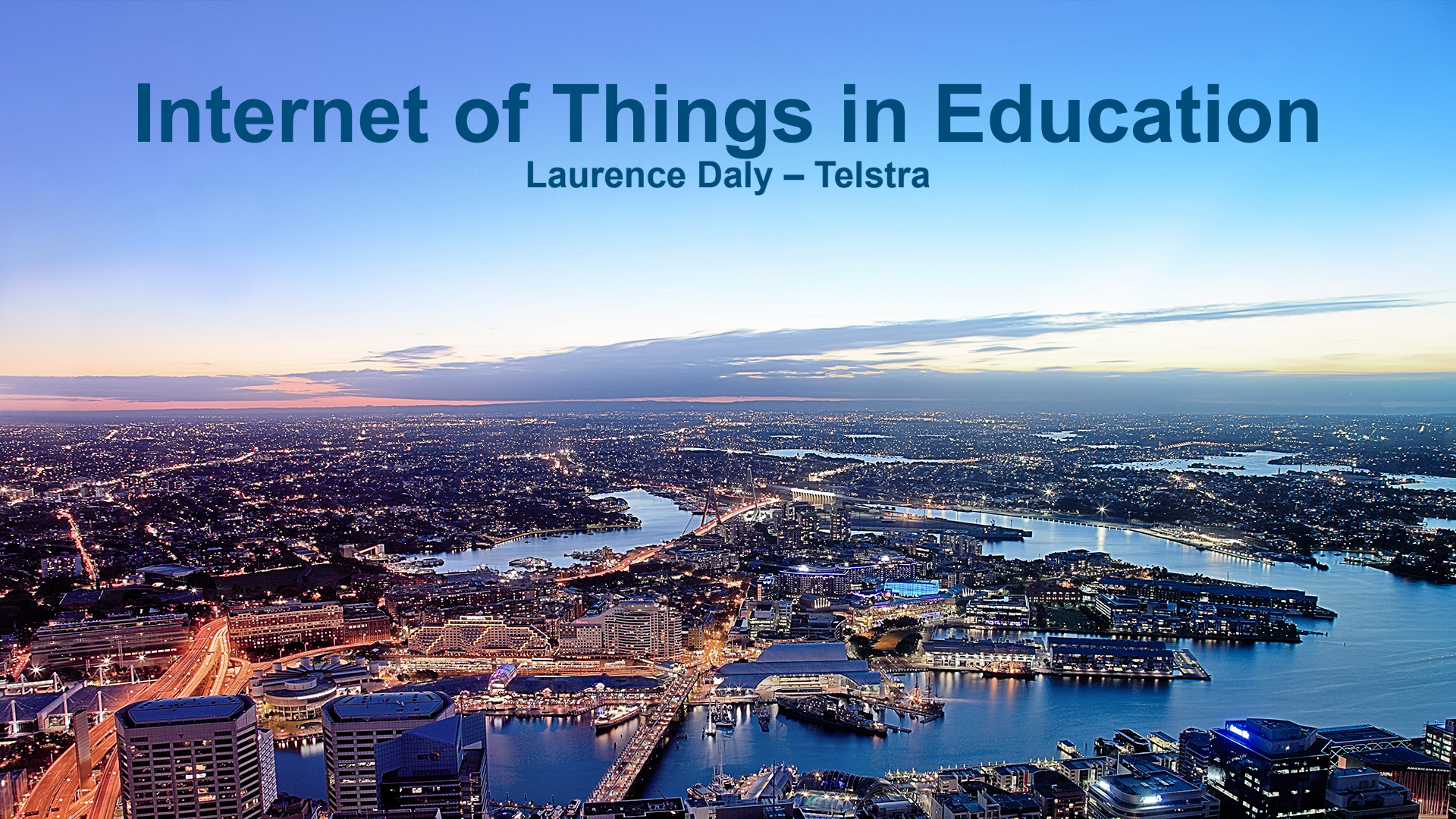
Internet of Things in Education

Laurence Daly – Telstra



Agenda

What is IoT, how does it impact the world, growth, different types of networks etc

The breakdown of how IoT impacts education looking at:

- School i.e. the physical buildings, building management, grounds etc
- Classroom - how we interact with students
- And finally the student and curriculum and how IoT could play a part in the education and engagement with students

IoT is not simply about connectivity – it just starts here

Internet of Everything / Internet of Education

The 5 Pillars of Education

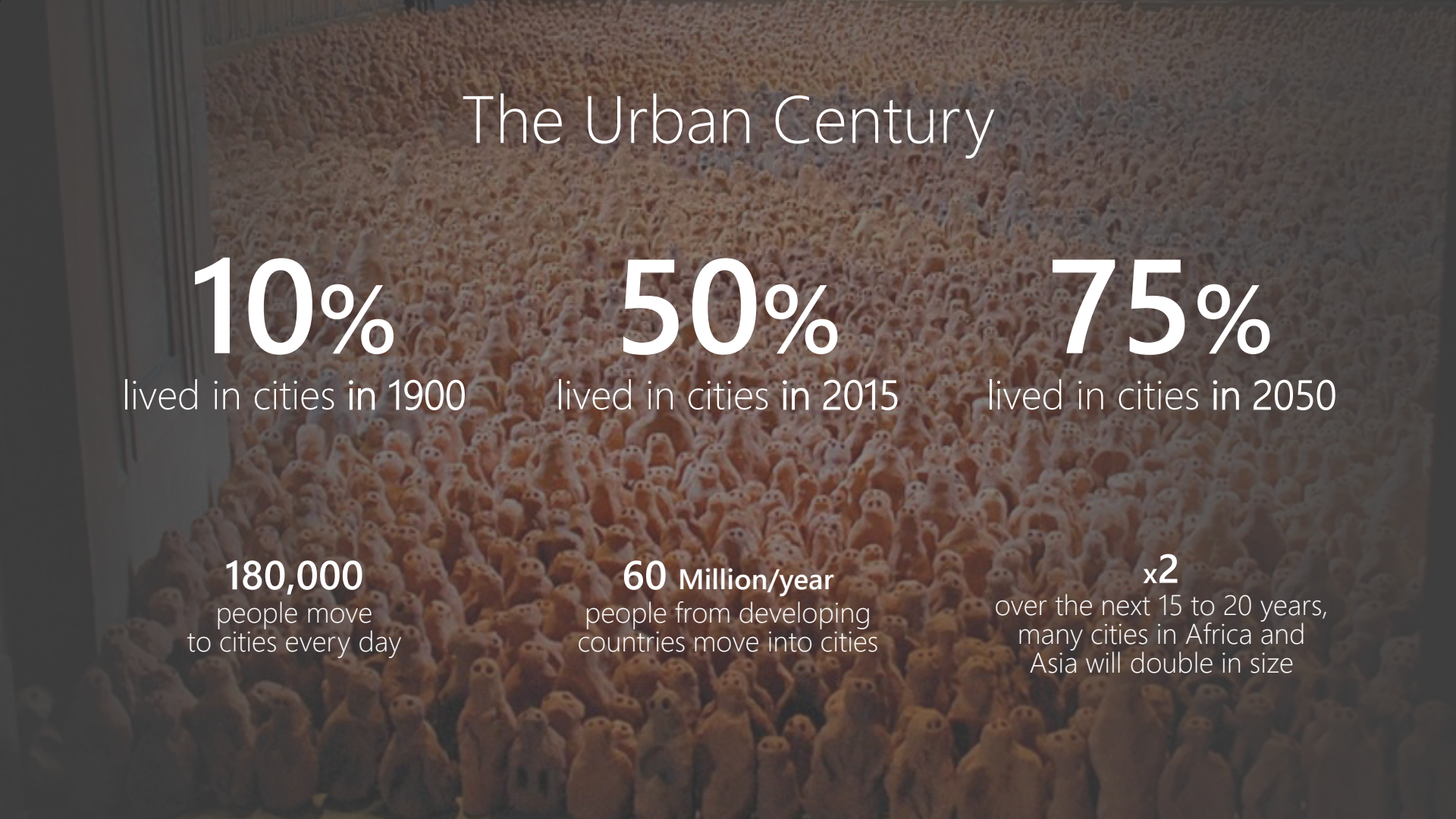
Digital Student Journey

Connected Workplace

Connected Campus

Smart Student Tools

Data Insights


The Urban Century
10%
lived in cities in 1900
50%
lived in cities in 2015
75%
lived in cities in 2050
180,000
people move
to cities every day
60 Million/year
people from developing
countries move into cities
x2
over the next 15 to 20 years,
many cities in Africa and
Asia will double in size

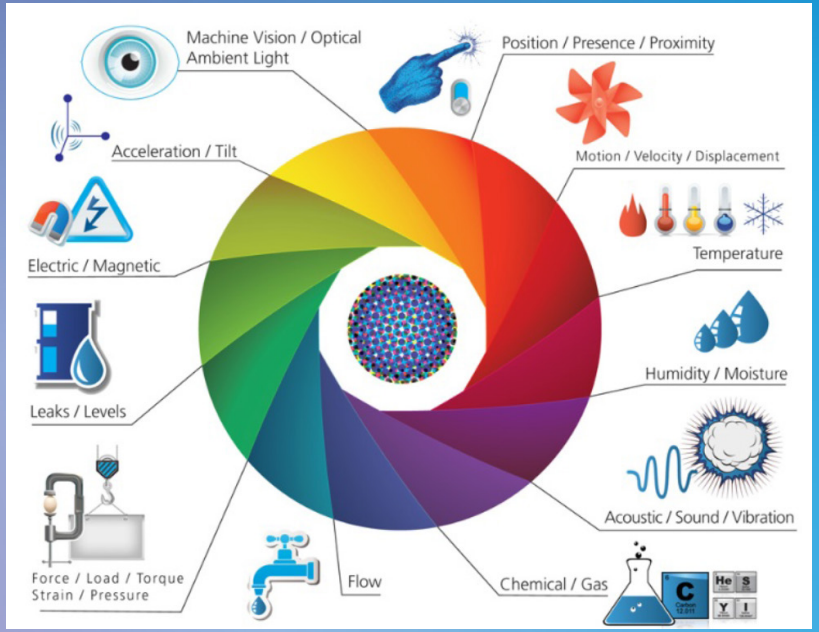
What is IoT?

IoT is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data.

IoT allows objects to be sensed and controlled remotely across network infrastructure, creating opportunities for integration between the physical world and computer-based systems.

IoT is giving our world a digital nervous system
- Location data using GPS sensors
- Eyes and ears using cameras and microphones
- Sensory organs that measure everything from temperature to pressure changes

Couple that with
- Augmented Reality
- Artificial Intelligence
- Machine learning
- Quantum computing



A smarter world awaits
IoT the new "Buzz word"

The stats

The number of things connected to the internet now far exceeds the number of people on earth

50 billion
connected devices

Over **US$9M**
raised on Kickstarter for IoT

Over **50M**

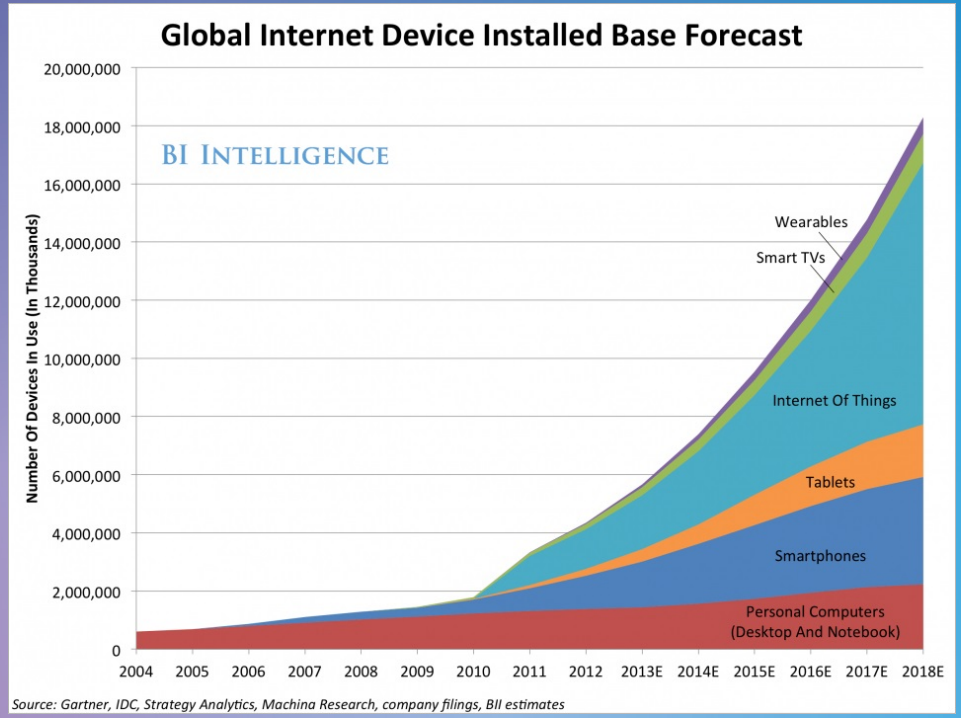
wearable computing devices shipped in 2013

Almost **100M**

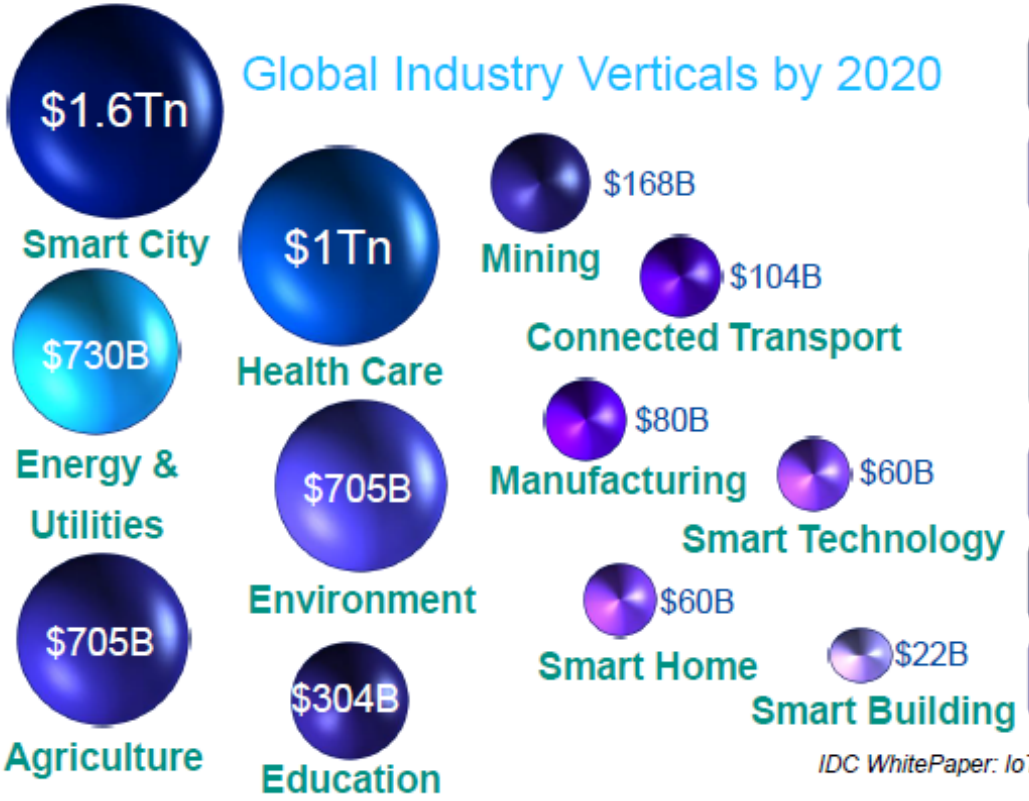
802.15.4 devices shipped in 2012
(smart meters / remote controls)

Size of the market

GLOBAL SPENDING ON IOT—INCLUDING ALL HARDWARE, SOFTWARE AND SERVICES —HAS EXCEEDED $1.3 TRILLION IN 2015 AND IS FORECAST TO REACH $3.5 TRILLION BY 2020. (GARTNER)



IoT provides New Opportunities



"58% of organisations worldwide see the Internet of Things as strategic to their business" *IDC*

"Another 24% of organisations worldwide see IoT as transformational to their business" *IDC*

"Almost 50% of Australian Companies see IoT as Transformational with a need to innovate after the mining boom" *IDC*

"IoT has the potential to boost the national economy by $116 billion by 2025" *IoT Alliance Aust*

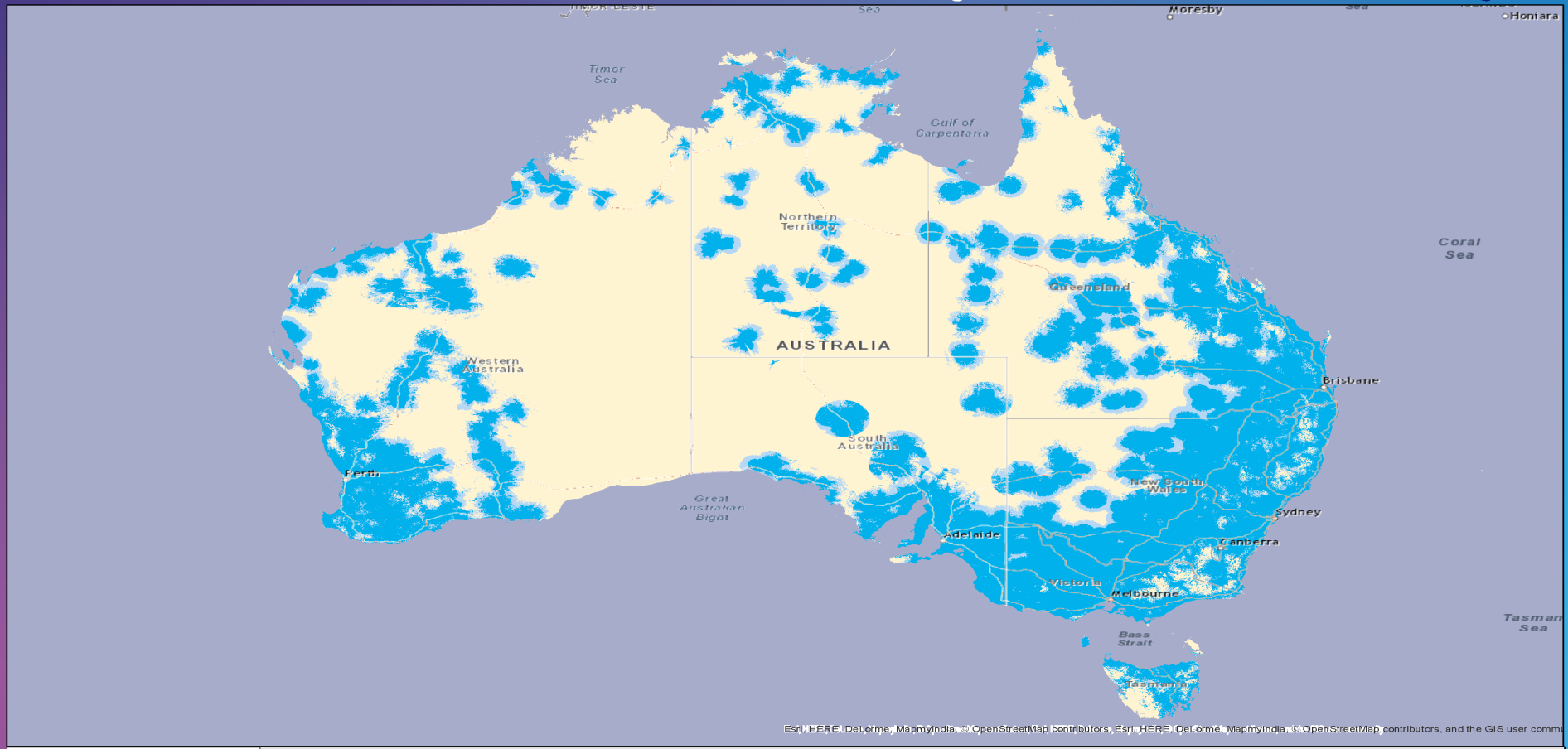
"IoT could boost Australia's GDP by $6.5 billion in the next 4 years" *Microsoft*

"$11.1USD Trillion Global Economic Impact by 2025" *McKinsey*

IDC WhitePaper: IoT and Digital Transformation: A Tale of Four Industries Mar 2016
IDC's 2015 Global IoT Decision Maker Survey
Global Verticals is an averaged estimation from 9 agencies e.g. Ovum, GSMA, Gartner, etc : Source Huawei

Telstra Mobile Network Coverage

TELSTRA



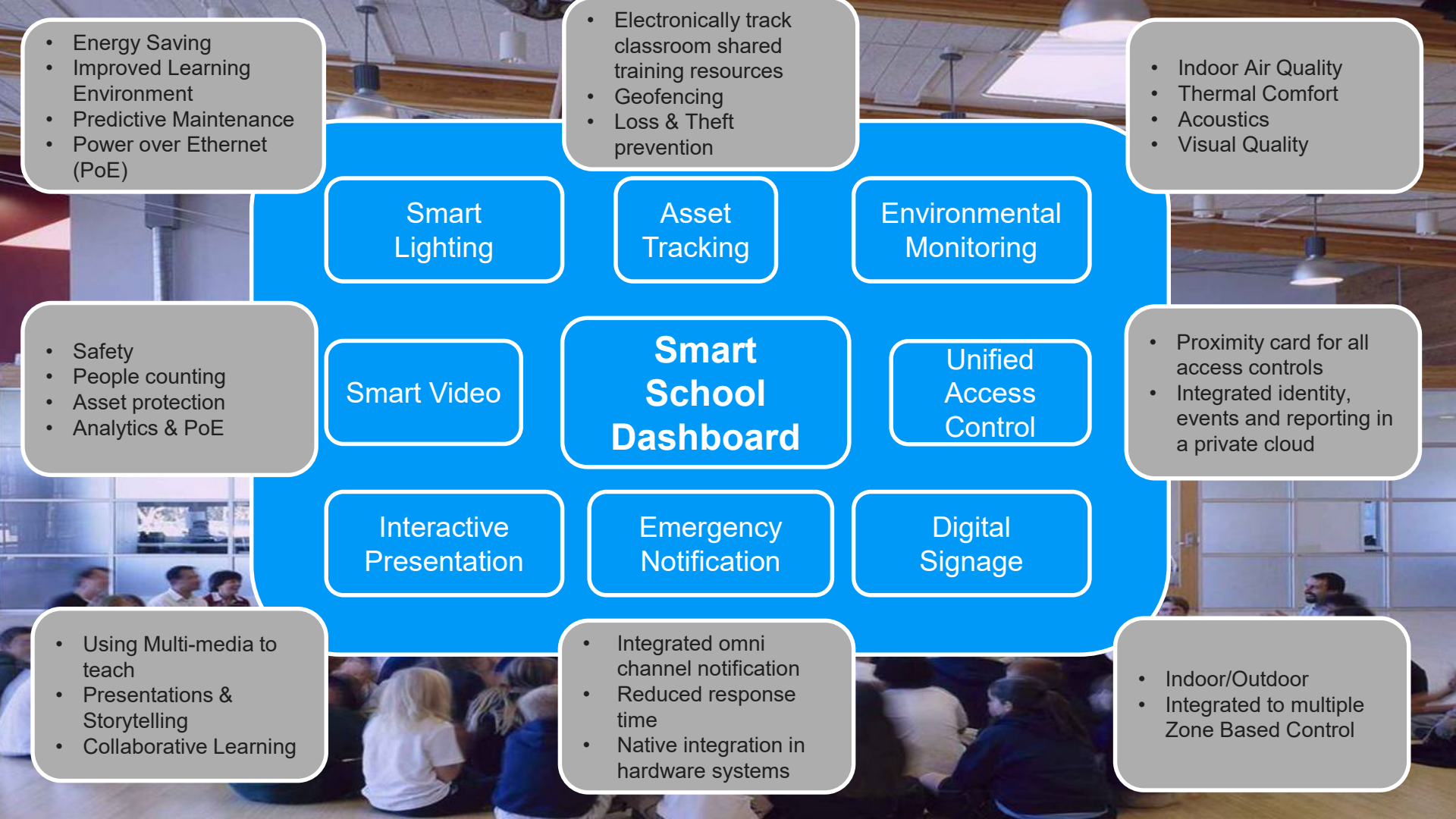
Legend

- Future CAT M coverage with a device with a single receive antenna
- Future CAT M coverage with a device with dual receive antenna's

Mobile device coverage depends on where you are, the device you are using and whether it has an external antenna attached. For tips on maximising your coverage, visit the Maximise Your Coverage page.

Customers should be aware that the Telstra mobile coverage maps displayed have been created using tools that predict the likely areas of coverage. Not every particular location within the identified coverage areas has been individually tested for coverage. This means that while the footprint of coverage outlined on the maps is generally accurate, there will be specific areas described as being within a coverage area where a customer's device will not work. This is a common characteristic of wireless systems. For example, coverage could be degraded or not existent in specific locations due to certain physical structures or geographic features or as a result of the device used. Physical structures which may block or inhibit coverage could include basements, lifts, underground car parks, concrete buildings, tunnels and road cuttings. Geographic features which may block or inhibit coverage could include formations such as hills and mountains or even trees.

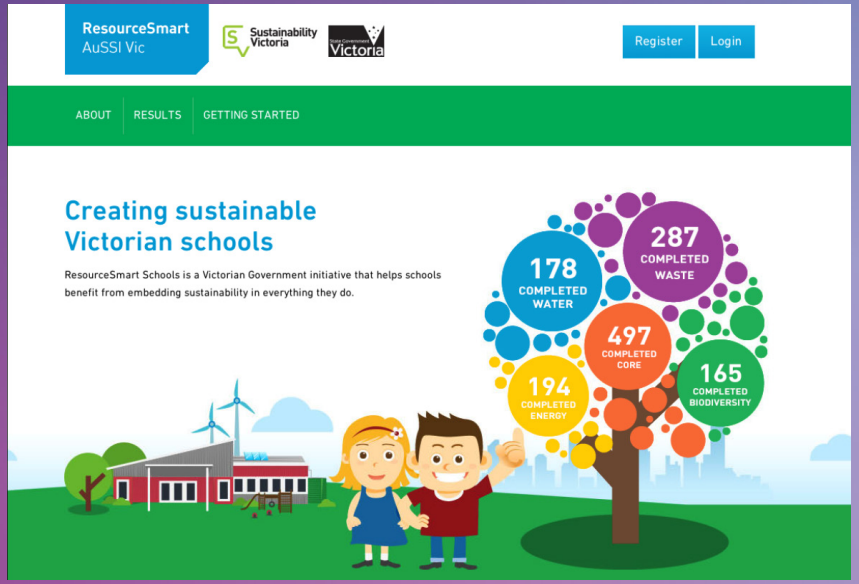
Current at 08/1

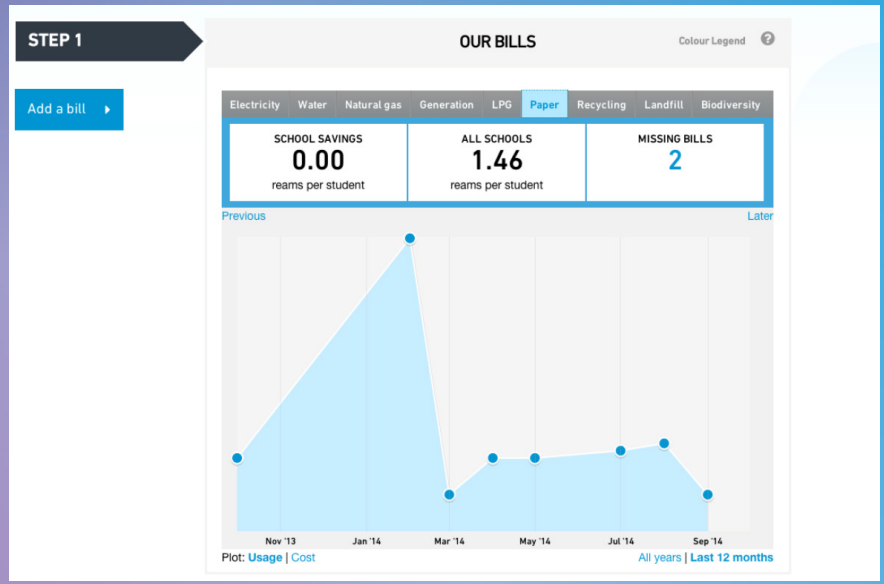

Energy Saving
Improved Learning Environment
Predictive Maintenance
Power over Ethernet (PoE)
Electronically track classroom shared training resources
Geofencing
Loss & Theft prevention
Indoor Air Quality
Thermal Comfort
Acoustics
Visual Quality
Smart Lighting
Asset Tracking
Environmental Monitoring
Safety
People counting
Asset protection
Analytics & PoE
Smart Video
Smart School Dashboard
Unified Access Control
Proximity card for all access controls
Integrated identity, events and reporting in a private cloud
Interactive Presentation
Emergency Notification
Digital Signage
Using Multi-media to teach
Presentations & Storytelling
Collaborative Learning
Integrated omni channel notification
Reduced response time
Native integration in hardware systems
Indoor/Outdoor
Integrated to multiple Zone Based Control

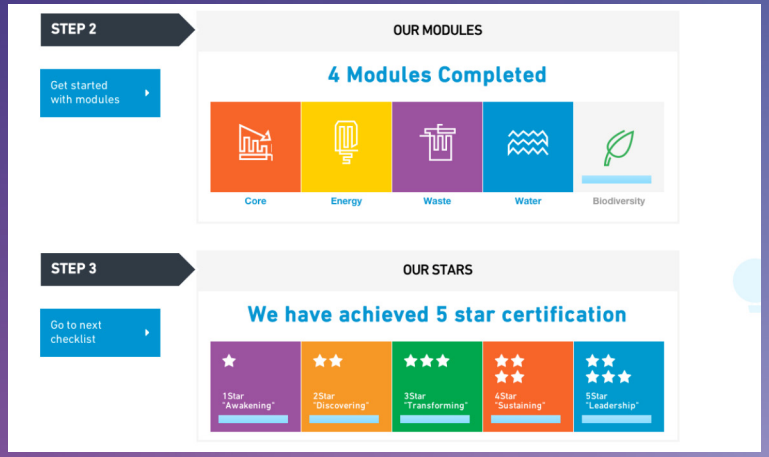
Examples of IoT in Education

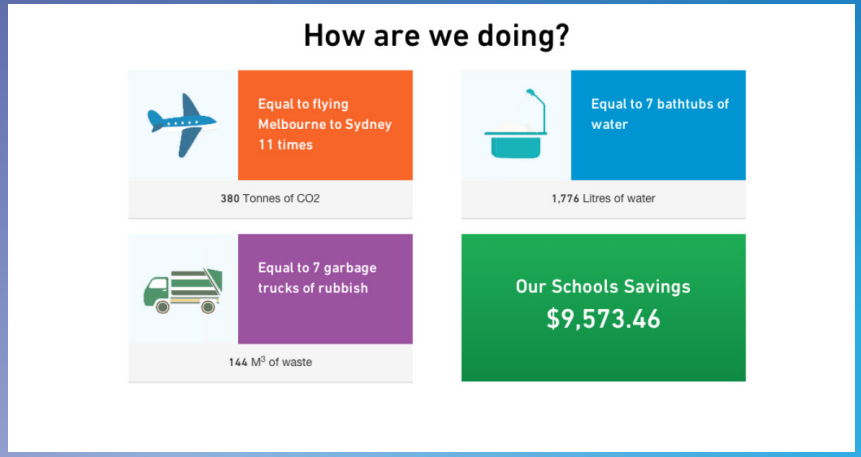
http://www.wspdigital.com/our_work/all/32/

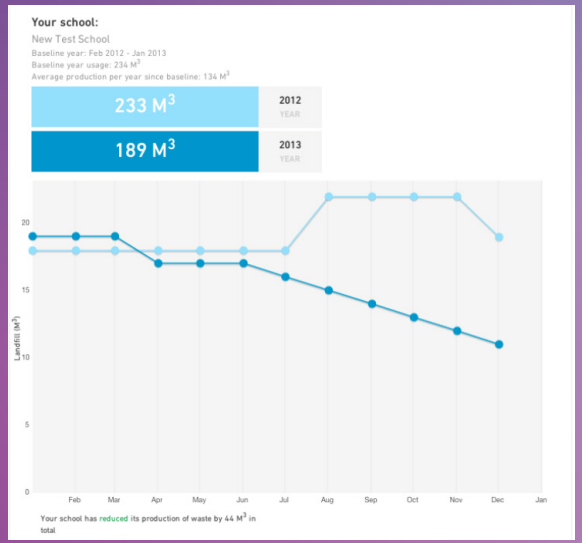
http://www.sustainability.vic.gov.au/School











The ResourceSmart website commenced deployment in 2014 and is now used broadly across Victoria's schools. In 2014 the system was awarded the AIIA iAwards National Merit Award for a Government Application.

http://www.resourcesmartschools.vic.gov.au/

GOOD CITIES DIAGNOSTIC ATTRIBUTES OVERVIEW DRAFT

RESILIENCE & SUSTAINABILITY

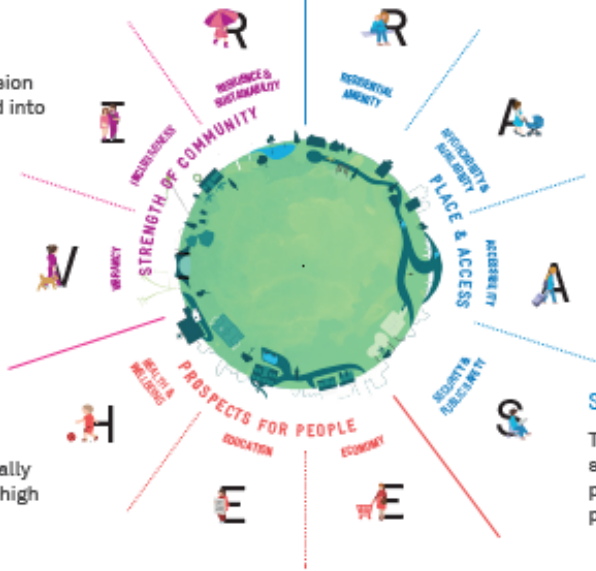
The capacity of a city, its users and businesses to cope with acute shocks and chronic stresses, while also sustaining its physical environment over the longer-term.

RESIDENTIAL AMENITY

The qualities of the physical landscape and built environment that make somewhere a good place to live for particular residents.

INCLUSIVENESS

The fundamental human need for a sense of belonging and social cohesion based on how people are connected into the social ecosystem.



AFFORDABILITY & AVAILABILITY

The ability of citizens to locate themselves in a suitable area and in the right type of housing for their lifestyle and family needs, without undue stress on their finances.

VIBRANCY

The inherent attractiveness of a particular community or locality based on the range and quality of activities and experiences that are available for people to enjoy.

ACCESSIBILITY

How easy it is for people to access the things they need for their personal and economic wellbeing.

HEALTH & WELLBEING

People being physically and mentally healthy to help ensure a long and high quality life

SECURITY & PUBLIC SAFETY

The perceived and actual level of public safety in a community, the security of personal property and the protection of personal privacy (physical and digital)

EDUCATION

The existence of effective education offered through appropriate modes / channels for members of the community.

ECONOMY

Effective economic activity being nurtured in the community for residents, visitors and businesses.

Telstra Smart Community (Phase 1)

Asset and facilities management

Connect a vast range of council assets to allow improved visibility, maintenance and utilisation.

Generate revenue from under utilised assets.

Smart monitoring (CCTV)

Improve safety, reduction in maintenance/repair costs.

Faster detection and responsiveness to issues.

Smart bins

Reduce collection frequencies, reduce overflows optimising waste management.

Smarter parking

Availability of spaces, utilisation, ease of payment, whilst upholding parking compliance.

Future planning of car parks.

Smart lighting

Improve safety, reduce energy consumption and proactively monitor faulty lights. City backbone of all communications.

Environmental monitoring

Sensors to provide insights to improve decision making, community engagement and monitoring of sustainability plans

Telstra Air

Best-in-class public Wi-Fi that creates strong visitor engagement. Fully managed, turn-key deployment that's cost effective to operate. Part of Australia's largest Wi-Fi network, maintained and owned by Telstra

Location insights

Aggregates anonymised information from proprietary network assets to provide actionable insights about the location and movement of the Australian population.

OUR GOOD CITIES PRINCIPLES

VISION-LED

We lead with vision and human outcomes, not technology, utilising a powerful model that enables councils to gain new insight on their situation and develop a coherent narrative for their stakeholders —built around the 'WHY'.

HUMAN-CENTRED

We see 'Smart Cities' not just as a bundle of tech and services. We reimagine the 'city' as a set of human activities and interactions—and then identify the unmet needs for which we can co-design fit-for-purpose solutions that enhance people's experience of the city.

TECH-ENABLED

We believe in the power and promise of technology to deliver human outcomes. Our goal is to integrate with the existing environment to provide accessible world-class connectivity and technology that connects lives and empowers community participation.

Telstra Location Insights

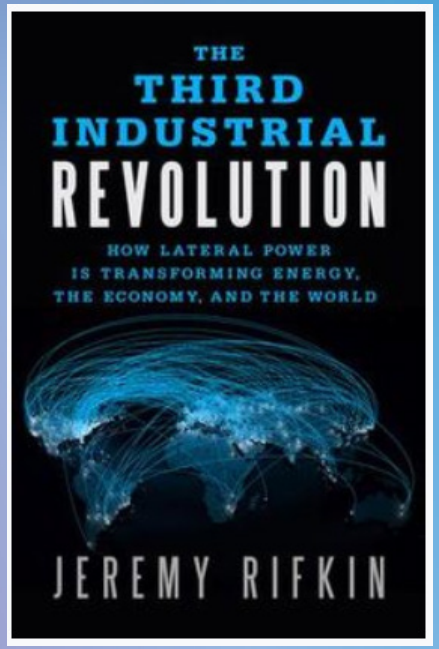
aggregates information from proprietary network assets to provide actionable insights about the location of the Australian population

Enabler for deep, rich and highly relevant analytics and predictive insights

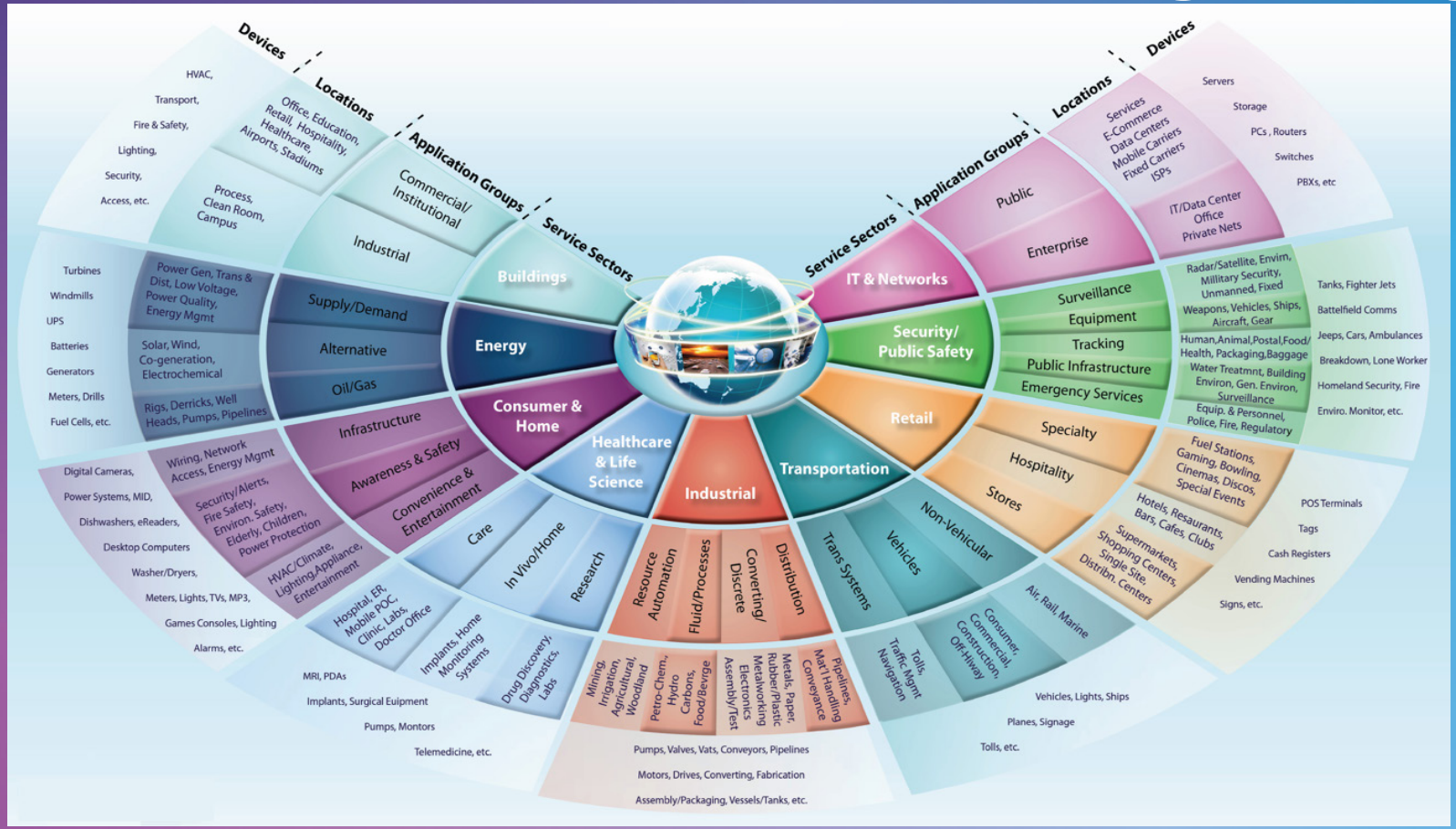
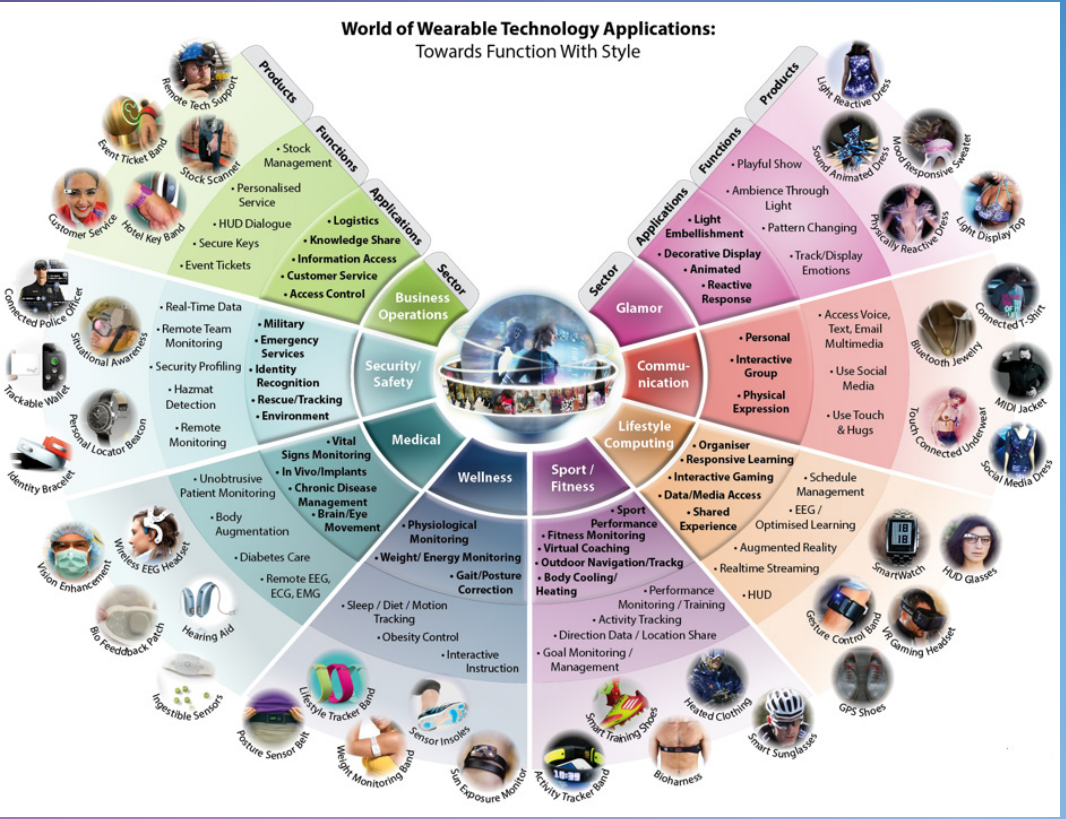
The Third industrial revolution

Jeremy Rifkin

The Third Industrial Revolution; How Lateral Power is Transforming Energy, the Economy, and the World



M2M World of connected things today



Wearable technology