# The Fourth Industrial Revolution: Opportunities and Challenges for the Philippines

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# Outline

1. Opportunities and Risks
2. Preparing for FIRe
   - Readiness for future production
   - Industry 4.0 policies
   - Gardening innovation

# Opportunities and Risks

# How frontier technologies could support the Sustainable Development Goals

| SDG | APPLICATIONS |
|---|---|
| Agriculture (SDGs 1, 2, 5, 8, 10 and 12) | Recent advances in image recognition allowed researchers to scan more than 50,000 photos of plants to help identify crop diseases at sites using smartphones with a success rate of over 99 per cent https://www.youtube.com/watch?v=NIpS-DhayQA |
| Healthcare (Goal 3) | AI applications have been developed that substitute and complement highly educated and expensive expertise by analyzing medical images. 3D printing produce patient specific prosthetics, orthotic braces and customized medical implants. |
| Environment and climate (Goal 13) | AI and deep learning can help climate researchers and innovators test out their theories and solutions as to how to reduce air pollution |

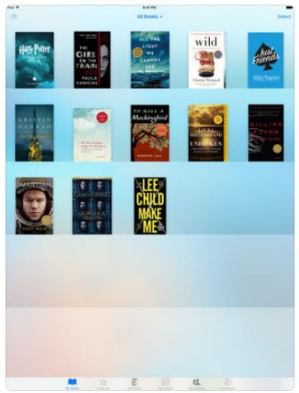
ESCAP (2018)

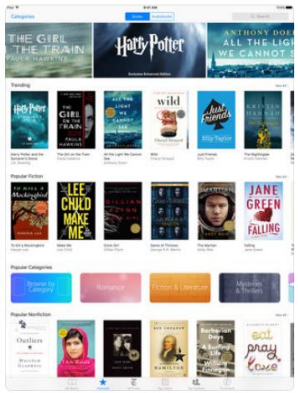
# From traditional to digital trade

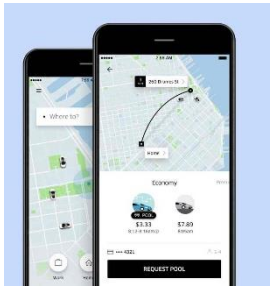
**Figure 1. Dimensions of digital trade**[1]

| Nature ('how') | Product ('what') | Actors ('who') |
|---|---|---|
| Digitally ordered | Goods | Business |
| Platform enabled | Services | Consumer |
| Digitally delivered | Information | Government |

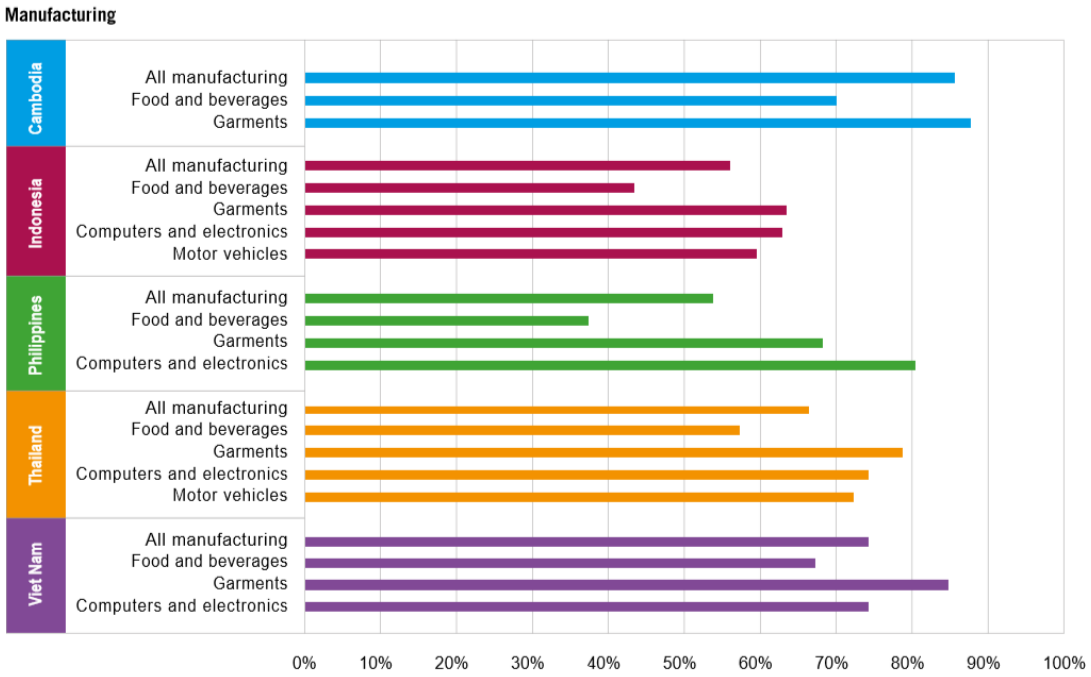
Source: López González and Jouanjean (2017); OECD (2017)







**Share of wage and salaried employment in key manufacturing subsectors at high risk of automation (per cent).**



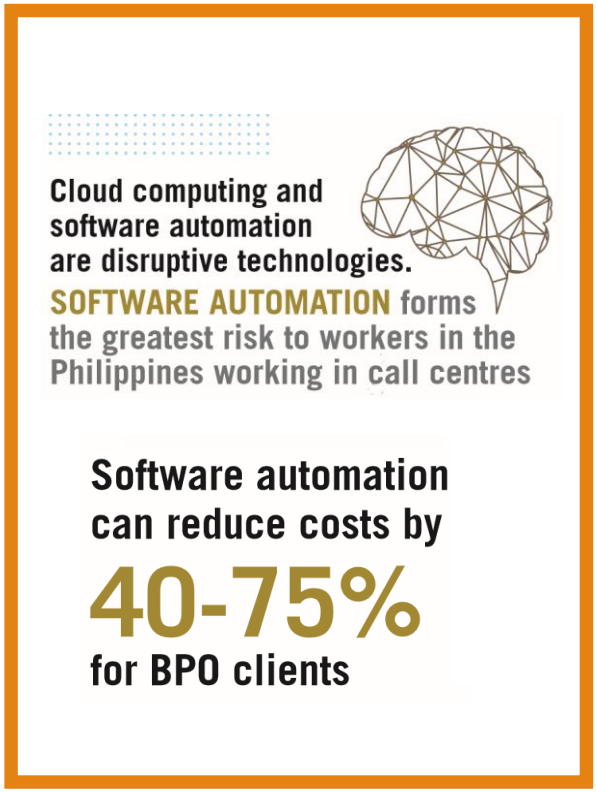

ILO (2016)

Philippines:

- Nearly half (49%) of wage workers (males: 44%, females : 52%) face a high probability of getting affected by automation
- Those working as fishery labourers (580,000), waiters (574,000), carpenters (525,000) and office cleaners (463,000) face a high potential of automation
- Around 89 per cent of salaried workers in BPO sector fall into the high risk category of automation

# Impact: Opportunities and Risks (cont'd)

The Fourth Industrial Revolution will trigger selective reshoring, nearshoring and other structural changes to global value chains (WEF 2018, ILO 2016)

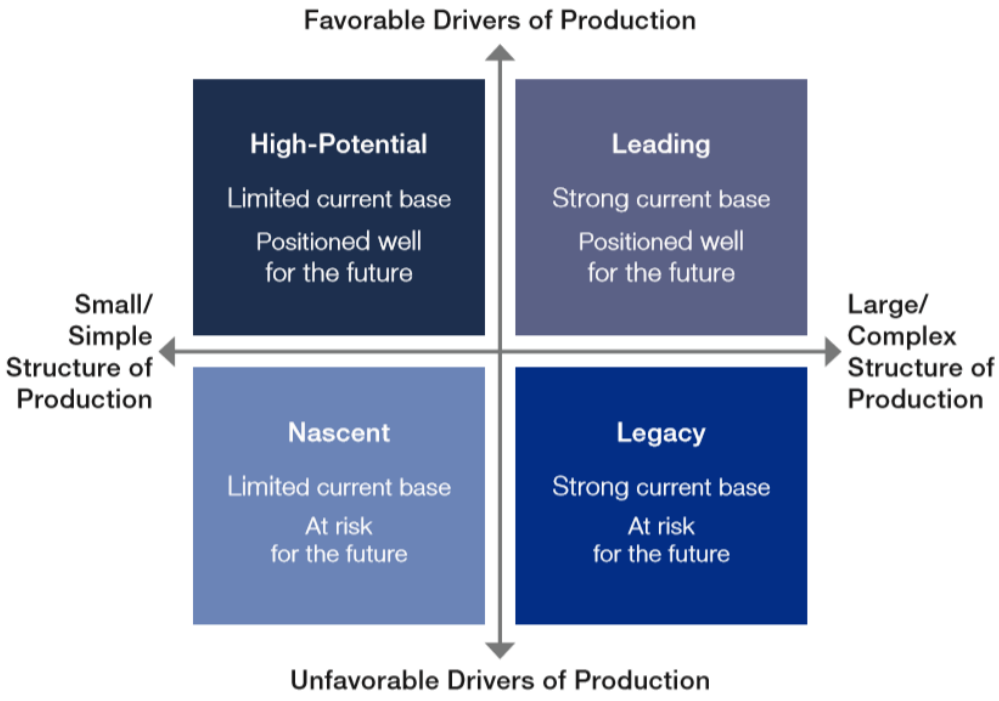





# Preparing for Industry 4.0: What are the challenges?

# WEF Assessment on Preparations

Country Archetypes




**Note:** Average performance of the top 75 countries (weighted average driver score, weighted average structure score) is at the intersection of the four quadrants to create the archetype borders.

WEF (2017)

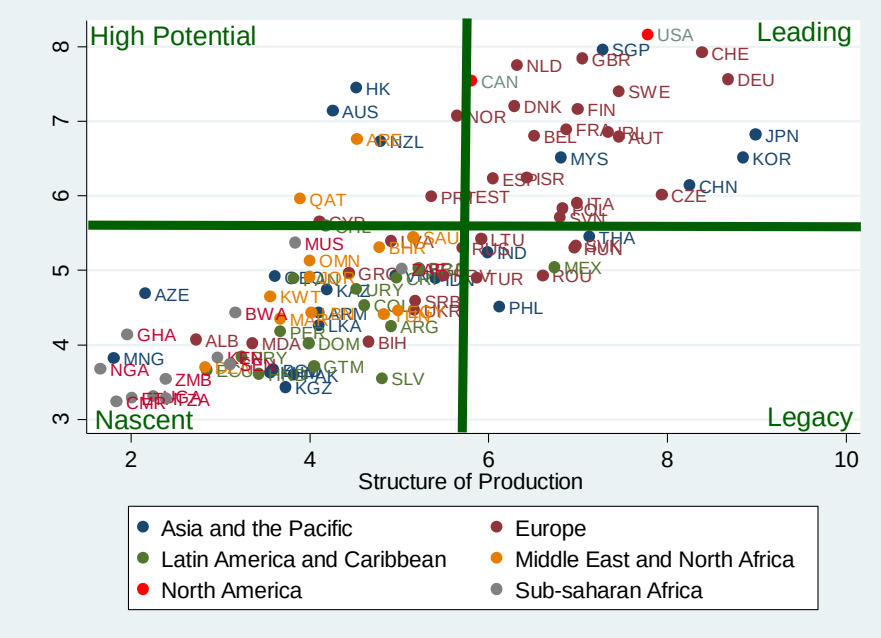
The seven ASEAN countries included in the assessment are spread across three different archetypes: Leading— Malaysia and Singapore; **Legacy**— Philippines and Thailand; and Nascent— Cambodia, Indonesia and Viet Nam.

***Legacy country*** **-** has a strong production base today, but it is at risk for the future due to weaker performance across drivers of production, which include technology and innovation, human capital, global trade and investment, institutional framework, sustainable resources, and the demand environment.

# WEF Assessment on Preparations (cont'd)

- Investments in R&D, hard and soft infrastructure, as well as capacity dev't of human resources and institutions are complementary factors for Inclusive Development and for **Readiness for Future of Production**

Drivers and Structure of Production




WEF (2018)

# Select Industry 4.0 policies in ASEAN Member States

**Indonesia**: Launch of 'Making Indonesia 4.0' Roadmap (2017); Indonesia Broadband Plan 2014-2019

**Malaysia**: Development of the National Industry 4.0 Policy Framework (2018); Establishment of Industry 4.0 High Level Task Force (2017); Launch of the Centre of Excellence on Industry 4.0 (2017); ); Launch of the Digital Free Trade Zone (DFTZ) Initiative and Pilot Project(2017); The Malaysian ICT Strategic Plan 2016-2020 (2016); Launch of the National e-Commerce Strategic Roadmap (2016); 11th Malaysia Plan 2016-2020 (2015); National IoT Roadmap (2015); National Broadband Initiative (2006)

Source: ASEAN Secretariat Draft Report

# Select Industry 4.0 policies in ASEAN Member States (cont'd)

**Singapore**: AI.SG Initiative (2017); Research Innovation Enterprise 2020 Plan (2016); Industry Transformation Programme (2016); Intelligent Nation 2015 (2015); National Robotics Program (2015); Smart Nation (2014)

**Thailand**: Digital Government 2017-2021 (2017); Thailand 4.0 (2016); National Digital Economy Master Plan (2016-2020); Digital Economy Master Plan (2015)

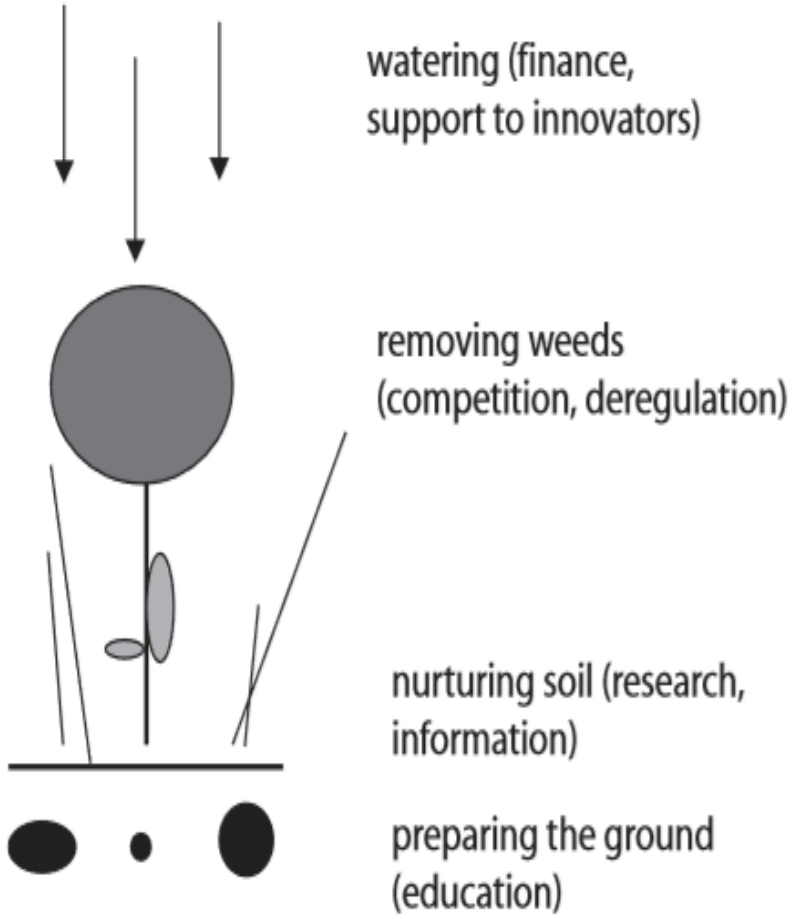
**Viet Nam**: Prime Minister's Directive 16/CT-TTg on Strengthening Access to the Fourth Industrial Revolution (2017); 2020 Broadband Plan (2016)

Source: ASEAN Secretariat Draft Report

# Select Industry 4.0 policies in ASEAN Member States (cont'd)

**Philippines:**

- Inclusive, Innovation-led Industrial Strategy (i3s) (2017)
- Philippines Digital Strategy 2011-2015 (2011) (successor plan still being developed)
- National Broadband Plan
- e-Government Master Plan 2016-2020 (EGMP 2.0)



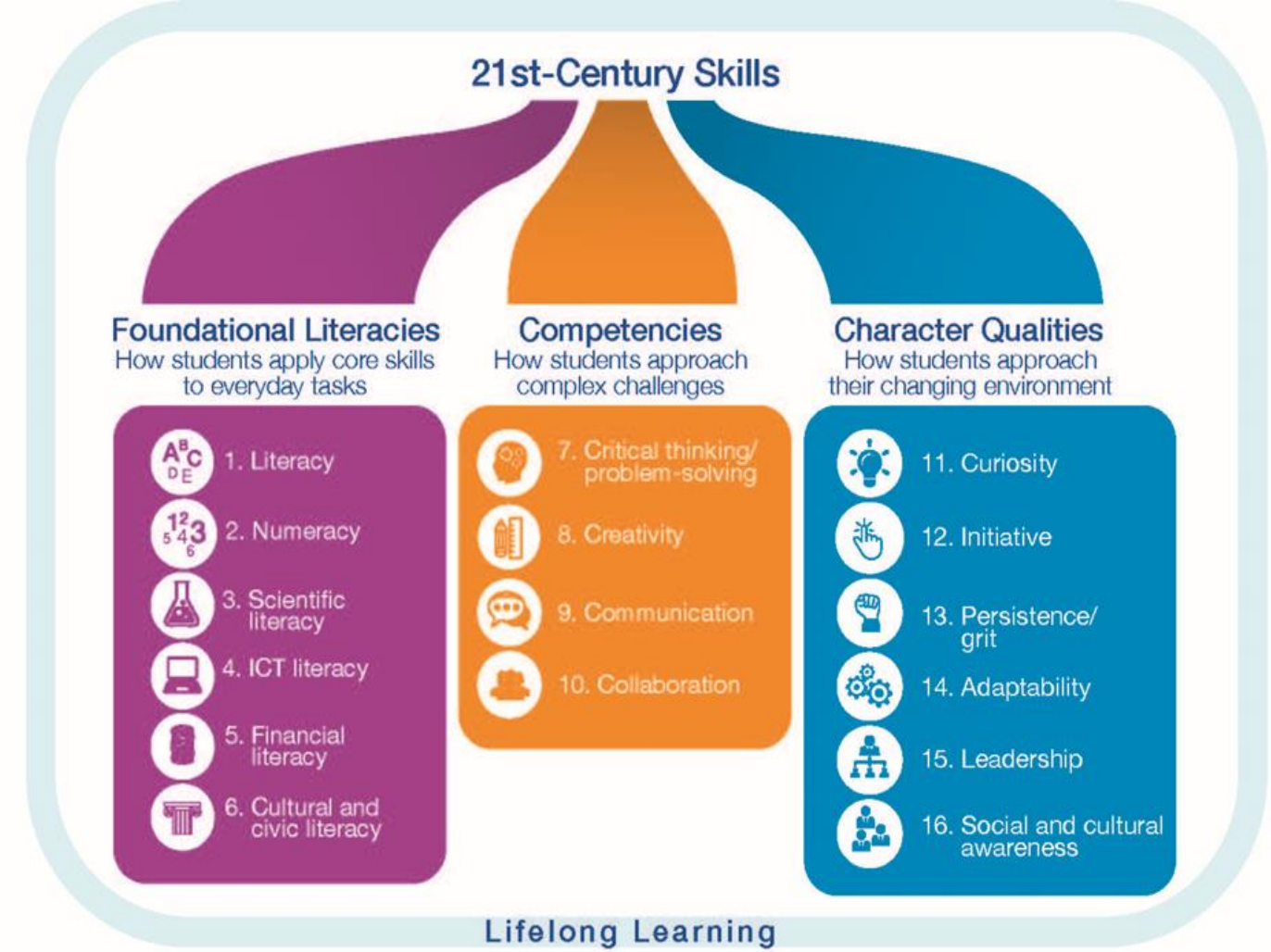

# Gardening innovation

Source: World Bank (2010)

# Preparing the ground (Education)

- Skills and competencies developed in school should be like LEGO blocks which can used to create different figures using the same building blocks
- Need for lifelong learning, continuous training and retraining;  the only way to keep up is to continuously learn, unlearn, and re-learn
  - A key skill that needs to be developed among learners is *“learning how to learn”.*
- Pedagogy should go beyond transmitting knowledge into  encouraging reconstruction of knowledge

# Preparing the ground (Education)




Source: WEF (2015)

# Nurturing soil (Research, Information)

The bulk (60%) of R&D spending across sectors is actually supported by government (Albert *et al*., 2015).

While the Philippines has had a slight increase in R&D expenditure to GDP in recent years, this spending is still at **less than a fifth of one percent of GDP**, which is below the **one percent benchmark** recommended by the United Nations Educational, Scientific, and Cultural Organization (UNESCO).

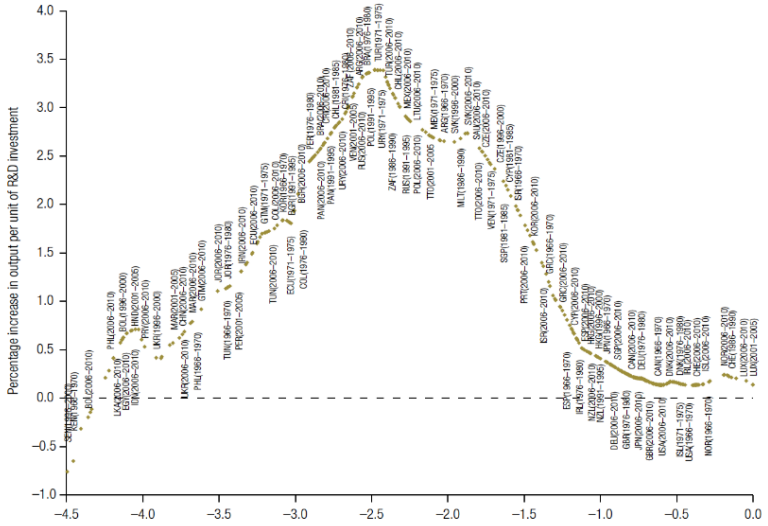
The country's share of spending in GDP also falls below spending of several ASEAN member states, especially Singapore (2.4 %) and Malaysia (1.3 %), and even including Thailand (0.5 %) and Viet Nam (0.2 %).

# Watering (Finance, Support to Innovation)

- Science for Change Program (S4CP)
- Balik Scientist 2.0
- SETUP
- DTI, DOST and CHED working in tandem on “i3S”
- Addressing issues on coverage, price and quality of internet

# Watering (Finance, Support to Innovation)

## CAUTION: Returns to R&D Trace an Inverted U-Shape across the Dev't Process




*Source:* Goñi and Maloney 2017.

*Note:* Graph uses quinquennials of cross-country data from 1960 to 2010 to estimate the rates of return to research and development (R&D) across the development process: 0 is the frontier, and moving left represents progressively less developed countries.

- ROI on Innovation/R&D Spending rate of return begins to fall and may even be negative for quite poor countries
- Explanation: when countries are far from the technological frontier, the potential gains from "catch-up" increases but when stock of complementarity factors (human capital, firm and management capabilities, financial markets) are missing, returns will be low
- Issues about absorptive capacity

SOURCE: Innovation Paradox

# Removing Weeds (Competition, Deregulation)

- In the most recent *Doing Business 2018* (2018) report, the Philippines ranking slipped from 99th in 2017 to 113th behind Vietnam and Indonesia at 68th and 72nd, respectively. Among the indicators, the Philippines was ranked lowest in "starting a business".
- According to the OECD (2016), **foreign direct investment (FDI) restrictions in the Philippines are high by both regional and global standards.** Based on OECD FDI Regulatory Restrictiveness Index, the Philippines is the most restrictive economy among the 62 OECD and non-OECD countries included in the database. Compared to other countries (e.g. China, Vietnam, India, Indonesia, and Malaysia) the regulatory environment for FDI in the Philippines has not changed much in the last 20 years.

# Other challenges and issues

- Responsive and adaptive regulation
  - Regulatory sandbox
  - “Whole of Government”
- Labor market and social protection
  - Flexible and forward-looking labor market
  - Strengthening social protection systems: progressive universalism and portable social protection systems
  - Universal basic income (???)
- Taxation reform/upgrade (???) : : improve collection of real property tax, provision of excise taxes on sugar, tobacco and alcohol, subsidy reforms, reducing tax avoidance.

# Fourth PIDS Annual Public Policy Conference (APPC) on Sept 19, 2018

- *A broad view of the technological landscape, technological breakthroughs, and a glimpse into the future*
- *Socio-economic consequences of FIRe and related policy ideas: How does it affect the poor and marginalize*d?
- *Parallel sessions*
  - *Agriculture, manufacturing, and services*
  - *Science, Technology, and Innovation (STI)*
  - *Labor market and social protection*
  - *Human capital development (education and training)*
- *Ways forward*

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Service through policy research

Preparing the Philippines for the Fourth Industrial Revolution: A Scoping Study
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