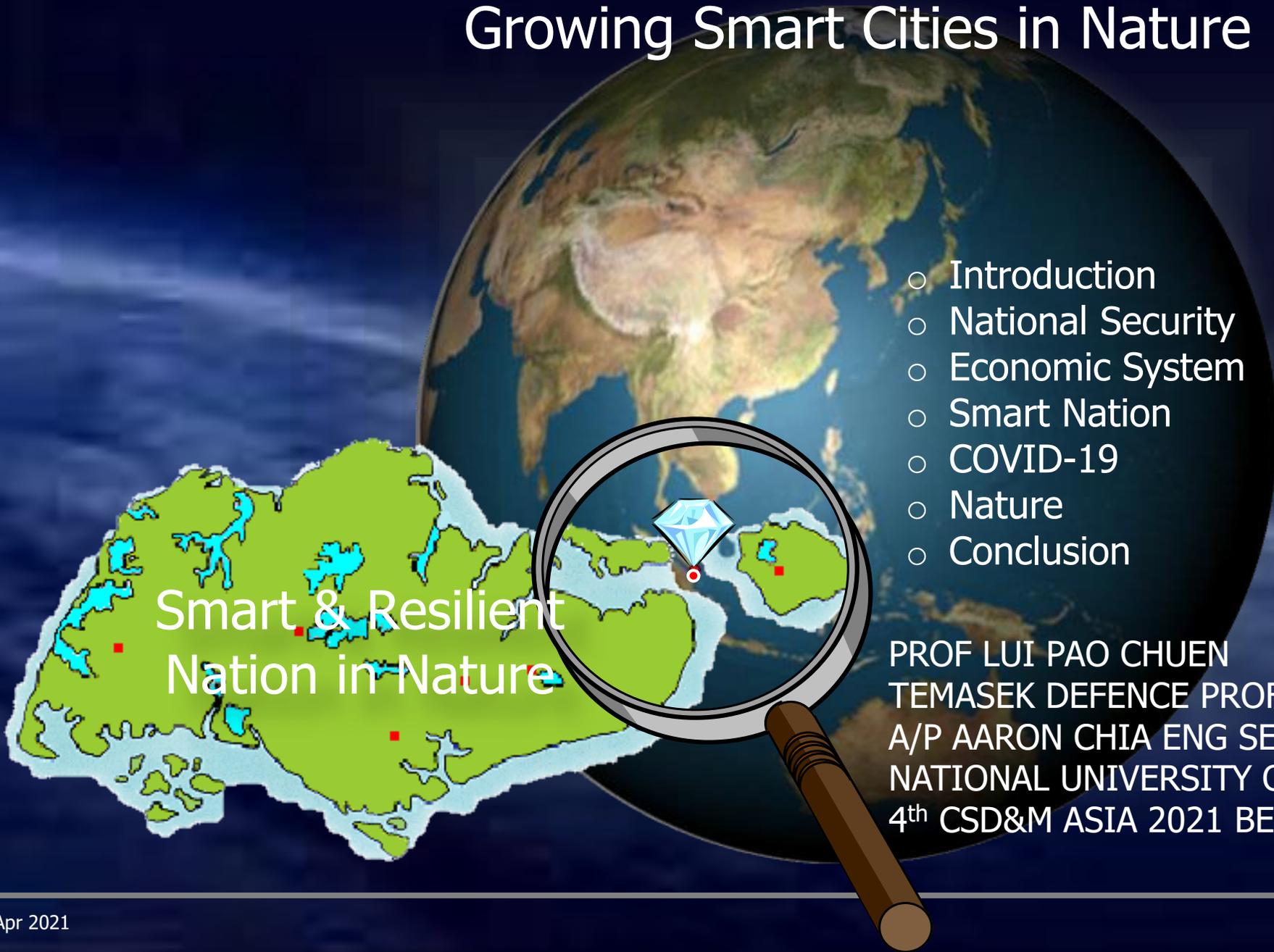


Growing Smart Cities in Nature

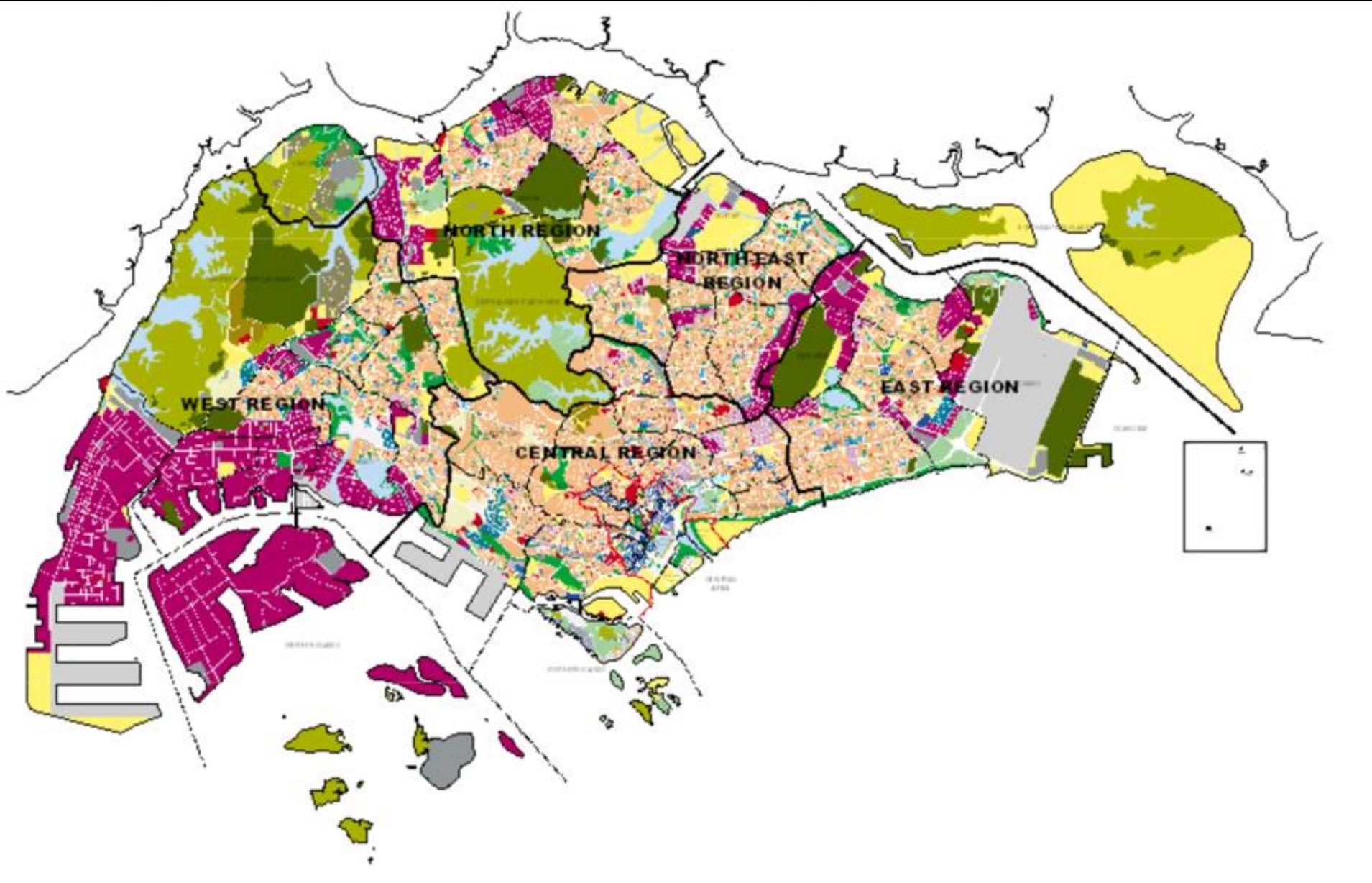
- Introduction
- National Security
- Economic System
- Smart Nation
- COVID-19
- Nature
- Conclusion



Smart & Resilient
Nation in Nature

PROF LUI PAO CHUEN
TEMASEK DEFENCE PROFESSOR and
A/P AARON CHIA ENG SENG
NATIONAL UNIVERSITY OF SINGAPORE
4th CSD&M ASIA 2021 BEIJING

Singapore's Physical Space



KARMAN LINE

↕ Air Space
↕ 100 Km

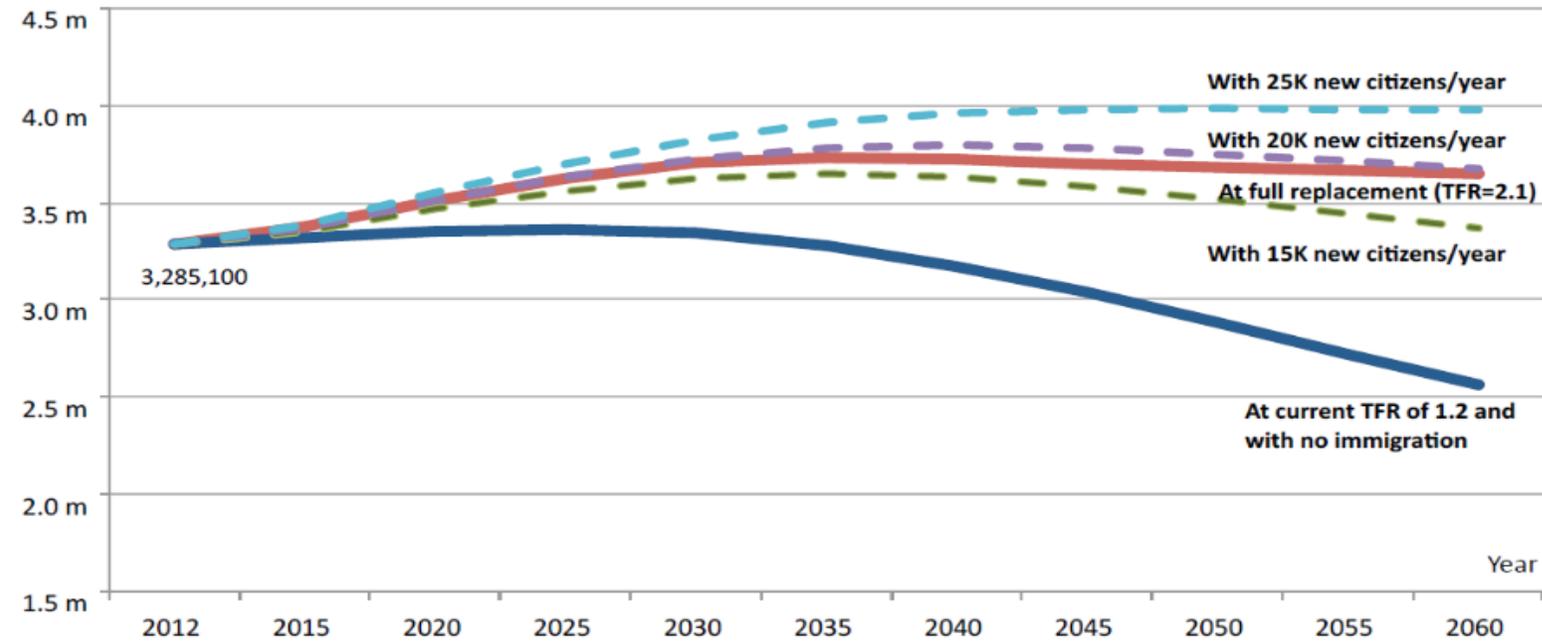
674 Sea
726 Land

Territory ~
1,400 sq. km

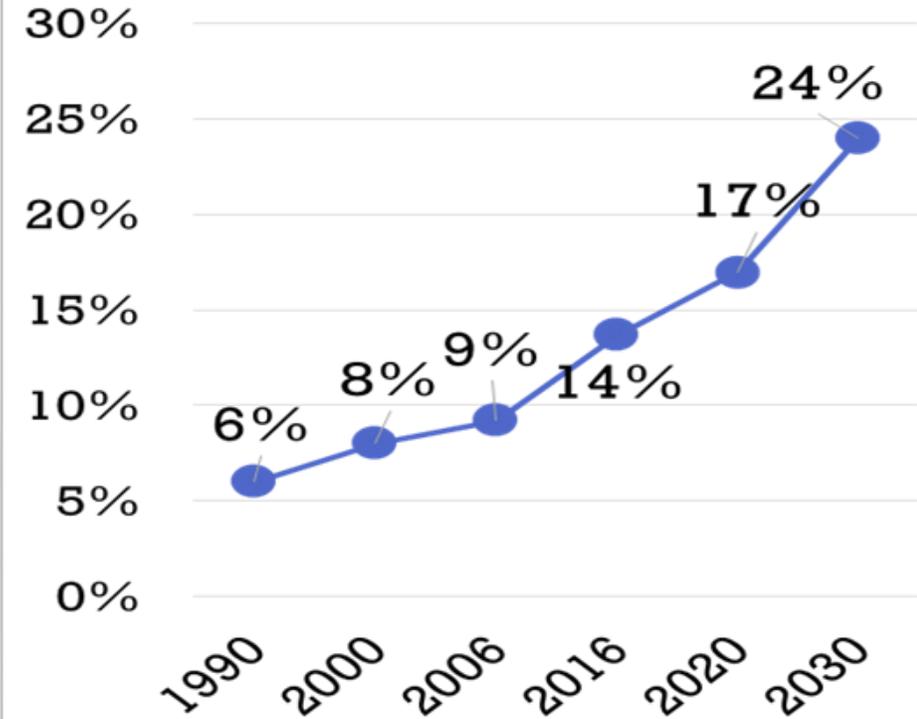
6378 km

Projected Demographic Changes To Singapore's Population

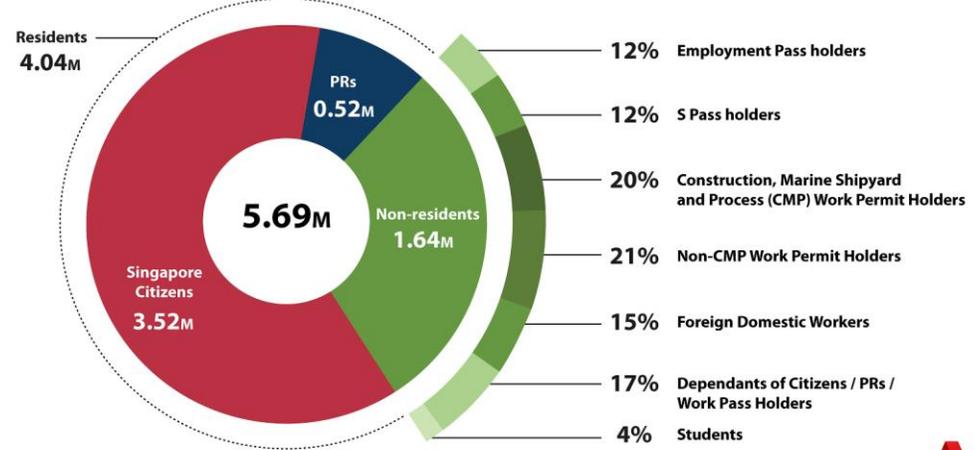
Citizen Population Size



Elderly as % of citizen population



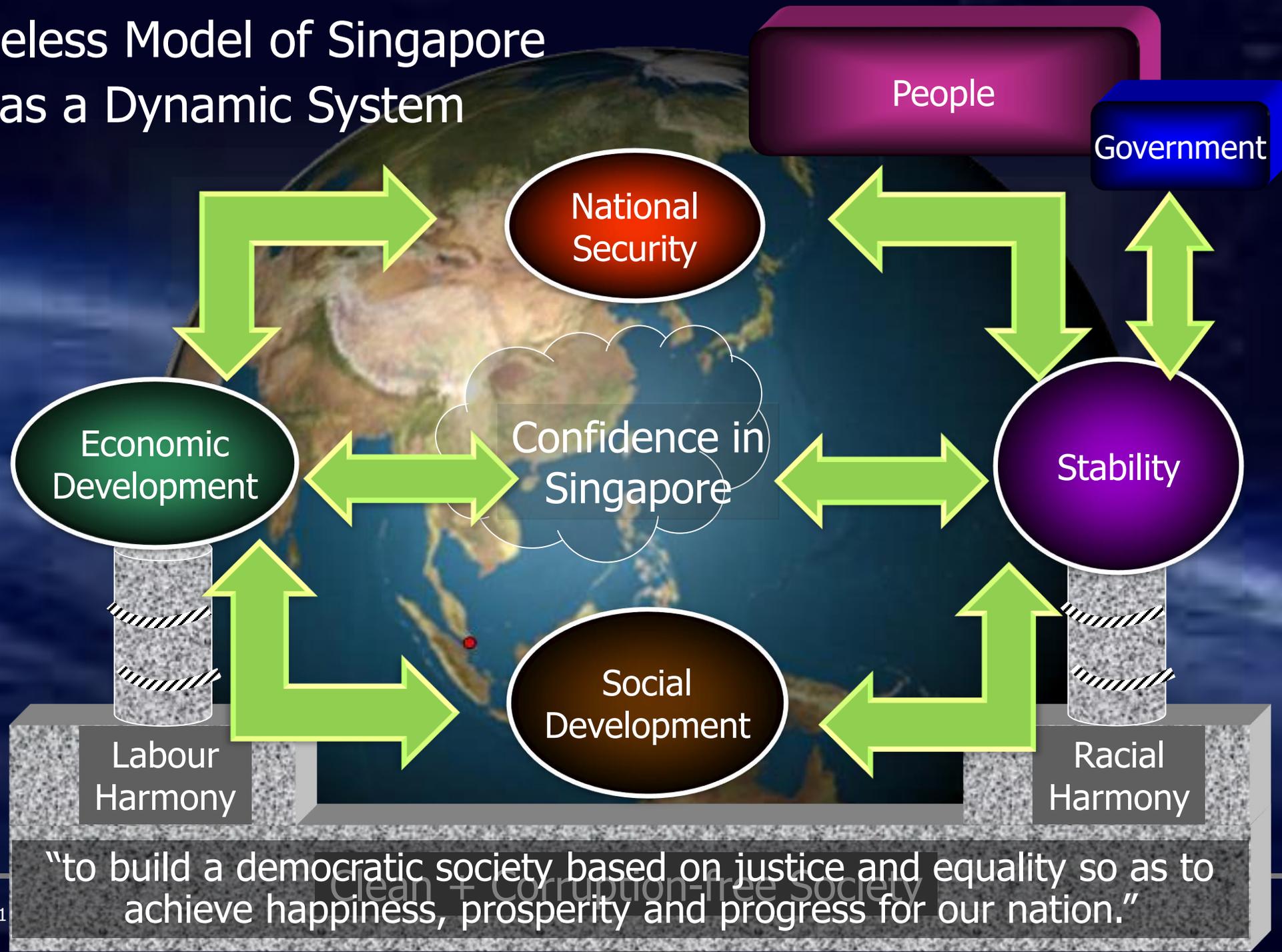
TOTAL POPULATION JUNE 2020



As of Jun 2020
 Infographic by Rafa Estrada Sources: Department of Statistics, Ministry of Manpower Numbers may not sum up due to rounding



Timeless Model of Singapore as a Dynamic System

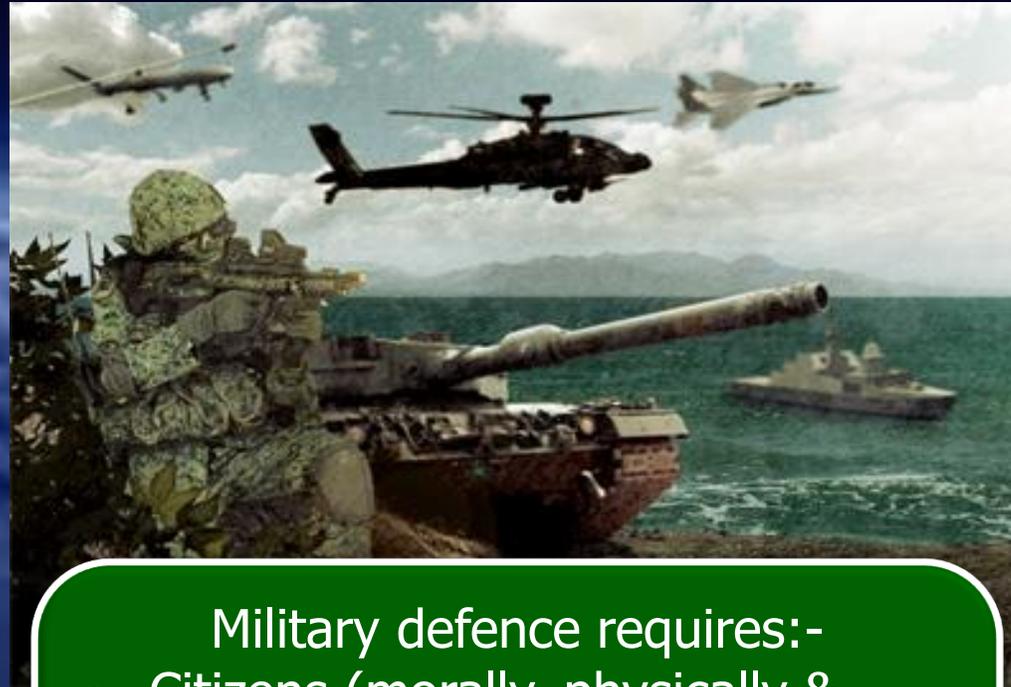
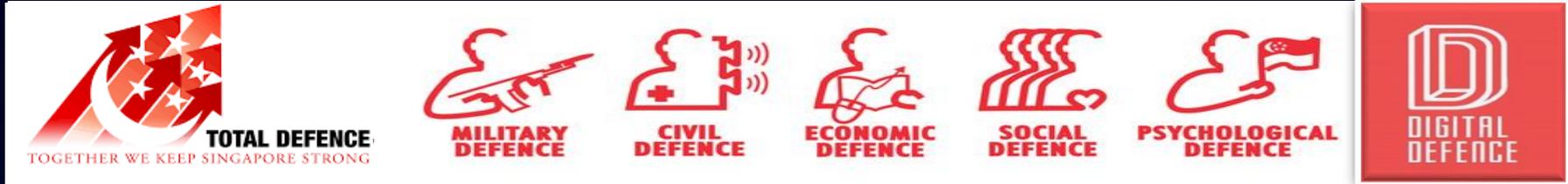


Singapore's Security is based on Total Defence

THREATS

- Military
- Terror
- Digital
- Water
- Energy
- Food
- Pandemic
- Climate Change

- Climate Change



Military defence requires:-

- Citizens (morally, physically & mentally strong)
- Leaders
- Money (US \$11B)
- Land (19% of Singapore land)



Climate Change Defences for Singapore



National Day Rally 2019

PM Lee Hsien Loong | 18 August 2019

“We should treat climate change defences like we treat the SAF – with utmost seriousness. Work steadily at it, maintain a stable budget year after year, keep your eye on the target and do it over many years and several generations.”

>\$100 B, Over 50 to 100 Years

Integration of Government Ministries & People: Whole of Nation Effort in the Development of Climate Change Defences



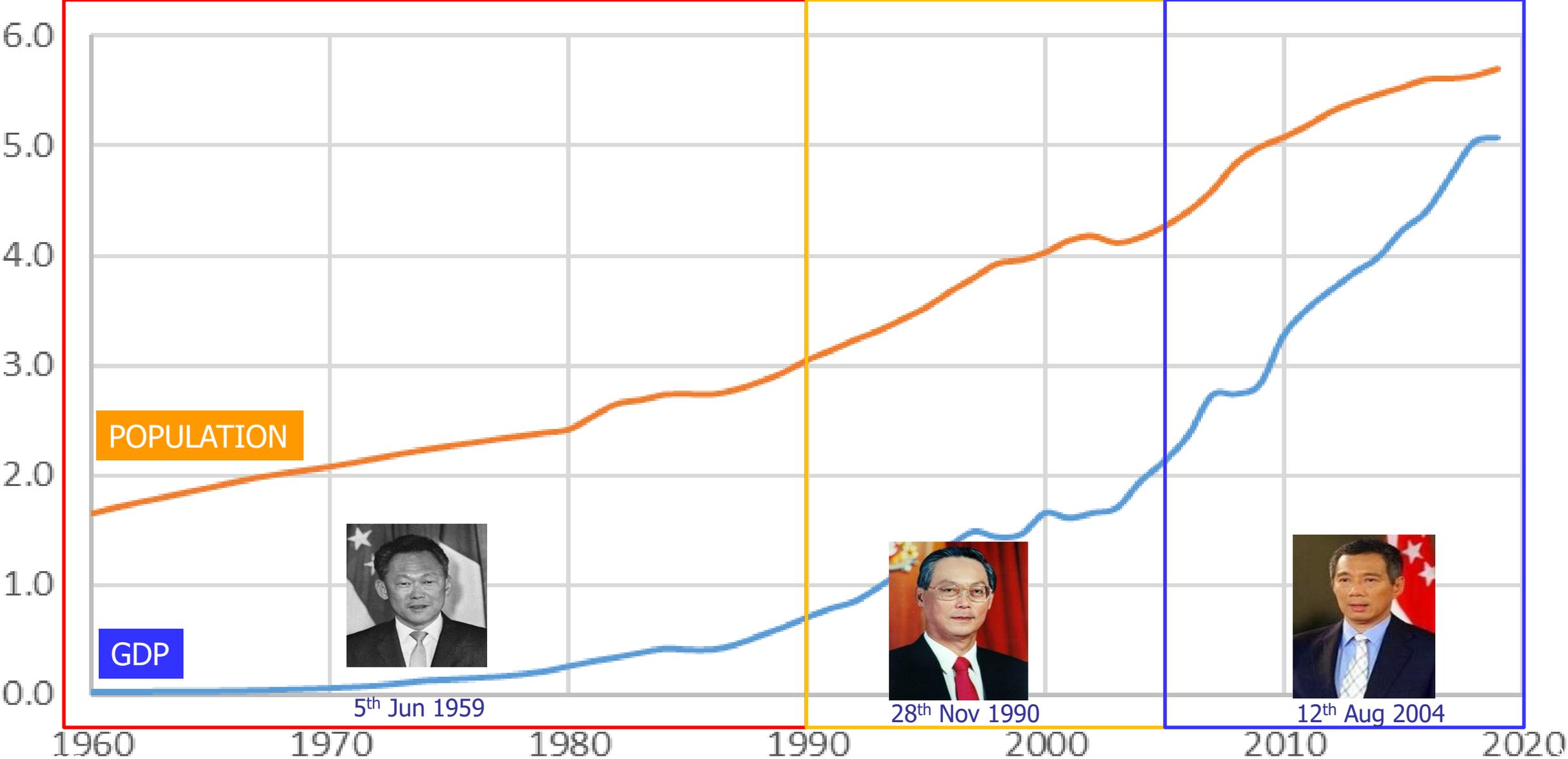


SG GREEN PLAN

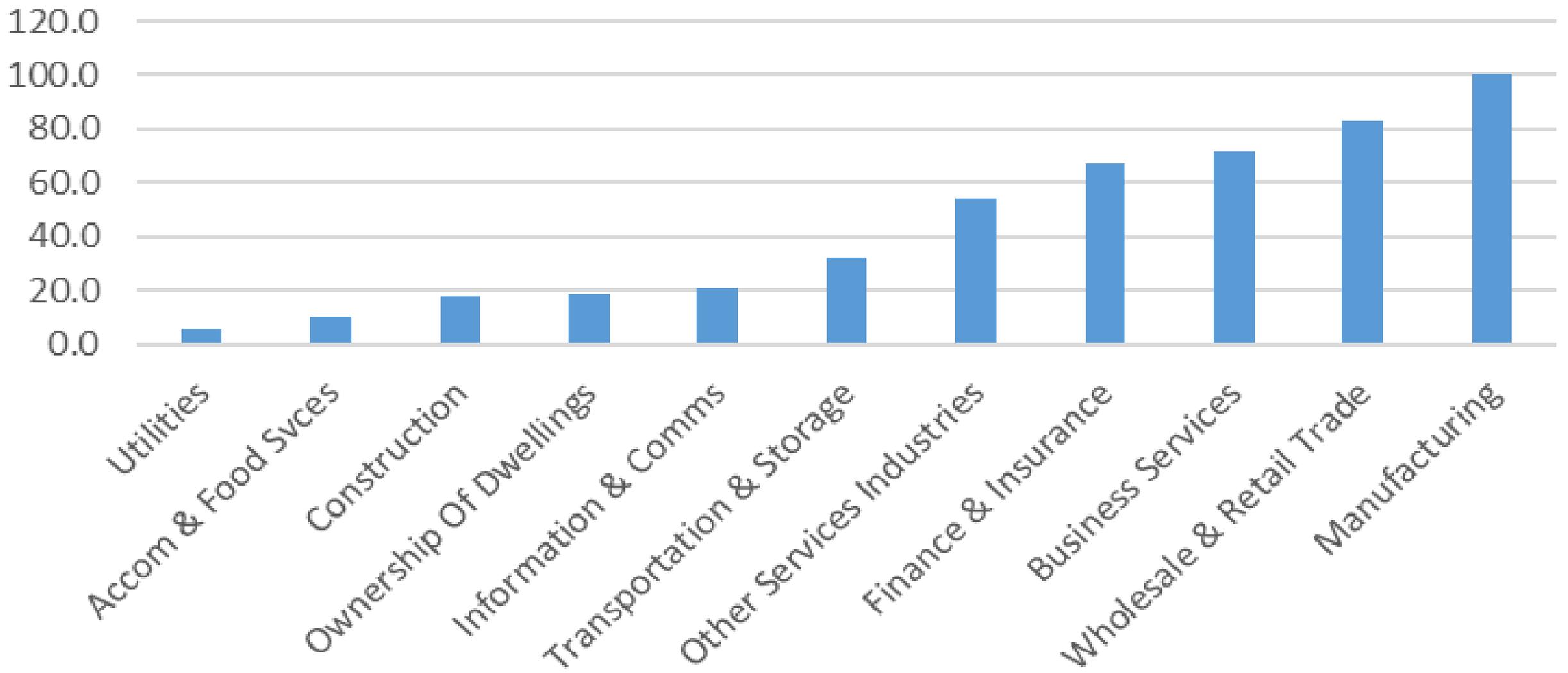
"charts ambitious and concrete targets over the next 10 years, strengthening Singapore's commitments under the UN's 2030 Sustainable Development Agenda and Paris Agreement, and positioning us to achieve our long-term net zero emissions aspiration as soon as viable." <https://www.greenplan.gov.sg/>



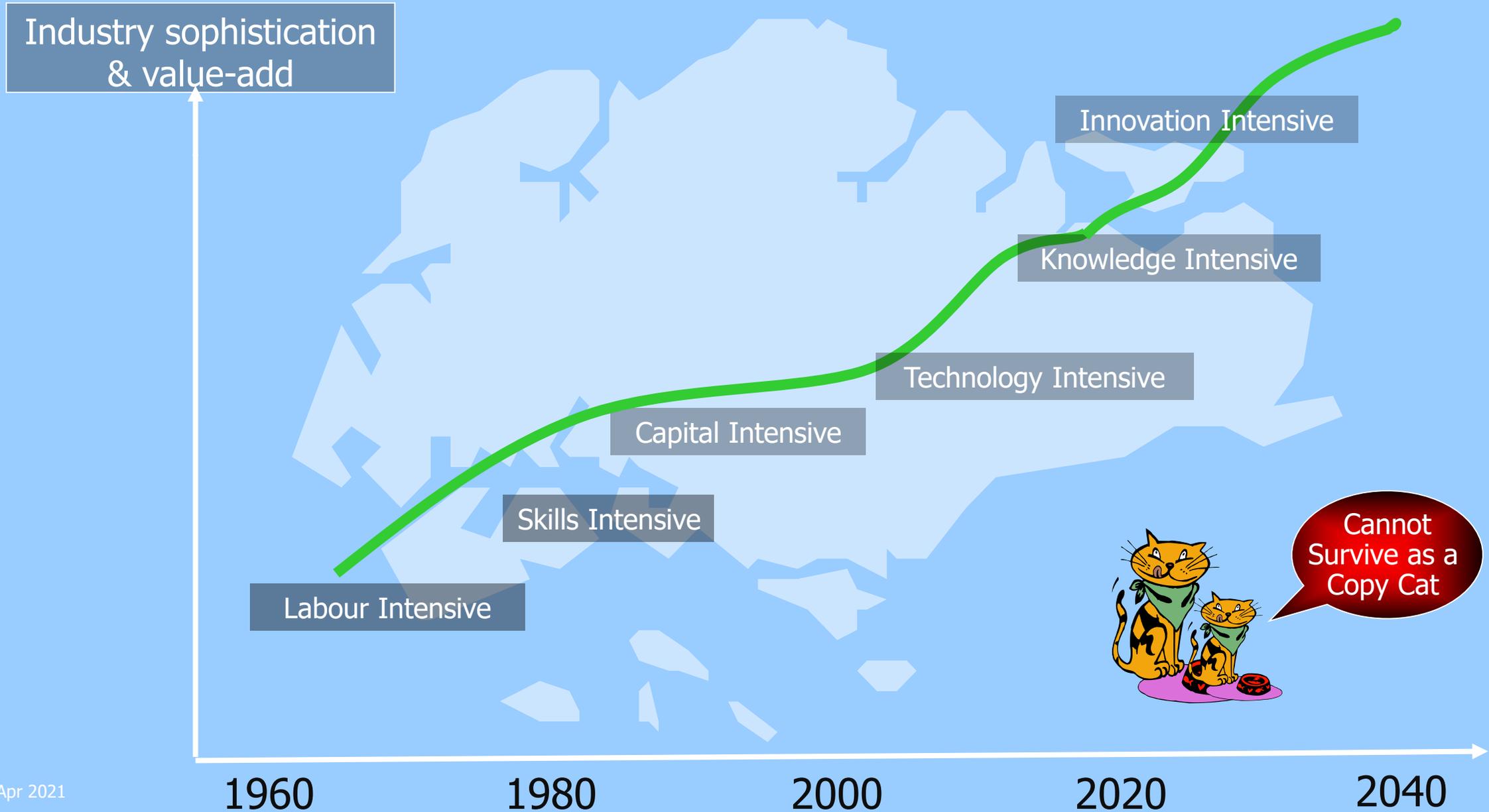
POPULATION in Million & GDP in 100 x \$Billion



2019 GDP at Current Prices by Industry in SGD\$ Billion (SGD \$1 = USD \$ 0.75)



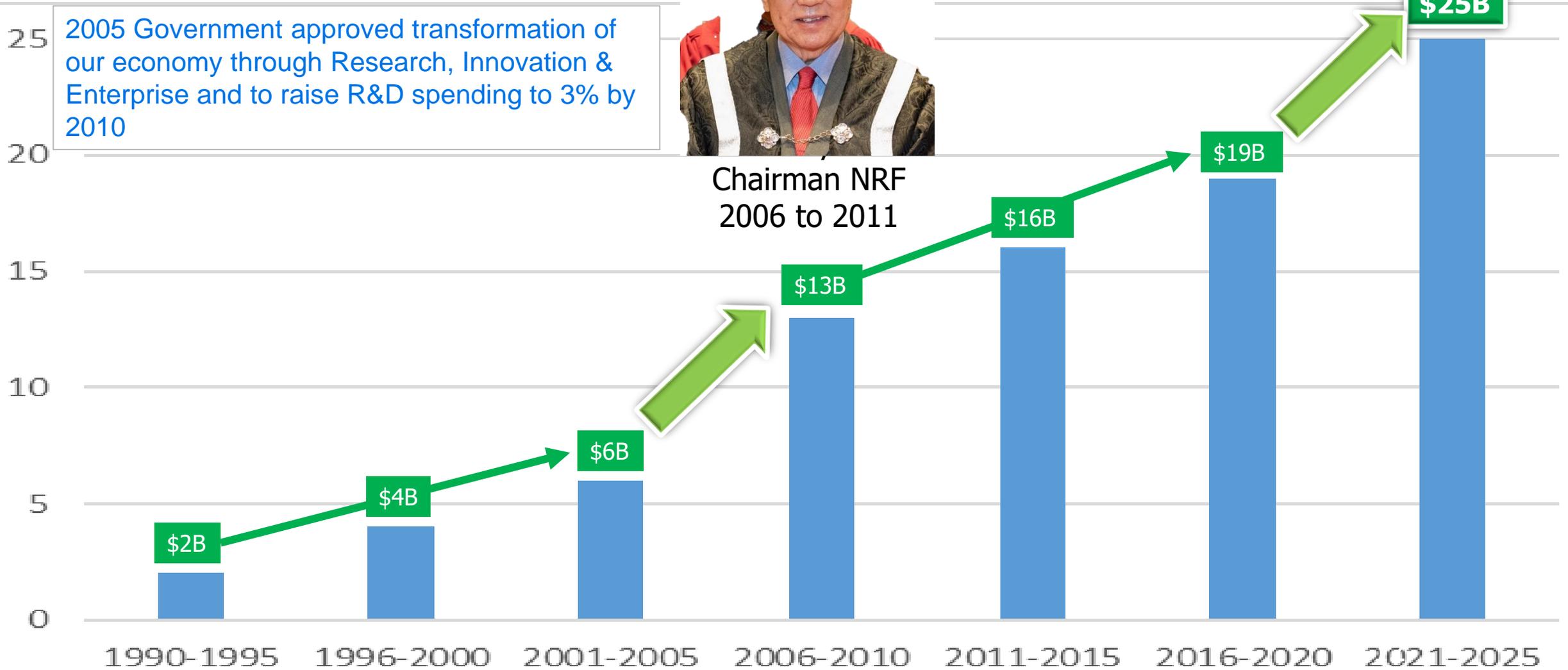
Singapore's Economy Evolved Rapidly over 60 Years



Dr Tony Tan, Chairman NRF, led the transformation of our economy through Research, Innovation & Enterprise initiatives



Chairman NRF
2006 to 2011



A photograph of Prime Minister Lee Hsien Loong at a public event. He is in the foreground, wearing a pink shirt and a dark tie, smiling. Behind him, a crowd of people is gathered, including a cameraman in a black jacket holding a professional video camera. The setting appears to be an exhibition or a public demonstration, with various equipment and people visible in the background.

PM Lee Hsien Loong on 24th Nov 2014
Launched Smart Nation

Our Vision

... to use technology extensively and systematically, particularly IT. Not just piecemeal, individual gadgets, individual programmes and systems ... but we have to do this systematically, to integrate all of the technology and possibilities into a coherent and comprehensive whole.

Smart Nation – A nation where people live meaningful and fulfilled lives, enabled seamlessly by technology, offering exciting opportunities for all.



Healthy Babies



Happy Children



Learn



Our Future

Work



Happy & Healthy

Live

Our Vision

"Smart Nation –A nation where people live meaningful and fulfilled lives, enabled seamlessly by technology, offering exciting opportunities for all." PM Lee Hsien Loong, 24th Nov 2014

Digitalization Enables DARS (Dynamic Allocation of Resources & Services) Matching Supply of Municipal Services in Real-time

Example of Smart Town Command & Control System: HDB Smart Hub



Image: Business Times, "The Brain Behind Estate Operations", 09 Nov 2018.

- Collecting and integrating information into data repository for town planning and building design
- Improve estate management

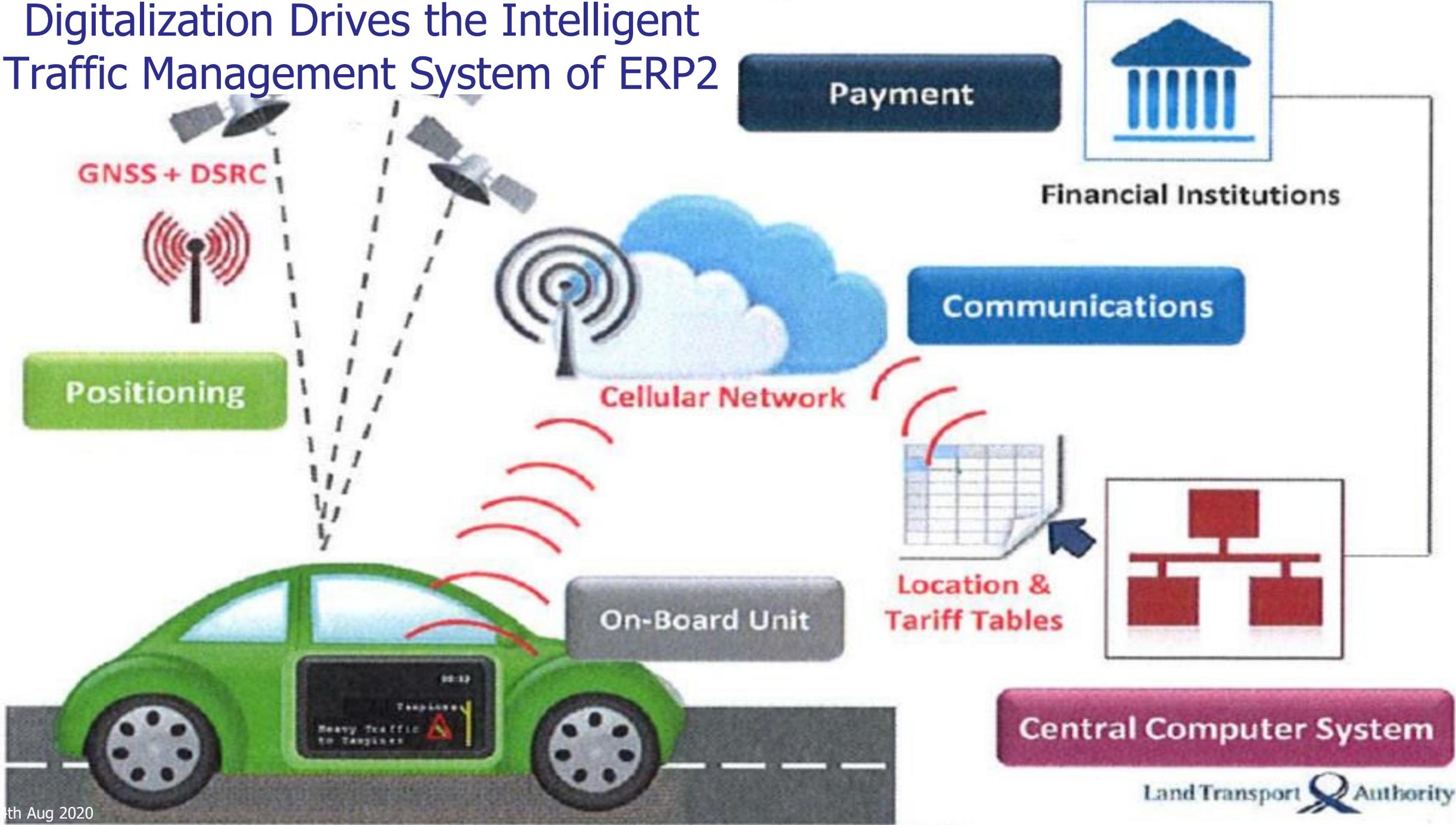
Example of DARS (Dynamic Allocation of Resources & Services) Matching Demand for and Supply of Public Transport in Real-time

Real-Time Situation
Picture of Demand &
Supply

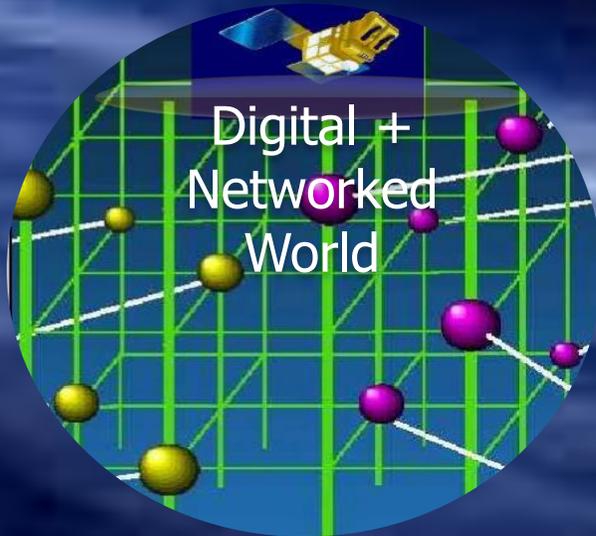
Operation Centre

- Observation
- Assessment
- Projection
- Planning
- Decision
- Action

Digitalization Drives the Intelligent Traffic Management System of ERP2



Singapore's Smart Nation strategy



- Building a
 - Digital economy,
 - Digital government
 - Digital society,
- Supporting High Tech Solutions
 - Development
 - Application
 - Test bedding
 - Scaling

Downsides to the Pervasive Digital and Networked World



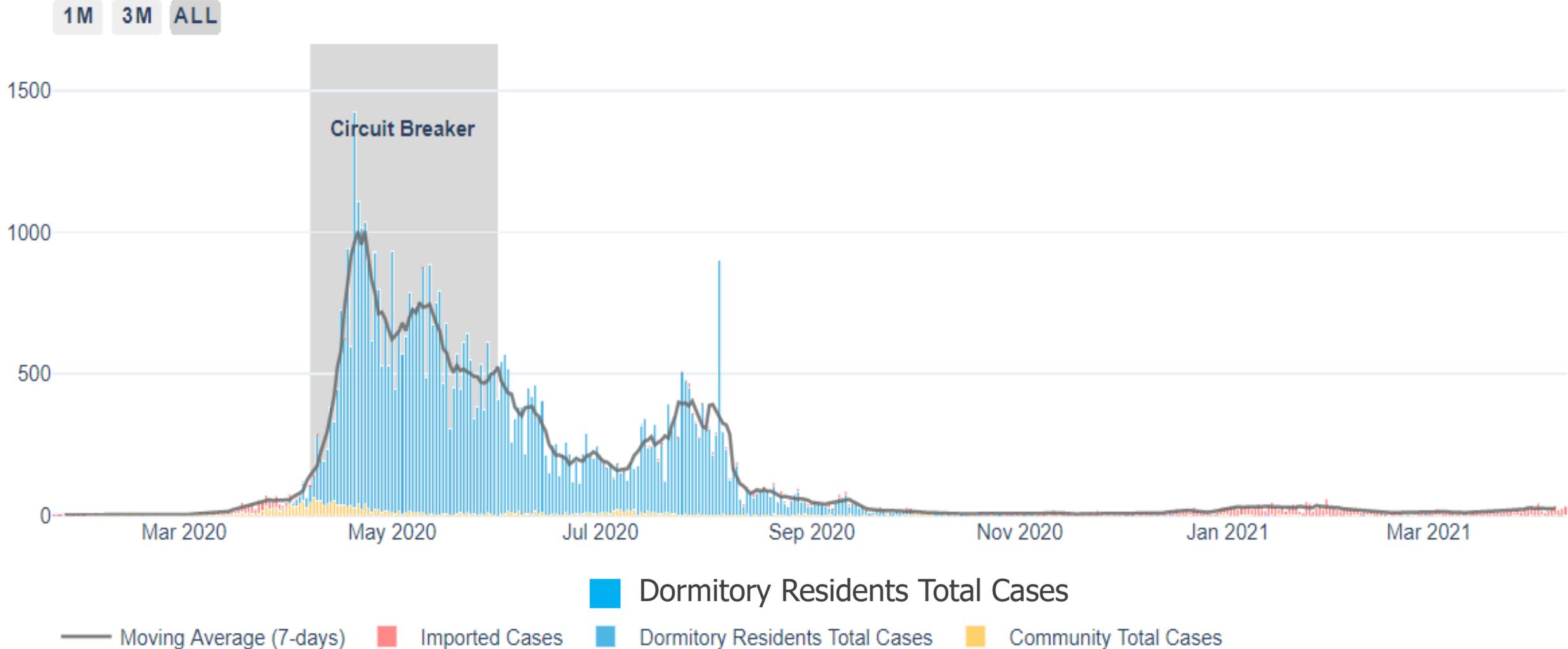
NATURE AS
COUNTERVAILING
FORCE IN THE
PHYSICAL WORLD



Cybersecurity Needed to Live in the Digital + Networked World

COVID 19 Had Changed the World and Gave Digitalization a Boost

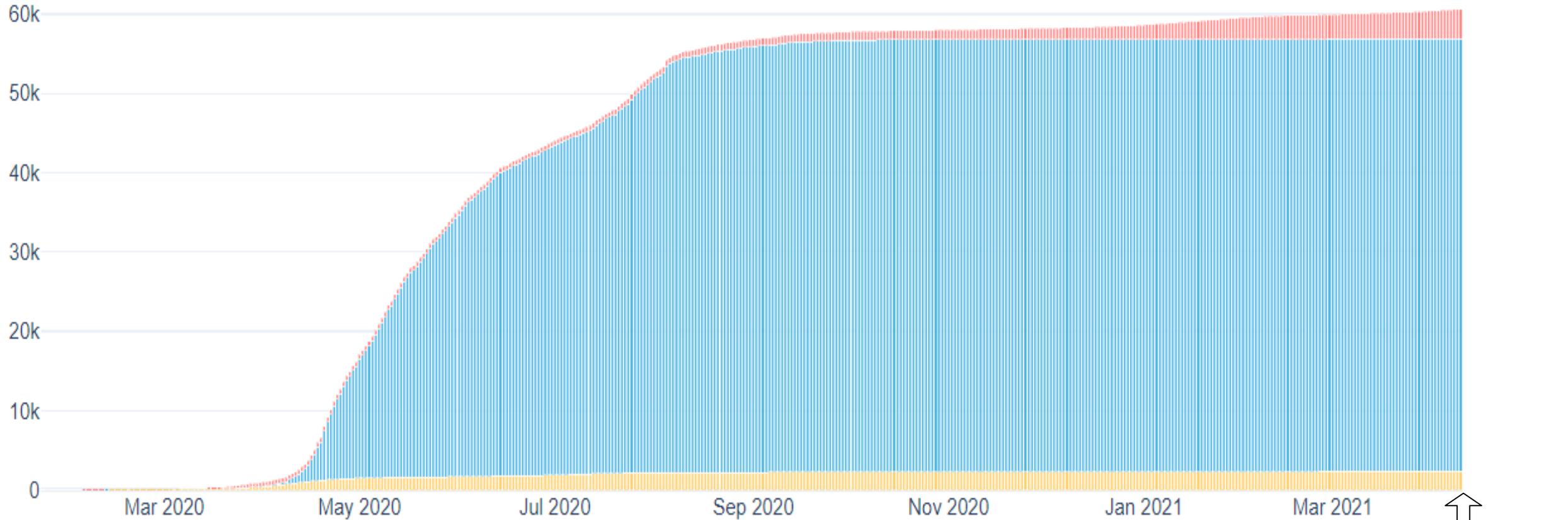
Singapore Epidemic Curve



Total Cases Singapore <https://covidsitrep.moh.gov.sg>

Sum of Community, Dormitory, Imported Cases

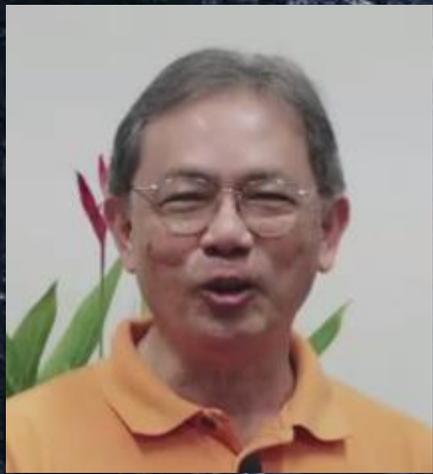
1M 3M ALL



11th Apr 2021

■ Imported Cases ■ Dormitory Residents Total Cases ■ Community Total Cases (Includes WP Holders not in Dorms)

2333	54512	3898
------	-------	------



... living near greenery helps people live longer,
healthier and happier lives.

Prof Kua Ee Heok
Professor in Psychiatry and
Neuroscience Yong Loo Lin
School of Medicine, NUS



Outdoor Education:
To develop rugged &
resilient youths



Growing Our Green Natural Capital



GREEN COVER
(40%)

LANSAT-8 Image 10/03/2020
30m resolution
Image processed by CRISP₃

Prof Khoo Teng Chye, Singapore's Urban Systems Architect

"... to create "nature based solutions" that requires a systems approach that cuts across water engineers, urban planners, ecologist, landscape architects, sociologists to make it happen."



Large Scale Systems Approach of Integration, Systems and Sharing

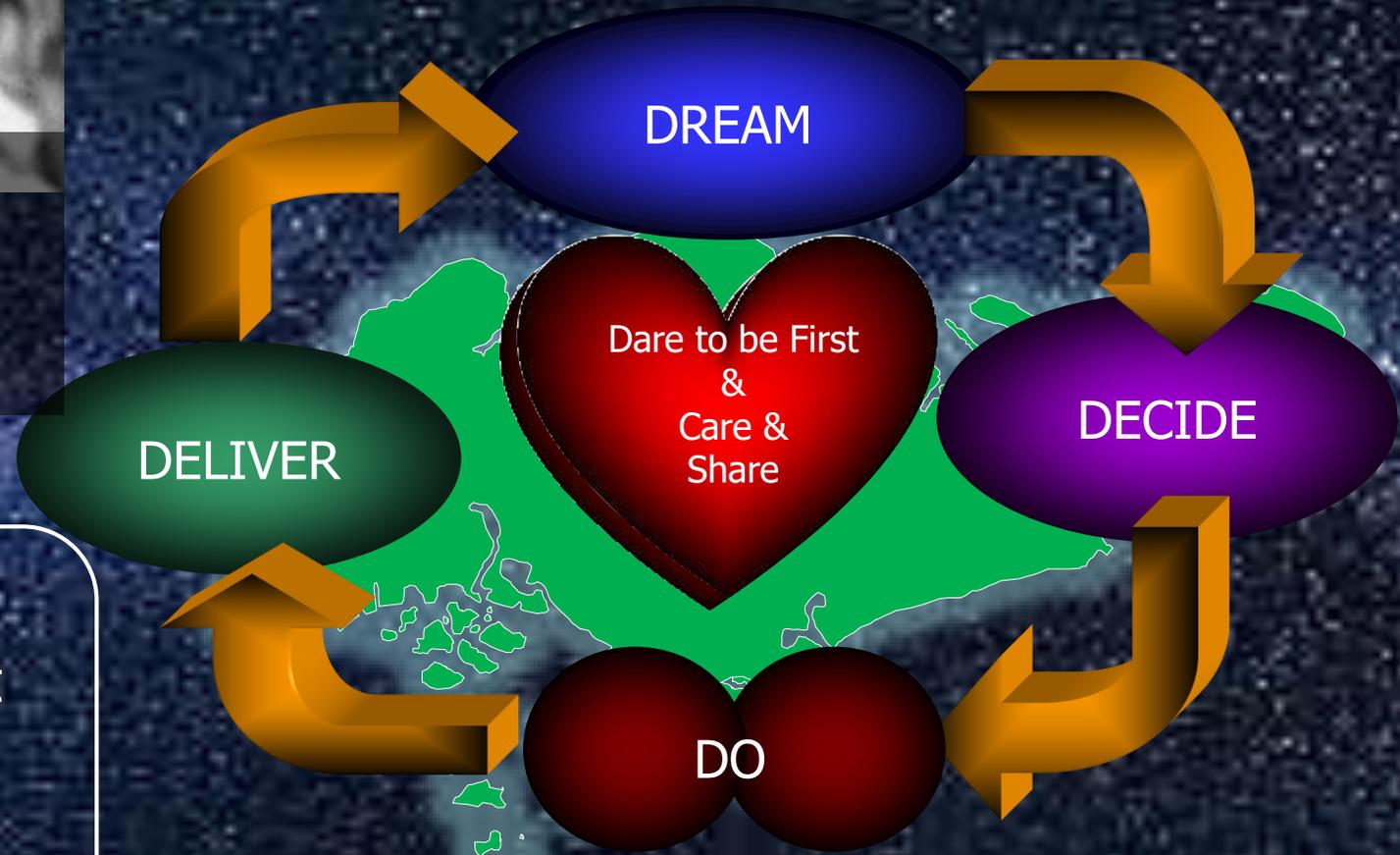


Grow our Human Capital, Intellectual Capital, Social Capital & Natural Capital in the making of our Smart & Resilient Nation in Nature



Dr Goh Keng Swee
1959 Minister for Finance
1965 Minister of Interior & Defence
1967 Minister of Finance
1970 Minister for Defence
1979 Minister of Education

“The only way to avoid failing is not to do anything. That will be the ultimate failure.”



Our Shared Vision is Our North Star

Thank You!