Living Digital

Imagining, Integrating, and Improving with Disruptive Tech

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Singapore University of Technology and Design
Story
Imagine
Integrate
Improve

Source: Factfulness (Hans Rosling et al)
Imagine
Integrate
Improve

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

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

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

Use
Contribute
1970-90s: landfill
2011: wetland

Started in 1960s
Cabinet decision
Cherish

Started in 1960s
100 years plan

Contribute
Use

Started in 1960s
100 years plan
Imagine
what disruptive tech can do
Chen Tiaqiao Program in Urban Innovation: Smart Cities Lab

Future of Cities: Future Digital Economies and Digital Societies

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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
No statistically significant difference found across age groups; differences only in the role played in a company. Beta report at: [http://bit.ly/peopleplusdigitalfull](http://bit.ly/peopleplusdigitalfull)
High aspirations, stark realities:
Digitising government in South-east Asia


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

<table>
<thead>
<tr>
<th>Service</th>
<th>Now</th>
<th>In 3 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>42%</td>
<td>59%</td>
</tr>
<tr>
<td>Education</td>
<td>43%</td>
<td>51%</td>
</tr>
<tr>
<td>Finance (eg, taxes)</td>
<td>45%</td>
<td>39%</td>
</tr>
<tr>
<td>Social security/welfare</td>
<td>31%</td>
<td>39%</td>
</tr>
<tr>
<td>Labour/employment</td>
<td>36%</td>
<td>31%</td>
</tr>
<tr>
<td>Security/policing</td>
<td>38%</td>
<td>26%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>33%</td>
<td>33%</td>
</tr>
</tbody>
</table>

Source: The Economist Intelligence Unit
<table>
<thead>
<tr>
<th>Smart City Component</th>
<th>Related Urban Aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart people</td>
<td>Education; communities</td>
</tr>
<tr>
<td>Smart economy</td>
<td>Digital economy; industry; operational efficiencies</td>
</tr>
<tr>
<td>Smart governance</td>
<td>E-Government; e-democracy; public consultation</td>
</tr>
<tr>
<td>Smart mobility</td>
<td>Logistics; infrastructure; transport; sharing economy</td>
</tr>
<tr>
<td>Smart environment</td>
<td>Waste management; cooling; sustainability</td>
</tr>
<tr>
<td>Smart living</td>
<td>Health; safety; security; livability</td>
</tr>
</tbody>
</table>

*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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A city that cares about caregiving
Integrate
different disruptive tech
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
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
App-based wireless control
Environmental sensing (air quality, noise)
Façade Lighting (colours)
RGBA Notification
Digital Street Sign
Water level / Flood monitoring
PV (photovoltaic) power for lamp, mobile phone
Smart Lighting
• LED
• Photocell control
• 0-100% dimming
• On-demand lighting
Concealed Speakers (music, alerts)
Image sensing
• Proximity
• Pedestrian counter
• Parking monitoring
• Public security
Digital Signage
• Way finding
• Traffic direction
• Civic info
• Revenue potential
Push-to-Talk system (‘blue-light’ services)
eVehicle / eBike Charging

www.UrbanDNA.eu
Sources: Various
<table>
<thead>
<tr>
<th></th>
<th>Pre-Globalized World</th>
<th>1st Unbundling</th>
<th>2nd Unbundling</th>
<th>3rd Unbundling?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade costs</td>
<td>High</td>
<td>Lower</td>
<td>Lower</td>
<td>Lower</td>
</tr>
<tr>
<td>Communication costs</td>
<td>High</td>
<td>High</td>
<td>Lower</td>
<td>Lower</td>
</tr>
<tr>
<td>Face-to-face costs</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Lower?</td>
</tr>
<tr>
<td>Time Period</td>
<td>Pre-1820s</td>
<td>1820s onwards</td>
<td>1990 onwards</td>
<td>Emerging</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>Integrate global supply chains; Export-oriented growth booms</td>
<td>How do countries and cities develop and compete?</td>
</tr>
</tbody>
</table>

*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)
Building Human Capabilities

To live a long, healthy life
To acquire knowledge and be creative
To enjoy a decent standard of living
To participate in the social, economic and political life of a community

Knowledge; Creativity

Technological Advances

Employment; Resources for Education, Health, Communication

Productivity Gains

Resources for R&D

Technological Change

Economic Growth

Future of Work

Source: Living Digital 2040
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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


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

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

- **Organisational ICT infrastructure**
  - Government/public sector: 36%
  - IT and technology supplier: 44%

- **Lack of technology standards**
  - Government/public sector: 18%
  - IT and technology supplier: 28%

- **Staff ability/skills to use ICTs**
  - Government/public sector: 32%
  - IT and technology supplier: 32%

- **Affordability/funding**
  - Government/public sector: 20%
  - IT and technology supplier: 37%

- **Budgeting and procurement policies**
  - Government/public sector: 23%
  - IT and technology supplier: 18%

Source: The Economist Intelligence Unit
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 preoccupation 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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