

DEVELOPING A DIGITAL ECONOMY SUB-INDEX FOR CITIES FOR SMART AND SUSTAINABLE GROWTH

PREPARED BY

TAN CHEE WEE
SINGAPORE

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MOTIVATION



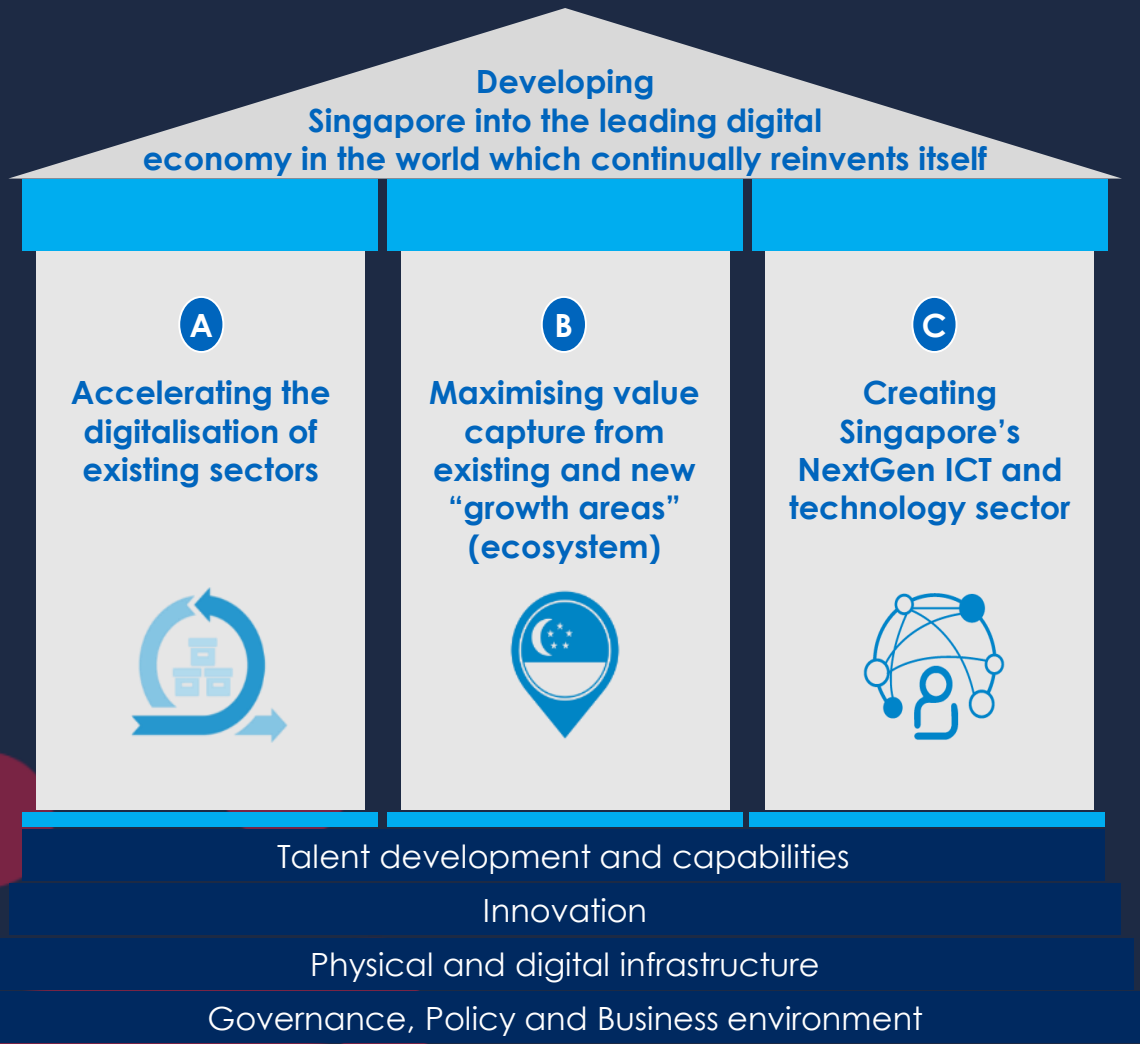
Singapore participated in pilot to test-bed smart cities indicators

Contributed to the development of ITU's development of KPIs

Like many countries, Singapore has embarked on this journey to digitalize our economy. Measures on the digitalization of business sectors will serve to provide data for tracking the impact of digitalization

Singapore would like to share our experience and contribute to the development of the Global Smart Sustainable Cities Index by proposing the inclusion of a Digital Economy (DE) Sub-Index, providing a means to measure and track over time the performance of a digital economy at the city level

SINGAPORE'S DE FRAMEWORK



The roof benchmarks Singapore's DE internationally in the areas of competitiveness, future readiness and digital trust.

Pillar A: Tracks the state of digitalisation across sectors, in terms of digital propensity and digital activities of businesses as well as business outcomes from digitalisation.

Pillar B: Tracks R&D investment in digitalisation and innovation outcomes (growth in IP and revenue from new products and services).

Pillar C: Tracks growth in ICT sector in terms of revenues, productivity and internationalisation of local ICT companies.

The foundation tracks the critical enablers for DE – talent, infrastructure and platforms.

PROPOSAL: DIGITAL ECONOMY SUB-INDEX

- Recognizing the importance of *investing in smart infrastructure, unleashing innovation, and delivering jobs and growth* to create a vibrant Digital Economy, the DE Sub-Index KPIs we proposed for consideration at the city level include:

1. KPIs drawn from Economy and Society/Culture dimensions of the SSC KPIs

2. KPIs augmented from Singapore's experience in the DE index development journey

- Digitalization
- Innovation
- Value of digital talent
- Health and vibrancy of the ICT Sector

RETAINING THE ICT SUB-DIMENSIONS WITHIN THE ECONOMY DIMENSION, PROPOSE TO ADD E-PAYMENT ADOPTION AS A FORWARD-LOOKING INFRASTRUCTURE KPI

Dimension	Sub - Dimension	Category	KPI	Type
Economy	ICT (Investing in Smart Infrastructure)	ICT Infrastructure	Household Internet Access	Core
			Fixed Broadband Subscriptions	Core
			Wireless Broadband Subscriptions	Core
			Wireless Broadband Coverage	Core
			Public WIFI	Advanced
			Enterprise adoption of e-payments: Proportion of enterprises that use e-payments	NEW Advanced
		Water and Sanitation	Smart Water Meters	Core
			Water Supply ICT Monitoring	Advanced
		Drainage	Drainage / Storm Water System ICT Monitoring	Advanced
		Electricity Supply	Smart Electricity Meters	Core
			Electricity Supply ICT Monitoring	Advanced
			Demand Response Penetration	Advanced
	Transport	Dynamic Public Transit Information	Core	
		Traffic Monitoring	Core	
		Intersection Control	Advanced	
	Public Sector	Open data	Advanced	
		e- Government	Advanced	
		Public Sector e-procurement	Advanced	

PROPOSE ADDITIONAL INDICATORS IN PRODUCTIVITY SUB-DIMENSION TO HIGHLIGHT THE IMPORTANCE OF INNOVATION AND VALUE OF DIGITAL TALENT

Dimension	Sub - Dimension	Category	KPI	Type
Economy	Productivity	Innovation (Unleashing Innovation)	R&D Expenditure	Core
			Patents	Core
			Small and Medium-Sized Enterprises	Advanced
			Financial resources: Public expenditure on R&D in ICT and electronics, as % of GDP	NEW Advanced
		Employment (Delivering Jobs and Growth)	Unemployment Rate	Core
			Youth Unemployment Rate	Core
			ICT Industry Employment	Advanced
			Productivity Growth: % change in value add/worker	NEW Core
			Wage growth: % increase in median real income of ICT professionals	NEW Core
				Core

PROPOSING TO ADD A “DIGITALISATION” SUB-DIMENSION TO REFLECT ITS GROWING IMPORTANCE IN THE ECONOMY

Dimension	Sub - Dimension	Category	KPI	Type
Economy	Digitalisation (Delivering Jobs and Growth)	Digital Propensity	Digital investments: % of total spend on ICT (including spend on digital services and R&D) and digital training for workers	NEW Core
			Digital strategy and orientation: % of enterprises that integrated digitalization into corporate strategy	NEW Advanced
		Digital Activities	Digital buying: % of enterprises that use digital channels and solutions to buy or source inputs for the business	NEW Advanced
			Digital making and working: % of enterprises that use digital solutions in the production of goods and services including in areas such as life cycle management, value chain management, automation and corporate functions such as HR and resource planning	NEW Advanced
			Digital selling: % of enterprises that utilise digital channels and solutions in the selling of outputs of the business	NEW Advanced
			Digital creation: % of enterprise that use digital channels and solutions to create new areas of business (including but not limited to new clients, new markets or new business models)	NEW Advanced
		Outcome	Effect of digitalisation on business success: % of enterprises that are satisfied with the effect of their digitalisation efforts on business success	NEW Core
			Revenue growth: % of enterprises that experienced improvements in revenue due to digitalisation	NEW Core

PROPOSING TO ADD AN “ICT SECTOR” SUB-DIMENSION AS HEALTH AND VIBRANCY OF ICT SECTOR SUPPORTS DIGITALISATION OF THE CITY’S ECONOMY

Dimension	Sub - Dimension	Category	KPI	Type
Economy	ICT Sector (Health and vibrancy)	Outcome	Revenue growth: % growth of overall revenue of ICT sector	NEW Core

EXTRACTED RELEVANT SSC KPIs FROM BUILDINGS, EDUCATION AND HEALTH CATEGORIES

Recognised that *Investing in Smart Infrastructure* through the use of ICT is forward looking

Dimension	Sub - Dimension	Category	KPI	Type
Economy	Infrastructure (Investing in Smart Infrastructure)	Buildings	Integrated Building Management Systems in Public Buildings	Advanced

Cognizant that *Empowering Society* is equally as important:

Dimension	Sub - Dimension	Category	KPI	Type
Society and Culture	Education and Health (Empowering Society)	Education	Students ICT Access	Core
			School Enrolment	Core
			Higher Education Degrees	Core
			Adult Literacy	Core
		Health	Electronic Health Records	Advanced

WEIGHTAGE

- **Making it easier for users for comparison over time, propose to use equally-weighted dimensions, categories and KPIs**
- **Dimensions and weights of the DE Sub-Index:**
 - Economy (1/2)
 - Society and Culture (1/2)
- **Sub-dimensions and weights within Economy dimension:**
 - ICT (1/5)
 - Productivity (1/5)
 - Infrastructure (1/5)
 - Digitalisation (1/5)
 - ICT Sector (1/5)
- **Sub-categories and weights within Productivity – Innovation and Employment sub-dimension:**
 - Innovation (1/2), Employment (1/2)
- **Sub-categories and weights within Society and Culture – Education and Health sub-dimension:**
 - Education (1/2), Health (1/2)
- **Sub-categories and weights within Digitalisation sub-dimension:**
 - Digital Propensity (1/3), Digital Activities (1/3), and Outcome (1/3)

ANNEX

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SINGAPORE PARTICIPATED IN ITU'S SMART SUSTAINABLE CITIES PILOT PROJECT

- The ITU Focus Group for Smart Sustainable Cities has formulated a list of KPIs to measure Smart Sustainable Cities and has invited Singapore to participate in a pilot exercise to assess their KPI framework using Singapore data. The pilot project will contribute to ITU's international standardization of the indicators and the subsequent development of a 'Global Smart Sustainable Cities Index' derived from this set of indicators.
- ITU Sec-Gen met with PM Lee on 2 June 2015 and mentioned this project to PM Lee, hoping to have Singapore's participation. Singapore accepted, signed an agreement on 13 Oct 2015 and became one of the pilot cities.
- Subsequently, an IMDA internal project team with representatives from various divisions was formed to undertake the effort. As IMDA is the national focal agency for ITU, we have reached out to the relevant agencies for assistance on the indicators, arranged for the auditor visit and verification of data with agencies.
- Singapore has participated in the Smart Sustainable Cities KPIs pilot project through providing inputs for the case study "*Implementing ITU-T International Standards to Shape Smart Sustainable Cities: The Case of Singapore*", and worked with more than 20 agencies to consolidate, verify data and provide inputs for about 100 data points in 80 reported KPIs.

Drivers of Digital Economy

Ultimate aim of digitalisation

Increased standard of living

Whole of Economy

Sector/Firm Level

Macro level:
Government's goals

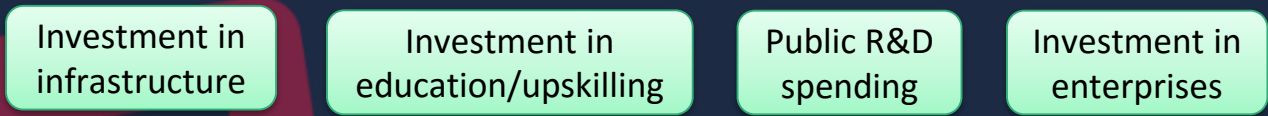
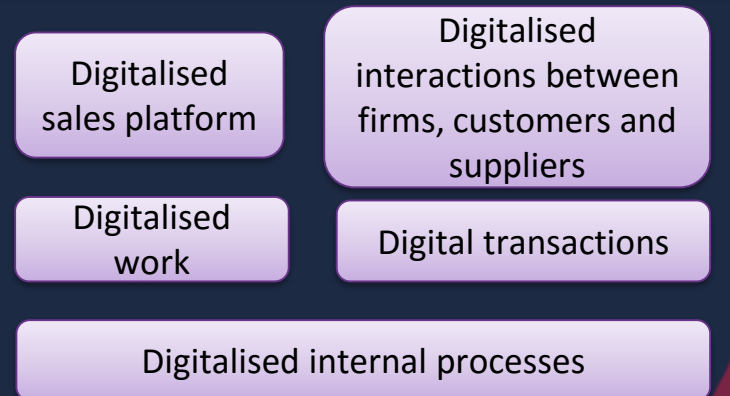
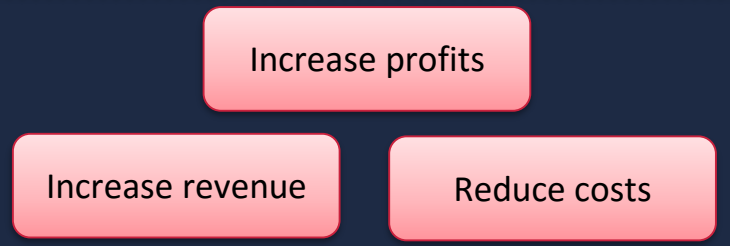
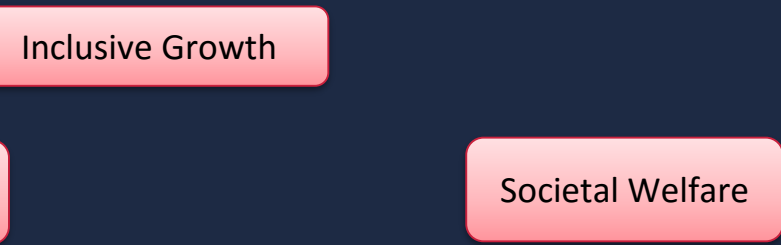
Industry/micro level:
Sector/Firm goals

Process to reach goals

Process to reach goals

Inputs

Inputs



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* Metrics are non-exhaustive. This slide is meant to discuss the overall concept

OECD – Conceptual Approach & key dimensions

Source	Conceptual approach	Key Dimensions	Broad Measures
Competition Committee of Organisation for Economic Cooperation and Development	Digital Economy is comprised of markets based on digital technologies that facilitate the trade of goods and services through e-commerce.	Investing in Smart Infrastructure	<ul style="list-style-type: none"> Broadband penetration Mobile data communication Growth of internet Towards higher speed <ul style="list-style-type: none"> Prices for connectivity ICT devices and applications E commerce across borders Security and Privacy
	Macroeconomic approach – rewards digital technologies and ecommerce but focuses on the impact on society in general	Empowering Society	<ul style="list-style-type: none"> Internet users Online activities Digital Natives ICT in education <ul style="list-style-type: none"> ICT skills at workplace E-consumers Content without borders E-government use
	OECD underlines that digital economy induces a significant increase in a country and its influence extends far beyond market of information products, encompassing other sectors of internal economy as well as way of living in general.	Unleashing Innovation	<ul style="list-style-type: none"> ICT and R & D Innovation in ICT industries E Businesses ICT Patents ICT Designs ICT trademarks
		Delivering Jobs and Growth	<ul style="list-style-type: none"> ICT investment ICT business dynamics ICT value added Labour Productivity <ul style="list-style-type: none"> E-commerce Human Capital in ICT ICT jobs and jobs in the ICT sector Trade competitiveness and GVCs

Source: OECD 2015
“Measuring the Digital Economy”