G20 INSIGHTS

GLOBAL
SOLUTIONS
FOR G20: THE THINK 20 SUMMIT
BERLIN 29 - 30 MAY 2017

G20 GERMANY 2017
THINK 20 DIALOGUE

Digital Infrastructure:
Overcoming Digital Divide in Emerging Economies

POLICY AREA: Digital Economy

2017-May-31

Ben Shenglin (Zhejiang University, Academy of Internet Finance)
Felice Simonelli (Center for European Policy Studies)
Zhang Ruidong (Zhejiang University, Academy of Internet Finance)
Romain Bosc (Center for European Policy Studies)
Li Wenwei (Zhejiang University, Academy of Internet Finance)

Supported by: Emerging Market Sustainability Dialogues

Outline

Introduction: What's Digital Divide
- **What's digital divide?**
- **What're the "full benefits" of overcoming digital divide?**

Part 1: Digital Infrastructure in China

Part 2: Digital Infrastructure in EU

Part 3: Our Proposal

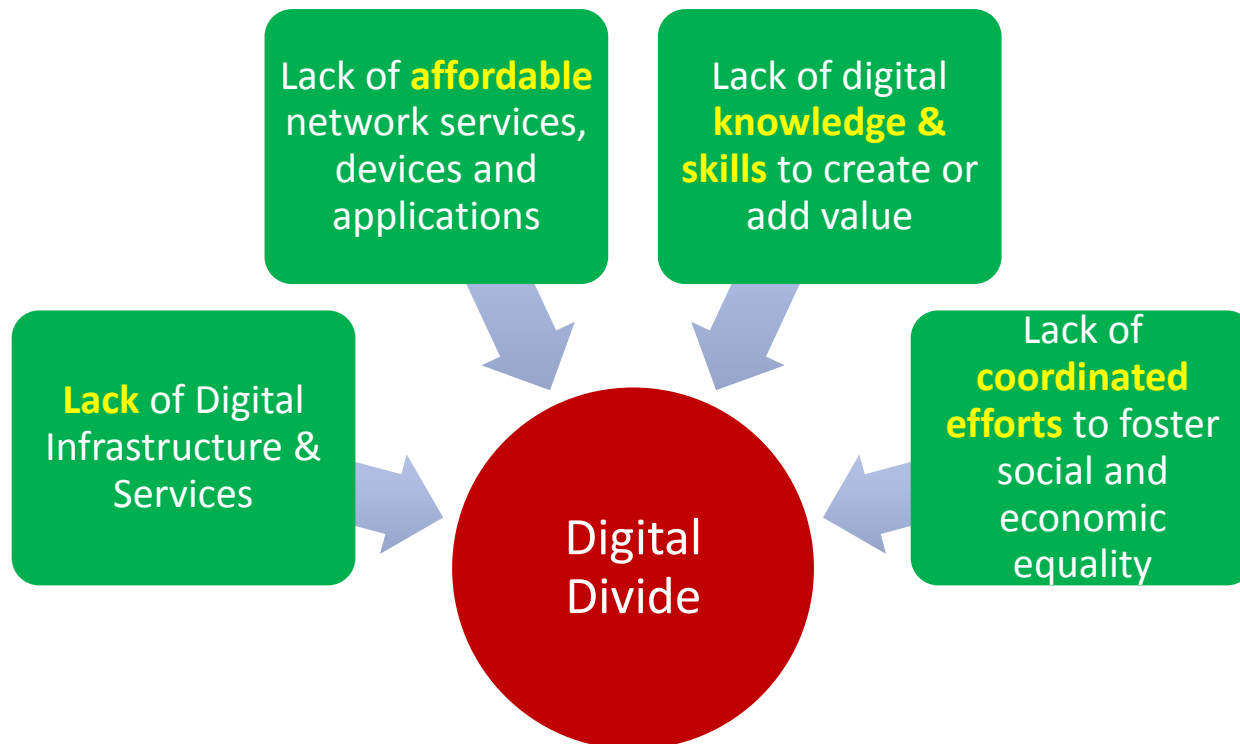**Part 4: Policy Recommendations**
- **A life-cycle theory on overcoming digital divide comprehensively**
- <u>**Staged efforts**</u> **in overcoming digital divide**

Introduction: What's Digital Divide

What's **digital divide?**

- **It** refers to the gap in **usage and access** to digital infrastructure and services **between** individuals, households, businesses or geographical areas.
- It affects certain population segments, for instance, low-income and rural communities, due to the lack of digital infrastructure, affordability, knowledge and skills.

Lack of **affordable** network services, devices and applications

Lack of digital **knowledge & skills** to create or add value

Lack of Digital Infrastructure & Services

Lack of **coordinated efforts** to foster social and economic equality

Digital Divide

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"Full benefits" of ICT and internet connectivity

The ultimate goal of closing the digital divide is to inclusively provide every member of a society with an equal opportunity to benefit from digital development. The digital development brings following benefits:
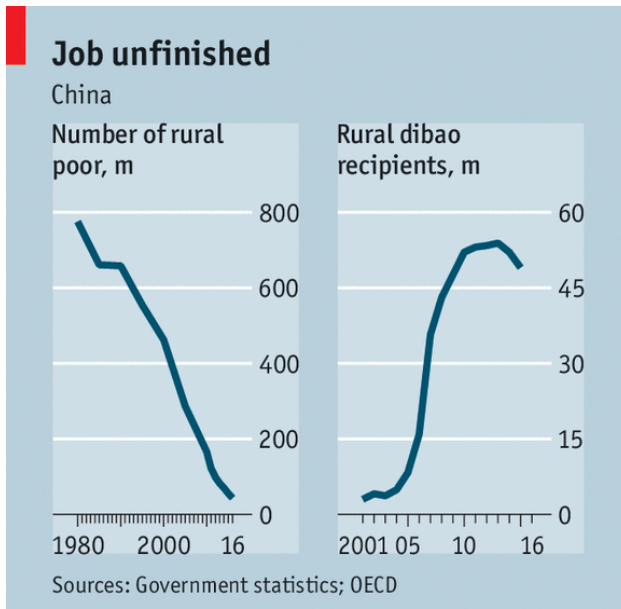
	Efficiency	Social & Economic Inclusion	New Economy
Business	Capital utilization	Trade	Competition
People	Labor productivity	Job Opportunities	Consumer welfare
Governments	Public sector capability	Participation	Voice

Source: World Bank (2016)

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Part 1: Digital Infrastructure in China

Helping China's rural poor: government's efforts

Job unfinished

China

Number of rural poor, m

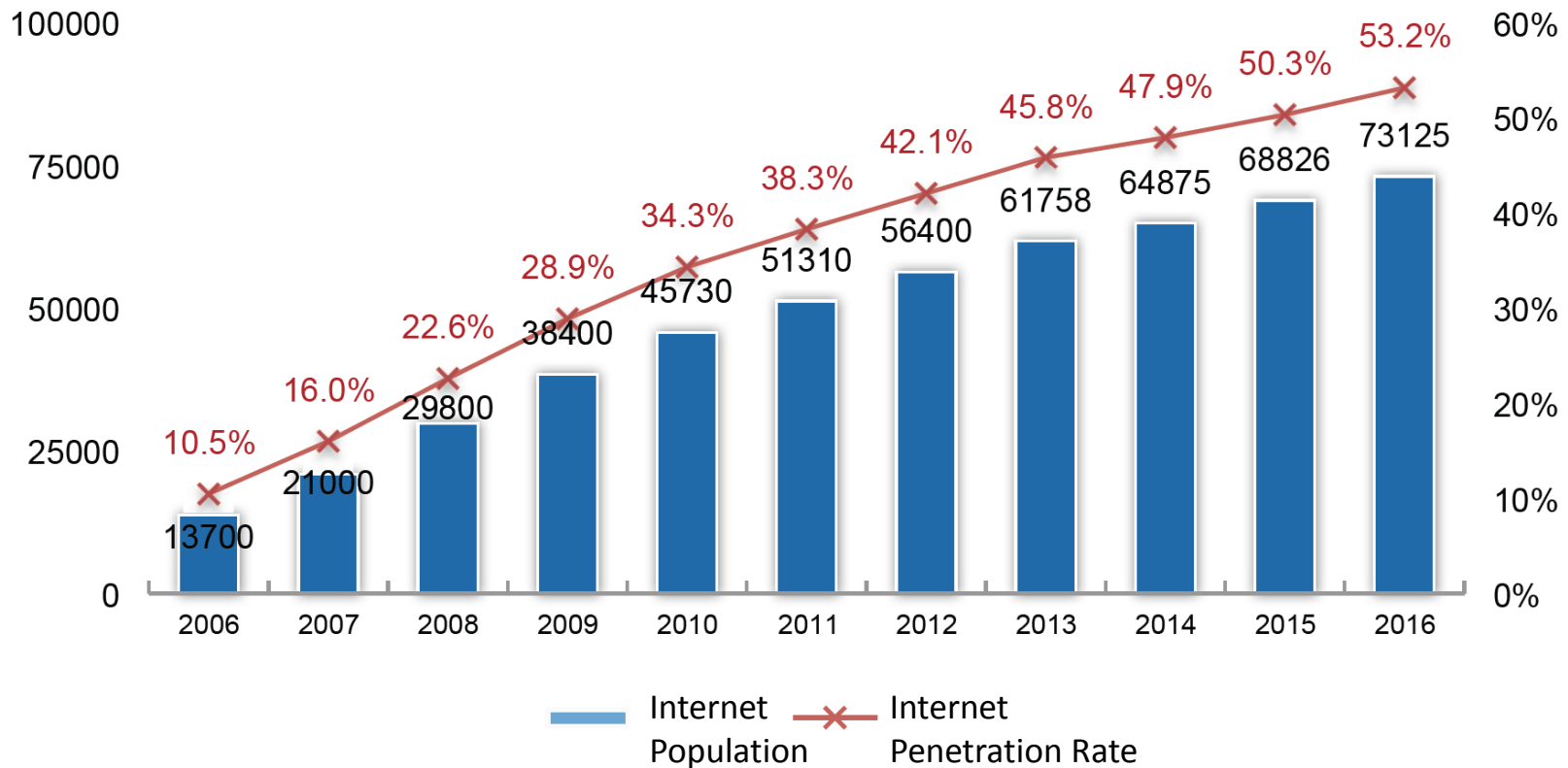Rural dibao recipients, m

Sources: Government statistics; OECD

Economist.com

(source)

(source)

Increasing Internet Penetration in China

of Internet Population & Internet Penetration Rate

Unit: $1 * 10^4$
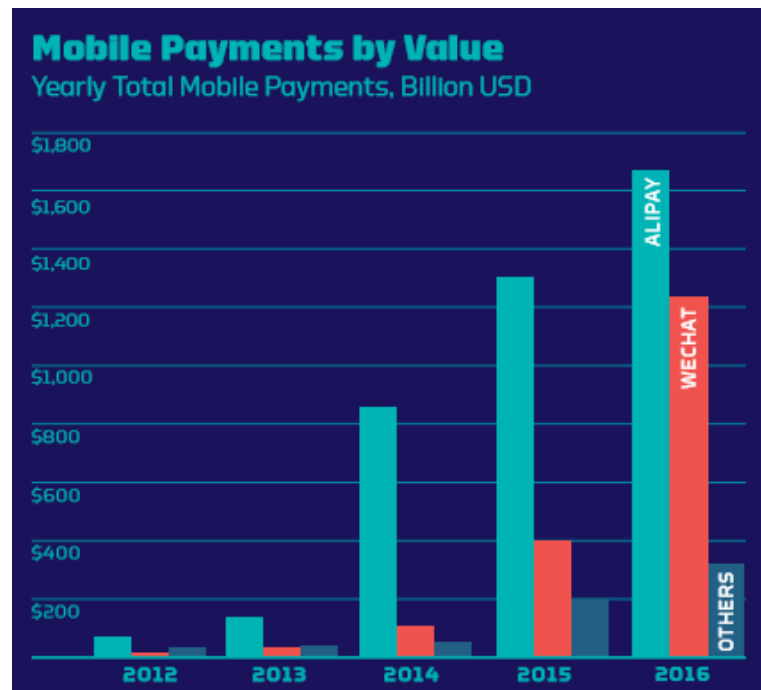

Source: CNNIC Survey (2016)

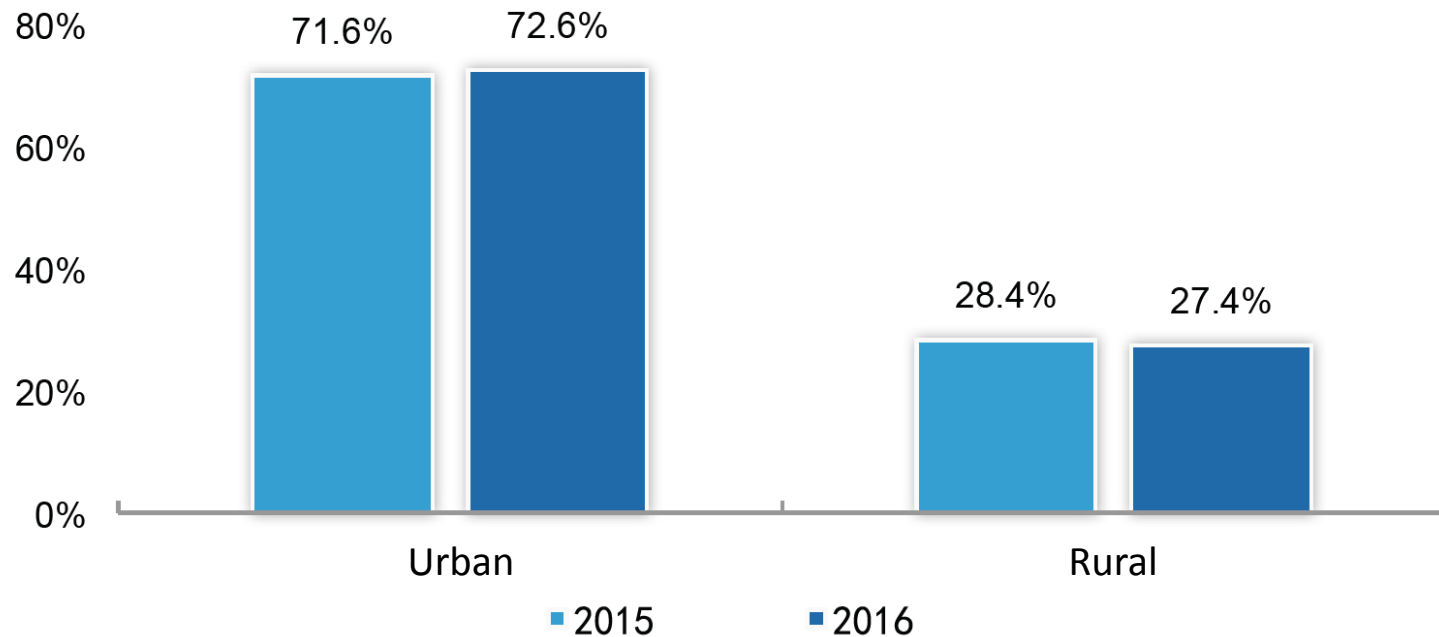# 2012-2016 China's Mobile Payment Market (in billion $)

(source)

Digital Divide Remains Significant
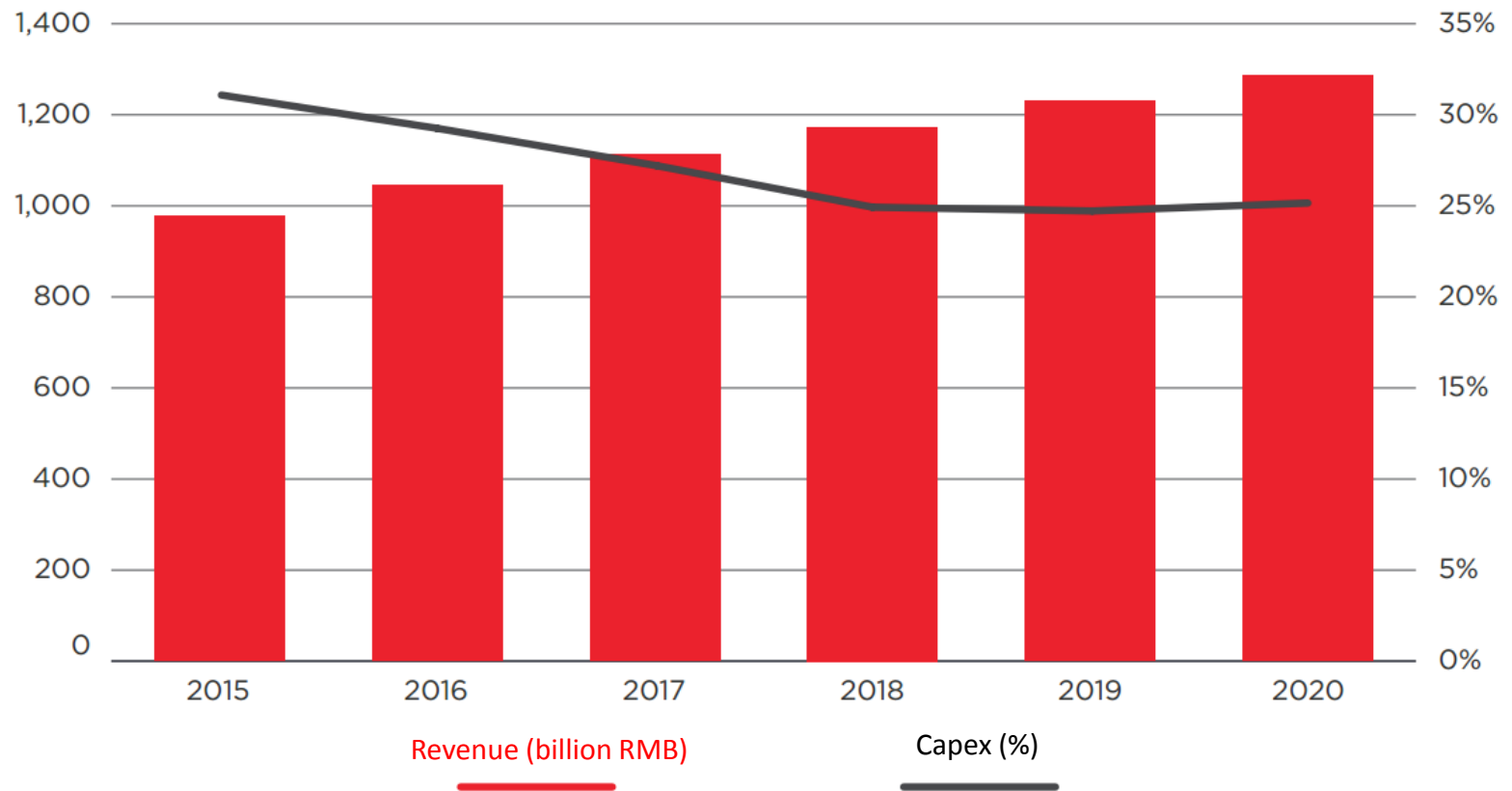
% of Internet Population from urban and rural areas

Source: CNNIC Survey (2016)
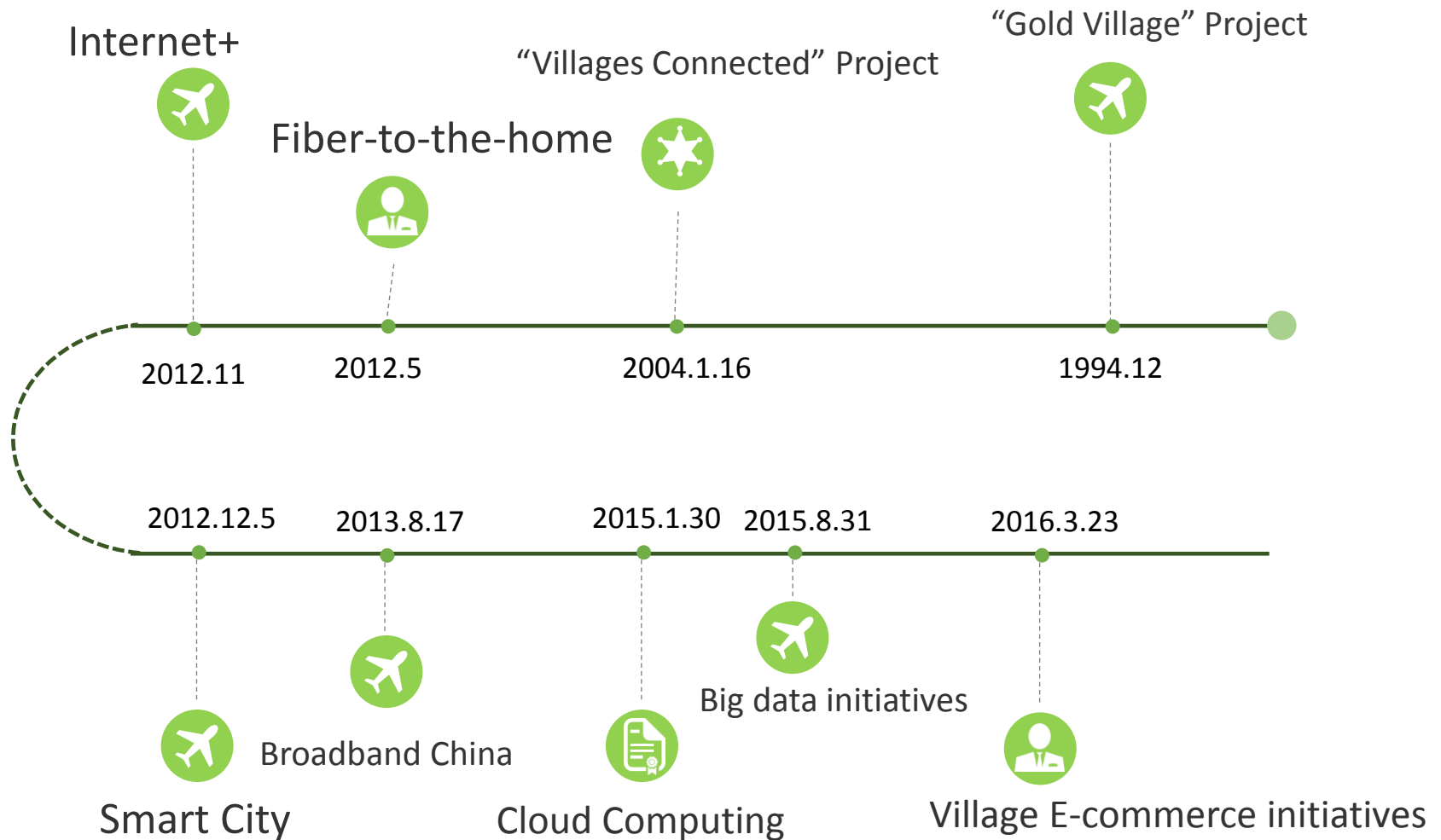
Declining Capital Expenditure in Telecom Equipment

Revenue (billion RMB) and % of Capex of Chinese Telecom Companies

Revenue (billion RMB)

Capex (%)

Source: Wind

Major Policy Milestones in China

Internet+

"Gold Village" Project

"Villages Connected" Project

Fiber-to-the-home

2012.11   2012.5   2004.1.16   1994.12

2012.12.5   2013.8.17   2015.1.30   2015.8.31   2016.3.23

Big data initiatives

Smart City   Broadband China   Cloud Computing   Village E-commerce initiatives

"Villages Connected" Project in China

- **Extending Radio and TV Broadcasting Coverage to Every Village:** a national project that emphasized making available paved roads, electricity, living and drinking water, telephone networks, cable networks, the Internet and so on in Chinese villages

- **Progress:** Chinese government had invested accumulatively 87 billion RMB in the decade during 2004-2013, which has activated phone lines for about 204,000 villages, opened the broadband for 111,000 villages, respectively accounting for 95.6%, 91% of all villages in China.

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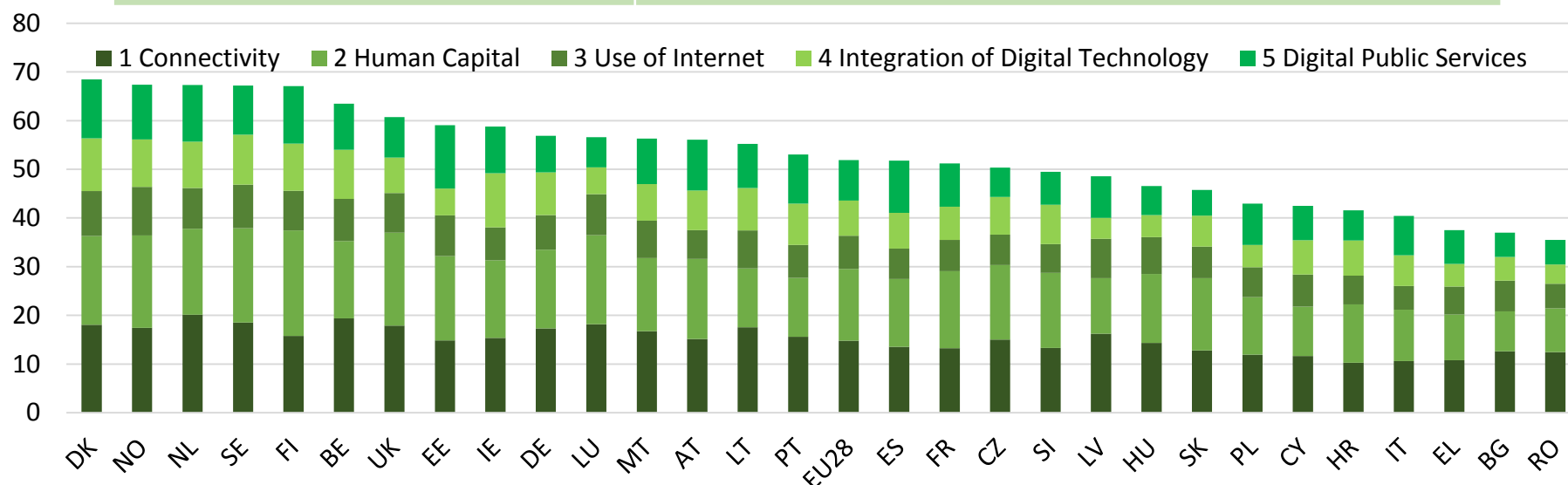THINK 20 DIALOGUE

Part 2: Digital Infrastructure in EU

The Digital Infrastructure in the EU

→ **Digital infrastructure:** broadband connectivity, human capital (skills) and digital tech integration and usage for individuals, businesses and public administrations

Digital Economy and Society Index (DESI):

1 Connectivity	Fixed Broadband, Mobile Broadband, Broadband speed and Affordability
2 Human Capital	Basic Skills and Usage, Advanced skills and Development
3 Use of Internet	Content, Communication and Online Transactions
4 Integration of Digital Technology	Business digitisation and eCommerce
5 Digital Public Services	eGovernment

Legend: ■ 1 Connectivity ■ 2 Human Capital ■ 3 Use of Internet ■ 4 Integration of Digital Technology ■ 5 Digital Public Services

Countries (x-axis): DK, NO, NL, SE, FI, BE, UK, EE, IE, DE, LU, MT, AT, LT, PT, EU28, ES, FR, CZ, SI, LV, HU, SK, PL, CY, HR, IT, EL, BG, RO

Source: European Commission, Digital Scoreboard

The Digital Infrastructure in the EU

Broadband infrastructure:

Connectivity Indicators (DESI 2016) Figures from June 2015	Coverage EU28	Take-up EU28
Fixed Broadband	**97%**	**72%**
	% households	% households
Fixed Fast Broadband (NGA)	**71%**	**30%**
	% households	% of subscriptions >= 30Mbps, out of fixed BB subscriptions
Mobile Broadband	**86%**	**75%**
	% households (4G LTE)	Subscribers per 100 people (all tech)

- NGA networks are still limited to urban areas: only **28 % of rural homes are covered**, mainly by VDSL

- Mobile 4G LTE deployment has also focused mainly on urban areas, as **only 36 % of rural homes are covered**

NGA networks coverage, 2015
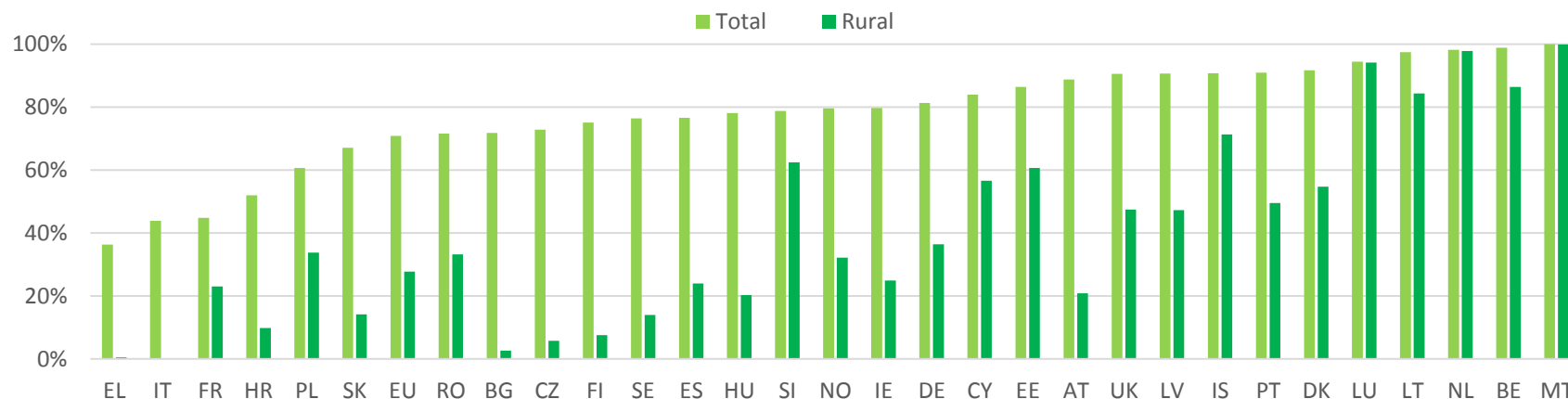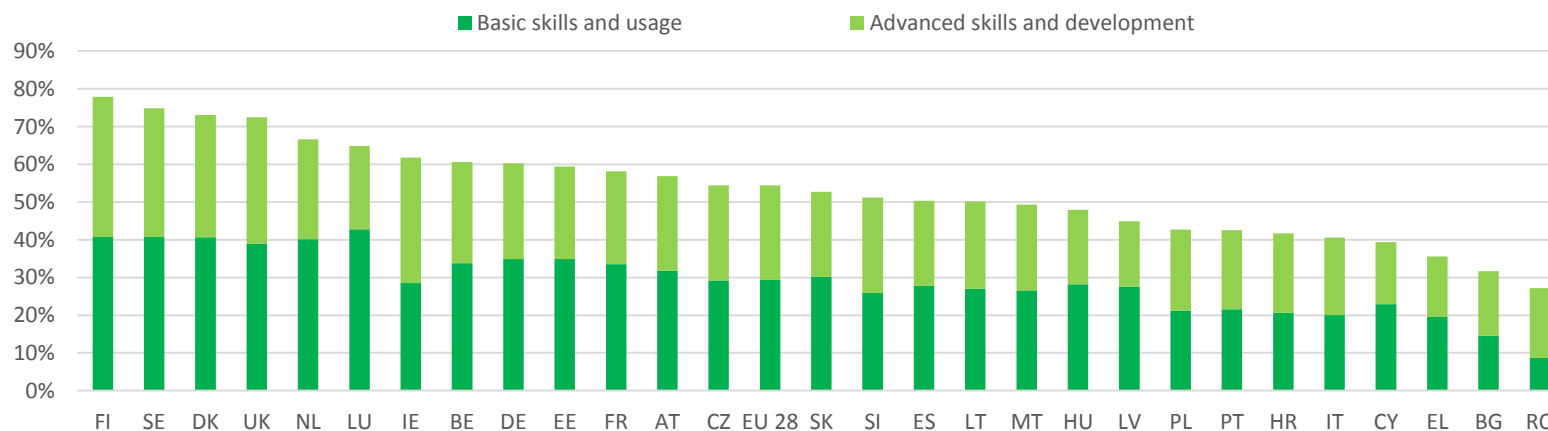

Source: IHS and VVA

The Digital Infrastructure in the EU

Human capital

Human Capital main dimensions	EU 28
Internet Users	**75% weekly - 65% daily**
% individuals (aged 16-74)	2014
Never used Internet	**18%**
% individuals	2014
ICT Specialists	**2.8%**
% employed individuals	2012
STEM Graduates	**17/1000**
Graduates in STEM per 1000 individuals (aged 20 to 29)	2012

- **38% of EU workplaces lack of digital skilled** employees, leading to loss of productivity (46%) and loss of customers (43%)

- **88% of the EU workplaces did not take any action** to tackle the lack of digital skills of their employees.

## DESI Component on Human Capital by aggregate scores, 2015


Source: European Commission, Digital Agenda Scoreboard

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The Digital Infrastructure in the EU

North-South & Western-Eastern divide in BB penetration (left) and Internet usage (right)

Households with broadband connections by NUTS2 Regions 2015 (%)
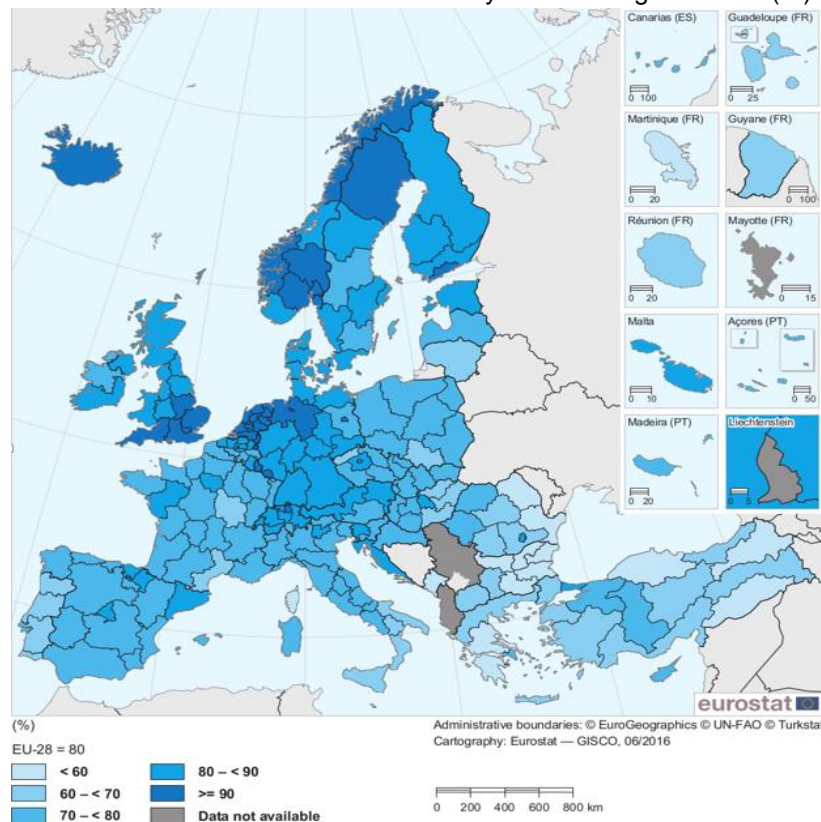
Proportion of people who never used Internet by NUTS2 Regions, 2015 (%)
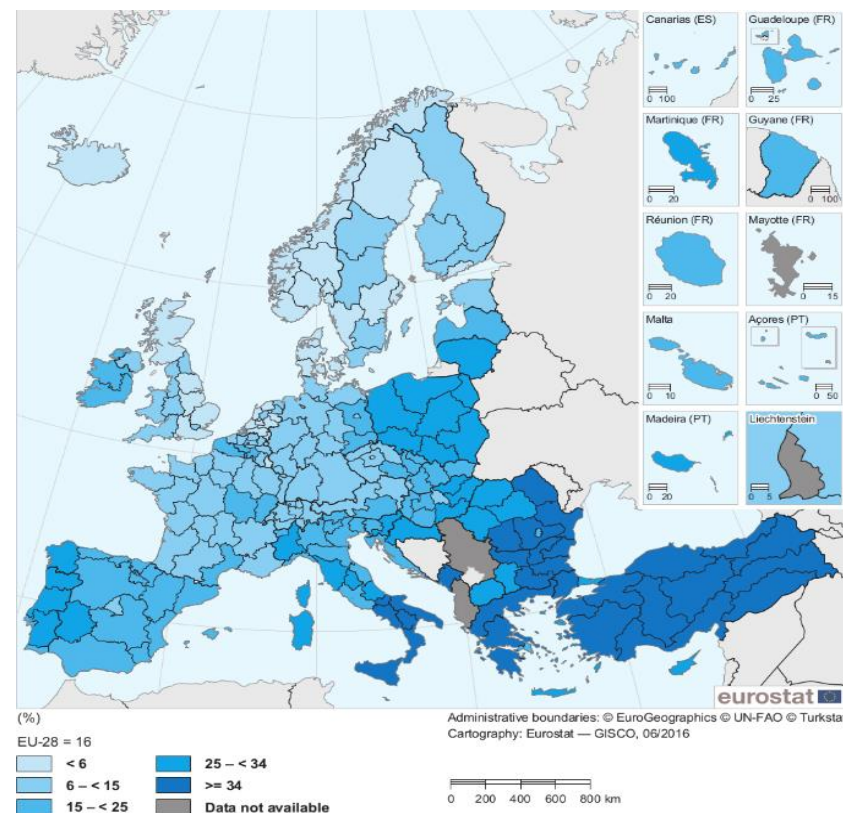
(¹) Germany, Greece, Austria, Poland, the United Kingdom and Turkey: NUTS level 1. Iceland and Switzerland: 2014. Montenegro: 2012. Corse (France): low reliability.
Source: Eurostat (online data codes: isoc_r_broad_h and isoc_ci_eu_h)

(¹) Germany, Greece, Austria, Poland, the United Kingdom and Turkey: NUTS level 1. Iceland and Switzerland: 2014. Montenegro: 2012. Corse (France): low reliability.
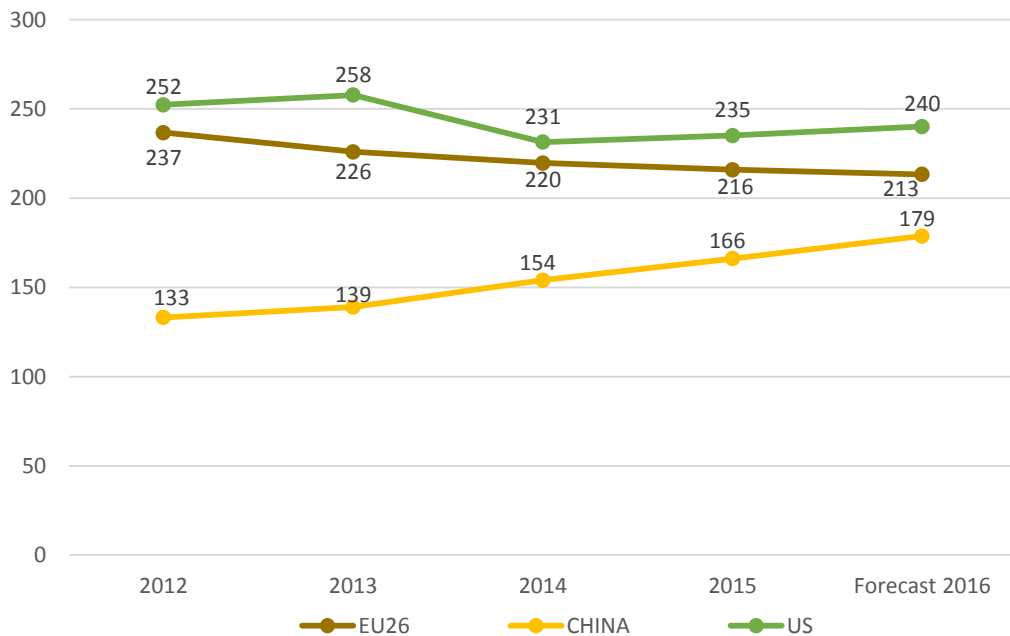*Source:* Eurostat (online data codes: isoc_r_iuse_i and isoc_ci_eu_i)

The Digital Infrastructure in the EU
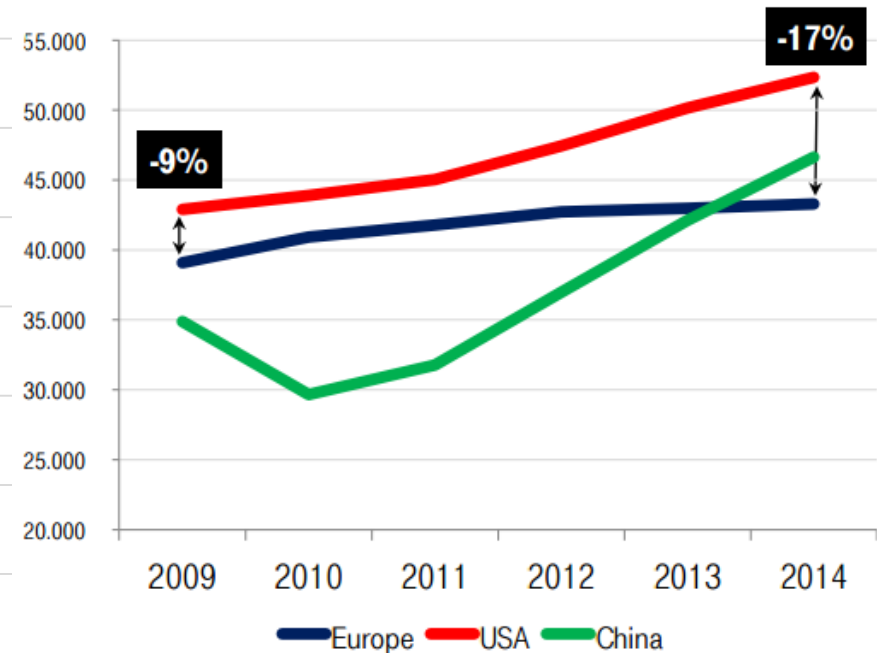
2. Challenges ahead and EU policy instruments to bridge the digital gaps

Telecommunication services revenues per region, bn EUR, 2012-2016

Source: European Commission, Digital Progress Report 2016

Fixed and Mobile CAPEX in domestic markets, mn EUR, 2009-2014

Source: IDATE

→ **Under-investment in Europe risks hampering the deployment of next-generation digital networks**

The Digital Infrastructure in the EU
EU response to close the digital divide

❑ Regulatory impulse - the **Digital Single Market** after two years: Success or Failure?

❖ **Better access for consumers and businesses** to online goods and services across Europe
❖ Creating the right conditions for **digital networks and services to flourish**
❖ Maximising the growth potential of our **European Digital Economy**

❑ **EU instruments** supporting ICT development, including broadband infrastructure

❖ **Cohesion funds**
  o The European Regional Development Fund and the European Agricultural Fund for Rural development: EUR 21 billion over 2014-2020 to ICT development

❖ **The Connecting Europe Facility (CEF) and European Fund for Strategic Investment (EFSI):**
  o CEF: around EUR 1 billion on telecoms
  o EFSI Infrastructure and Innovation Window: EUR 30 billion (so far in 2016) in 7 sectors, including ICT and human capital

❖ **The New Skills Agenda for Europe, along with the Digital Skills and Jobs Coalition launched in December 2016**

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Part 3: Our Proposal

1. Connect the unconnected

Supply-side ICT policies: the internet enters a country (the first mile), passes through that country (the middle mile) to reach the end user (the last mile), and certain hidden elements in between (the invisible mile).

First Mile

liberalizing the market for satellite dishes and

eliminating monopoly status over the international gateway and cable landing stations

Middle Mile

liberalizing the market for building and operating backbone networks,

encouraging open access to the incumbent's network,

requiring all major infrastructure programs to include provision for an optical fiber link,

setting up internet exchange points and creating local caches for used content.

Invisible Mile

involves spectrum management, which requires increasing the amount of spectrum available,

ensuring competitive access,

encouraging sharing of essential facilities, such as radio masts, and

liberalizing the market for spectrum resale.

Last Mile

Government policies permitting competing facilities, especially for intermodal competition and mandating the incumbent to make local access lines available to competitors at wholesale prices (local loop unbundling).
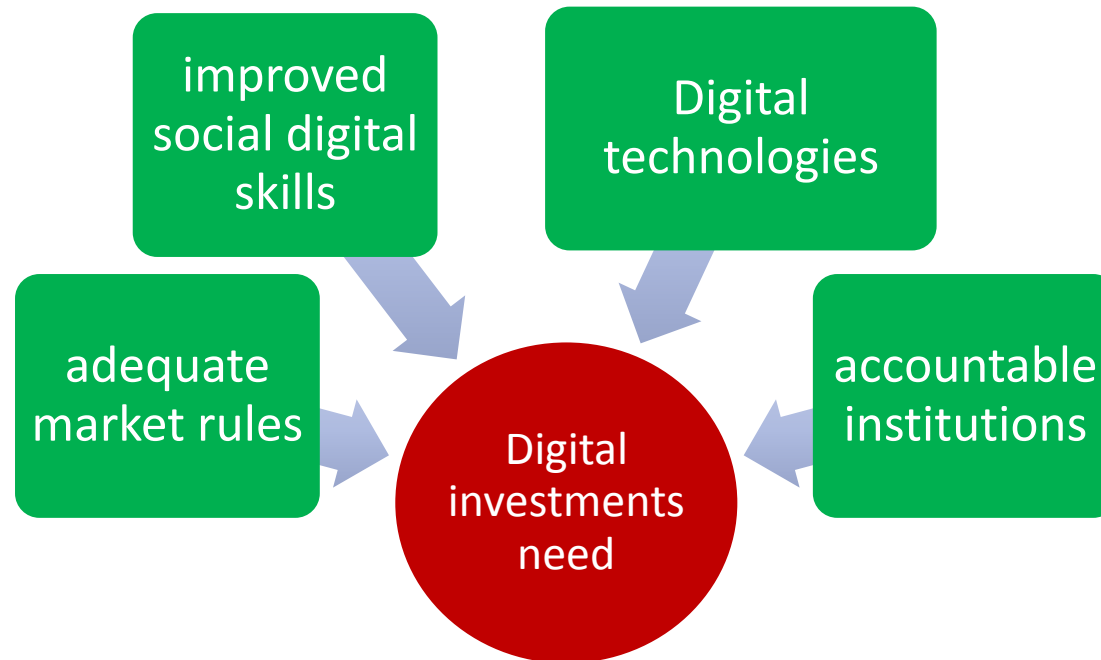
2. Industry innovations

Digital investments need the support of several factors:

- **China top Internet companies are bringing e-Commerce to Villages – see next slides**
- **An Indian example**

Rural e-commerce: Village-based e-Commerce - Taobao Villages in China

- Since 2009, the number of "Taobao Villages" has been on the rise in China, and these villages have become a significant force behind the development of **rural e-commerce** in China.

- In 2016, the number of Taobao villages in China reached 1311, with Taobao towns reaching 135.

As an important way of closing the digital divide between urban and rural areas in China, government should:

- Provide digital infrastructure at an affordable price.

- Provide digital knowledge and skill training to the villagers.

- Provide finance support.

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Industry innovation is essential -
Mobile Apps for India Under-supported people

- In a middle city called Indore, the way of doing business by "husband and wife" stores are changing dramatically
    - They can use smartphones to order over 1000 goods and they will be delivered the next day
    - Before, it is resellers visits theses small stores once a week
    - "ShopKirana" is the mobile App used to make this happen – the goal is to make it to be used by 9 million "husband and wife" stores so they can compete with those big and foreign capital supported chain stores.

- This example is about
    - Mobile infrastructure
    - Smartphone
    - Mobile Apps

(Source: Japan Economic News, 05/22/2017)

3. Education should be dynamic and stay ahead

- Workers must acquire new skills that help them become more productive thanks to this technology.

4. Technology cannot replace human beings in making decisions

- General knowledge and digital knowledge are equally important for closing digital divide. Although artificial intelligence (AI) is automating an increasing number of tasks, general skills revolving around human care and creativity for improved decision-making and ethical judgments are crucial to ensure a broader socio-economic inclusion.

5. Coordinated efforts

- Coordinated efforts at global level and at national level are needed in developing policies, standards and regulations to ensure a high degree of competition.
- **China's practice is on the next slide**

The Government-led Coordinated Efforts: Five-Year Rotational Plans in China

The Eleventh Five -Year Plan

2006-2010

- View information as a resource
- Improving the digital infrastructure
- Enhancing the information security
- Computerizing manufacturing

- Building the next generation of digital infrastructure
- Moving into an information society
- Enhancing network security and information security

The Twelfth Five - Year Plan

2011-2015

The Thirteenth Five -Year Plan

2016-2020

- Building advanced and efficient information network
- Developing internet based industries
- Implementing national big data strategy

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Recent Government Efforts: Precise Assistance of Poverty (PAP)

- A grand goal is to eliminate poverty by 2020
  - Promise a reduction of 10 million of people in poverty every year starting from 2016
  - Official poverty line is 2300RMB in China
  - Under poverty line: in 1995 - 555 million; in 2015 – 56 million
  - In 2016, 12 million people is out of the poverty line

- It is considered the last stage of eliminating poverty - a critical stage where more and precise efforts are needed

  - Poverty Subsidy System effectiveness needs to be improved
    - In 2010, over 80% of people under poverty line were not subsidized or assisted
    - Poverty assistance standard is not crispy clear
  - Precise Assistance of Poverty
    - Use the latest ICT such as **blockchain technology**

Recent Government Efforts: Precise Assistance of Poverty (PAP)

- Single-goal poverty assistance may not be enough
    - Long term assistance is needed
    - Other aspects need to be considered: health assistance
    - Skills training needed

- Move Poverty out of mountains
    - Move remote/poor living/not suitable to live villages out of mountains with strong government subsidies

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Part 4: Policy Recommendations

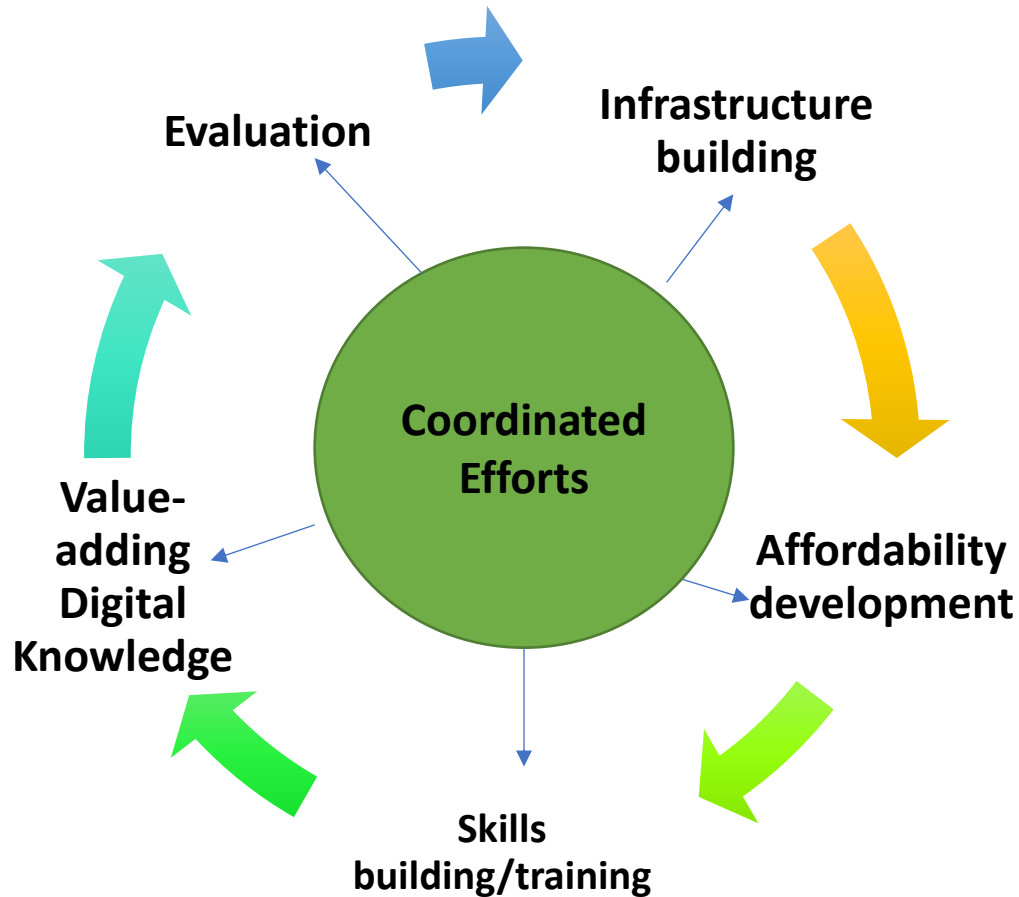## At the G20 level, general principles should be set for emerging economies:

- Ensuring physical access to digital infrastructure is necessary but not sufficient; other complementary actions must be taken to support digital literacy.

- The focus should shift, both in resource allocation and policy agenda-setting, from "providing infrastructure and access" to "encouraging the usage of the existing infrastructure to create value" and also from "hardware" to "human-ware".

- Digital responsibility should also be advocated; in other words, the Internet and ICTs should be used in a way to improve human life, economic prosperity, equality and inclusiveness.

- A **life-cycle theory** is provided on the next slide to shed lights on overcoming digital divide **comprehensively**

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A life-cycle theory on overcoming digital divide comprehensively

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At the national level, governments should elaborate policy guidelines and take the following actions to reduce socio-economic disparities.

- Governments should promote digital innovation and entrepreneurship, which in turn would create new markets, provide new employment opportunities and eventually improve living conditions.

- Governments should foster coordinated efforts, especially at the industry level, to create affordable technologies able to overcome the digital divide.

- Governments should adapt the education system to the changing labour market and support digital knowledge and skill training for everyone at an affordable price.

- The next few slides show China's Government's **Staged efforts** in overcoming digital divide

China's Government's <u>Staged efforts</u> in overcoming digital divide

1) Villages Satellite Covered: Bring Broadcast TC signals to villages via satellites

2) Villages Road Connected: Build paved roads to villages; the slogan: build roads first if you want to become rich

3) Villages Broadband Connected: bring Internet or FTTH to villages

4) Villages Mobile network Covered: most Chinese villages now have 3G or 4G network coverages

Stage 1

Stage 2

Stage 3

Stage 4
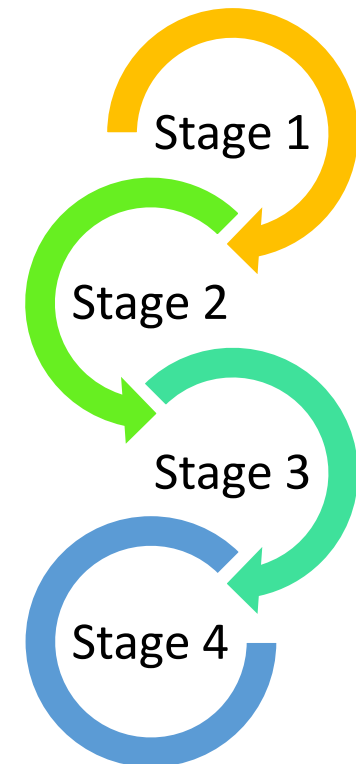
Recent China's Local Government Experimentation

- Big Data **Provincial Development Experimentation** in Guizhou
    - In GDP, Guizhou was ranked one of the last 3 provinces in China
    - Is considered a remote and poor province in China
        - Many people under poverty line

    - But rising quickly since 2015 with a strong ambition of big data driven economic lift initiatives
    - Guizhou is aiming to become the Center of big data industry innovations and entrepreneurships
        - The Internet-based sales **<u>growth rate</u>** in Guizhou province is becoming #1 in China

- IDC estimate, In 2017, globally, Big Data **contribution to GDP**
    - 151Billon USD, 12.4% growth over 2016
        - USA $78.8B
        - West Europe $34.1B

- China's goal is to make Big Data industry contribute to GDP 1000000 million RMB or 143B USD by year 2020

    (Source: Japan Economic News, 05/27/2017)

Thank You!