
INDUSTRY 4.0
& GOVERNANCE
INDUSTRIAL
ERA Technologies
4th
FOURTH
Computing data
EFFICIENCY
CPS
system
activity
exchange cloud
industry REVOLUTION
REVOLUTION
Network
RELIABILITY
Safety
infrastruture
integration
Maintenance
Monitoring
cyber-physical system
Adaptability
effectiveness
CPPS
BIG DATA
INTERNET OF THINGS
QUALITY
Energy supply
DATA
production
Planning
BREAKDOWN
4.0
POWER GRID
Delivery time
logistic
factory
IMPACT
structure
SMART FACTORY
LABOUR
effectiveness
FLOWS
MODULAR
Asset synchronization
GATEWAY
Any Device
NETWORK
Anything
NETWORK AND CLOUD
COMPUTER
REDUCE
Time
AUTOMATION
Autonomy
ROBOTS
Artificial
intelligence
Eco-System
VALUE
PRODUCT INTELLIGENCE
REDESIGN
Ingenious
Intelligent
SMART PRODUCT
New revenue
Digital
Energy supply
Digital
Everything
0101
PHYSICAL
Improving
3D PRINTING
Supply chain
TRANSFORMATION
0101010
WORLD
User-Conscious
ECO
RECONFIGURABILITY
Digitized
REMOTE SUPPORT
Business
DIGITALIZATION
Visual
Customer
OFFERING
BINARY
DECODES
CUSTOMIZATION
Integration
01
1010101
INFORMATION
BINARY
PLATFORM
APPLICATION

AGENDA

- Fourth Industrial Revolution
- Related Technologies
- Sustainable Development Goals
- How 4IR can help in achieving SDGs
- What will be the Yardstick

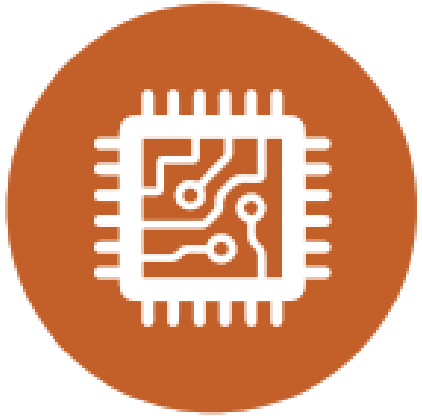
1st revolution
Indutrial

Late 1700s
Mechanisation

2nd revolution
Technological

Late 1800s
Electricity

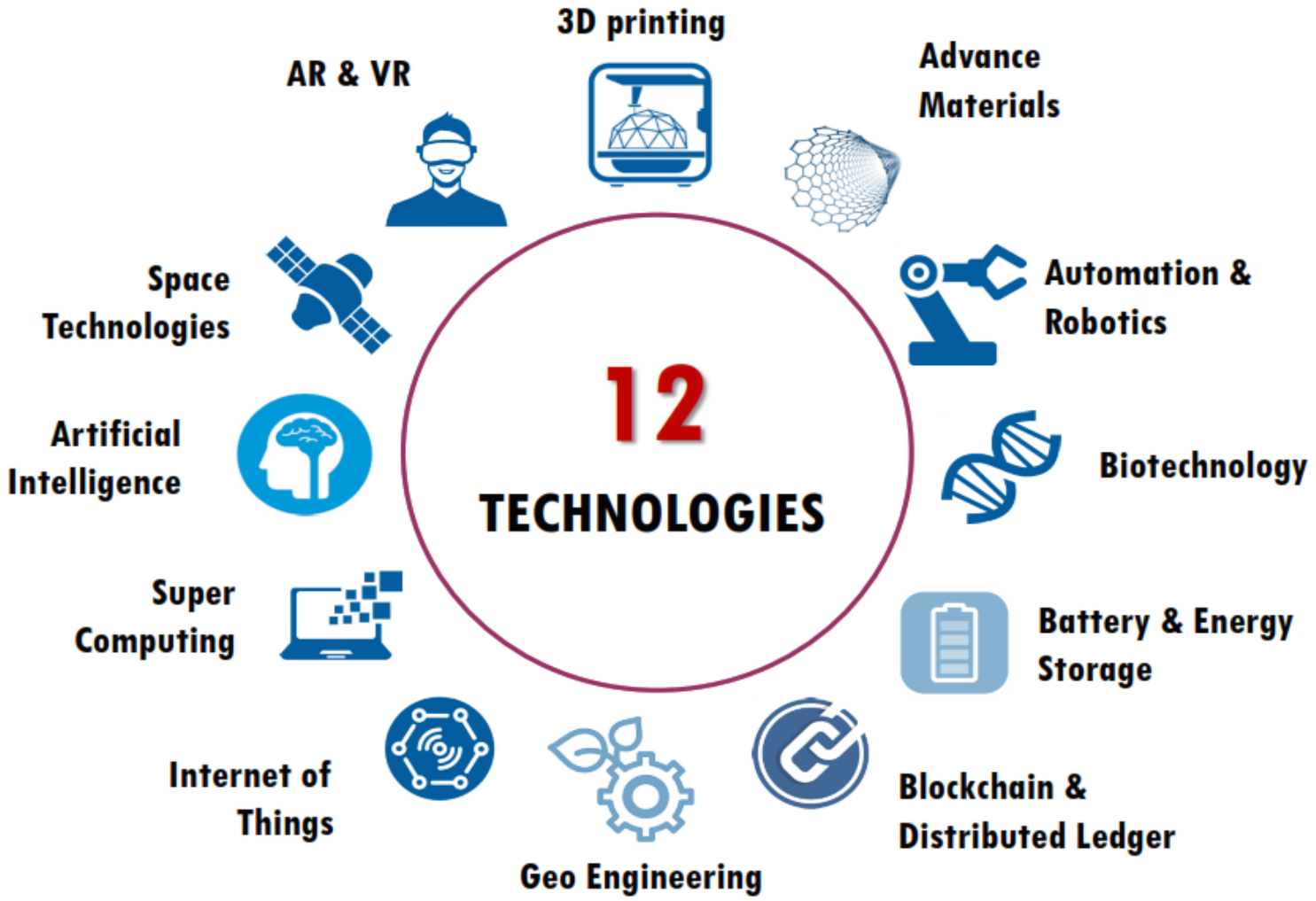
3rd revolution
Digital



Late 1900s
Electronics

4th revolution
4IR

Early 2000s
Cyber-physical



orld Economic Forum

1

Advanced materials

Materials with significantly improved functionality, including lighter-weight, stronger and more conductive materials, e.g. nano-materials.

2

Cloud technology, including big data

Enables the delivery of computer applications and services over the internet, reducing storage and computer power needs. Big data enabled by cloud allows predictive relationships to form, underpinning optimisation.

3

Autonomous vehicles, including drones

Enabled by robots, these are vehicles that can operate and navigate with little or no human control. Drones fly or move without a pilot and can also operate autonomously.

4

Synthetic biology

Inter-disciplinary branch of biology applying engineering principles to biological systems. The market for biotechnology already exceeds $80bn/year.

5

Virtual and Augmented Reality

Computer-generated simulation of a three-dimensional image overlaid to the physical world (AR) or a complete environment (VR).

6

Artificial Intelligence

Software algorithms that are capable of performing tasks that normally require human intelligence, e.g. visual perception, speech recognition and decision-making.

7

Robots

Electro-mechanical machines or virtual agents that automate, augment, or assist human activities, autonomously or according to set instructions.

8

Blockchain

Distributed electronic ledger that uses software algorithms to record and confirm transactions with reliability and anonymity.

9

3D printing

Additive manufacturing techniques used to create three dimensional objects based on 'printing' successive layers of materials.

10

Internet of Things

Network of objects embedded with sensors, software, network connectivity and computer capability, that can collect and exchange data over the internet and enable smart solutions.

Source: PwC analysis

Big data : Defined by 3 Vs

01

- Volume: amount of data

02

- Variety: different types and sources

03

- Velocity: often real-time availability

Taxonomy of Big Data: Exhaust data

Passively collected data from people's use of digital services.

"It's the little data bread crumbs that you leave behind you as you move around in the world."

Examples

- Mobile phone data
- Financial transactions
- Online search and access logs
- Citizen card
- Postal data

Taxonomy of Big Data: Sensing data

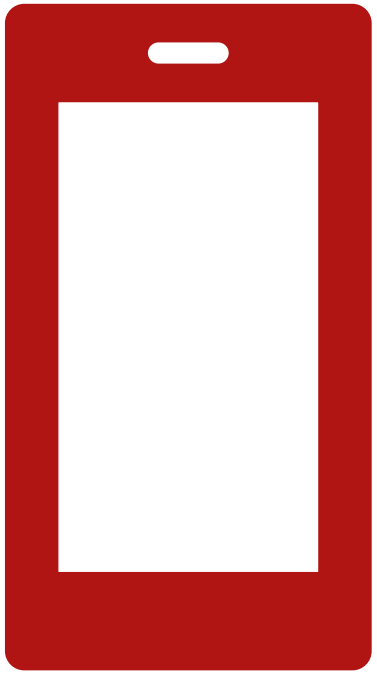
Internet of Things and Global Positioning Systems (GPS)

Aim: to reduce the information gap between world and internet.

Examples

- Satellite and unmanned aerial vehicle imagery
- Sensors in cities, transport and homes
- Sensors in nature, agriculture and water
- Wearable technology (human and animals)
- Biometric data

Taxonomy of Big Data: Digital content

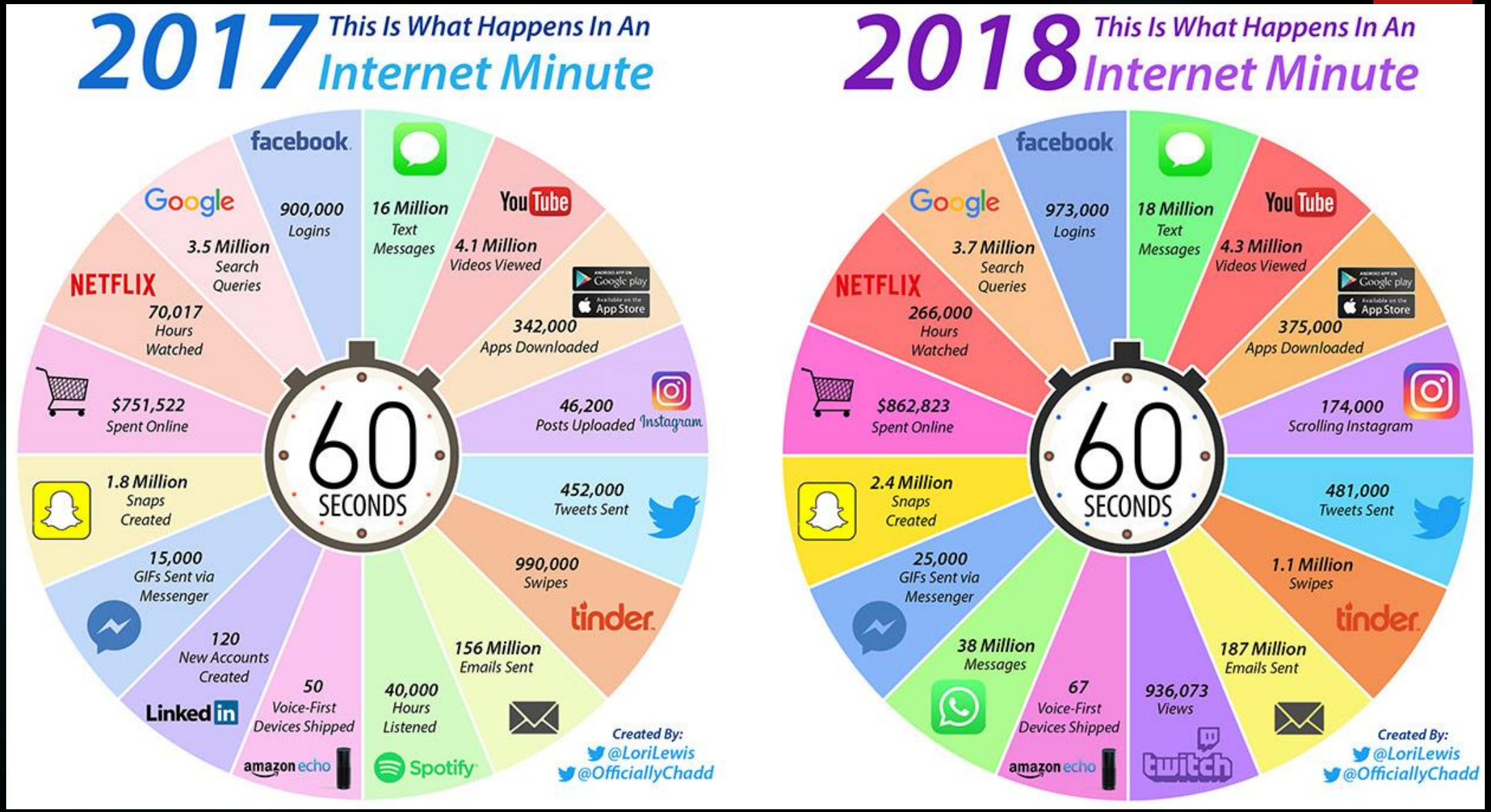


Content actively produced by people as well as Governments.

Unstructured data, unlike exhaust and sensing data, can include text and multimedia content, e.g. images, videos or audio -> AI analysis

Examples

- Social media data
- Web scraping
- Participatory sensing / crowdsourcing
- Health records
- Radio content


2017 This Is What Happens In An Internet Minute
facebook
900,000 Logins
16 Million Text Messages
YouTube
4.1 Million Videos Viewed
342,000 Apps Downloaded
46,200 Posts Uploaded
Instagram
452,000 Tweets Sent
990,000 Swipes
tinder
156 Million Emails Sent
40,000 Hours Listened
Spotify
50 Voice-First Devices Shipped
amazon echo
120 New Accounts Created
LinkedIn
15,000 GIFs Sent via Messenger
1.8 Million Snaps Created
$751,522 Spent Online
NETFLIX
70,017 Hours Watched
Google
3.5 Million Search Queries
60 SECONDS
Created By:
@LoriLewis
@OfficiallyChadd
2018 This Is What Happens In An Internet Minute
facebook
973,000 Logins
18 Million Text Messages
YouTube
4.3 Million Videos Viewed
375,000 Apps Downloaded
174,000 Scrolling Instagram
481,000 Tweets Sent
1.1 Million Swipes
tinder
187 Million Emails Sent
936,073 Views
twitch
67 Voice-First Devices Shipped
amazon echo
38 Million Messages
25,000 GIFs Sent via Messenger
2.4 Million Snaps Created
$862,823 Spent Online
NETFLIX
266,000 Hours Watched
Google
3.7 Million Search Queries
60 SECONDS
Created By:
@LoriLewis
@OfficiallyChadd

Internet of things

- **Sensors:** (Often small) objects, which detect changes in its environment

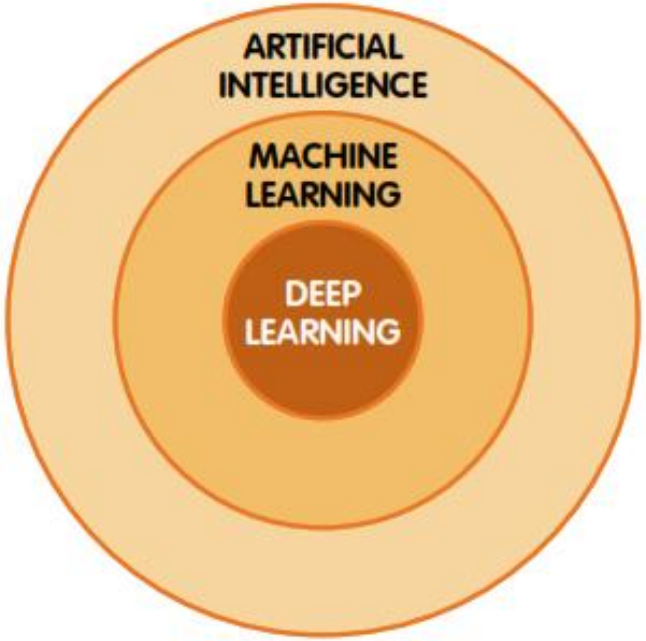
  and potentially quantify the extent of the change.

- Machine-to-machine communication and AI decision making.

- Prevention of negative incidents, e.g. disasters or illnesses, through early detection.

Example healthcare: "My car, my airplane, my computer know more about their health status than I do." **Peter Diamandis**

Artificial intelligence



"Intelligence measures an agent's ability to achieve goals in a wide range of environments." Legg and Hutter (2007)

Artificial general intelligence:

- equals human intelligence.
- not yet been developed.

Successes were in specialized fields.

Examples: Deep Blue (1997), AlphaGo (2016)

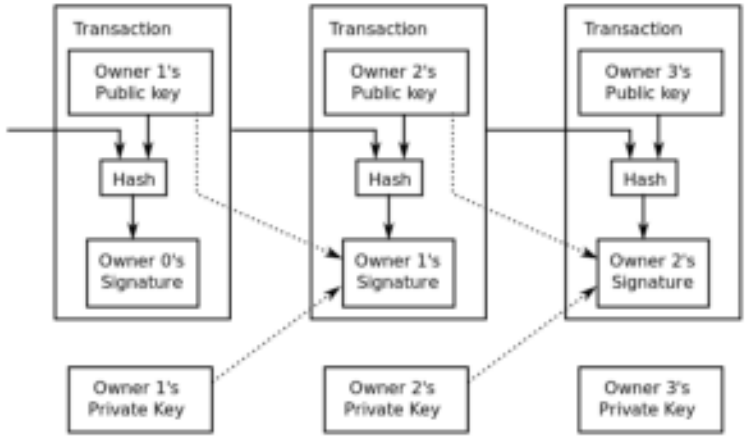
Under a traditional explanation, a blockchain is a type of digital ledger that is distributed and maintained over a peer-to-peer network, without the use of a central authority.

Blockchain underpins Bitcoin . . .

What?

1. bitcoin is unregulated, censorship-resistant shadow currency
2. Blockchain ensures “cash like” coin passing
   - unique,
   - immutable,
   - final
3. bitcoin the first Blockchain application
   - Blockchain is not bitcoin
4. Digital currencies different from cyptocurrency

bitcoin



Blockchain for Business

What?

Append-only distributed system of record shared across business network

Shared Ledger

Smart Contract

Business terms embedded in transaction database & executed with transactions

Ensuring appropriate visibility; transactions are secure, authenticated & verifiable

Privacy

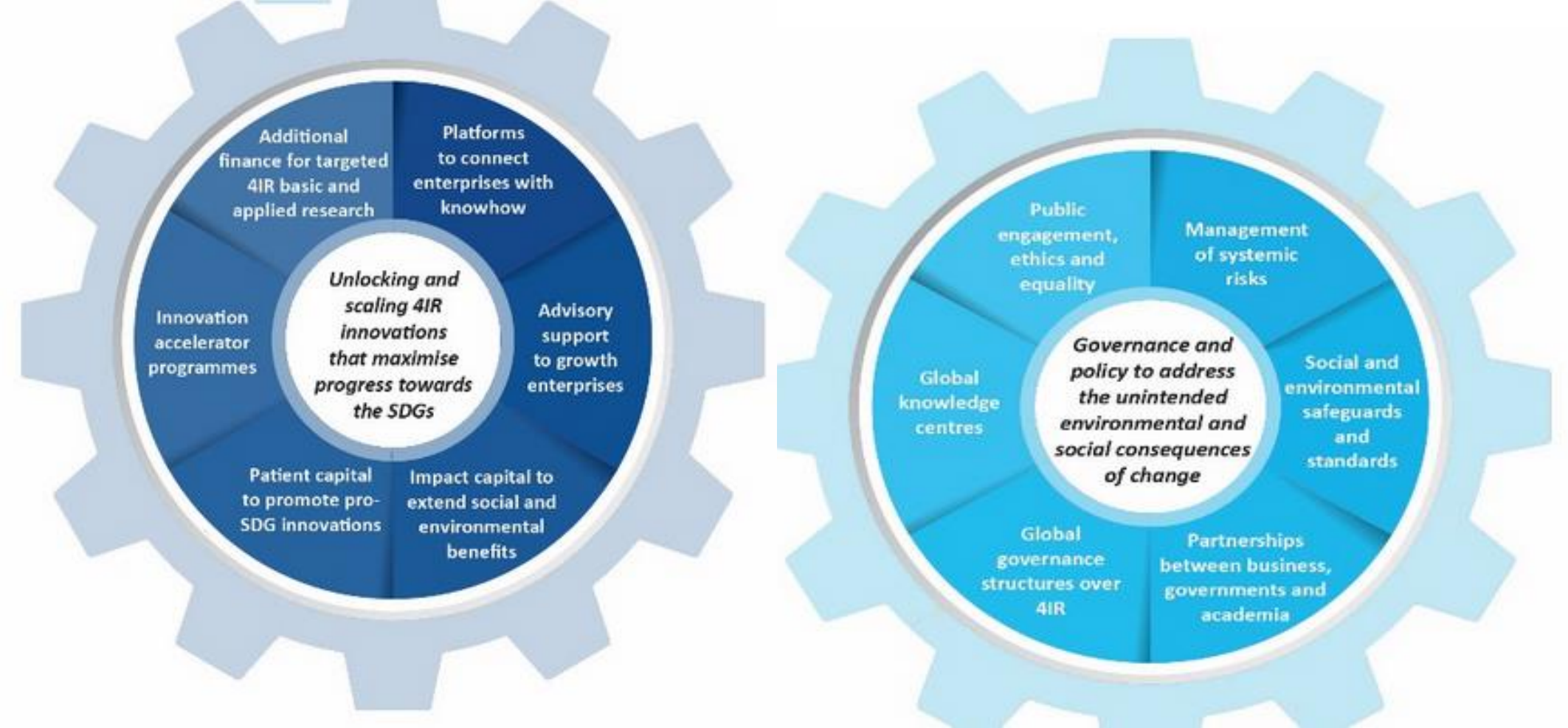
Validation

All parties agree to network verified transaction

Broader participation, lower cost, increased efficiency

THE GLOBAL GOALS
For Sustainable Development

SDG , 4IR and Governance : The 21st Century Growth Engine



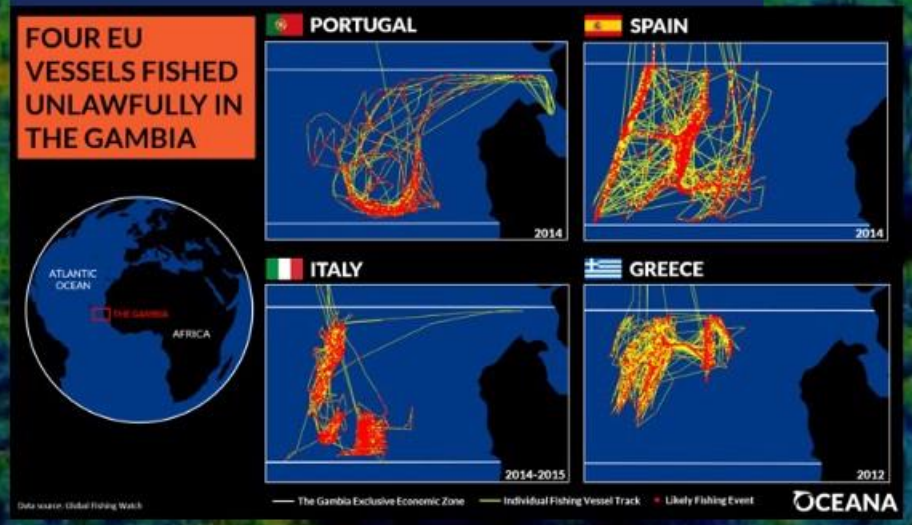
Using Satellite Data

SDG 1

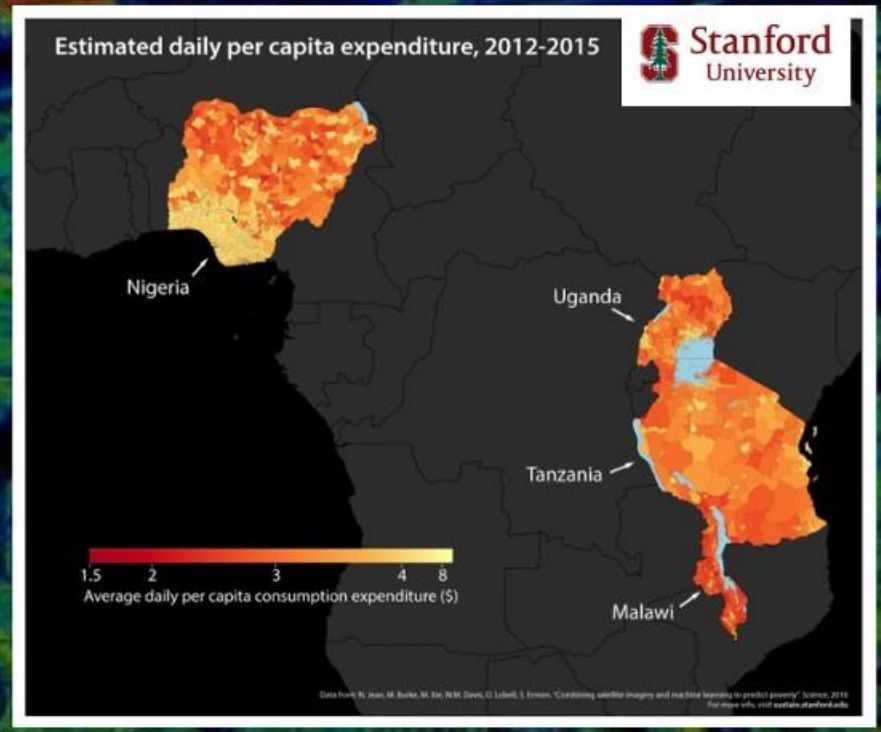
planet.
See Change.
Change the World.

"Real-time" data coverage

GLOBAL FISHING WATCH
Sustainability through Transparency



Monitoring Regulations and Wildlife



Predicting Poverty

Sources:DLR&TUM(https://phys.org/news/2017-06-cities-grownew-algorithms-satellite.html),http://globalfishingwatch.org,http://sustain.stanford.edu/predicting-poverty,http://www.wired.co.uk/gallery/planet-labs-

@ch_rauch

Agriculture

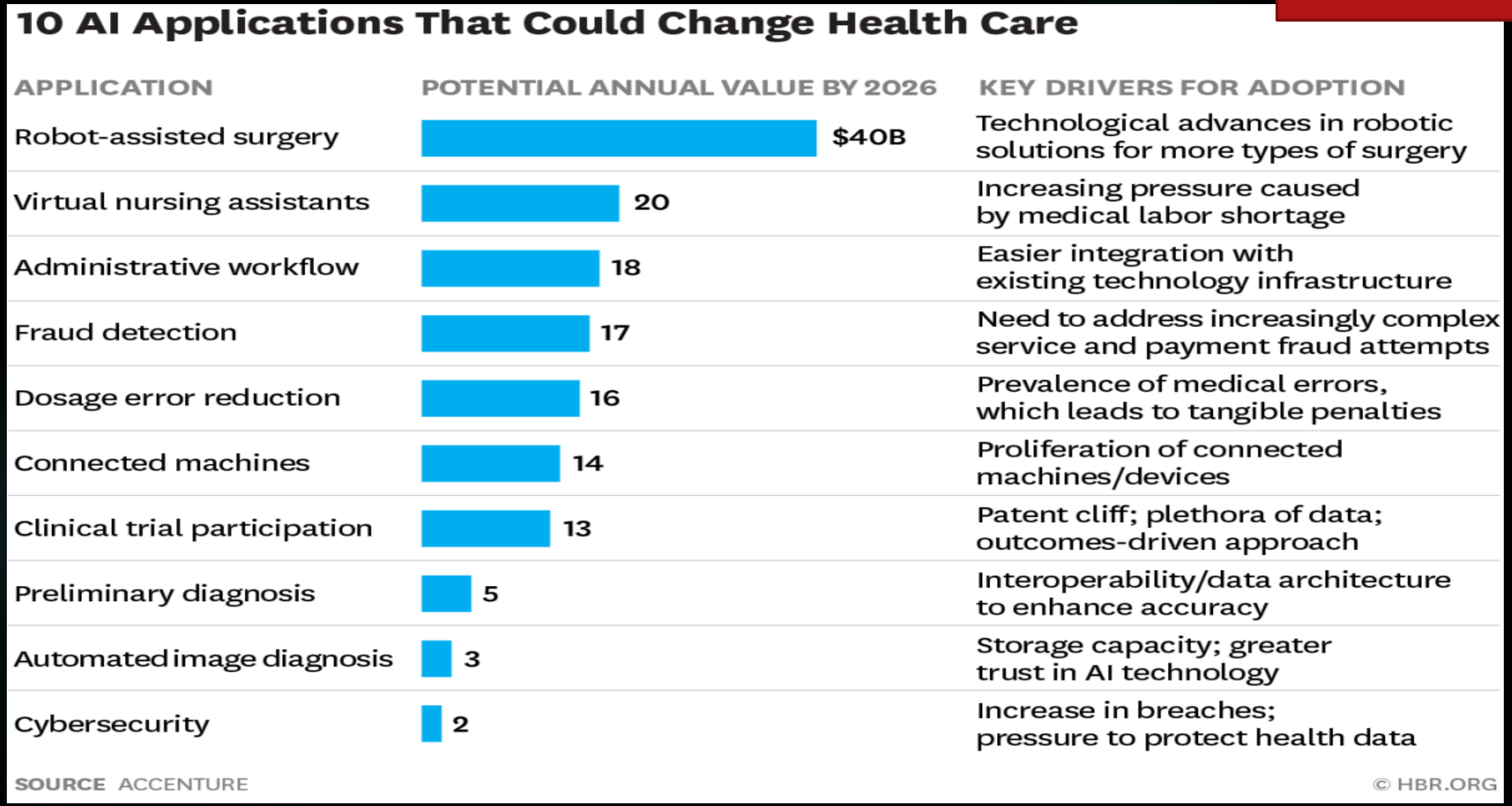
SDG 2

Remote lifestock and wildlife management

Fully automated vertical greenhouses

Sources:https://www.nectar.buzz,https://www.incimages.com/uploaded_files/image/1940x900/getty_537635746_277381.jpg,https://www.plenty.ag/

SDG 3


10 AI Applications That Could Change Health Care
APPLICATION
POTENTIAL ANNUAL VALUE BY 2026
KEY DRIVERS FOR ADOPTION
Robot-assisted surgery
$40B
Technological advances in robotic solutions for more types of surgery
Virtual nursing assistants
20
Increasing pressure caused by medical labor shortage
Administrative workflow
18
Easier integration with existing technology infrastructure
Fraud detection
17
Need to address increasingly complex service and payment fraud attempts
Dosage error reduction
16
Prevalence of medical errors, which leads to tangible penalties
Connected machines
14
Proliferation of connected machines/devices
Clinical trial participation
13
Patent cliff; plethora of data; outcomes-driven approach
Preliminary diagnosis
5
Interoperability/data architecture to enhance accuracy
Automated image diagnosis
3
Storage capacity; greater trust in AI technology
Cybersecurity
2
Increase in breaches; pressure to protect health data
SOURCE ACCENTURE
© HBR.ORG

Use of AR/VR in Education

SDG 4

SDG 6

Water security

- *Water monitoring and management*
- *Micropayments for water meter donations*

- *Decentralized, catchment-based approach to improving water quality*
- *Water quality control in catchment areas*

- *Precipitation intensity monitoring and forecasting*
- *Automated crop insurance for drought periods*

- *Blockchain-enabled peer-to-peer trading of excess water resources*
- *Cryptocurrency-enabled smart meters*

- *Asset-backed token system for clean, accessible drinking water*
- *Hyperlocal water data for monitoring water quality*
- *Efficient water treatment systems*

Energy Sector

SDG 7

Smart grids

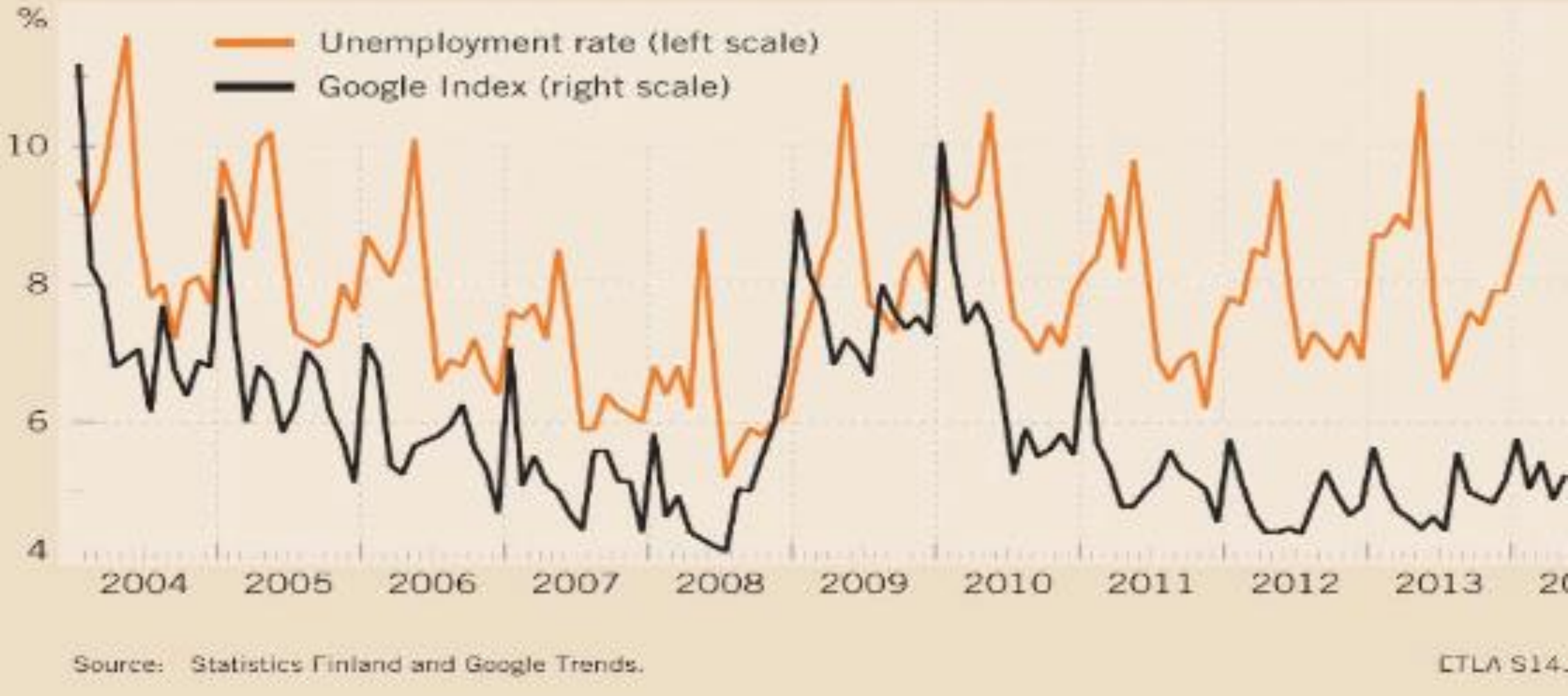
Smart meters

Smart materials research

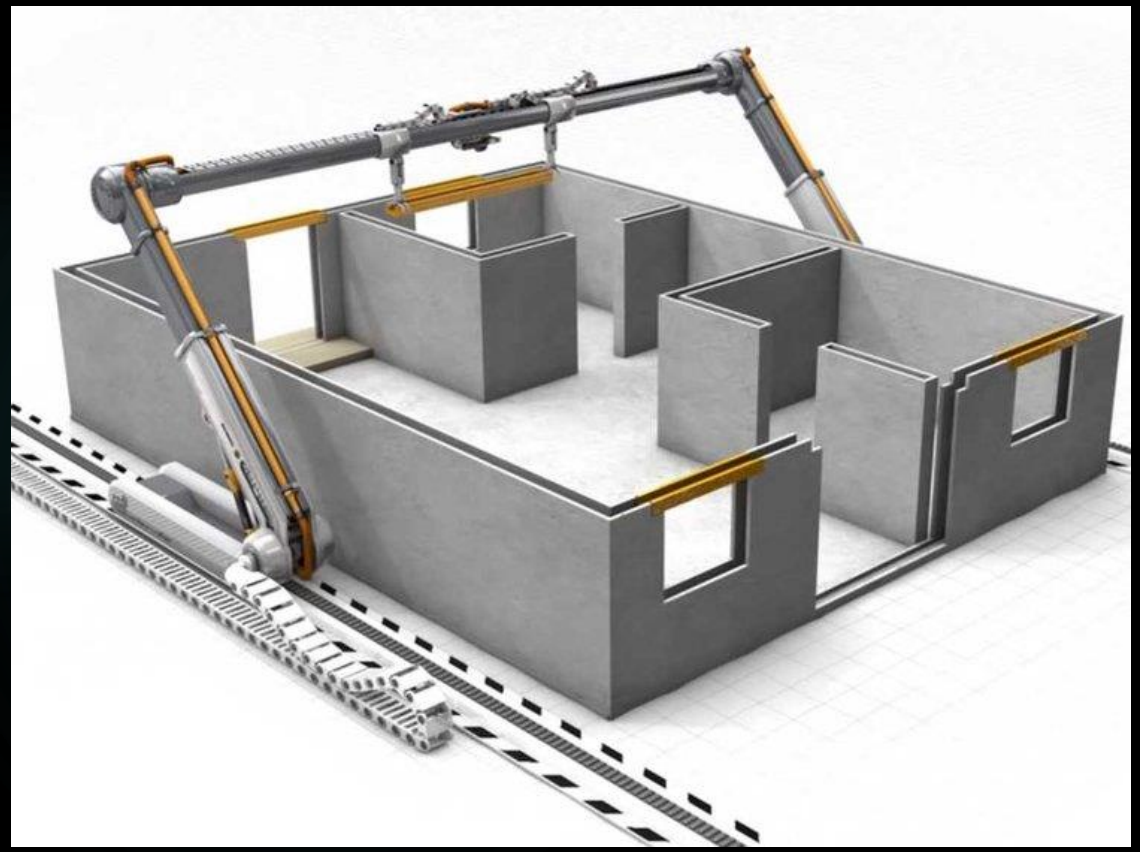
Sources:https://phys.org/news/2017-06-cities-grownew-algorithms-satellite.html),https://www.bmbf.de/de/energiewende-565.html,https://www.gridhound.de,https://materialsproject.org/

Google Searches Predict Unemployment in Finland

SDG 8



SDG 9 and 3D Printing

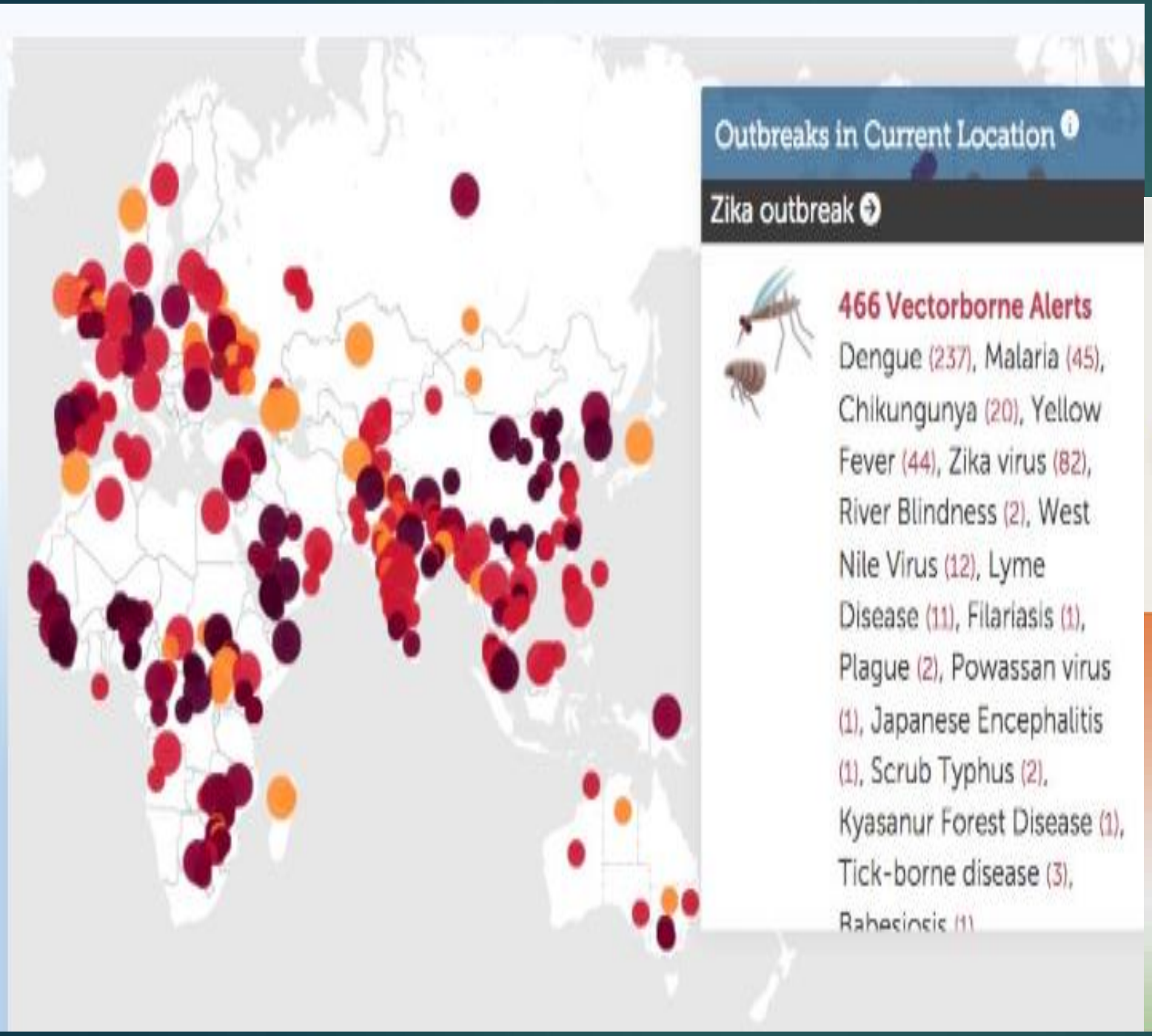


Sensors to monitor bridges

SDG target: 9.1

Country: Sweden

SDG 8


Outbreaks in Current Location
Zika outbreak
466 Vectorborne Alerts
Dengue (237), Malaria (45), Chikungunya (20), Yellow Fever (44), Zika virus (82), River Blindness (2), West Nile Virus (12), Lyme Disease (11), Filariasis (1), Plague (2), Powassan virus (1), Japanese Encephalitis (1), Scrub Typhus (2), Kyasanur Forest Disease (1), Tick-borne disease (3), Babesiosis (1)


UNDERGROUND
oyster
Transport for London


AAPKA
AADHAAR

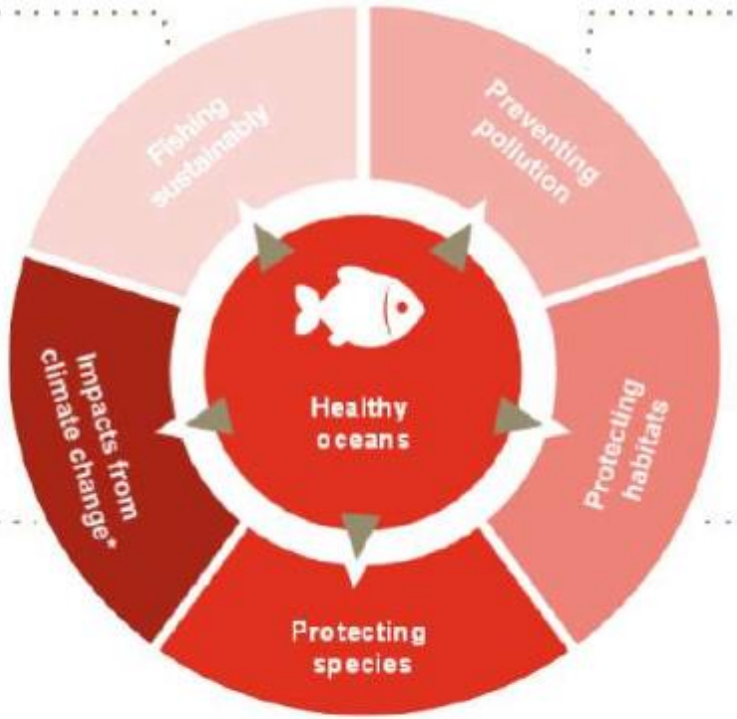
SDG 13


RAINFOREST CONNECTION: HOW IT WORKS
Rainforest Connection cloud API
Alert can also be received by remote users, whose reactions are encouraged and rewarded.
2
Software transmits signal to cloud API.
Each device can detect chainsaw noise up to 2/3 of a mile in the distance.
3
Real-time alert is received by a responsible agent on the ground nearby ...
IT ALL STARTS HERE!
1
Sound of chainsaws is picked up by microphones in solar-powered cellphones.
4
... enabling immediate intervention.

Healthy oceans

- *Tracking fish provenance*
- *Monitoring of illegal fishing activities*

- *Incentivized ocean plastic recycling initiatives*
- *Transparent ledger for faster, safer and more efficient shipping*



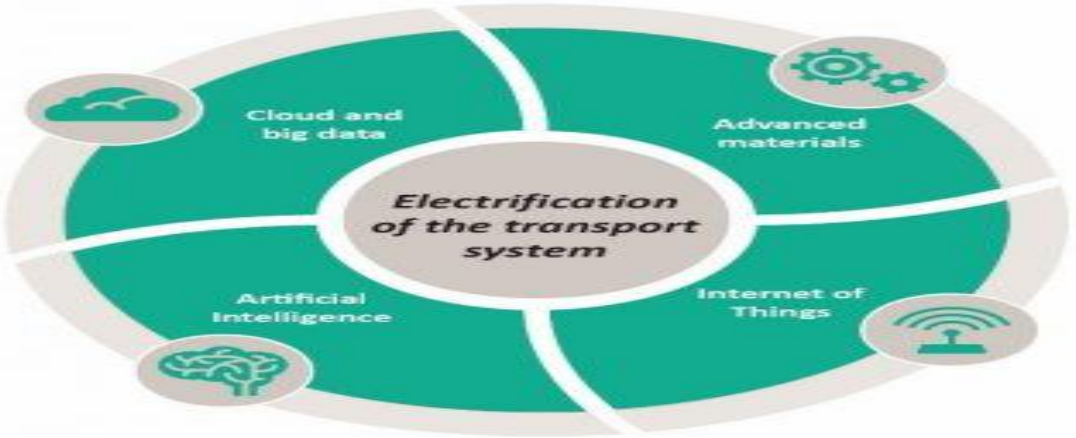
- *Real-time monitoring of ocean temperature and pH*
- *Incentivized collection of data on ocean conditions*
- *Incentivized investments in ocean conservation*

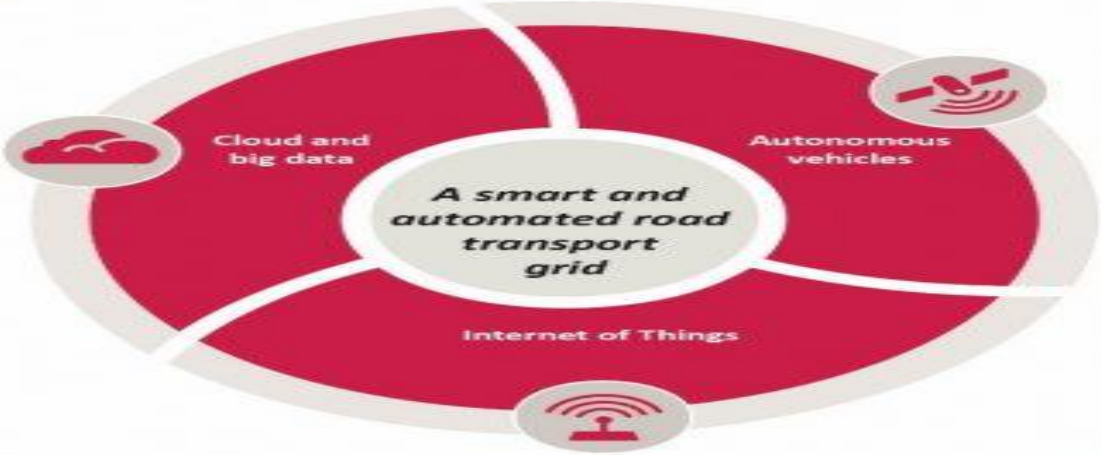
- *Decentralized and open-source ledger of ocean data*

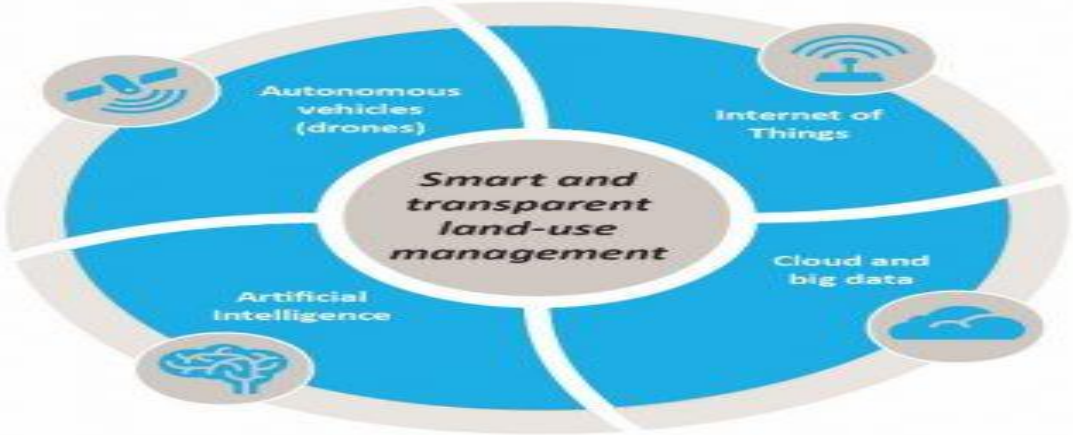
- *Fundraising for marine wildlife conservation*

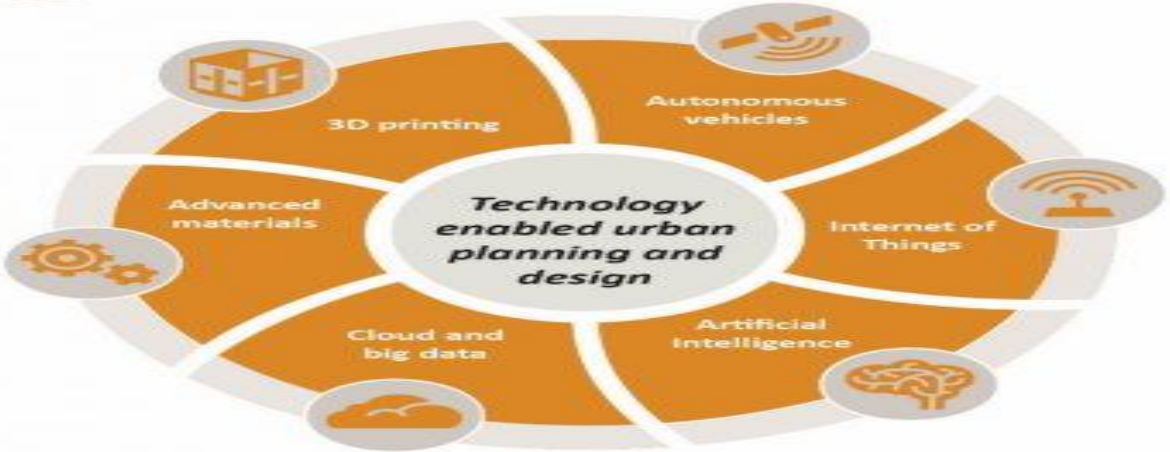
SDG 17


The next-generation distributed grid
Advanced materials
Blockchain
Internet of Things
Artificial Intelligence
Cloud and big data


Electrification of the transport system
Cloud and big data
Advanced materials
Artificial Intelligence
Internet of Things


A smart and automated road transport grid
Cloud and big data
Autonomous vehicles
Internet of Things


Smart and transparent land-use management
Autonomous vehicles (drones)
Internet of Things
Cloud and big data
Artificial Intelligence

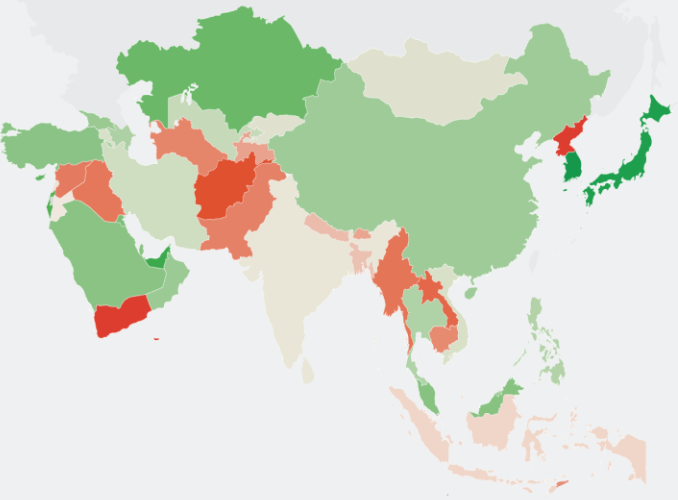

Technology enabled urban planning and design
3D printing
Autonomous vehicles
Advanced materials
Internet of Things
Cloud and big data
Artificial Intelligence

How the Growth will be Measured?

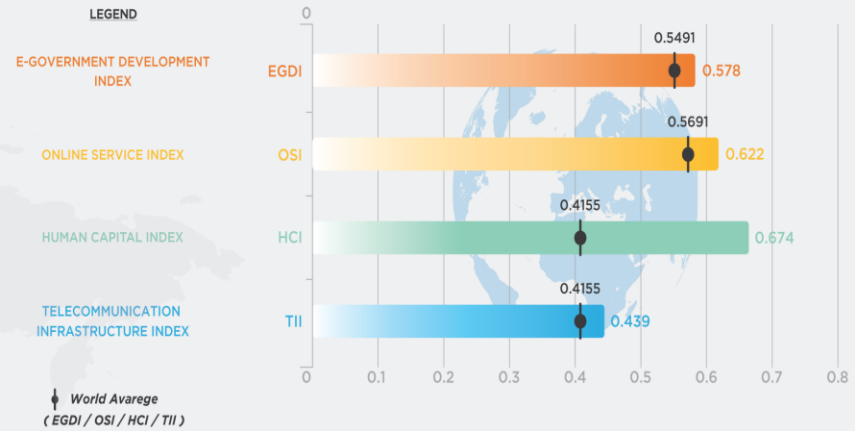
UNITED NATIONS E-GOVERNMENT SURVEY 2018

2018

ASIA



2018 E-Government Development Index (EGDI)



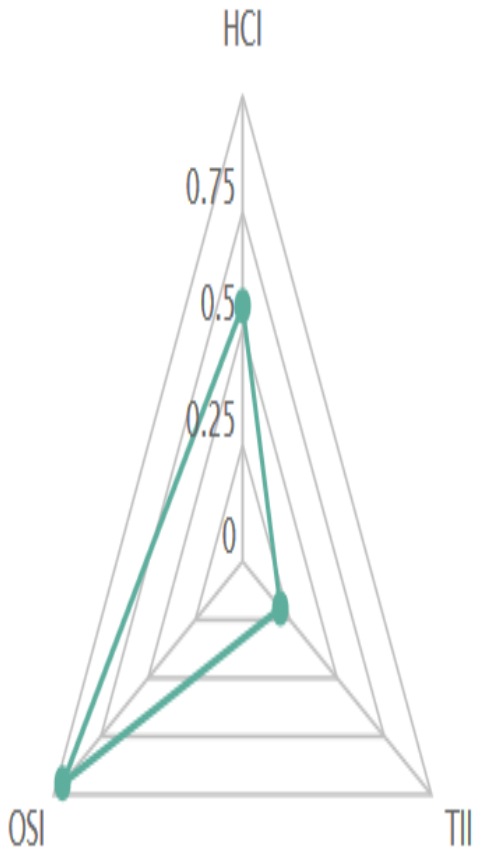
Top 10 Countries

Flag	Country	Sub-Region	EGDI	Ranking
	Republic of Korea	Eastern Asia	0.9010	3
	Singapore	South-Eastern Asia	0.8812	7
	Japan	Eastern Asia	0.8783	10
	United Arab Emirates	Western Asia	0.8295	21
	Bahrain	Western Asia	0.8116	26
	Israel	Western Asia	0.7998	31
	Cyprus	Western Asia	0.7736	36
	Kazakhstan	Central Asia	0.7597	39
	Kuwait	Western Asia	0.7388	41
	Malaysia	South-Eastern Asia	0.7174	48

Source: United Nations E-Government Survey 2018 • https://publicadministration.un.org/egovkb

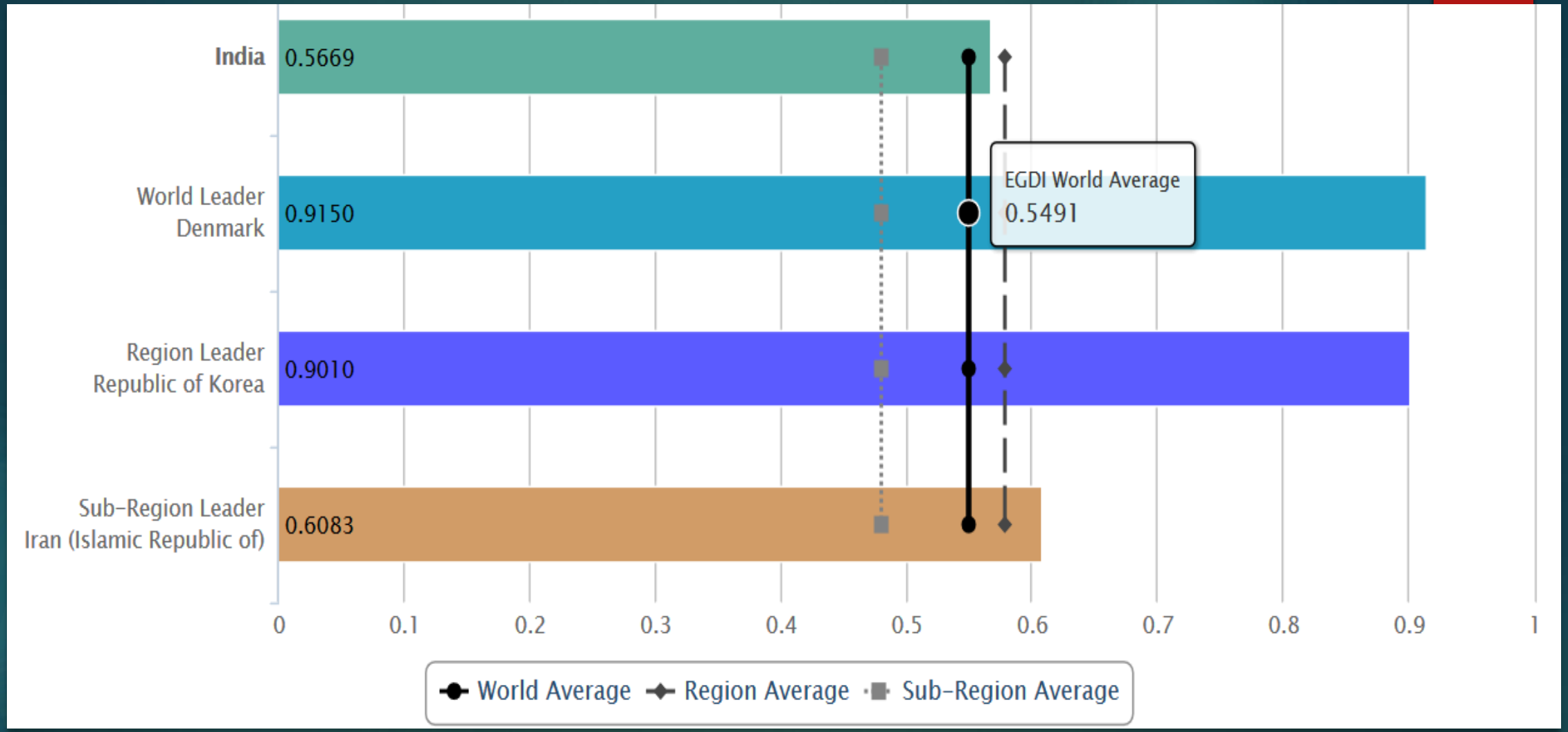
eGDI- ASIA

EGDI : India



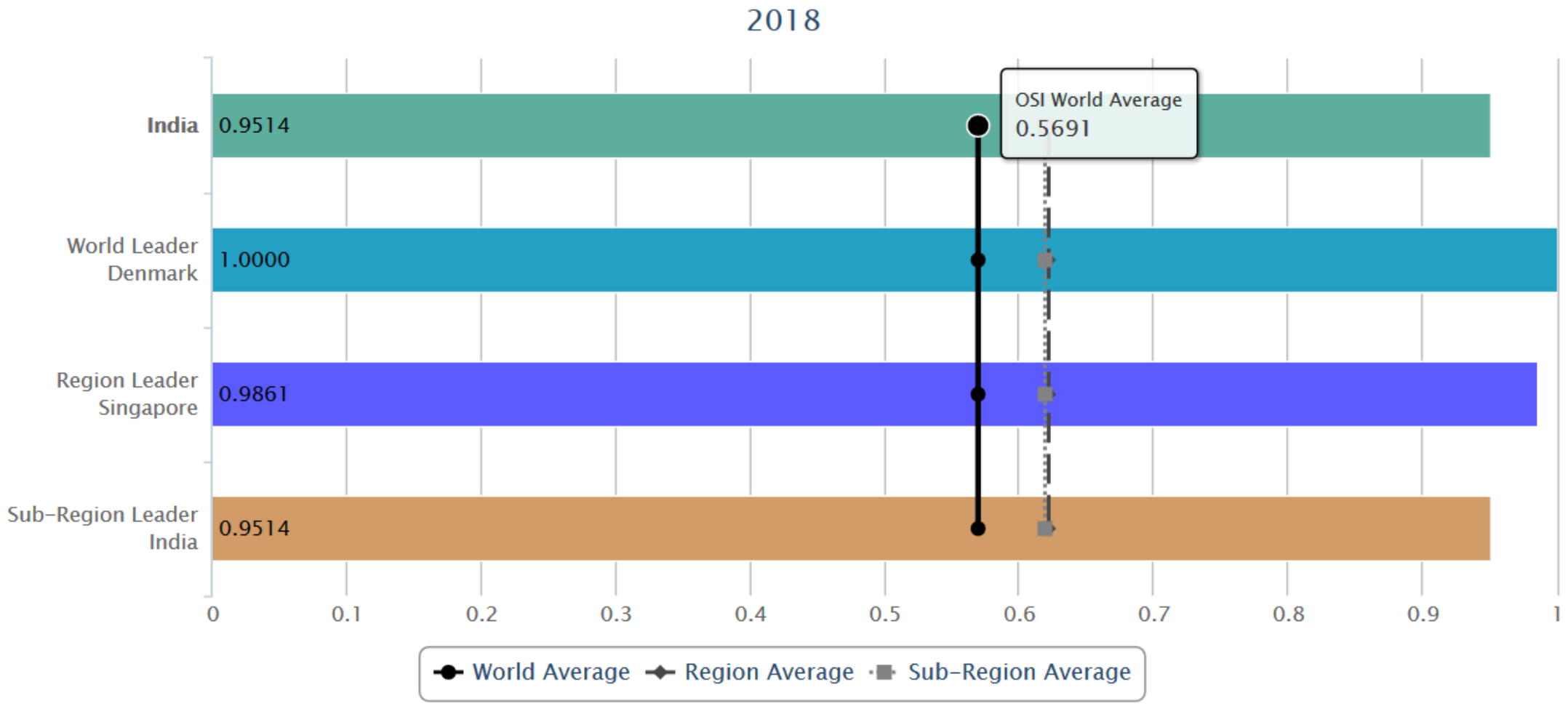
E-Government (2018 EGDI: 0.5669)	
2018 Rank	96
Group	HEGDI
2016 Rank	107
Change	-11

E-Participation (2018 EPART: 0.9551)	
2018 Rank	15
2016 Rank	27
Change	-12

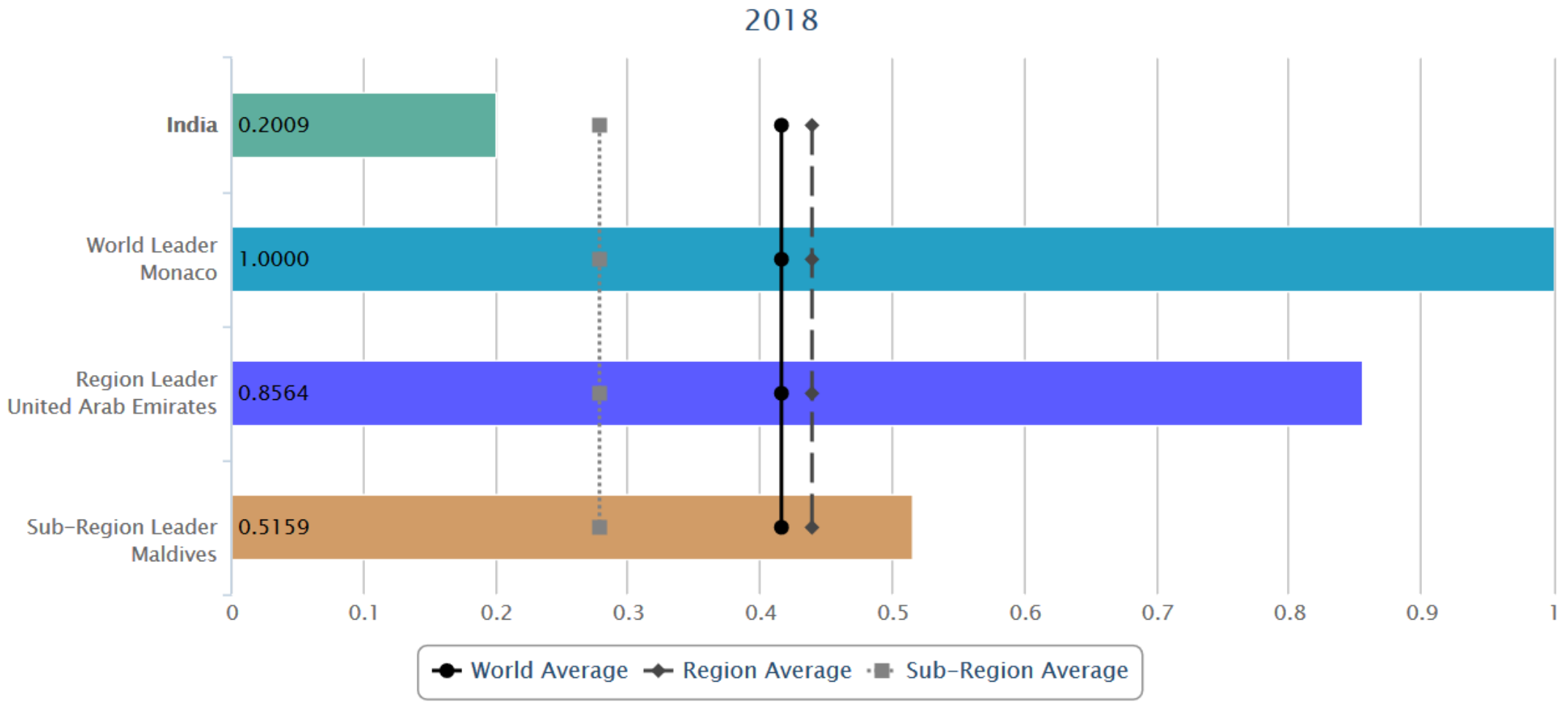

India
0.5669
World Leader
Denmark
0.9150
Region Leader
Republic of Korea
0.9010
Sub-Region Leader
Iran (Islamic Republic of)
0.6083
EGDI World Average
0.5491
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
World Average
Region Average
Sub-Region Average

EGDI- India

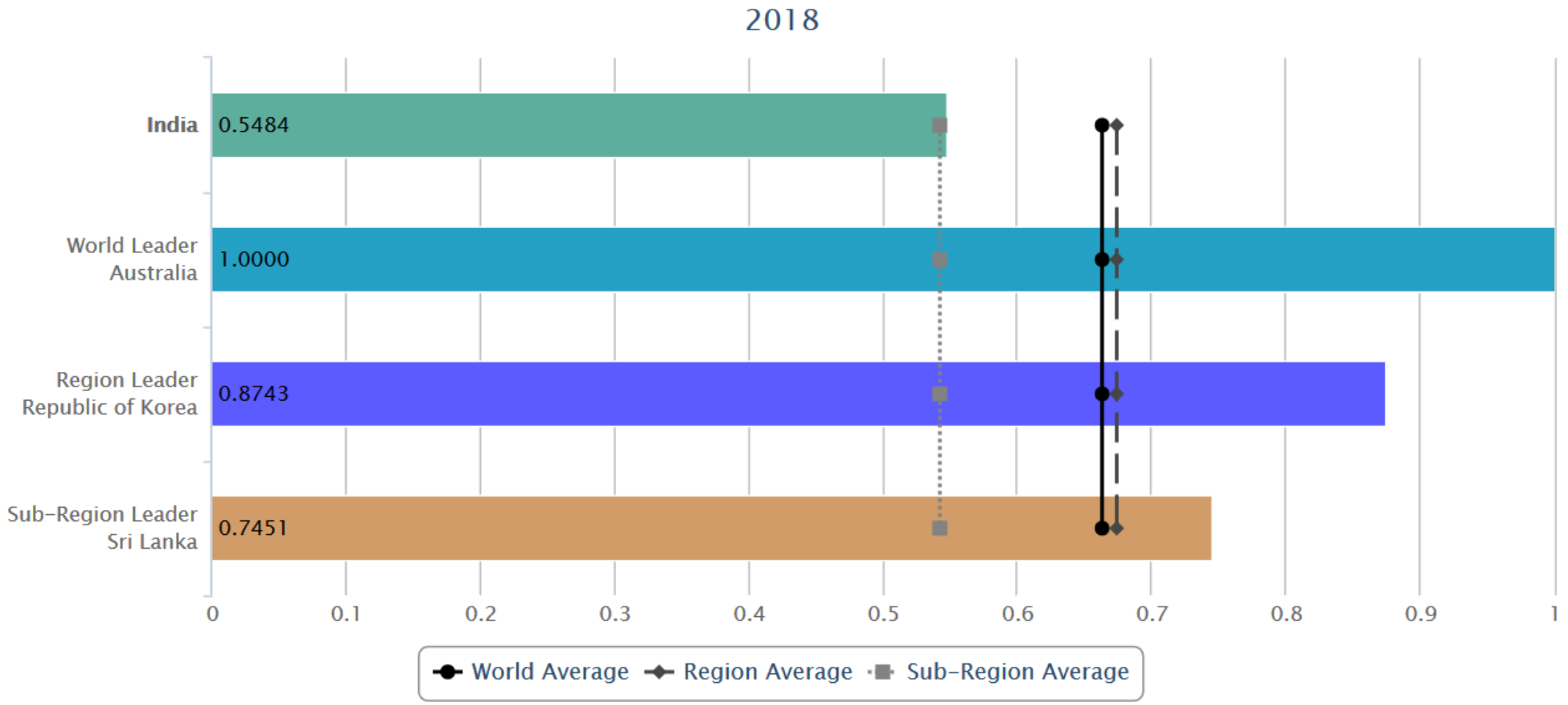
Online Service Index



Telecommunication Infrastructure Index



Human Capital Index




delete
government
alt
shift