ICTs for smart sustainable cities

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Asia – we love cities, and we love ICT

The Asian and Pacific region became majority urban in 2019 for the first time.

With more than 2.3 billion people in the region living in cities, the need for a sustainable urban future has never been greater.

The future of smart & inclusive cities

The Future of Asian & Pacific Cities

.08 Improve smart city governance across urban systems, institutions and actors to overcome inequalities and make more informed and integrated planning decisions

.09 Encourage technology firms to become more civic minded and create sustainable smart city solutions with social enterprise

.10 Adopt cybersecurity safeguards in both digital and physical urban infrastructure development planning

.11 Develop smart mobility investment plans that prioritize sustainable urban mobility options for citizens

.12 Expand viable smart city funding mechanisms by enabling cross-sector partnerships and business matching platforms

https://www.unescap.org/sites/default/files/Future%20of%20AP%20Cities%20Report%202019_EXECUTIVE_SUMMARY_0.pdf

This was my turning point

1.7m

Daily carbon footprint: 87kg

(it should be 2.7kg)

Our economic growth has been based on a Linear Economy
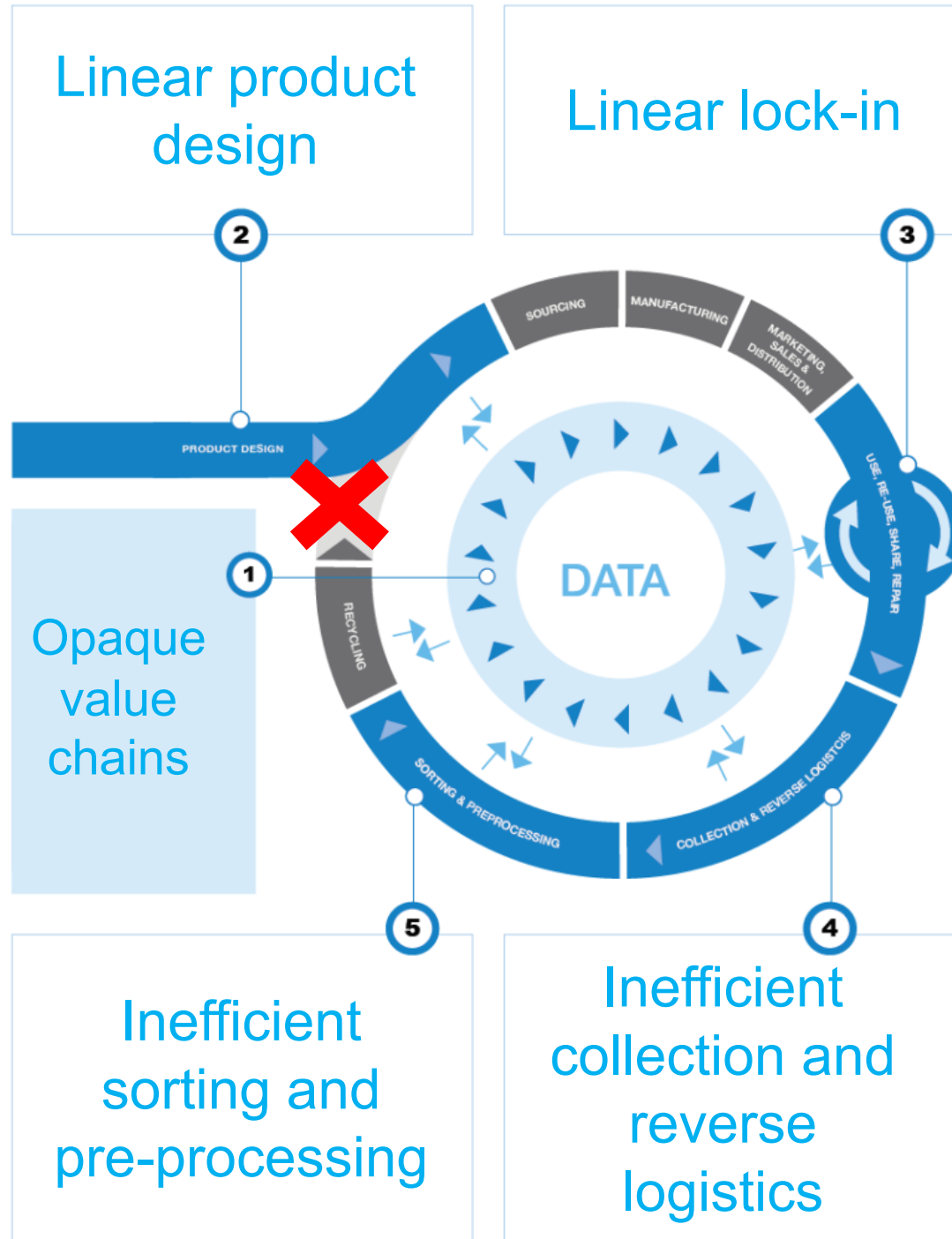
| RESOURCE EXTRACTION | PRODUCTION | DISTRIBUTION | CONSUMPTION | WASTE |

2015:

80 billion
tonnes materials

2050:

150 billion
tonnes materials

Figure 2. Overview of shared challenges along the value chain (Accenture, 2018)

Why is the economy linear?

Waste and pollution to be designed out of products and urban systems

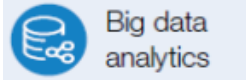**Materials to be kept in use and maintain their value**

Natural systems in and around cities to regenerate

Circular Economy Principles

How are digital technologies overcoming linearity?
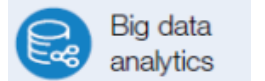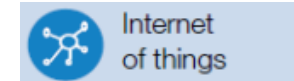
Design durable product and materials
Design tool:
- Artificial Intelligence
- Big data analytics

Enable efficient reuse
Service based models
Connected reusable products
Value assessment tool for used products
- Internet of things
- Big data analytics
- Blockchain

Enable transparency of material flows
Internet of materials
Provenance tool, Product passport
- Cryptographic anchor
- Blockchain

Optimise collection and reverse logistics
Tokenised rewards system
Virtual waste management platform, Waste taxi, reverse logistics
- Blockchain
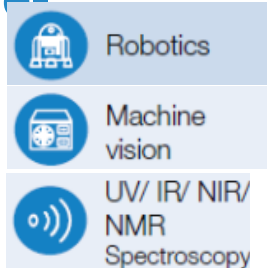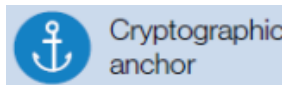- Mobile device
- Artificial Intelligence
- Internet of things

Optimise sorting and pre-processing
Hyper intelligent sorting
Disassembly robots
Visual signature sorting
- Robotics
- Machine vision
- UV/ IR/ NIR/ NMR Spectroscopy

SOURCING
MANUFACTURING
MARKETING, SALES & DISTRIBUTION
PRODUCT DESIGN
RECYCLING
SORTING & PREPROCESSING
COLLECTION & REVERSE LOGISTCIS
USE, RE-USE, SHARE, REPAIR

DATA

Circular economy – Long lifespan, reuse, recycle, share
Mobike

Hydraulic Adjustable Seat

Ultra Strong Basket

IoT Smart Lock

Full Aluminum Body

5-spoke Wheel

Disc Brakes

Advanced Shaft Drive Transmission System

Airless and Puncture less Tyres

Recycle and Reuse Bicycle Parts, Partner with Dow Chemical
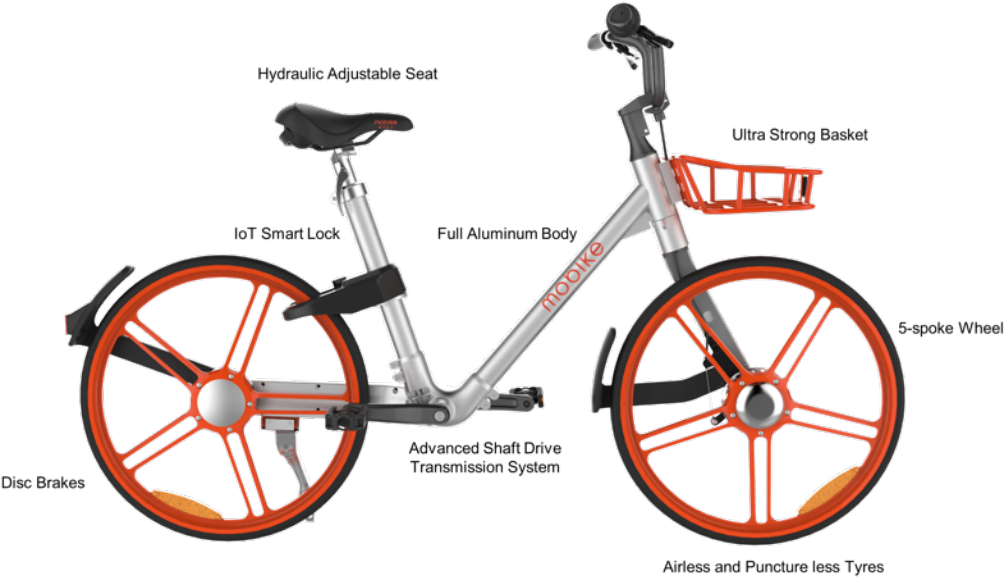
Reuse Locks

Reuse PV panels

Reuse back tire and rim

Recycle aluminum by recycling companies

Recycle tires by supplier

Material: Polyurethane

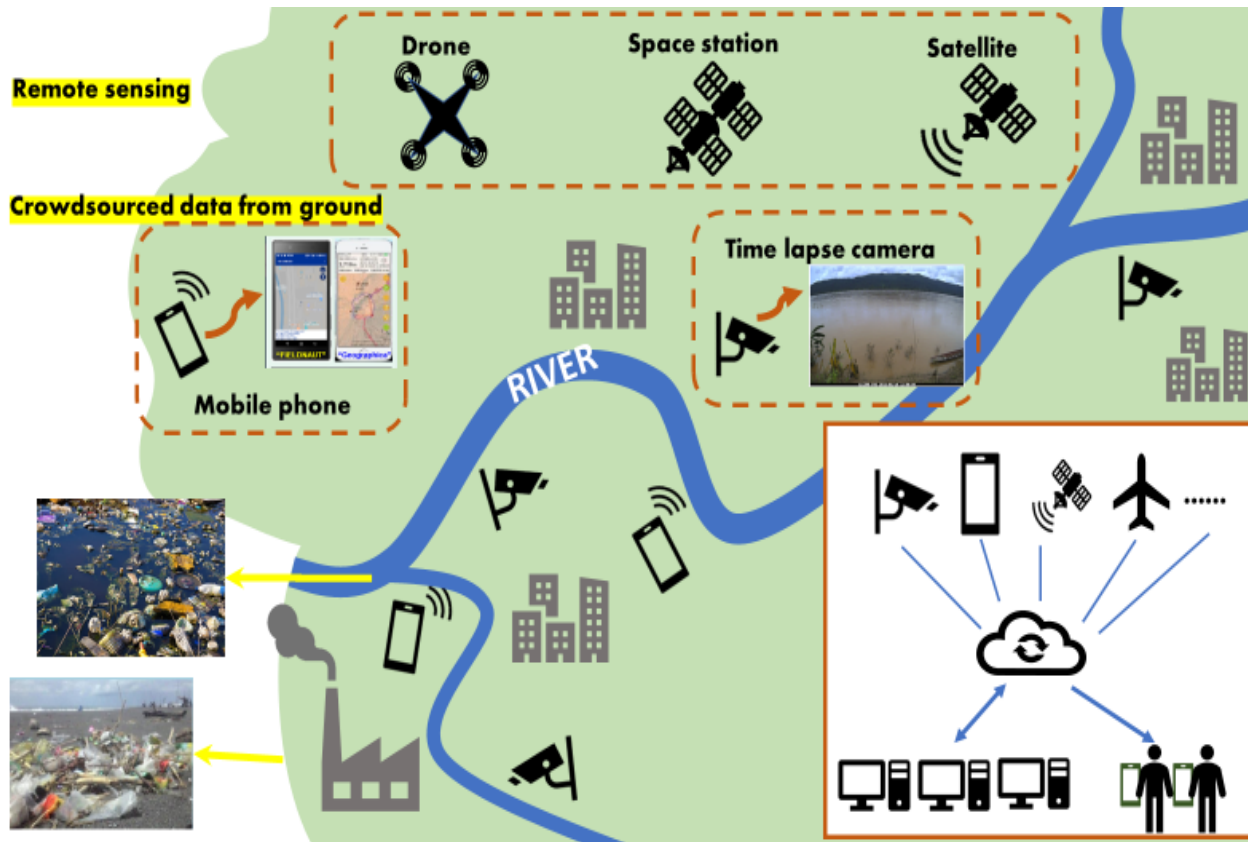Recycle steel by recycling companies

+9,000,000 SMART BIKES OPERATING GLOBALLY

+30,000,000 MOBIKE RIDES EVERYDAY

Closing the Loop

Digital tool using satellite data, remote sensing, drones, crowdsourced data, machine learning to map marine plastic hotspots in South East Asian cities

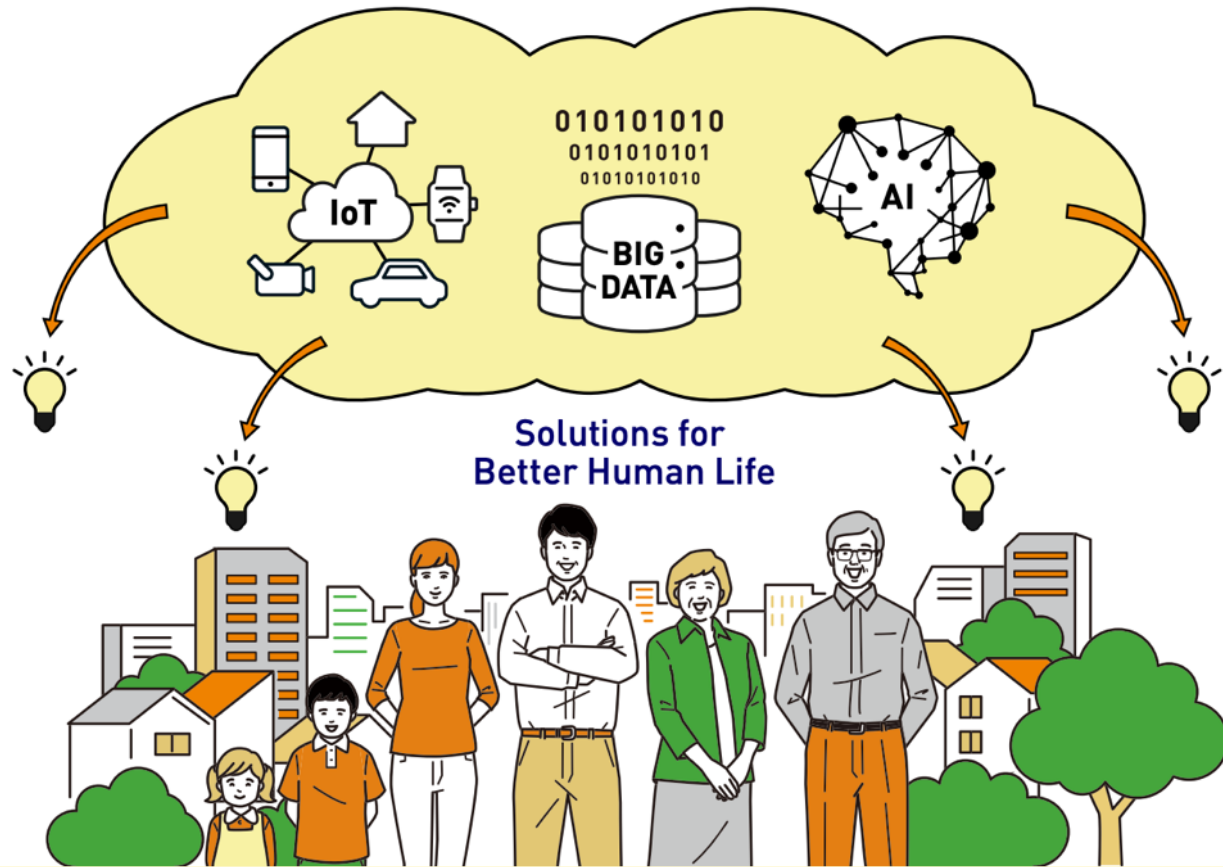https://www.unescap.org/projects/closing-the-loop

China's Emerald City guidelines

Smart Telecommunications
Smart Mobility
Smart Energy Management
Smart Governance
Smart Public Services
Smart Safety

1. Urban growth boundary
2. Transit-oriented development
3. Mixed use
4. Small blocks
5. Public green space
6. Non-motorized transit
7. Public transit
8. Car control
9. Green buildings
10. Renewable and district energy
11. Waste management
12. Water efficiency

https://energyinnovation.org/wp-content/uploads/2015/12/12-Green-Guidelines.pdf

Japan's Society 5.0

Entering Society 5.0

Solutions for Better Human Life

https://www.japan.go.jp/abenomics/_userdata/abenomics/pdf/society_5.0.pdf

- Healthcare
  - telehealth, robot care, eHealth data
- Mobility
  - autonomous vehicles, efficient logistics
- Infrastructure
  - Sensors, AI and robots for maintenance
- FinTech
  - Blockchain for transactions, API for fintech, cashless

A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy

The threats and risks of climate change are known, and so are many ways to prevent them.

The transition requires further scaling-up of **technological innovations in energy, buildings, transport, industry and agriculture sectors**.

It can be accelerated by breakthroughs in digitalisation, information and communications, artificial intelligence and biotechnology.

A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy

Energy efficient buildings: digitalisation and home automation

Low carbon energy: decentralised power system based on renewables needs a smarter system through digitalisation.

Mobility: decarbonised, decentralised and digitalised power, connectivity and autonomous driving, videoconferencing

Circular Economy: new business models

Infrastructure: smart network infrastructure and inter-connections

THANK YOU

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