

Labor markets in the age of 4IR

How is technology impacting jobs in developing Asia?

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The Fourth Industrial Revolution

Industrial Revolutions: From steam engines to smart phones



Source: Asian Development Outlook 2018: How Technology Affects Jobs.

Drivers of 4IR (with Artificial Intelligence being cross-cutting)

- Physical → autonomous vehicles, 3D Printing, advanced robotics, new materials
- 2) Digital → internet of things (IoT), distributed ledger (blockchain), on-demand economy/platforms
- 3) Biological \rightarrow gene editing, synthetic biology, bio-printing





4IR: Is this time different?

Reasons why 4IR is distinct and more disruptive:

- **Speed:** the pace of change is exponential.
- **Breadth and depth:** builds on the digital technology and combines multiple new technologies.
- **Systems impact:** involves transformation of entire systems, across (within) countries, companies, societies and govt.

Source: Schwab, K. 2016. *The Fourth Industrial Revolution*, World Economic Forum, Crown Publishing Group, Penguin Random House, New York.





Impact of 4IR: Critical dimensions are growth and employment

Impact	Dimensions	
Economy	Growth Employment The nature of work	
Business	Consumer expectations Data-enhanced products Collaborative innovation New operating models	
National and Global	Governments Countries, regions and cities International security	
Society	Inequality and the middle class Community	
Individual	Identity, morality and ethics Human connection Managing public and private information	

ADB

Source: Schwab, K. 2016. *The Fourth Industrial Revolution*, World Economic Forum, Crown Publishing Group, Penguin Random House, New York.



Threat of automation: Should we worry?

Impact of automation on jobs



Note: Percentages refer to Frey and Osborne (2017) estimates on probability of automation. Framework is based on Acemoglu and Autor (2011).

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E.g. Occupational structure in the Philippines

		Manufacturing	Services
2005	Non-routine cognitive	19%	45%
	Non-routine manual	2%	16%
	Routine cognitive	6%	17%
	Routine manual	73%	23%
2015	Non-routine cognitive	24%	41%
	Non-routine manual	2%	20%
	Routine cognitive	6%	21%
	Routine manual	68%	19%

Note: Classification based on Acemoglu and Autor (2011).

Source: Philippine Statistics Authority, Labor Force Survey, various years. Philippine Statistical Yearbook and Yearbook of Labor Statistics, various years.



There are compelling reasons to remain optimistic about developing Asia's job prospects

- 1. New technologies often automate only some tasks of a job.
- 2. Technically feasibility does not guarantee economic feasibility.
- 3. Rising income & demand.
- 4. New occupations and industries.



There are different channels at play that determine employment outcomes



Category shares in worker's activities by occupations



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Source: Author's calculations based on PIAAC database.

Industrial robots are concentrated in capital intensive sectors where employment shares are small



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Robot usage in the People's Rep. of China has increased considerably in the last few years





Figure: China's Plan to Increase Robot Intensity (robots per 10,000 workers)



In response to rapidly rising wages,

in recent years Chinese firms have turned to automation and robots .

From 2013 to 2016, China's robot purchases increased by 106% compared to 65% for the world.

By 2016, China became the largest market for robots in the world, accounted for 30% of global sales.

Robots in China are concentrated in three sectors—automobiles (39%), the 3C's of computers, communication, consumer electronics (24%), and metal processing (10%).



What types of firms automate in the PRC?

Firms with automated equipment tend to be **larger**, **older**, **more capital intensive**, **high-tech firms**, and located in special economic zones; and this is even more so for firms with robots.

Robot-adopting firms are more globalized: greater exports as a share of sales and greater likelihood of being foreign-owned.

High-tech firms are 10% more likely to automate; foreign and domestic private firms are 13% and 10% more likely to automate than state-owned enterprises

For all occupations, monthly wages are highest in firms with robots, and lowest in firms with no automated equipment. The relative wage of skilled workers is highest in firms with robots and lowest in firms with no automated equipment.

Source: Working paper on "Robots, Automation, and Jobs in Chinese Manufacturing Firms" by Peng Jia, Alberado Park, and Yang Du.

Routine task intensity does not mean automation: Economic vs. technical feasibility

Evidence from manufacturing, selected Asian economies



Deviation from average labor compensation in manufacturing

Note: Wage and robot stock data cover India, Indonesia, Pakistan, the Philippines, Thailand, and Viet Nam.



Rising demand offsets impact of automation



Note: Developing Asia in the decomposition analysis includes Bangladesh, India, Indonesia, Malaysia,

Mongolia, the People's Republic of China, the Philippines, the Republic of Korea, Sri Lanka,

Taipei, China, Thailand, and Viet Nam.





Technology also creates new work

Distribution of New Occupations by Job Type



* Computer Aided Manufacturing





Share of new job titles by skill level



Source: Khatiwada and Veloso (2019).





Wages have also grown more for these workers, leaving low-skill workers behind

Change in average monthly wages, constant prices (in US\$)



Note: The time frames vary across countries, with Viet Nam the shortest (2007–2015), followed by Thailand (2000–2010), India (2000–2012), and Indonesia (2000–2014). Developing Asia refers to the five countries included in this analysis. Source: *Asian Development Outlook 2018:* How Technology Affects Jobs.





- As the technology evolves from doing routine and transactional tasks → rules-based chatbots and cognitive automation → push for RPA adoption
- Customer experience has improved as the technology has evolved from basic automation to cognitive automation → <u>high degree of accuracy and reliability</u>.
- According to the ILO, 89 per cent of call center workers in BPOs are at risk of automation.
- Credit-Suisse shows that 50-55 per cent of all BPO jobs in the Philippines are automatable.



But technology will change the composition, while total employment will continue to rise

Adjusting to the impact of automation in the IT-BPO Sector in the Philippines





Government has an important role to play in harnessing new technology

The new industrial revolution and the role of government



- Education and training
- Favorable labor regulation
- Social protection
- Tax policies
- Facilitate skills development and job-matching
- Provision of public goods and services
- Investments in ICT infrastructure
- Antitrust and consumer protection
- Innovation and technology adoption





Thank you.

