here is a look at why some people age better than others

FACEAPP, WHICH USES AGEING FILTERS TO predict how one might look in the future, may have raised privacy concerns, but some users are more alarmed about how old the app makes them look.

Recent allegations of data theft by the artificial intelligence that powers the app have overtaken the #faceappchallenge in August, when thousands worldwide posted geriatric photos of themselves on social media. The app, which is made by a Russian company, can also edit photos to show users younger versions of their faces.

One user, Mr Andrew Yeo, 41, says it was a shock to be presented with his grey-haired future self.

"It was very ugly. I had so many wrinkles," says the pastor, adding that confidentiality complaints are common, not only for FaceApp, but also for other online platforms.

"Maybe FaceApp isn't complimentary for Asians. My Caucasian friends looked nice on the app."

While physicians and plastic surgeons interviewed by The Straits Times were divided on the accuracy of FaceApp, which uses an algorithm to approximate ageing, the face-editing app raises the question of why some might age worse than others.

Doctors say that Asians generally age better than most others.

This is due to a combination of biological and cultural factors, ranging from skin type to face shape to beauty ideals that are widely held.

Plastic surgeon Por Yong Chen, medical director of Dream Aesthetics and Plastic Surgery, says: "As Orientals, we don't age as much. Our dermis is thicker so we don't wrinkle as much as Caucasians, for instance. The thicker the dermis, the more collagen and elastic fibres available."

The dermis is a section of skin that lies below the epidermis, the outer layer of skin that protects it against the environment.

Collagen and elastin, proteins that can be found in the dermis, offer support and elasticity, and stave

PHOTOS: ISTOCKPHOTO,  
FACEAPP

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off fine lines and wrinkles. The body's ability to produce collagen reduces with age, contributing to wrinkles and skin dryness.

While ageing is a complex process – taking into account genetics, hormonal changes like menopause, and other individual factors – many aspects of growing old are universal.

Bone resorption, or bone loss, for instance, causes people's facial structure to look more hollow, especially in the cheeks and near the eyes. Facial tissues sag and jowls form because of this reduction in structural support. People lose facial fullness and volume as fat pads shrink.

Plumpness can be a good thing when it comes

to ageing.

The look of youth is “volume and fullness,” says Dr Lee Hanjing, a plastic surgeon at National University Hospital's division of plastic, reconstructive and aesthetic surgery.

The amount of the pigment melanin in Asian skin provides better protection against sun damage, a major factor in ageing.

An “obsession with protection against the sun” and aspirational standards of fair skin among many Asians lead to better sun protection or avoidance, which is anti-ageing, says Dr Kevin Chua, a physician at Drs Chua and Partners, who has an interest in aesthetics.

Singapore-based South Korean actress Jin Yinji in her younger days (left), on FaceApp (centre) and currently (right).

PHOTOS: AGENCE FRANCE-PRESSE, EPA-EFE, ST FILE



## *How accurate is FaceApp's ageing filter?*

FAT AND BONE ARE CRUCIAL FACTORS TO consider when it comes to ageing.

Bone resorption, or bone loss, occurs in specific areas, says Dr Lee Hanjing, a plastic surgeon at National University Hospital's division of plastic, reconstructive and aesthetic surgery.

Loss of fat in the face can cause areas such as the cheeks to lose volume, thus reducing one's youthful appearance.

As one ages, the skin becomes thinner, loses elasticity and suppleness, and starts to sag. The

lower part of the face starts to widen as jowls develop.

Expressiveness – like the habitual raising of eyebrows in an animated conversation – contributes to ageing because wrinkles in the forehead can develop as a result.

But caution is advised for those who choose plastic surgery. Ms Annelise Lai, a clinical psychologist at Resilienz Clinic, says that while some see it as “self-investment”, others may chase an unrealistic ideal of anti-ageing. [S1](#)

Indian actor Anil Kapoor in his younger days (left), on FaceApp (centre) and currently (right).

PHOTOS: AGENCE FRANCE-PRESSE, EPA-EFE, ST FILE





While Asian skin affords a certain protection against rapid ageing, its propensity for pigmentation issues, compared with other ethnicities, is one reason FaceApp is not entirely accurate, according to NUH's Dr Lee.

"Ageing is a process that will cause certain predictable features to develop, thus FaceApp can, to a certain degree, place features like wrinkles at specific locations to simulate the appearance of ageing. This is similar to make-up that make-up artists use to create an aged appearance in actors," says Dr Lee.

"But some aspects of ageing will not be accurately depicted by FaceApp, such as the nature and location

of pigmentary changes, coarseness of skin and the degree of sagging."

Ageing is "multi-factorial", says plastic surgeon Woffles Wu.

"You cannot generalise it. An app doesn't take into account factors like sickness or weight gain or loss."

The good news is that lifestyle and other practices that affect ageing are under one's control.

Dr Chiam Chiak Teng, resident physician at Ensoul Medical Clinic, which provides aesthetic and anti-ageing treatments, says that getting enough sleep, eating a nutritious diet, managing stress well, skincare and beauty treatments, and not smoking, all play a role in ageing well. [ST](#)

## Inside the face

### UNDERNEATH YOUTHFUL SKIN

- **The facial muscles** situated within the subcutaneous tissue are responsible for providing different facial expressions.

- **The procerus muscle** helps to pull down the skin between the eyebrows. It can also contribute to an expression of anger. Wrinkles appear with over-use of this muscle.

- **Fat in the face** is evenly distributed when people are young, plumping up the forehead, temples, cheeks and areas around the eyes and mouth.

- **Full lips** are considered a sign of youthfulness. Age can bring on thinning lips and lines around the mouth.

### AS YOU AGE

- **Wrinkles form when facial muscles** continually tug at and eventually cause creases in the skin over time. Other folds may deepen because of the way fat decreases and moves around. Finer wrinkles are due to sun damage, smoking and natural degeneration.



- **Facial fat loses volume**, clumps up and shifts downwards. Features that were formerly rounded may sink and skin that was smooth and tight loosens and sags. Meanwhile, other parts of the face gain fat, particularly the lower half, so the skin tends to get baggy around the chin and saggy in the neck.

PHOTO: ISTOCKPHOTO  
SUNDAY TIMES GRAPHICS:  
MIKE M DIZON



## Big Picture

PHOTO: AGENCE FRANCE-PRESSE

# Desert sightseers find their oasis

IN SUMMER, THE DESERT DUNES OF CHINA'S north-western Gansu province are dotted with snaking queues of camel-riding tourists as they trek across the sand.

This photograph, taken in early August, shows the holidaymakers making their way towards the oasis town of Dunhuang, in Gansu.

Dunhuang, a Unesco World Heritage site, draws crowds every year for attractions such as the Mogao

caves, a collection of 492 Buddhist grottoes whose construction spans from the 4th century to the 14th century.

On the outskirts of Dunhuang is Yueya Spring, a naturally formed crescent-shaped lake that has existed for more than 2,000 years.

Day trips take tourists to the lake, as well as the Echoing-Sand Mountain, named for the sound made when the sands shift in the wind. [ST](#)



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