Digital Transformation for Inclusive Green Economy

Yaxuan Chen, Senior Consultant, UNEP
March 2021

A recap of the Part I presentation

- The pandemic has led to a further acceleration of digital transformation
- Policy examples of managing green and digital transitions

UN environment programme

Despite the global recession, the pandemic has led to a further acceleration of digital transformation

GLOBAL ECONOMIC IMPACT

GLOBAL GDP ↓ -4.3% in 2020

Global trade in goods
↓ -9%
in 2020

Global trade in services
↓ -15%
in 2020

GLOBAL TRENDS

ECOMMERCE

Share in global retail

OTHER SECTORS

Further acceleration of digital transformations in:

- Teleworking
- Gaming
- Distance learning
- Digital Entertainment
- Online conferencing

REGIONAL TRENDS

LATIN AMERICA

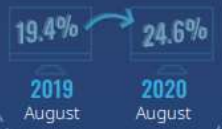
Mercado Libre
Articles sold per day

AFRICA

Jumia
Volume of transactions

ASIA

China
Online share of retail



Kazakhstan
Online share of retail

Thailand
Downloads of shopping apps

Similar observations were made in many developed countries.

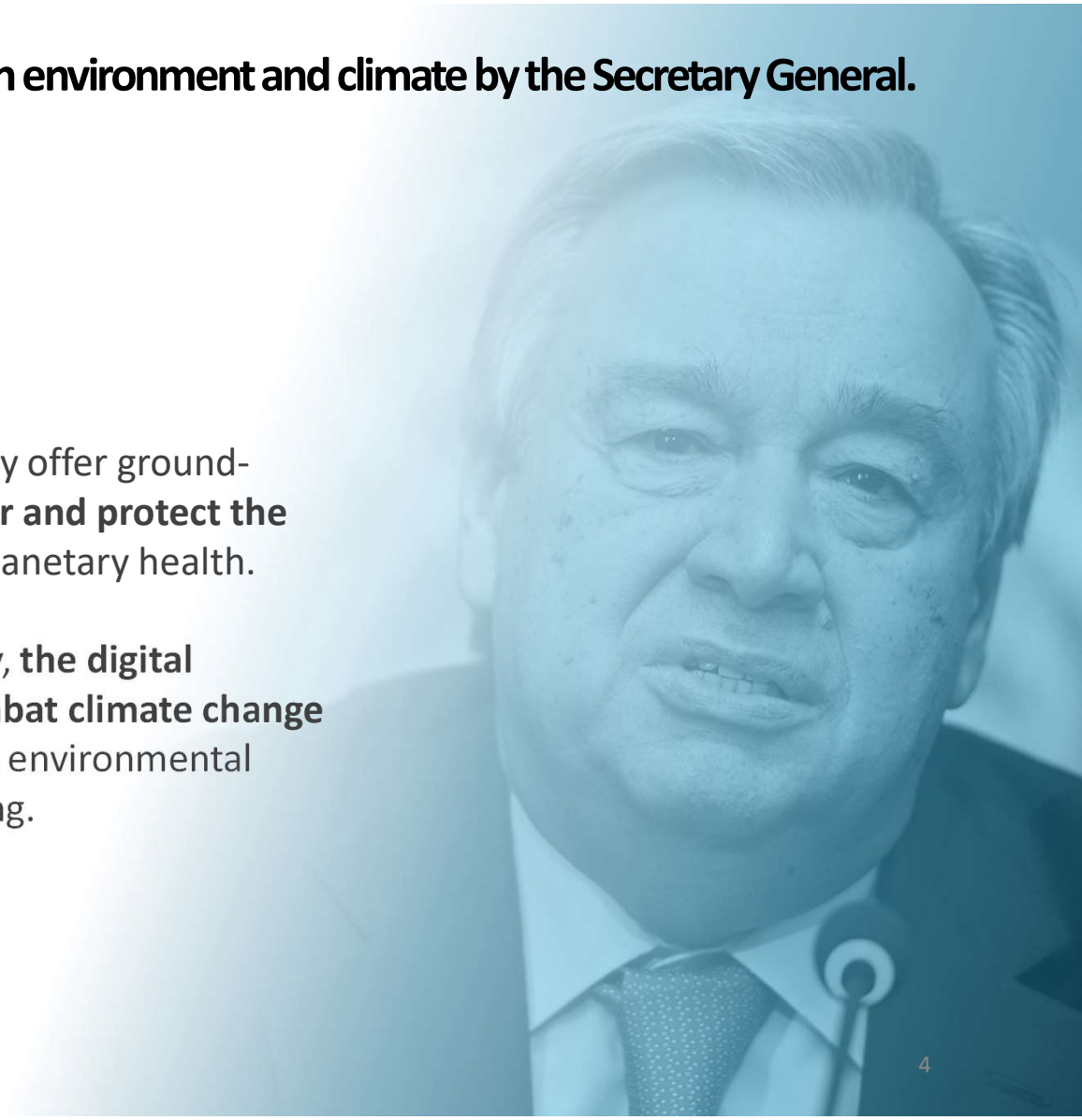
Strong digital transformation focus on environment and climate by the Secretary General.

“

The recent advances in technology offer ground-breaking opportunities to **monitor and protect the environment**, as well as overall planetary health.

By harnessing them appropriately, **the digital revolution can be steered to combat climate change** and advance global sustainability, environmental stewardship and human well-being.

”



Which item should be considered as part of green recovery expenditure?

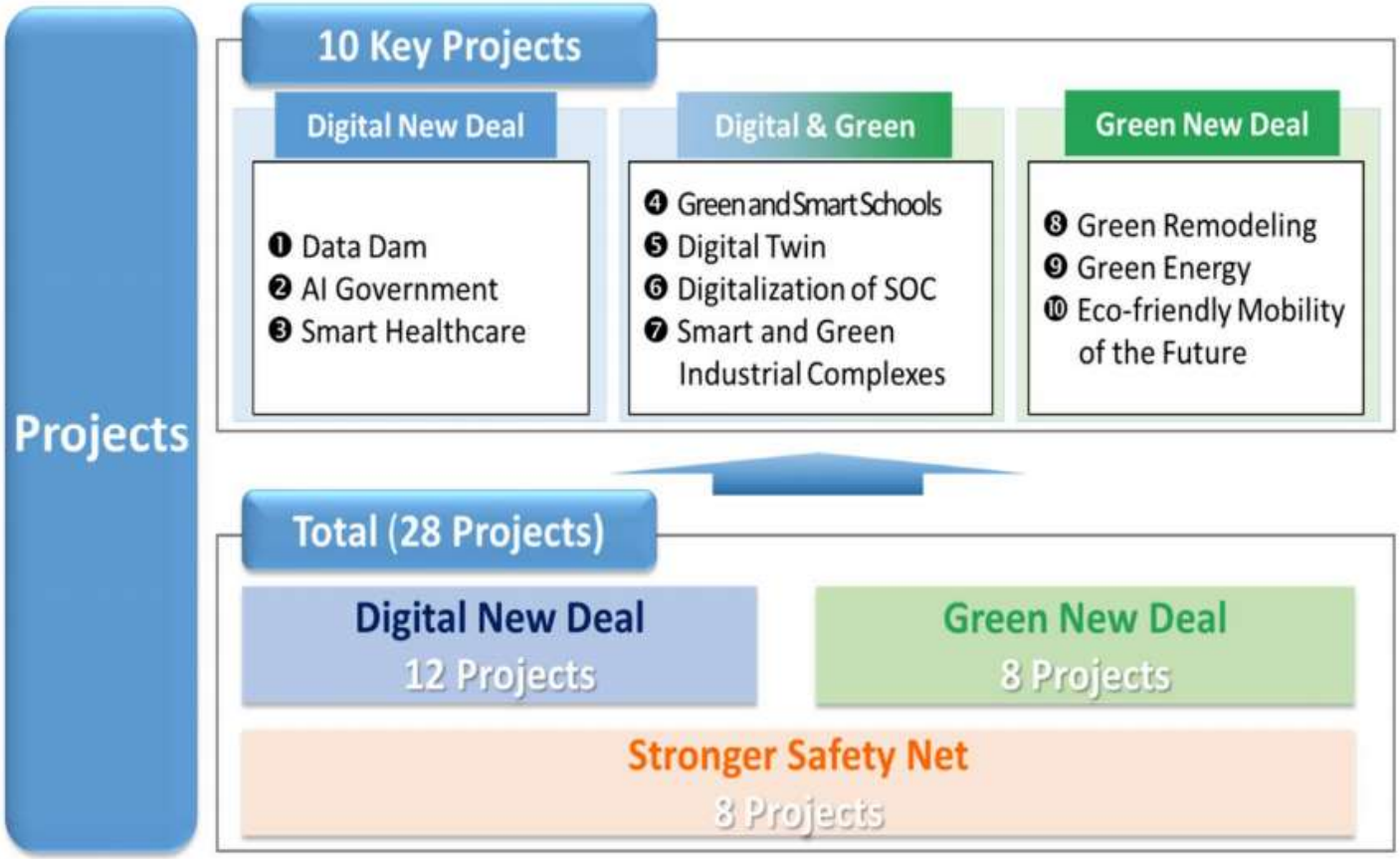
a) Digital Twin: (a **digital replica** of an object that can be used for the analysis and prediction of the future through simulation) will be made for roads, underground spaces, harbors and dams to lay the foundation for **new industries such as drones and self-driving vehicles,** and to allow for **the safe management of land and facilities**.

b) Digitalization of Social Overhead Capital (SOC): building a smart management system for four sectors-**transportation**, **geographic information** system, **water** management and **disaster** management.

c) Smart Industrial Complexes: a remote monitoring system on **leaking toxic chemical substance**; 10 **smart energy platforms** based on micro power grid; **networks to share waste materials for reuse**.

The Korean New Deal

National Strategy for a Great Transformation



The Korean New Deal

List of Projects*

(trillion won, thousand jobs)

	Focus Areas	Projects	2020 SB -2022	2020 SB -2025	# of Jobs
Aggregated Total			**49.0**	**114.1**	**1,901**
Digital New Deal	**Total**		**18.6**	**44.8**	**903**
	1. Stronger Integration of DNA[16] throughout the Economy	**Sub-total**	**12.5**	**31.9**	**567**
		1) Collecting, disclosing and utilizing data in areas closely related to people's lives	3.1	6.4	295
		2) Expanding the integration of 5G and AI into industries	6.5	14.8	172
		3) Making a smart government that utilizes 5G and AI	2.5	9.7	91
		4) Advancing cyber security	0.4	1.0	9
	2. Digitalization of Education Infrastructure	**Sub-total**	**0.6**	**0.8**	**9**
		5) Creating technology-based education infrastructure for grades 1-12	0.3	0.3	4
		6) Strengthening the online education system of universities and job training institutions	0.3	0.5	5
	3. Fostering the 'Untact' Industry	**Sub-total**	**1.1**	**2.1**	**134**
		7) Building smart medical and care infrastructures	0.2	0.4	5
		8) Promoting remote working in SMEs	0.6	0.7	9
		9) Supporting online activities of microbusinesses	0.3	1.0	120
	4. Digitalization of Social Overhead Capital (SOC)	**Sub-total**	**4.4**	**10.0**	**193**
		10) Building a smart management system in four sectors	3.7	8.5	124
		11) Adding digital innovation to urban spaces and industrial complexes	0.6	1.2	14
		12) Building a smart logistics and distribution system	0.1	0.3	55

Green New Deal	**Total**		**19.6**	**42.7**	**659**
	5. Green Transition of Infrastructures	**Sub-total**	**6.1**	**12.1**	**387**
		13) Turning public facilities into zero-energy buildings	2.6	6.2	243
		14) Restoring the terrestrial, marine and urban ecosystems	1.2	2.5	105
		15) Building a management system for clean and safe water	2.3	3.4	39
	6. Low-carbon and Decentralized Energy	**Sub-total**	**10.3**	**24.3**	**209**
		16) Building a smart grid for more efficient energy management	1.1	2.0	20
		17) Promoting renewable energy use and supporting a fair transition	3.6	9.2	38
		18) Expanding the supply of electric and hydrogen vehicles	5.6	13.1	151
	7. Innovation in the Green Industry	**Sub-total**	**3.2**	**6.3**	**63**
		19) Promoting prospective businesses to lead the green industry and establishing low-carbon and green industrial complexes	2.0	3.6	47
		20) Laying the foundation for green innovation via the R&D and financial sectors	1.2	2.7	16

Stronger Safety Net	**Total**		**10.8**	**26.6**	**339**
	1. Employment and Social Safety Net	**Sub-total**	**9.3**	**22.6**	**159**
		21) Building a universal employment safety net	0.8	3.2	-
		22) Strengthening the social safety net for an inclusive society for all	4.3	10.4	-
		23) Ensuring livelihoods and employment stability for those not covered by employment insurance	3.0	7.2	39
		24) Helping new employees in the labor market and those looking for new positions	0.9	1.2	118
		25) Innovating the working environment and industrial safety standards	0.3	0.6	2
	2. Investment in Human Resources	**Sub-total**	**1.5**	**4.0**	**180**
		26) Training digital and green talents	0.5	1.1	25
		27) Restructuring the job-training system to be future-oriented	0.6	2.3	126
		28) Enhancing the accessibility to digital infrastructure for rural residents and vulnerable people	0.4	0.6	29

Digitalization in the European Green Deal

Sector	Role of Digitalization
Energy	For [Energy Transition] to happen, it is essential to ensure that the European energy market is fully **integrated, interconnected and digitalized**, while respecting technological neutrality
Industry Strategy	Europe must leverage the potential of the digital transformation, which is a key enabler for reaching the Green Deal objectives.
Buildings	It should ensure that the design of new and renovated buildings at all stages is in line with the needs of the circular economy, and lead to **increased digitalization** and climate-proofing of the building stock.
Transport	Automated and connected multimodal mobility will play an increasing role, together with **smart traffic management systems enabled by digitalization**.
	Investment and policy focus: The Commission will help develop smart systems for traffic management and 'Mobility as a Service' solutions, through its funding instruments, such as the Connected Europe Facility.
Food	The Commission will explore new ways to give consumers **better information**, including by digital means, on details such as where the food comes from, its nutritional value, and its environmental footprint.

Digitalization in the European Green Deal

Area	Role of Digitalisation
Pollution	It will also propose to strengthen provisions on **monitoring** (Including by making use of new monitoring opportunities provided by digitalization), modelling and air quality plans to help local authorities achieve cleaner air.
Innovation	Accessible and interoperable data are at the heart of **data-driven innovation**. This data, combined with digital infrastructure (e.g. supercomputers, cloud, ultra-fast networks) and artificial intelligence solutions, facilitate evidence-based decisions and expand the capacity to understand and tackle environmental challenges. The Commission will support work to unlock the full benefits of the digital transformation to support the ecological transition.
	An immediate priority is developing digital twin of the Earth
Governance	Digitalization can also help improve the availability of information on the characteristics of products sold in the EU. For instance, **an electronic product passport** could provide information on a product's origin, composition, repair and dismantling possibilities, and end of life handling.
	Digital technologies are a **critical enabler** for attaining the sustainability goals of the Green deal in many different sectors

The European Green Deal

“Digital technologies are a critical enabler for attaining the sustainability goals of the Green deal in many different sectors. The Commission will explore measures to ensure that digital technologies such as artificial intelligence, 5G, cloud and edge computing and the internet of things **can accelerate and maximise** the impact of policies to deal with climate change and protect the environment. Digitalisation also presents new opportunities for **distance monitoring** of air and water pollution, or for **monitoring and optimising** how energy and natural resources are used. At the same time, Europe needs a digital sector that puts sustainability at its heart. The Commission will also consider measures to **improve the energy efficiency and circular economy performance of the sector itself**, from broadband networks to data centres and ICT devices. The Commission will assess the need for more transparency on the environmental impact of electronic communication services, more stringent measures when deploying new networks and the benefits of supporting ‘take-back’ schemes to incentivise people to return their unwanted devices such as mobile phones, tablets and chargers.”

State of the Union 2020

"Because **the twin green and digital transitions must go hand in hand** with our competitiveness, we presented a new industrial strategy to strengthen our single market, support small businesses and boost our competitive edge. […] In parallel with managing the current situation, we will start work on building the Union of tomorrow, with major initiatives planned across all six of our headline ambitions. These reflect the need to learn lessons from the crisis and to get ahead of the great acceleration of change in order to shape a **fairer, healthier, greener and more digital society**."

Six headline ambitions

A European Green New Deal	A Europe fit for the digital age
An economy that works for people	A stronger Europe in the world
Promoting our European way of life	A new push for European democracy

Thank you!

UN environment programme

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Digital Transformation for Inclusive Green Economy

Yaxuan Chen, Senior Consultant, UNEP
June 2021

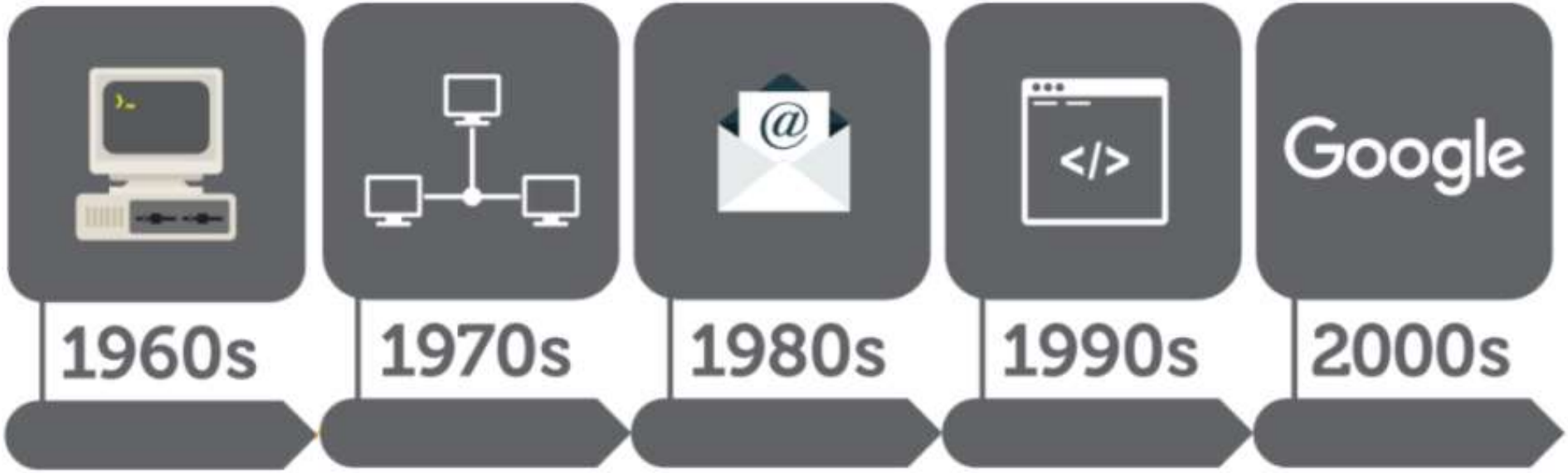
Presentation Contents

I. The relevance of “digital” to the social economy life: A brief history

II. Digital transformation for IGE: the policy rationale

III. A breakout session: country demand, the strength and challenges for PAGE

UN environment programme



The first network TCP/IP protocol Cost reduction to host multiple users World Wide Web Rise of Cyberspace Digitalization

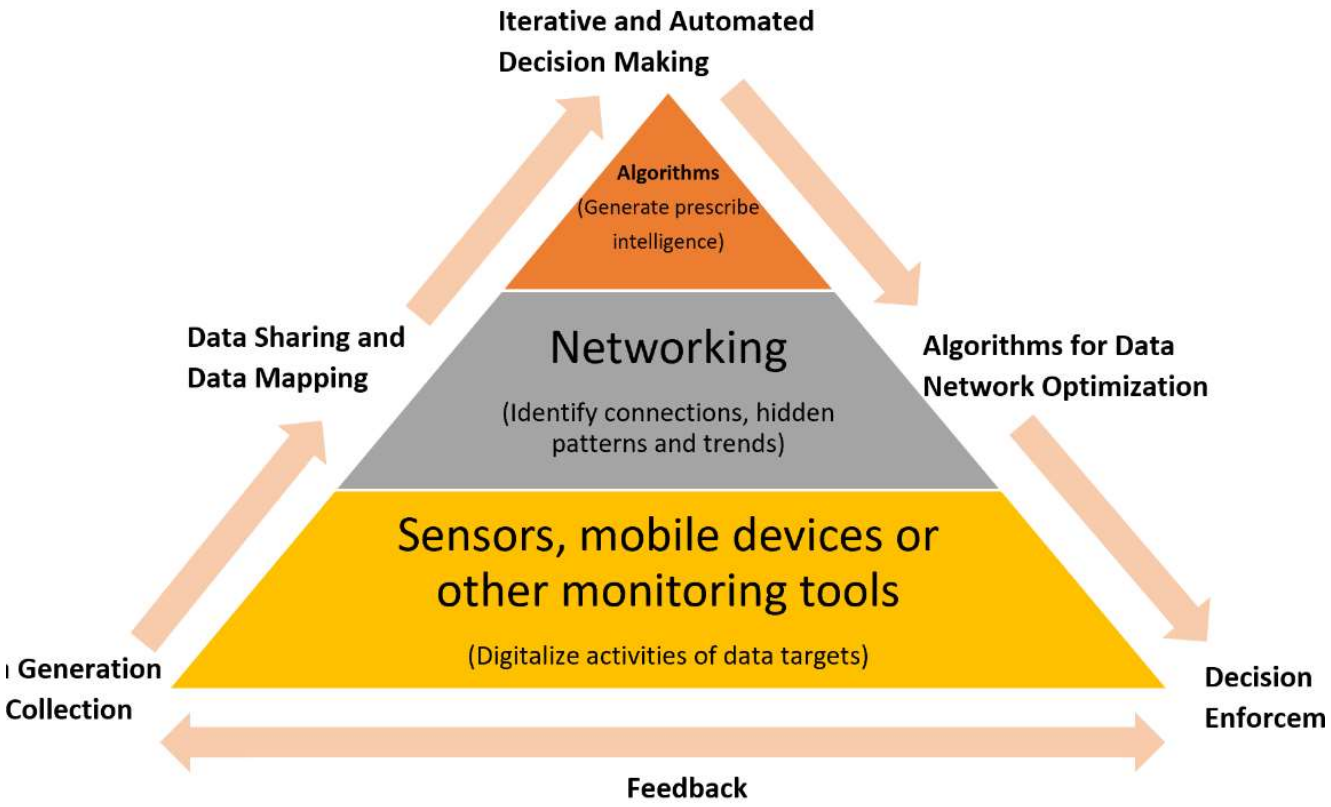

“Data is the new Oil”
– Clive Humby


amazon
coinbase
DOORDASH
Etsy
Expedia
facebook
handy
IAC
intuit
Microsoft
MONSTER
PayPal
Pinterest
practice fusion
salesforce
Spotify
TransferWise
tripadvisor
TURO
YAHOO!
yelp
ZENEFITS


cloud computing
5G
big data
ICT
semiconductors
smart phones
sensors
Digital Technologies
data center
CCTV
artificial intelligence
machine learning

Poll 1: If you are a traditional business owner, how can you transform your company to be a disrupter?

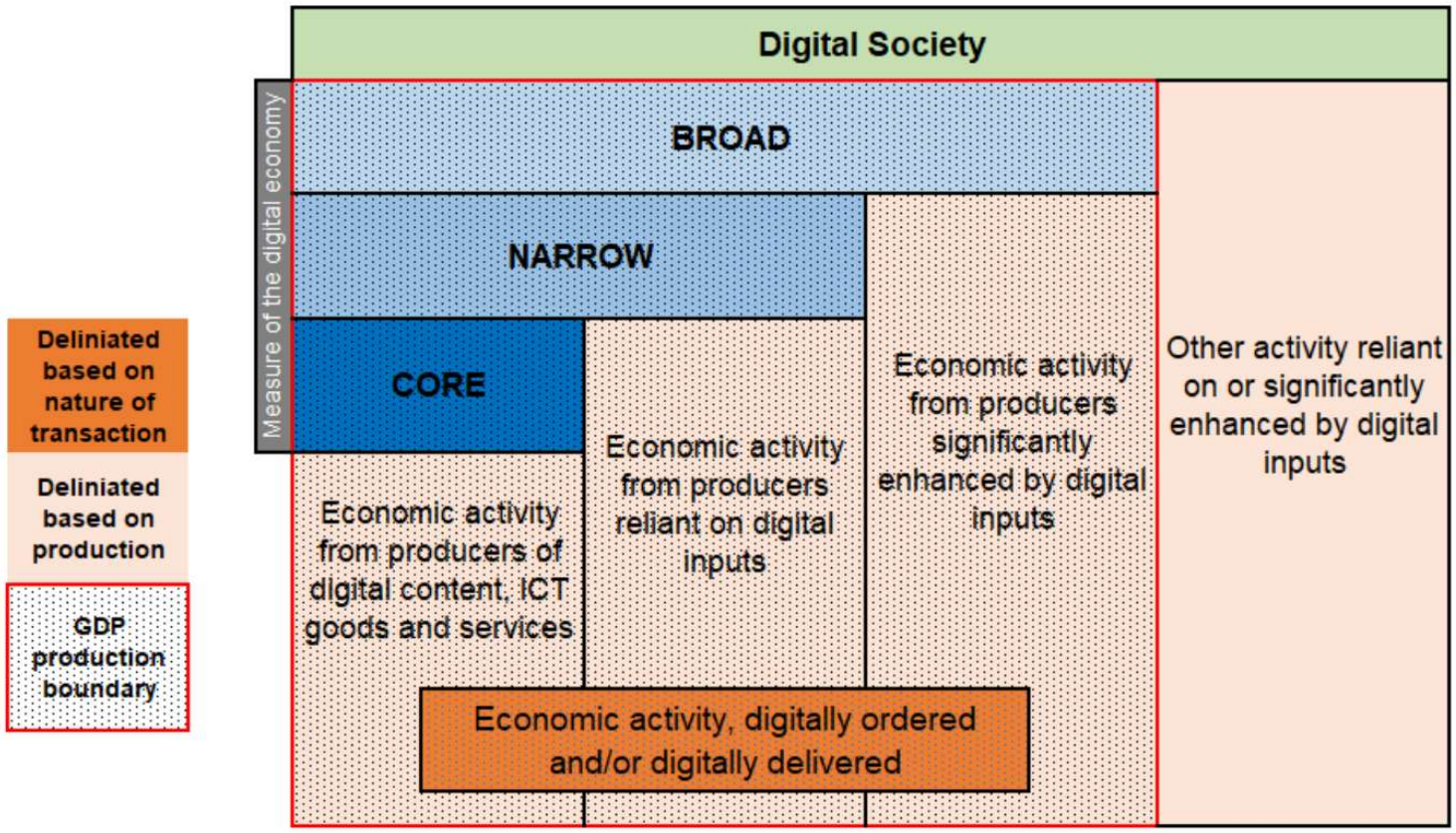
a. Set up sensors to monitor the core business or keep track of company activities through online records
b. Develop mobile applications to streamline the product or service delivery
c. Analyse the operational pattern, restructure the business for efficiency gain and expand the network of the business
d. Develop new products and services iteratively in response to consumer feedback
e. Other actions



A typical data value chain strategy

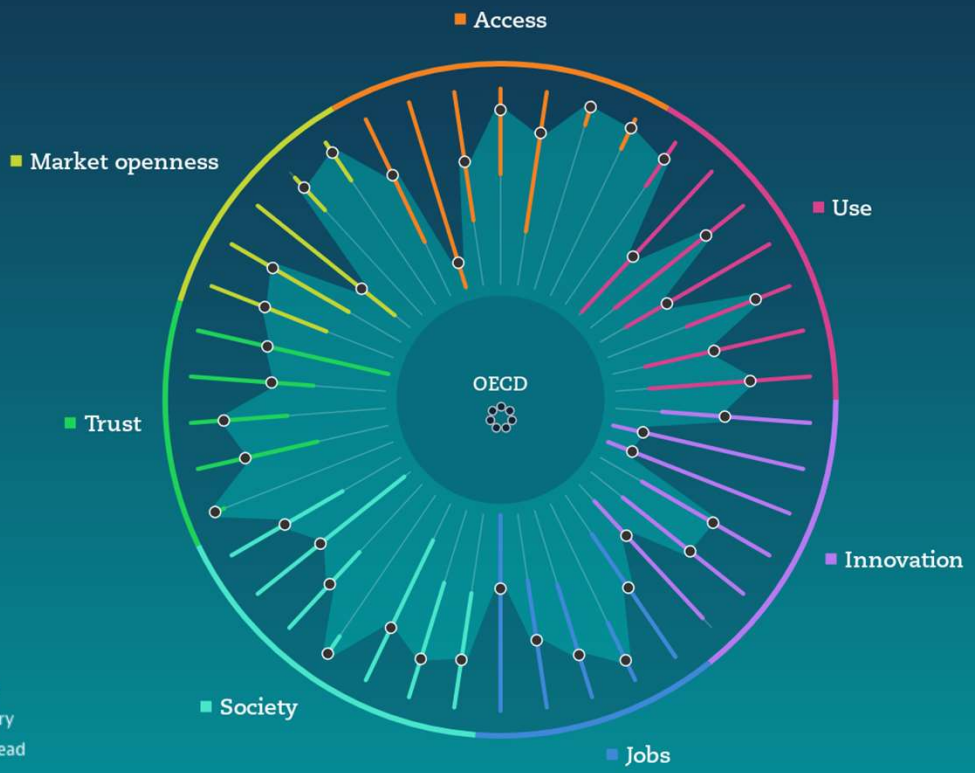
Source: Yaxuan Chen

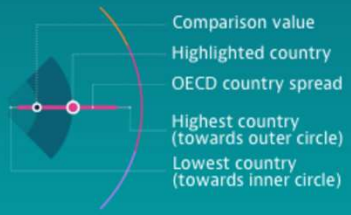
Figure 2: Tiered definition of the Digital Economy



Source: OECD

Going Digital Toolkit





Indicator labels are ordered clockwise

Access
- Fixed broadband penetration
- Mobile broadband penetration
- M2M penetration
- Household broadband access
- Businesses with broadband speed of 30+ mbps
- 4G broadband coverage
- Urban-rural broadband divide

Use
- Internet users
- Small firms selling online
- People buying online
- Uptake of digital government services
- Adults proficient in problem-solving with technology
- Businesses buying cloud services
- Businesses with web presence

Innovation
- ICT investment intensity
- R&D in information industries
- Top-cited computer science documents
- ICT patents
- Start-up firms
- ICT venture capital investment

Jobs
- ICT task-intensive jobs
- Jobs in digital-intensive sectors
- Public spending on active labour market policies
- New STEM graduates
- Workers receiving training

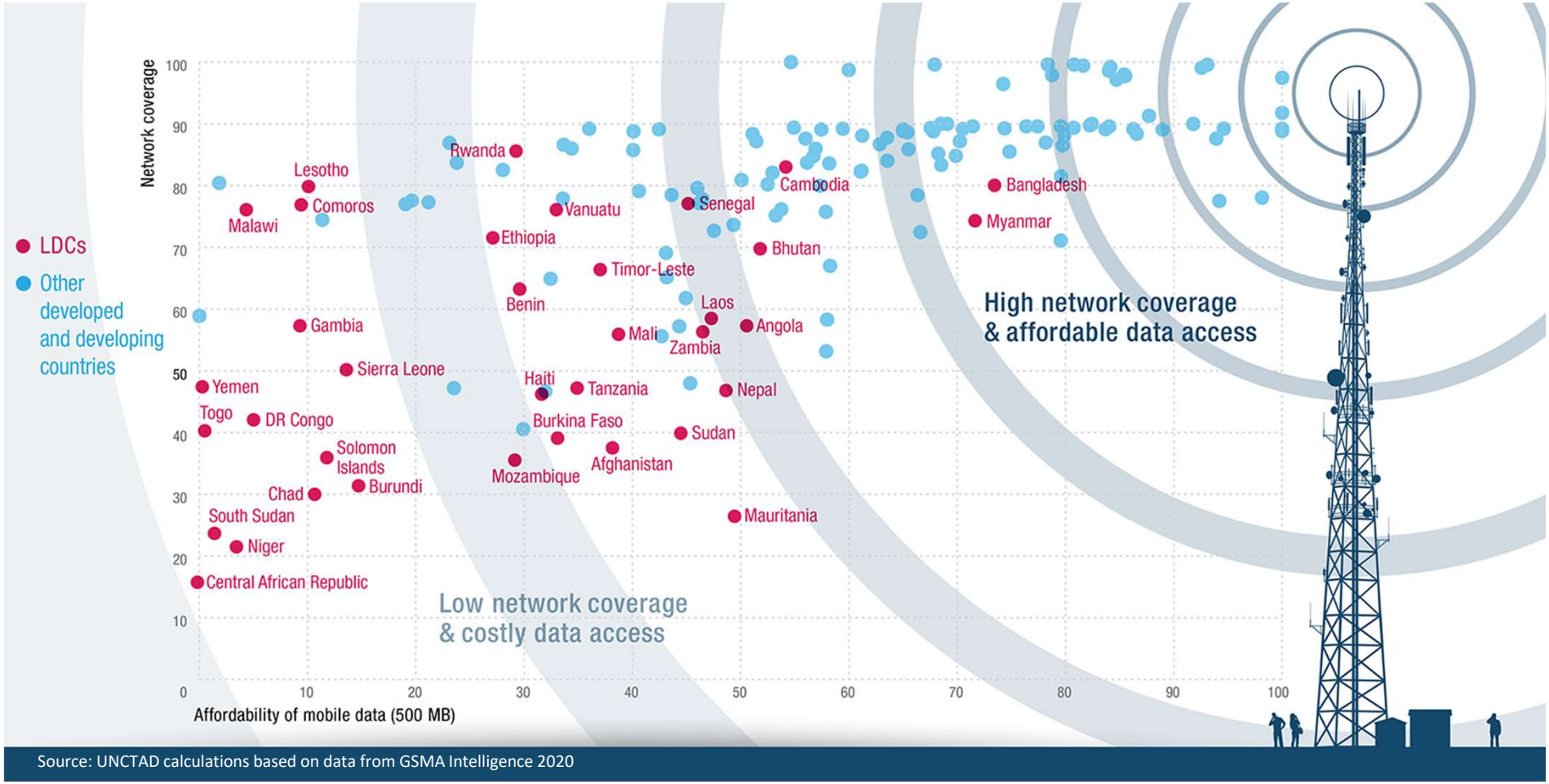
Society
- Internet users aged 55-74
- Low-income Internet users
- Top-performing students in science, maths and reading
- Young female coders
- Regular teleworking from home
- Internet gender divide
- Digital Government Index

Trust
- Intra-firm ICT security and data protection skills
- Internet users experiencing privacy violations
- Payment security concerns prevent individuals from buying online
- Product return concerns prevent individuals from buying online
- Health data sharing

Market openness
- Digitally-deliverable services trade
- Cross-border e-commerce
- Digital Services Trade Restrictiveness
- FDI Regulatory Restrictiveness
- ICT goods and services trade

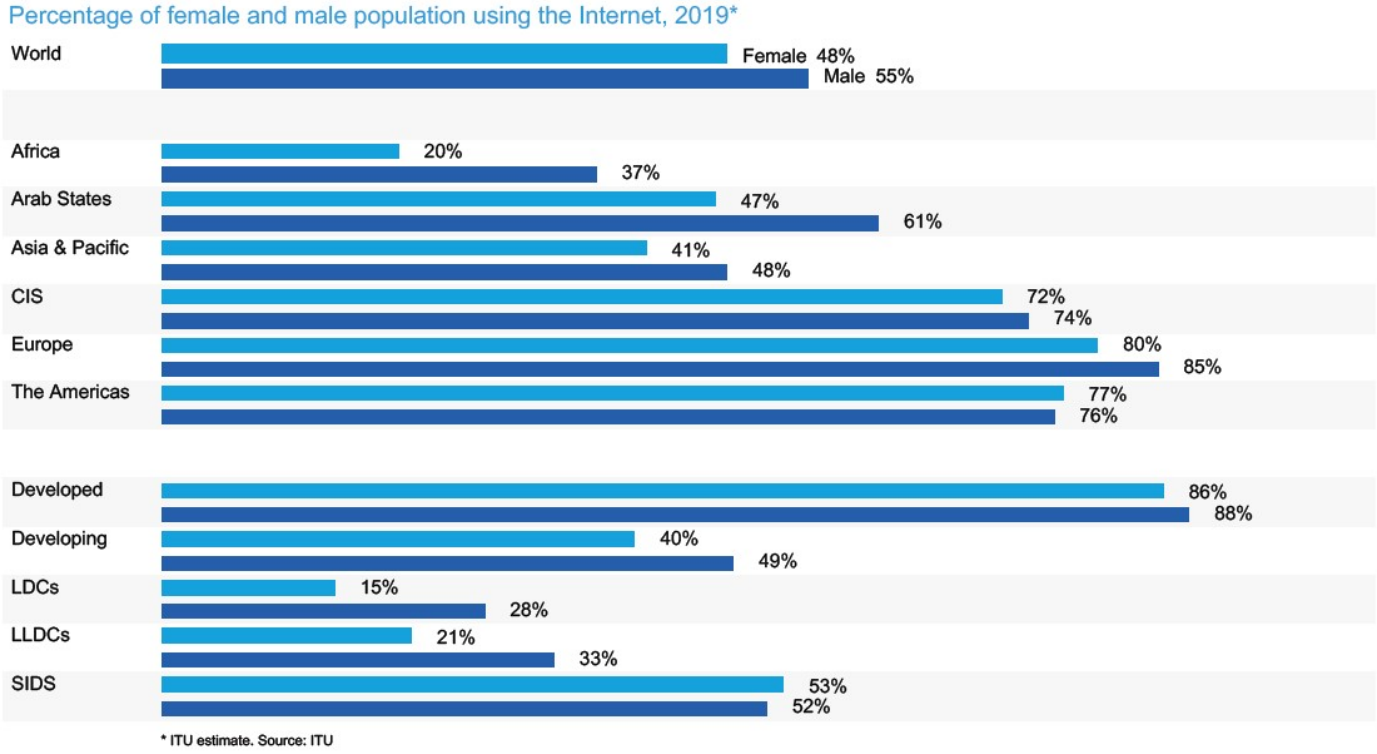
Source: OECD Going Digital Toolkit, http://www.oecd.org/going-digital-toolkit

OECD

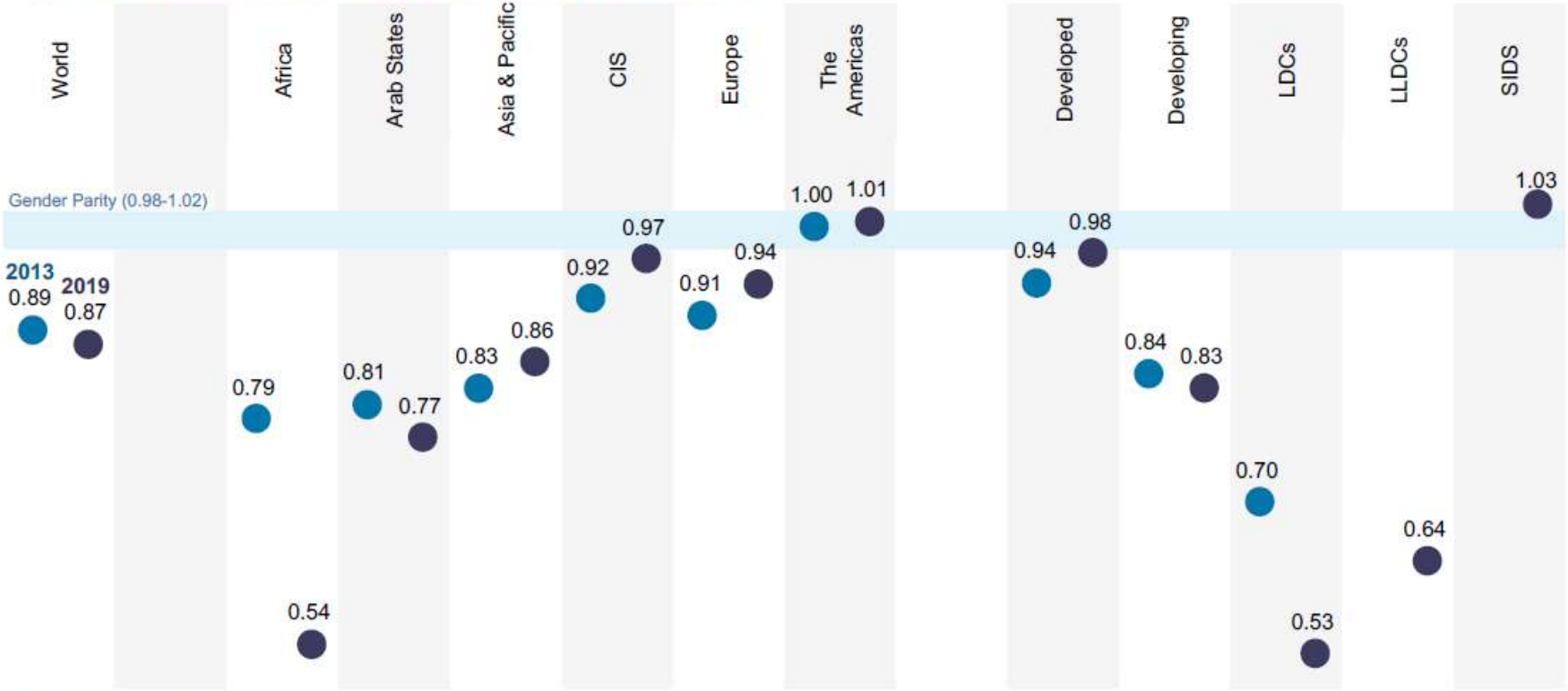


Source: UNCTAD calculations based on data from GSMA Intelligence 2020

Internet gender gap large in developing countries



The Internet user gender parity score (%), 2013 and 2019*

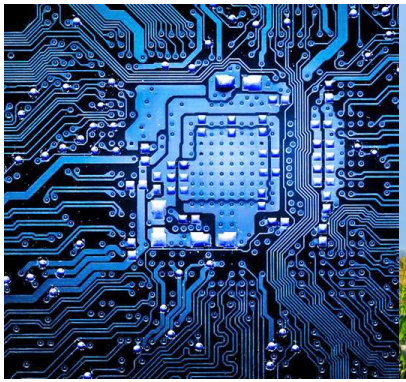


* ITU estimate. - Source: ITU

Note: The gender parity score is calculated as the proportion of women who use the Internet divided by the proportion of men. A value smaller than one indicates that men are more likely to use the Internet than women, while a value greater than one indicates the opposite. Values between 0.98 and 1.02 reflect gender parity.

Digitalizing environmental sustainability can positively impact foundational sectors of the economy through five pathways:

Efficiency + circularity + substitution + amplification + innovation



Information

Food

Transport

Energy

Materials

- Decarbonize (10-20% reduction)
- Dematerialize (90% reduction)
- Detoxify (10-100X less waste)
- Deintensify

Korean New Deal

3. Innovation in the Green Industry – finding areas of the green industry that strategically address climate change and environmental risks, and building infrastructure in support of this to create an innovative environment. (*7.6 trillion won including 6.3 trillion won from the treasury will be invested by 2025 to create 63,000 jobs.)*

Promoting prospective businesses to lead the green industry, and establishing low-carbon and green industrial complexes:

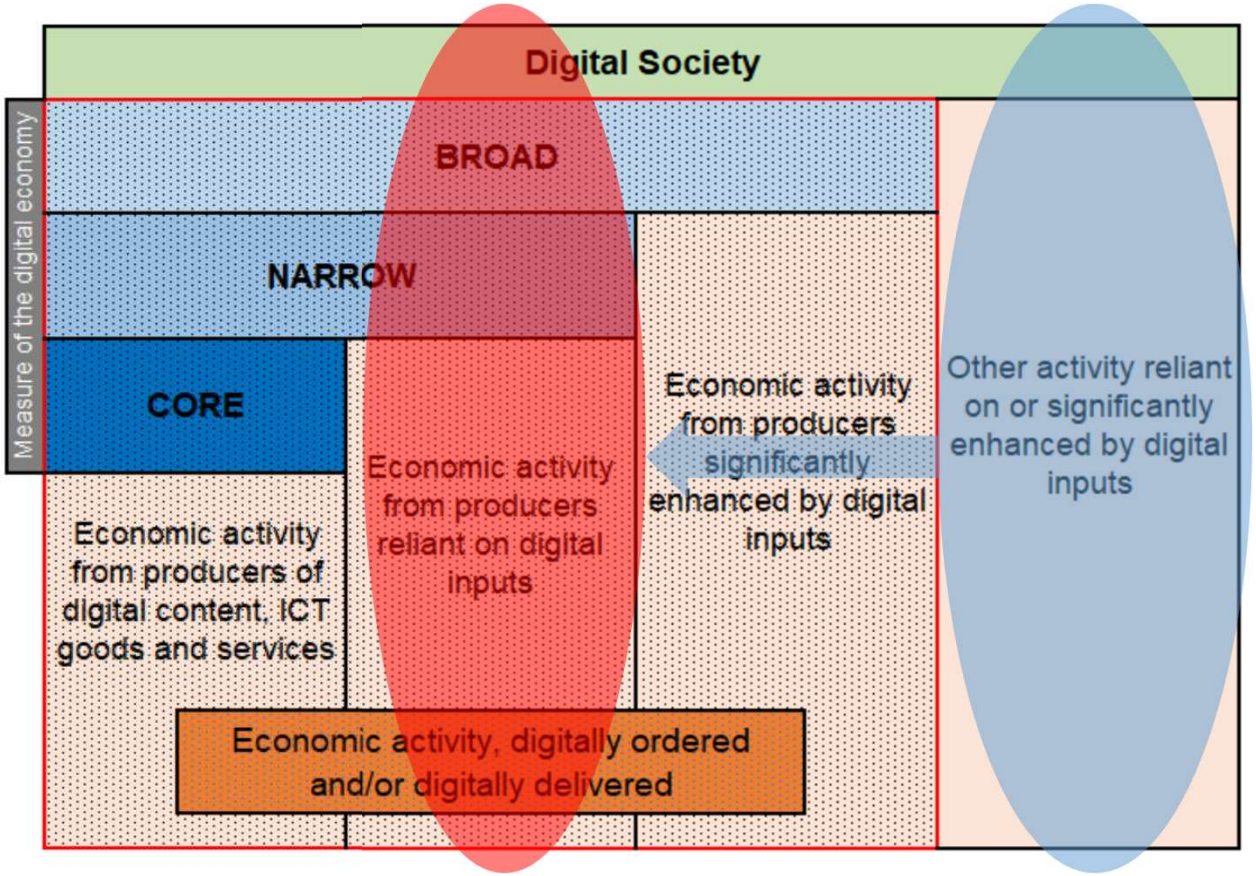
For 123 SMEs in environmental and energy sectors, the entire process of developing a business item (from R&D, testing and commercialization) will be supported. A 'green startup town,' a concentrated complex of startups that help improve environmental, transportation and residential infrastructures, will be set up by 2021.

A 'green-integrated cluster' will be set up as a regional hub that supports the technological development, testing, manufacturing and marketing in the five leading areas, which are clean air, biomaterial, hydrothermal energy, future waste resources and recycling of resources.

To enable the real-time monitoring and control of energy generation and consumption, 10 smart energy platforms based on a micro power grid will be established. These platforms allow for the collection of data based on ICT, the visualization of energy flow, and the operation of an integrated control center for electricity.

Support for facilities that prevent fine dust will be provided to 9,000 small businesses; and 100 smart ecological plants and 1,750 clean factories that reduce pollution will be established.

More digital inputs in the value chain of green sectors



Tesla set to pay for chips in advance in bid to overcome shortage

Electric-car maker also explores buying foundry but analysts warn of high costs

Carmakers such as Tesla are looking into producing their own chips © Reuters

Hyperdrive

Nio Loss Narrows; EV Maker Warns of Hit From Chip Shortage

Bloomberg News
April 30, 2021, 12:16 AM GMT+2 *Updated on April 30, 2021, 4:02 AM GMT+2*

- Deliveries seen at between 21,000-22,000 cars this quarter
- Supply chain faces 'significant challenges,' CEO Li says

Chip shortage expected to cost auto industry $110 billion in revenue in 2021

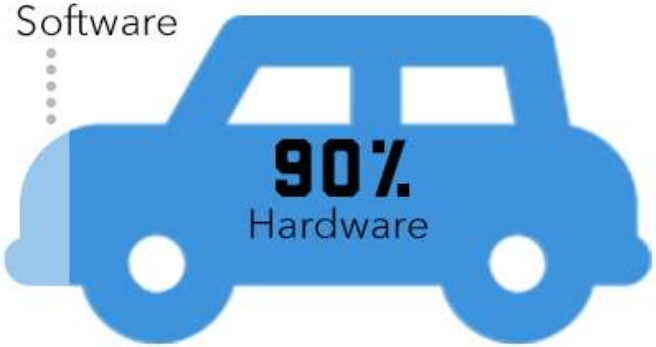
PUBLISHED FRI, MAY 14 2021•12:01 AM EDT | UPDATED FRI, MAY 14 2021•8:55 AM EDT

"There are up to 1,400 chips in a typical vehicle today, and that number is only going to increases as the industry continues its march toward electric vehicles, ever-more connected vehicles and, eventually, autonomous vehicles," Dan Hearsch, a managing director in AlixPartners' automotive and industrial practice, said in a statement. "So, this really is a critical issue for the industry."

CAPTURING THE SHIFT IN VEHICLE VALUE

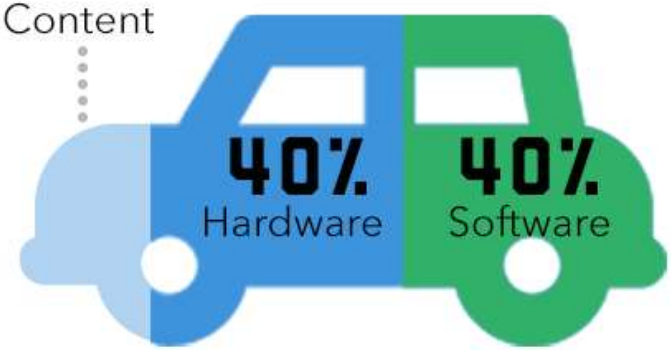
Traditional Vehicle

10%
Software



Autonomous Vehicle

20%
Content



Source: A.T. Kearney. How Automakers Can Survive the Self-Driving Era.

STATE OF THE UNION 2020
LETTER OF INTENT

KEY NEW INITIATIVES FOR 2021

A European Green Deal

- *Legislative proposal on revision of the EU emission trading system (ETS)*
- *Legislative proposal on the Carbon Border Adjustment Mechanism*

Fit for 55 Package (Climate and energy)

- *Effort-Sharing Regulation*
- *Revision of the Renewable Energy Directive, the Energy Efficiency Directive and the Directive on Energy Performance of Buildings*
- *Revision of the Regulation on Greenhouse Gas Emissions and Removals from Land Use, Land Use Change and Forestry*
- *Legislative proposal to address methane emissions in the energy sector, revision of the regulatory framework for competitive decarbonised gas markets and revision of the Energy Taxation Directive*
- *Revision of the Directive on Intelligent Transport Systems and the Directive on Deployment of Alternative Fuels Infrastructure*
- *Revision of the Regulation setting CO_2 emission performance standards for cars and light commercial vehicles and legislative proposal on development of post-Euro6/VI emission standards for cars, vans, lorries and buses*

Intelligent transport systems (review of EU rules)

Have your say > Published initiatives > Intelligent transport systems (review of EU rules)

In preparation

Roadmap
Feedback period
08 October 2020 - 19 November 2020
FEEDBACK: CLOSED

Public consultation
Feedback period
03 November 2020 - 02 February 2021
FEEDBACK: CLOSED

UPCOMING

Commission adoption
Planned for
Third quarter 2021
FEEDBACK: UPCOMING

About this initiative

Summary	Intelligent transport systems improve safety, traffic efficiency and driver comfor take the right decisions and adapt to traffic situations. EU rules aim to accelerate and coordinate the deployment and use of these sy This revision will assess the availability of infrastructure and traffic/travel data a transport network. It will also cover new developments such as: • connected and automated mobility (e.g. self-driving vehicles) • online platforms allowing users to access several modes of transport.
Topic	Transport
Type of act	Proposal for a directive
Category	REFIT

Roadmap

FEEDBACK: CLOSED

Type
Inception impact assessment
More about roadmaps

Feedback period
08 October 2020 - 19 November 2020 (midnight Brussels time)

View feedback received >

Some common policy priorities of digital governance

Facilitating digital uptake and promoting innovation:

- Enhance digital government
- Develop telecommunication infrastructure
- Foster innovation in digital technologies
- Develop skills for the digital transformation
- Promote digital uptake by businesses
- Promote digital uptake by individuals

Enhancing digital governance and establishing safeguards:

- Improve digital security
- Enhance data and Internet governance
- Enhance consumer protection on line

The role of Government

- Invest in the integrated, networks of sustainable infrastructure, which use data as infrastructure;
- Create an enabling environment for new business model and market mechanism such as servicification to grow in green sectors, for new profit models, job creation and innovation;
- Improve the capacity of digital government, for innovative ways of stakeholder engagement;
- Establish social safety net to fill the gap in green and digital skills;
- Impose a green ICT policy;
- Work hand in hand with other policy areas in particular on the issue of data governance.

The breakout session

A. Country demand

1) Do you know of any countries that may be interested in receiving policy guidance on digital transformation in connection to inclusive green economy?
2) Please briefly describe your organization's digital transformation strategy with a focus on substantive work themes

B. The entry point for PAGE

1) What do you think are PAGE's the strengths in assisting countries for managing the green and digital transitions?
2) What might be the challenges?
3) What might a PAGE product look like?

Thank you!

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