

Living Digital

Imagining, Integrating, and Improving with Disruptive Tech

Poon King Wang

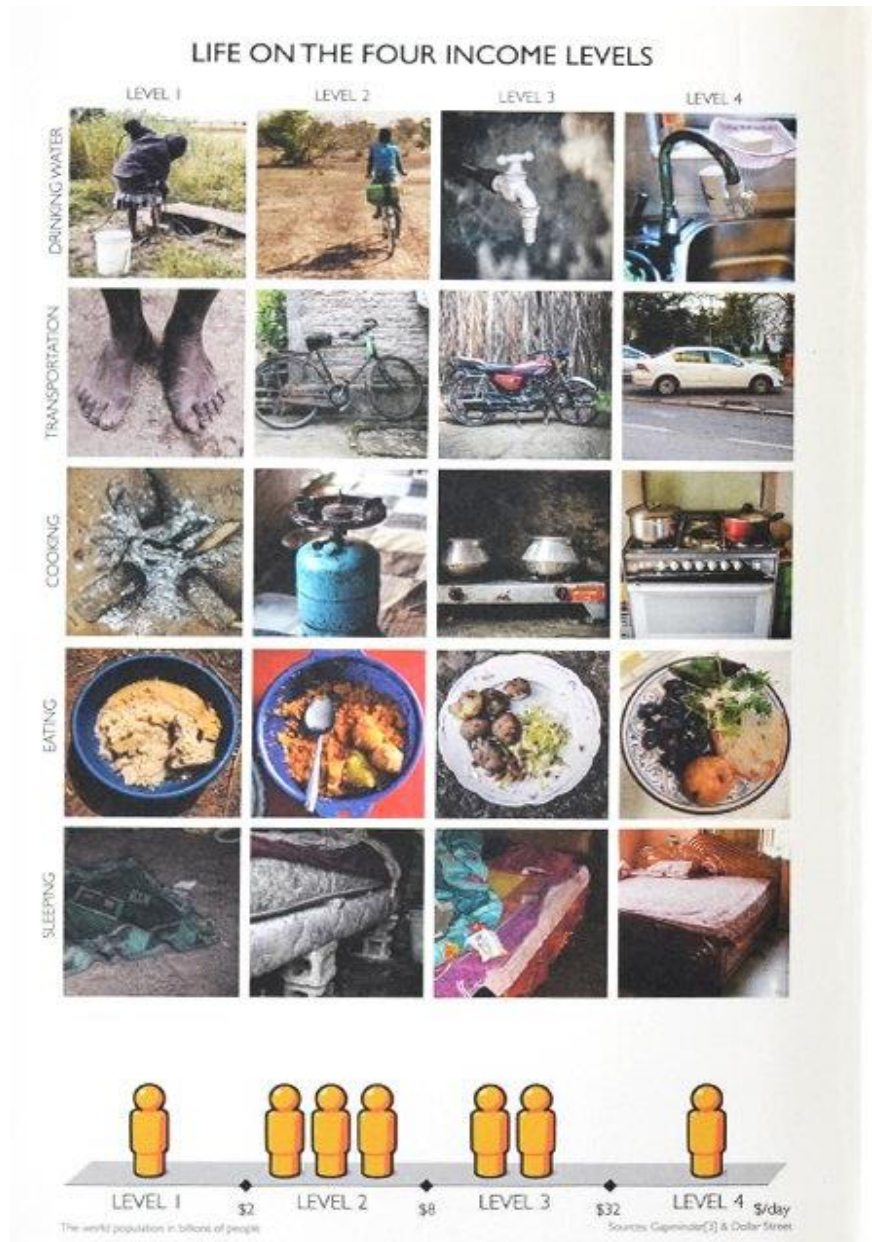
*Director – Lee Kuan Yew Centre for Innovative Cities
Singapore University of Technology and Design*



Story



Imagine
Integrate
Improve



Source: Factfulness (Hans Rosling et al)

**Imagine
Integrate
Improve**

*Started in 1960s
Cabinet decision*

Cherish



*How do you keep a tropical city-state cool?
Turn it into a city in a garden*



Use *Contribute*

1970-90s: landfill *Started in 1960s*
2011: wetland *100 years plan*

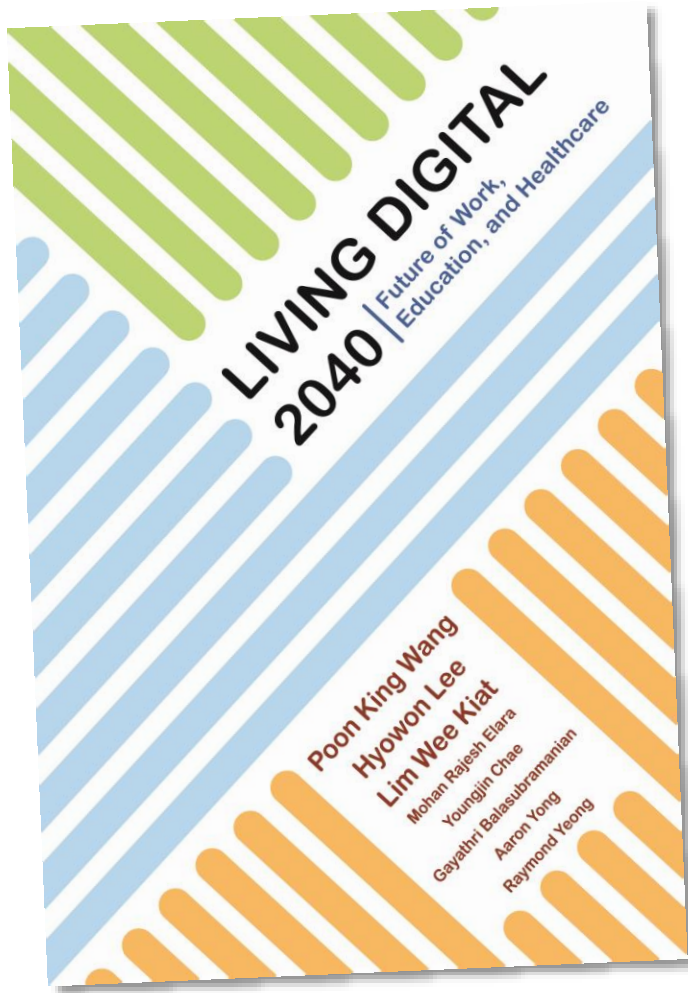


*How do you find land for waste?
Make waste land usable*

*How do we provide water for everyone?
Collect every drop of water*

Imagine

what disruptive tech can do



**Chen Tiaqiao Program in Urban
Innovation: Smart Cities Lab**

**Future of Cities: Future Digital
Economies and Digital Societies**

Funded by Singapore's Ministry of National Development (MND) and the National Research Foundation (NRF) under L2 NIC (Land and Liveability National Innovation Challenge) Award No. L2NICTDF1-2014-1. The opinions, findings, conclusions and recommendations expressed in this report (and additional publications) are those of the authors and do not necessarily reflect the views of MND and NRF.



MOST INNOVATIVE COMPANIES

VIPKid



Beijing-based VIPKid is giving American teachers an income boost from halfway around the world. Under cofounder and CEO Cindy Mi, the online learning company contracts with more than 30,000 North American instructors and matches them with some 200,000 primarily Chinese pupils (ages



State of People + Digital Transformation

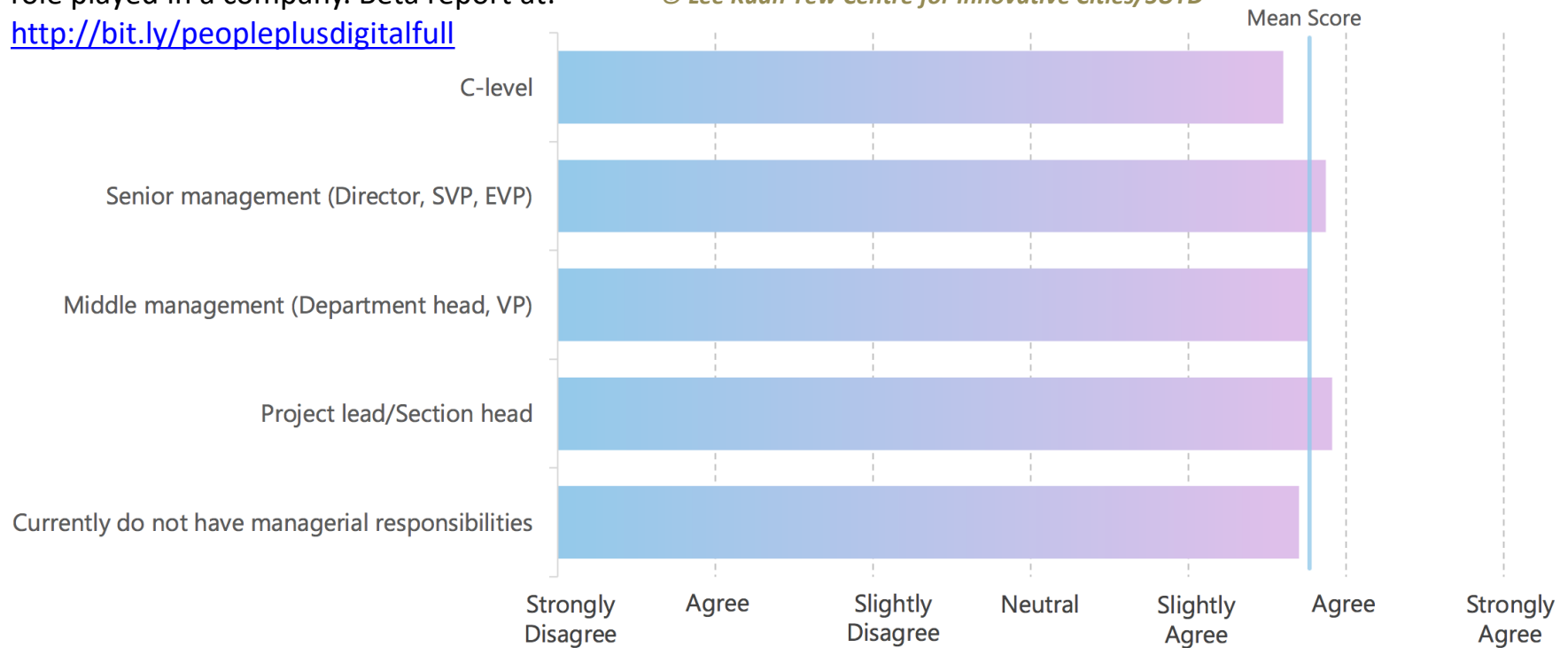


in collaboration
with
IoT ASIA

No statistically significant difference found across age groups; differences only in the role played in a company. Beta report at: <http://bit.ly/peopleplusdigitalfull>

Optimism Towards Change

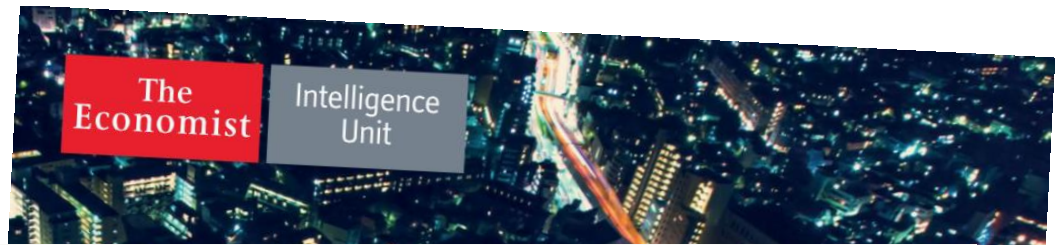
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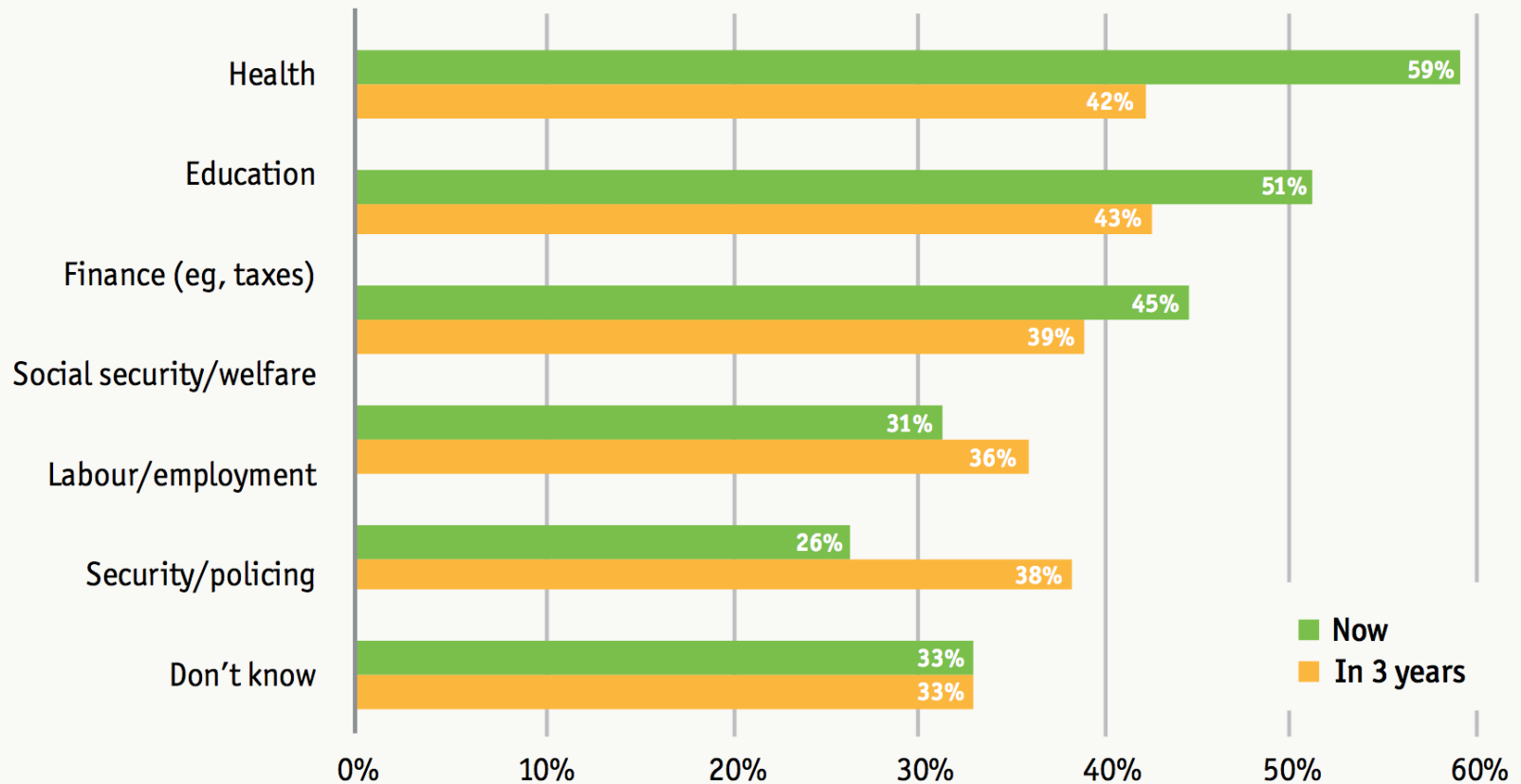
High aspirations, stark realities:

Digitising government in South-east Asia

https://www.eiuperspectives.economist.com/sites/default/files/EIU_Microsoft%20DigitisingGov_briefing%20paper_Jan2016.pdf



Where cloud computing will have the biggest impact, now and in 3 years (% of respondents)



Source: The Economist Intelligence Unit

Smart City Component	Related Urban Aspect
Smart people	Education; communities
Smart economy	Digital economy; industry; operational efficiencies
Smart governance	E-Government; e-democracy; public consultation
Smart mobility	Logistics; infrastructure; transport; sharing economy
Smart environment	Waste management; cooling; sustainability
Smart living	Health; safety; security; livability

Source: Adapted from Smart Cities: Definitions, Dimensions, Performance, and Initiatives; Table 2: Components of a smart city and related aspects (adapted Lombardi et al.,2012)

Future of Healthcare

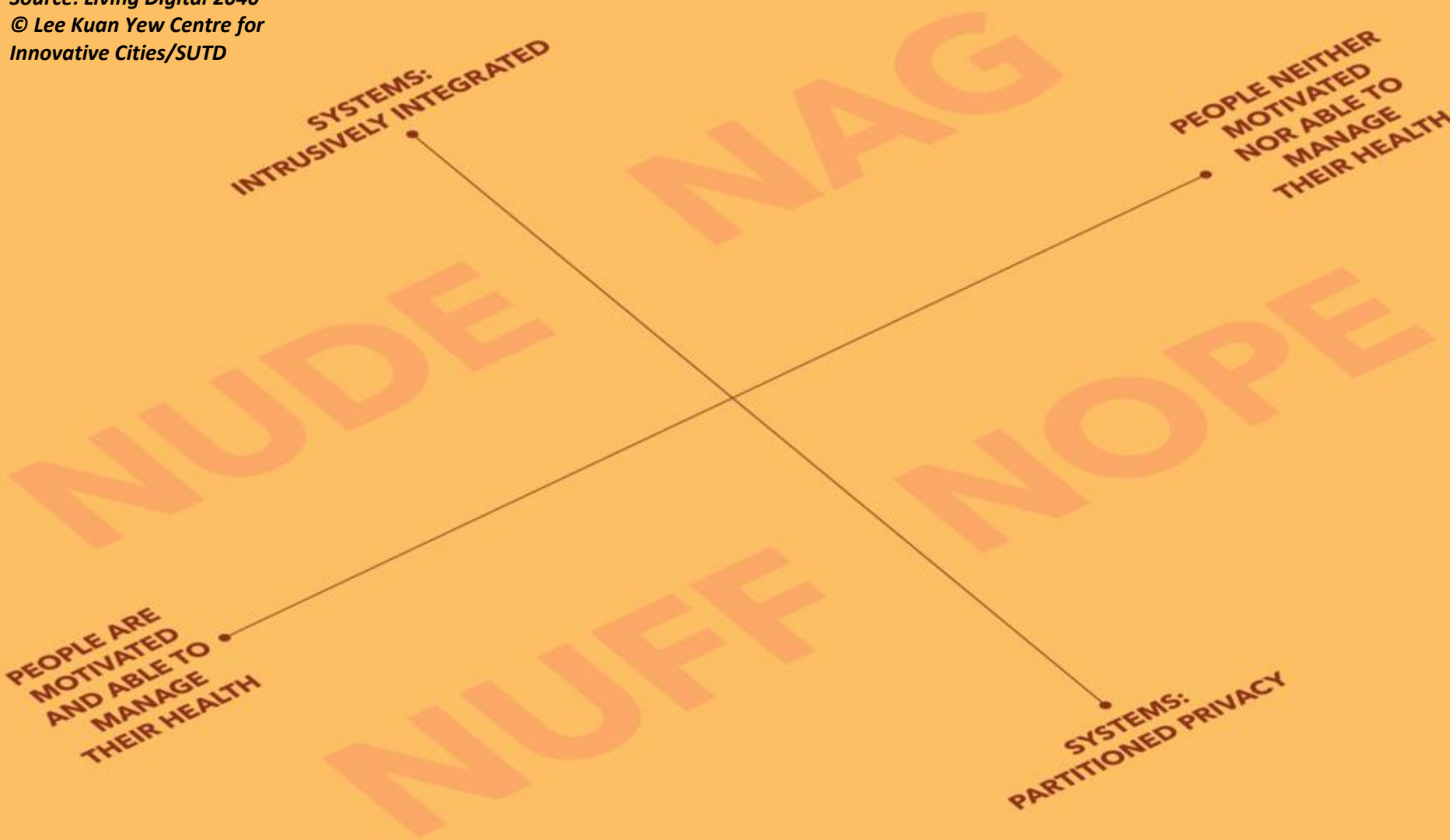
Source: *Living Digital 2040*
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SYSTEMS:
INTRUSIVELY INTEGRATED

PEOPLE NEITHER
MOTIVATED
NOR ABLE TO
MANAGE
THEIR HEALTH

PEOPLE ARE
MOTIVATED
AND ABLE TO
MANAGE
THEIR HEALTH

SYSTEMS:
PARTITIONED PRIVACY



Future of Healthcare

Source: *Living Digital 2040*
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**A city that
cares about
caregiving**

Integrate

different disruptive tech

4IR

Fourth Industrial Revolution

*Source: Living Digital 2040
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Live, love, learn, and earn

digital identities, **digital health**, online dating, gaming, freelancing, online courses

See, sense, experience and empathise

augmented/virtual/mixed-reality, 3D audio, **IoT**, smart fabrics, wearables, digital models, biometric and environmental **sensors**

Create, communicate and collaborate

3D printers, digital design, social media, universal translation, **man-machine interaction**, user-generated content and crowdsourcing

Automate, augment, and analyse

robotics, **autonomous vehicles**, genomics (and other omics), **AI and data analytics/algorithms**, predictive analytics, visualisation

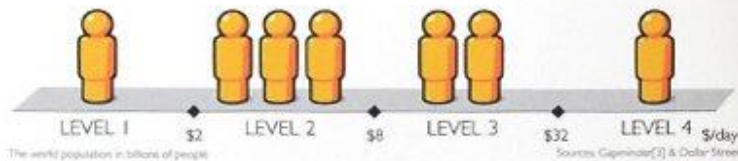
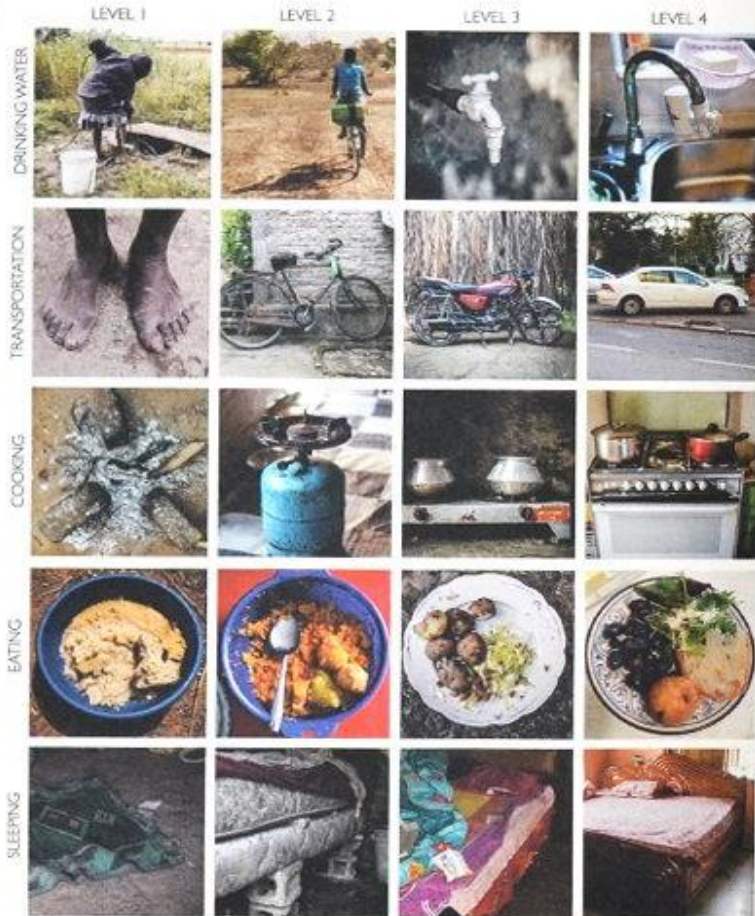
Trade and transact

online shopping/e-commerce, open data, **sharing economy**, freemiums, ad-supported, payment systems

Protect

surveillance, **cyber-physical security**, automated cyber defence, **blockchain**, Creative Commons, **privacy**, access controls; experiments with quantum comms

LIFE ON THE FOUR INCOME LEVELS



A good strategy would have:

1. Diagnosed the nature of the challenges faced and which aspects are the critical ones
2. Determined the overall approach to overcome the critical challenges above
3. Decided on the co-ordination and steps to accomplish the above approach

Source: Good Strategy/Bad Strategy, Richard Rumelt

Source: Factfulness (Hans Rosling et al)

Wi-Fi, Mobile,
& Mesh



PV (photovoltaic)
power for lamp,
mobile phone



Smart Lighting

- LED
- Photocell control
- 0-100% dimming
- On-demand lighting

App-based
wireless
control



Concealed
Speakers
(music, alerts)

Environmental
sensing (air
quality, noise)



Image sensing

- Proximity
- Pedestrian counter
- Parking monitoring
- Public security

Façade Lighting
(colours)



RGBA Notification



Digital Signage

- Way finding
- Traffic direction
- Civic info
- Revenue potential

Digital Street Sign

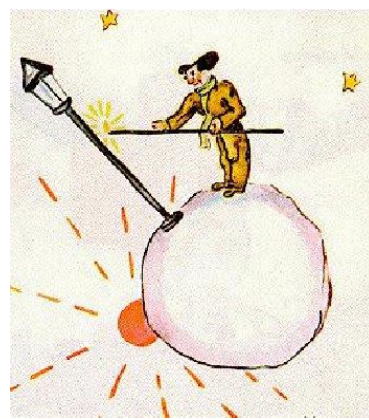
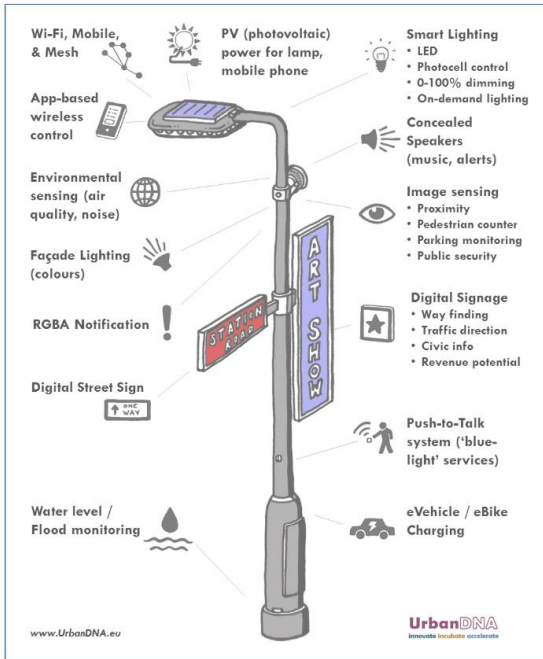


Push-to-Talk
system ('blue-
light' services)

Water level /
Flood monitoring



eVehicle / eBike
Charging



Sources: Various

	Pre-Globalized World	1 st Unbundling	2 nd Unbundling	3 rd Unbundling?
Trade costs	High	Lower	Lower	Lower
Communication costs	High	High	Lower	Lower
Face-to-face costs	High	High	High	Lower?
Time Period	Pre-1820s	1820s onwards	1990 onwards	Emerging
	--	--	Integrate global supply chains; Export-oriented growth booms	How do countries and cities develop and compete?

Source: The Great Convergence, Richard Baldwin

Improve

lives with disruptive tech

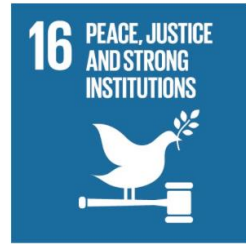
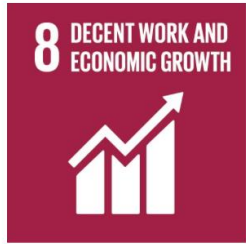
52%

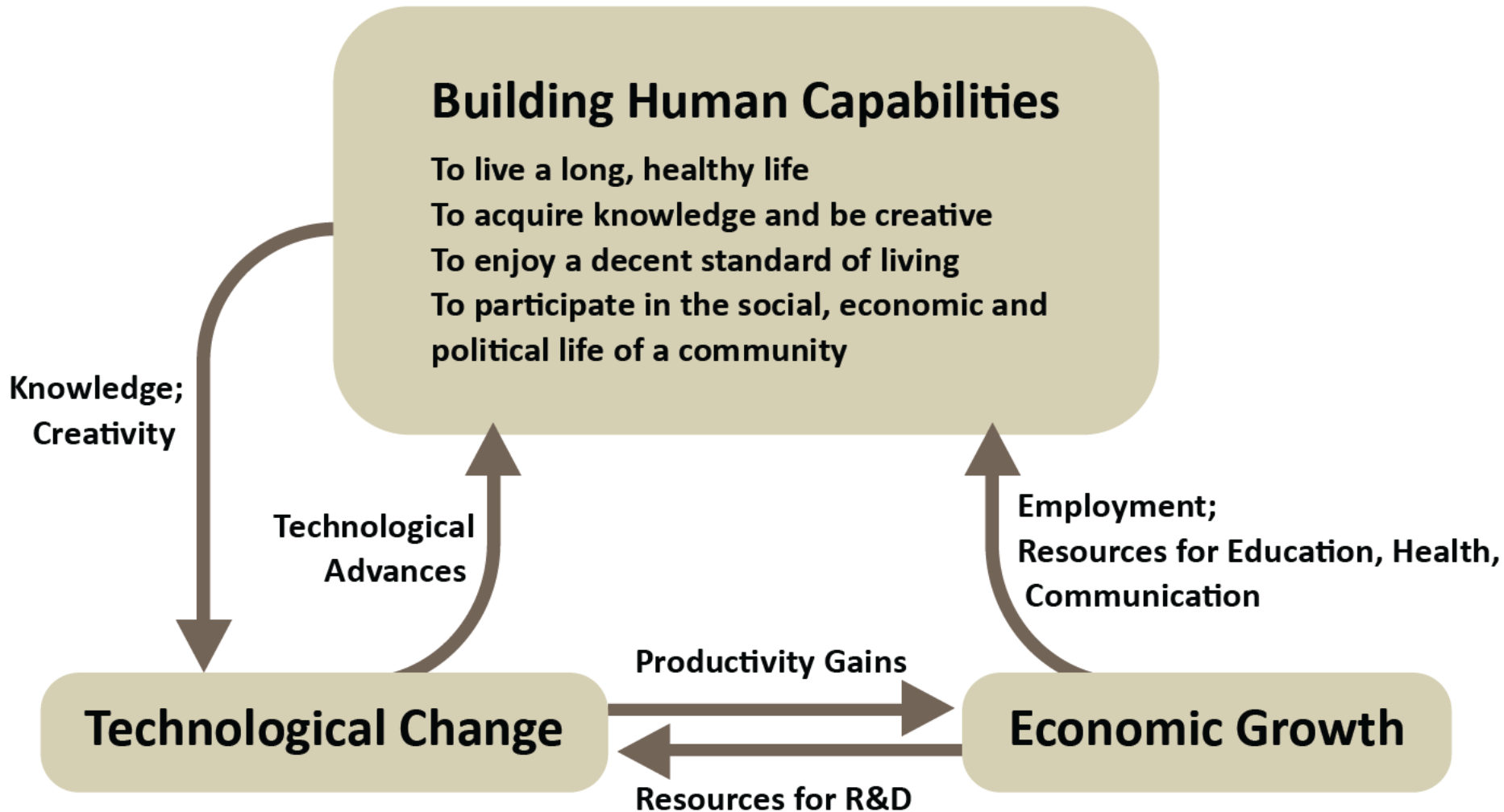
**Identifying the value of smart
city initiatives is difficult**

82%

**My city should create more
smart city initiatives**

*Source: Survey of general sentiments about
smart cities in Asia Pacific region (EIU)*





*Diagram from Living Digital 2040: Future of Work, Education and Healthcare -
Adapted from the United Nations Human Development Report 2001 –
Making New Technologies Work for Human Development*

Future of Work

Source: *Living Digital 2040*
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**RAPID TECHNOLOGICAL
DISRUPTION**



**MANY PEOPLE
THRIVE**



**INCREMENTAL TECHNOLOGICAL
DISRUPTION**



**MANY PEOPLE
STRUGGLE**

**SPLINTERING
STRUGGLES**

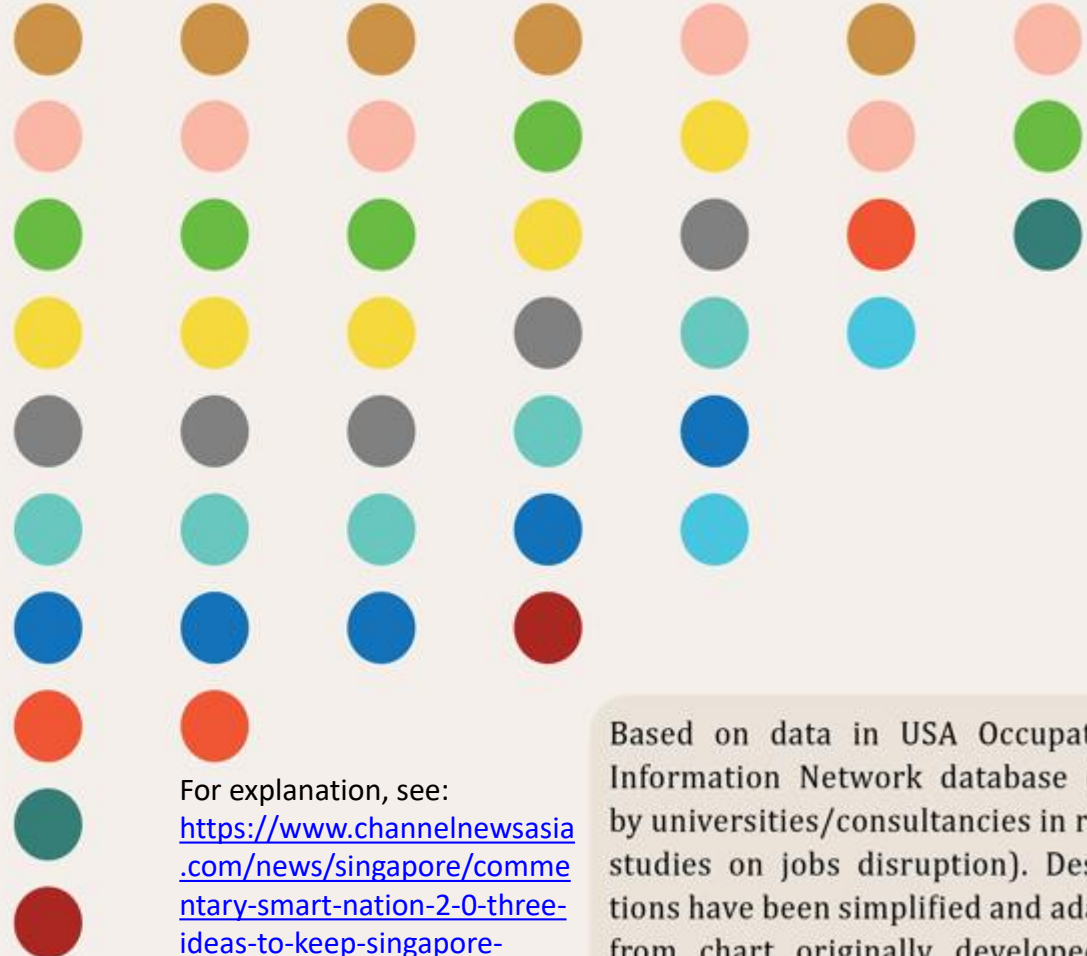


Information Security Analyst

TASKS

-  Discuss user issues
-  Train users, promote awareness
-  Monitor virus reports
-  Modify security files
-  Encrypt transmissions, erect firewalls
-  Review user violations
-  Develop plans to safeguard files
-  Assess risks and execute tests
-  Coordinate implementation
-  Document policies and procedures
-  Monitor use of data files

Related jobs
»



For explanation, see:
<https://www.channelnewsasia.com/news/singapore/commentary-smart-nation-2-0-three-ideas-to-keep-singapore-smart-8589830>

Based on data in USA Occupational Information Network database (used by universities/consultancies in recent studies on jobs disruption). Descriptions have been simplified and adapted from chart originally developed for research at LKYCIC, SUTD.

High aspirations, stark realities:

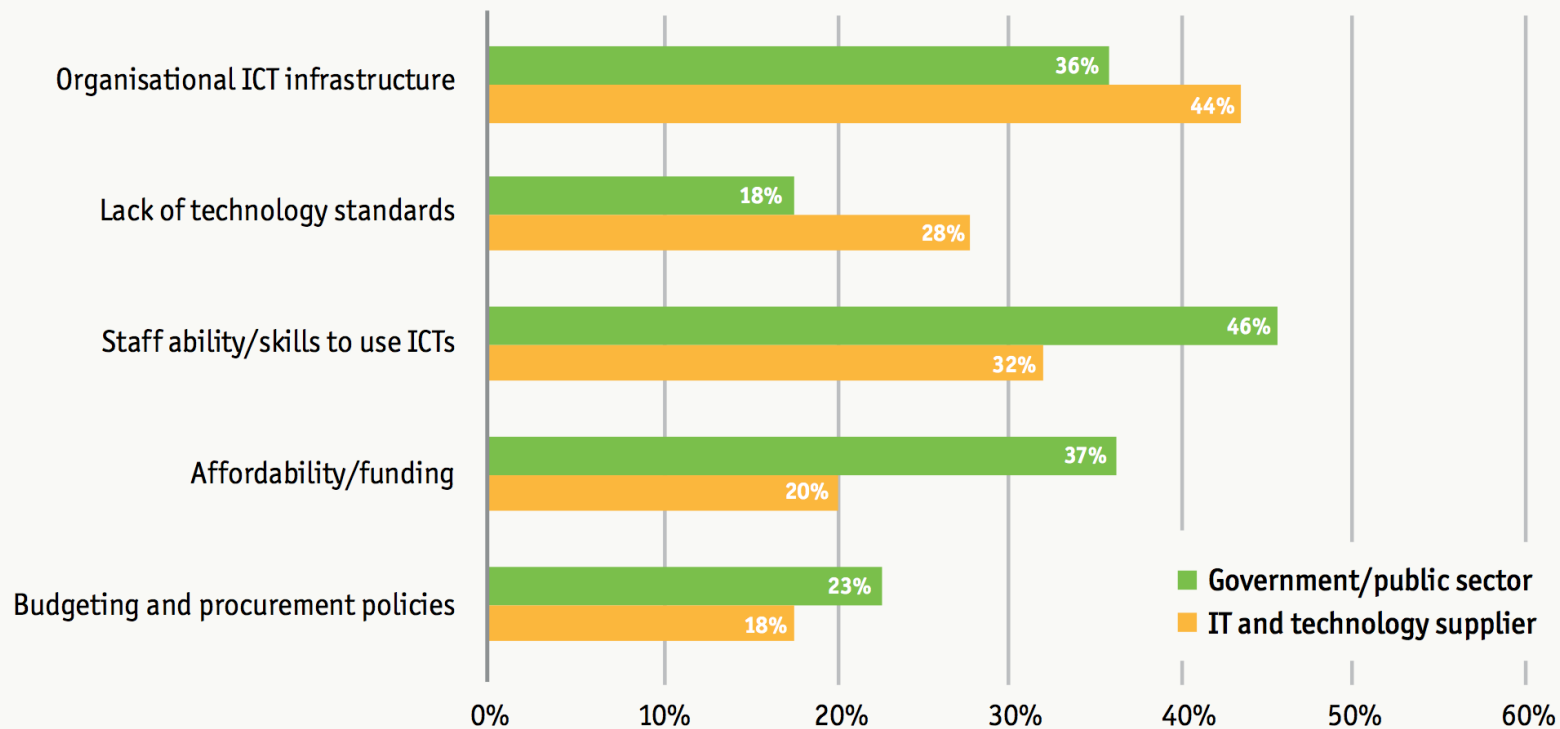
Digitising government in South-east Asia

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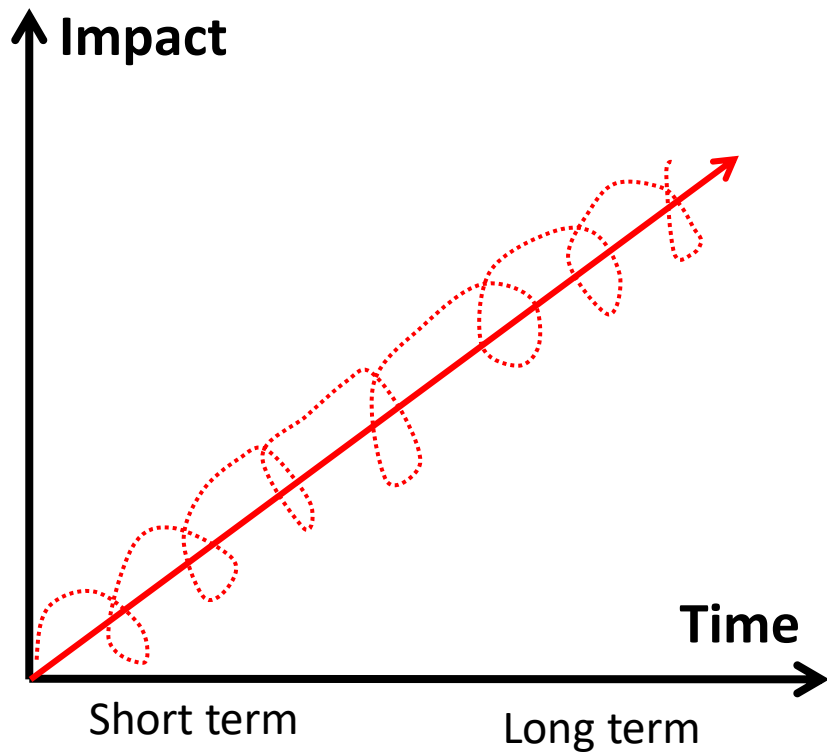


Figure 6: Having it, and knowing how to use it

Top 5 barriers to greater use of ICT in the public sector (% of respondents)



Source: The Economist Intelligence Unit



*Started in 1960s
Cabinet decision*

Cherish



How do you keep a tropical city-state cool?

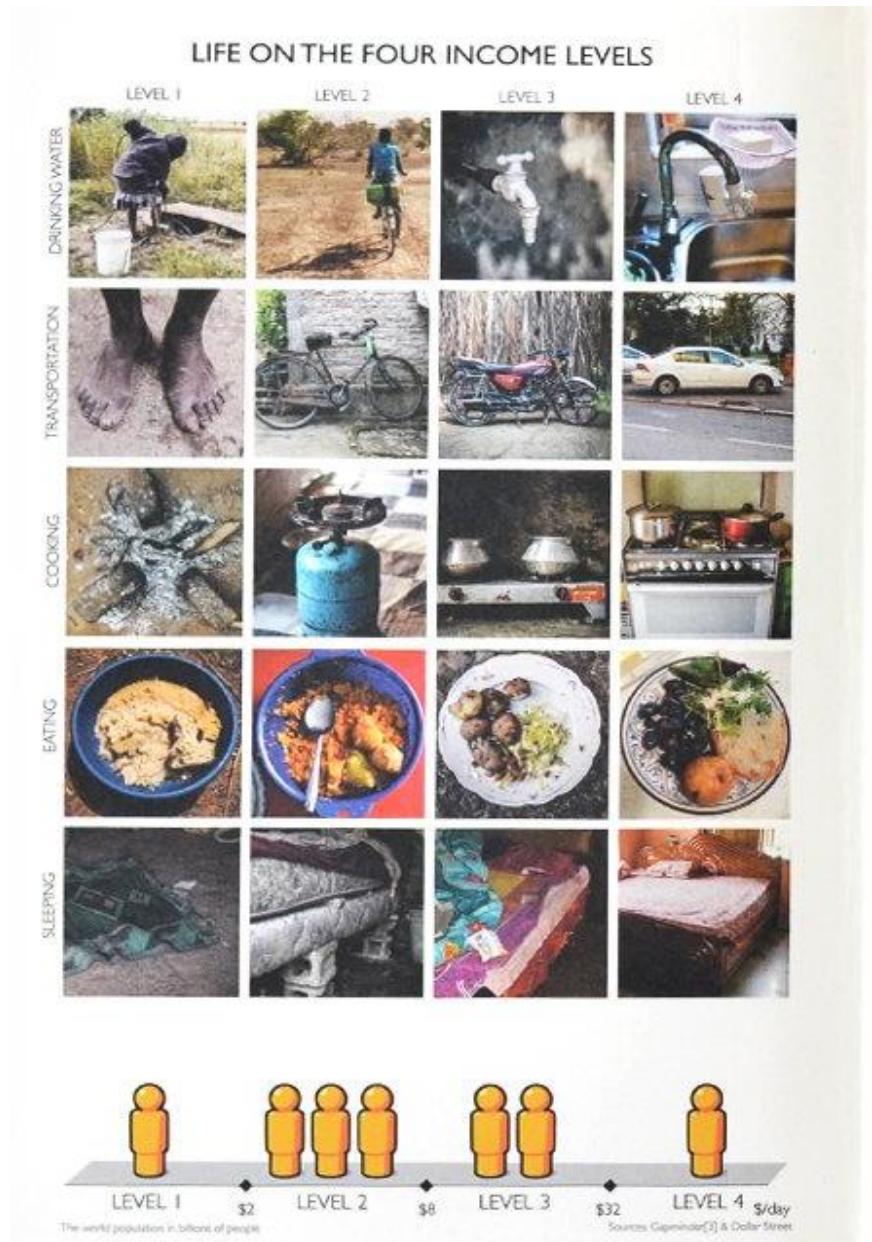
Turn it into a city in a garden

- 1963:** Start of tree-planting campaign
- 1967:** Garden City programme
- 1971:** First Tree Planting Day
- 1974:** Parks & Recreation Dept formed
- 1989:** Sungei Buloh - nature park status after NGO/public conservation calls
- 1990:** Clean and Green Week in 1990

- 1992:** Govt publishes first Green Plan
- 2001:** Labrador Park re-gazetted
- 2009:** Eco-link over a major expressway to bridge nature/catchment areas
- 2012:** Gardens by the Bay opened
- 2015:** Botanic Gardens becomes our first UNESCO World Heritage Site

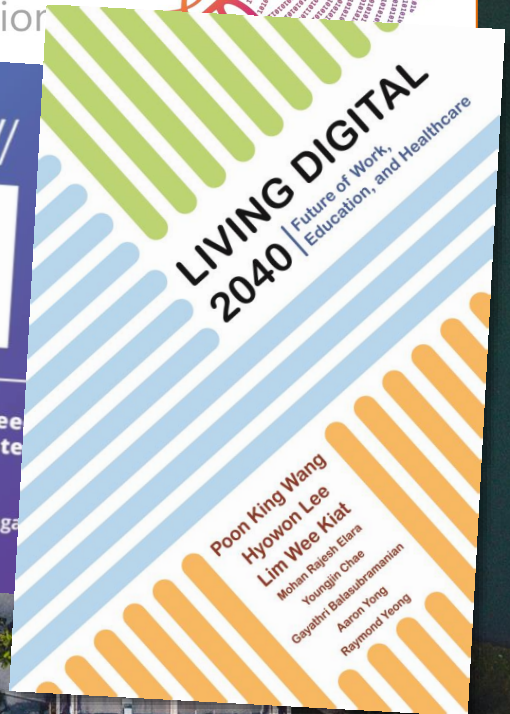
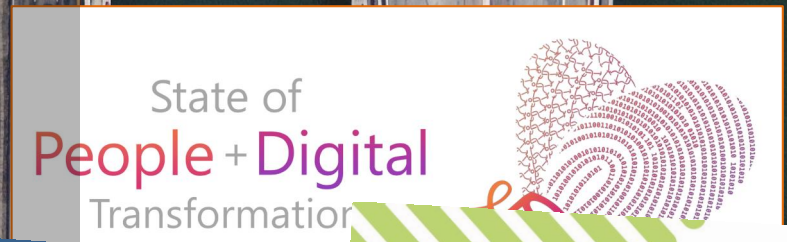
Conclusion

Imagine
Integrate
Improve



Source: Factfulness (Hans Rosling et al)

“An unstated question lies behind much of our current pre-occupation with the future of technology. The question is not what will technology be like in the future, but rather, what will we be like.” ~ Sherry Turkle, MIT



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