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KGID 2025 Green Growth: The Path to Sustainable Jobs

Jobs and Technology: An Integrated View and Insights from East Asia

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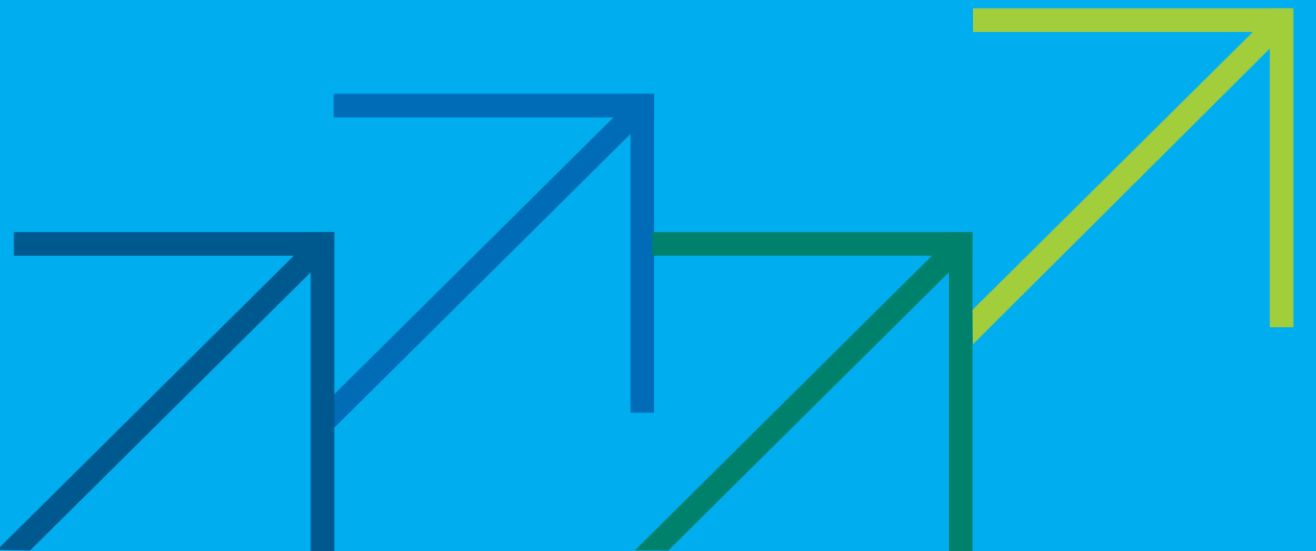

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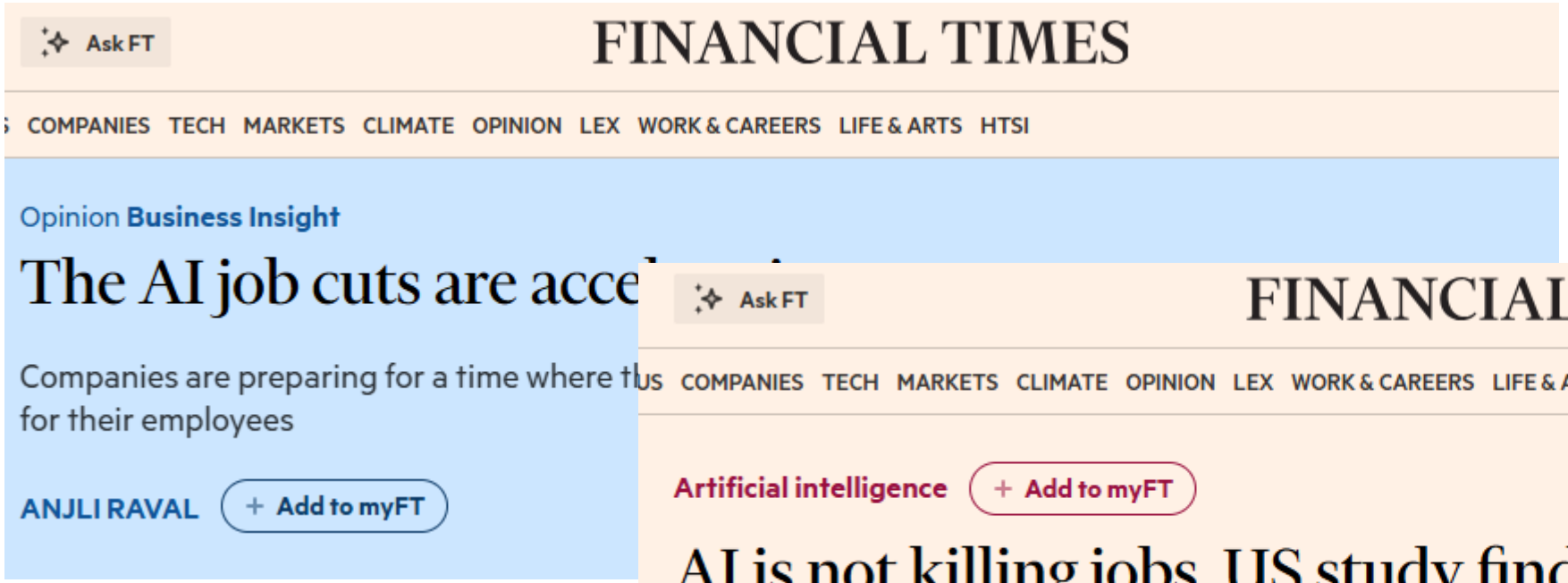
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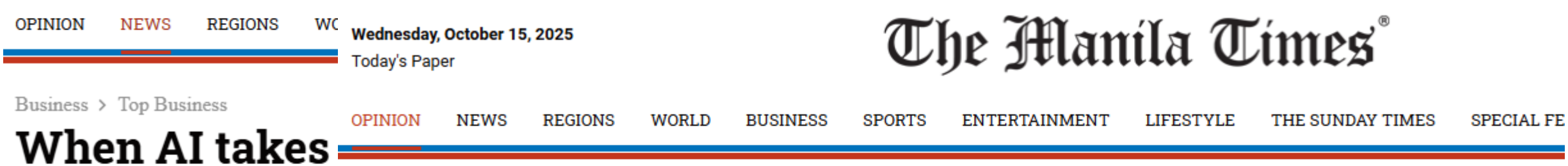
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DELOITTE ON THE DOT

By Joy Ong August 18, 2025

News > Nation

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AP By Associated Press September 4, 2024 Resize

Outline

- Technology and jobs: A unified framework
  - Technical feasibility
  - Economic viability
- Technology impacts on jobs in East Asia
  - Robots and AI
- Conclusion

Main points

Contributions

- Offer an integrated framework to assess the diffusion and impact of new automation technologies
- Contrast the implications for developing economies vis-à-vis advanced economies

Main messages

- **Robots** affect routine, manual jobs in developing countries, and more so as they become affordable and labor costs rise
- **AI** threatens fewer jobs in developing countries (than in advanced economies), but they are also less equipped to take advantage of AI.

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Literature (mostly advanced economies)

Technology and jobs

- Automation technologies may displace many workers by replacing humans in certain tasks (Brynjolfsson and McAfee, 2014; Frey and Osborne, 2017)
- Technologies can also complement humans and create entirely new tasks/jobs (Autor et. al. 2003; Acemoglu & Autor, 2011)

Robots impact

- Robots have displaced (and reduced wages) of low-skilled workers engaged in routine manual tasks (Graetz and Michaels, 2018; Acemoglu and Restrepo, 2020; Giuntella, Lu, and Wang, 2025)

AI impact

- Generative AI is encroaching on cognitive, non-routine work (automation of more skilled jobs) (Hampole et al., 2025; Brynjolfsson et al 2025; World Bank, 2025).

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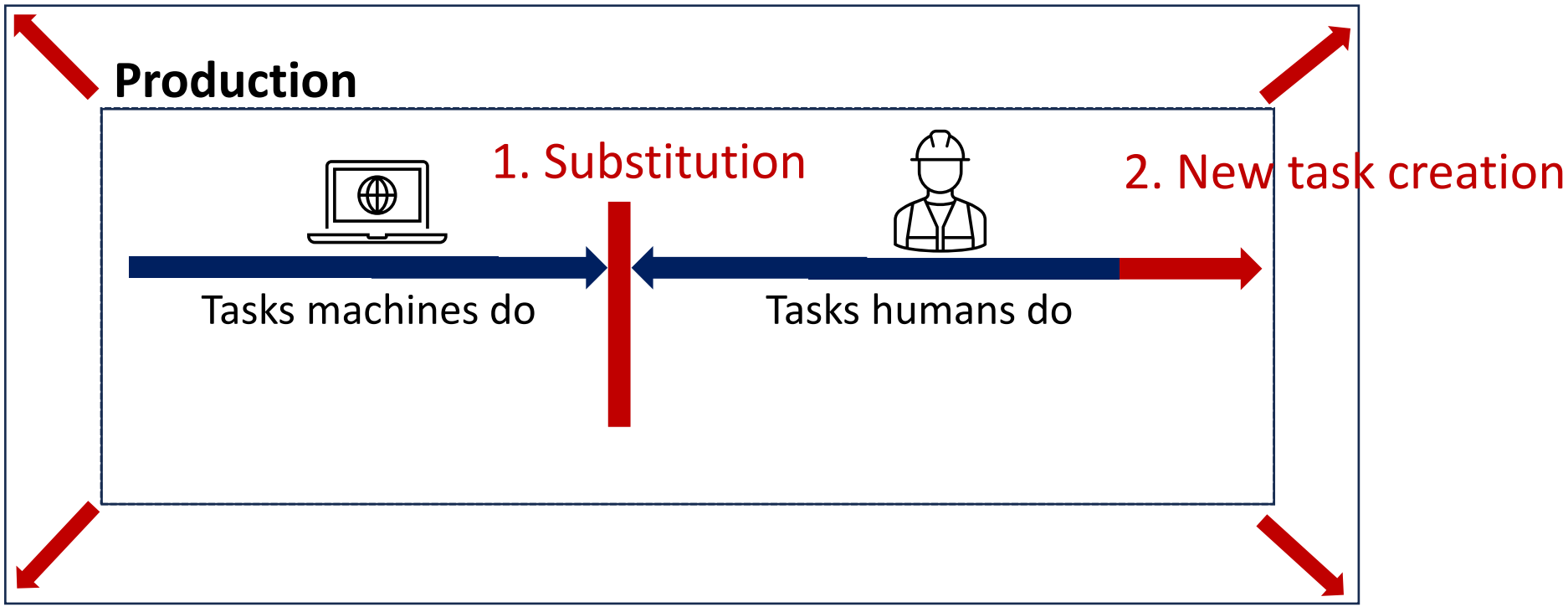
Framework: Technical feasibility and Economic viability

Industrial robots, AI

Technology changes the nature of work and the number of jobs



Source: Based on Arias et al (2025).

Framework:
Technical feasibility

Technologies affect jobs differently, depending on their task content

Cognitive

Computers, ATMs

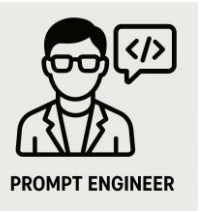
AI

Financial analyst

Augmented by AI

Teacher

New jobs



Routine cognitive
Optimization-based, less social

Non-routine cognitive
Creativity, strategy-based, more social

Routine physical
Low dexterity, structured environment

Assembly line worker

Robots

Smart robots

Non-routine physical
High dexterity, unstructured environment

New jobs

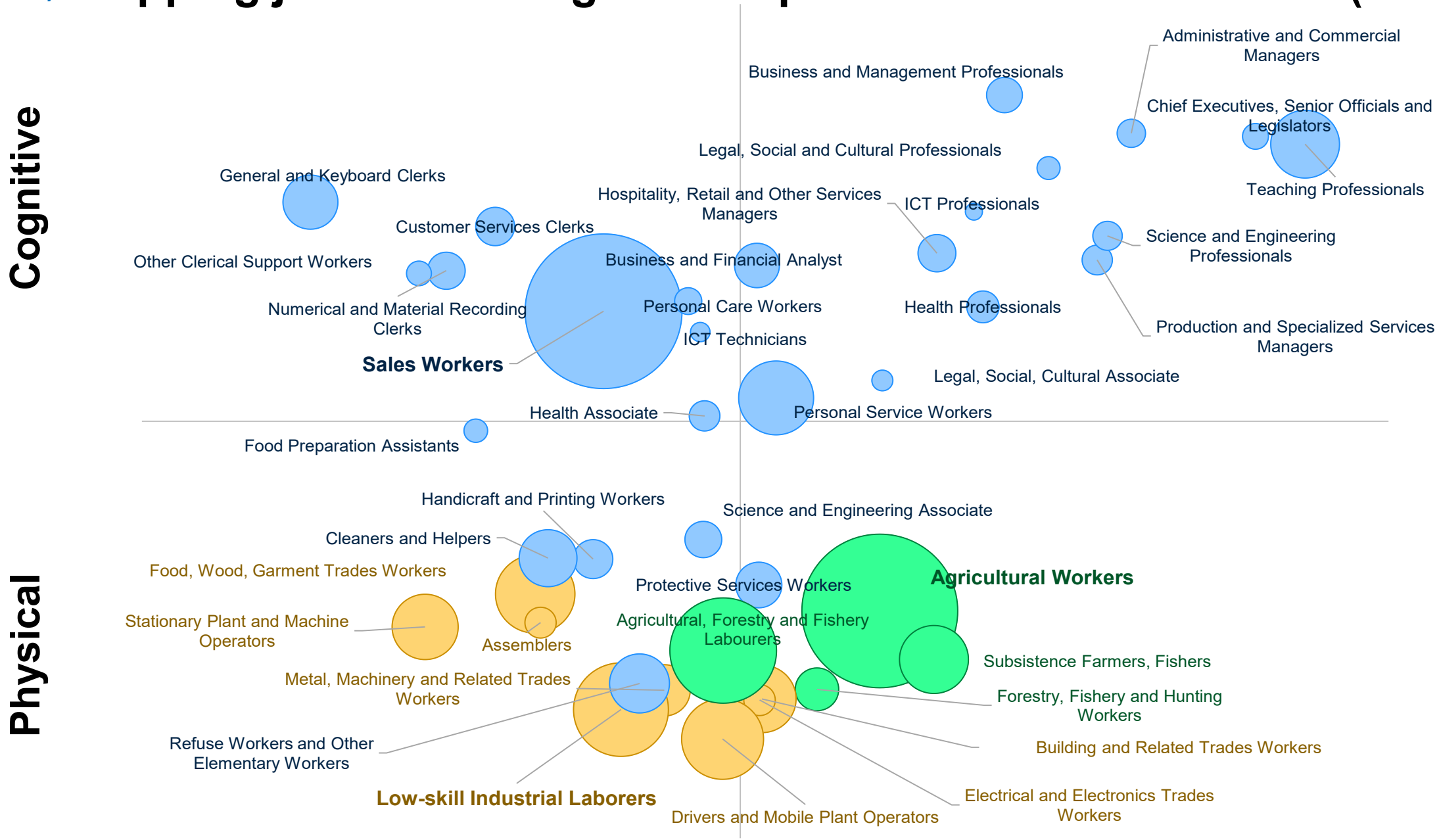
Drone pilot

Physical

Source: Based on Arias et al (2025).

Framework:
Technical feasibility

Mapping jobs according to their predominant task content (EMDEs)



Source: Based on Arias et al (2025).

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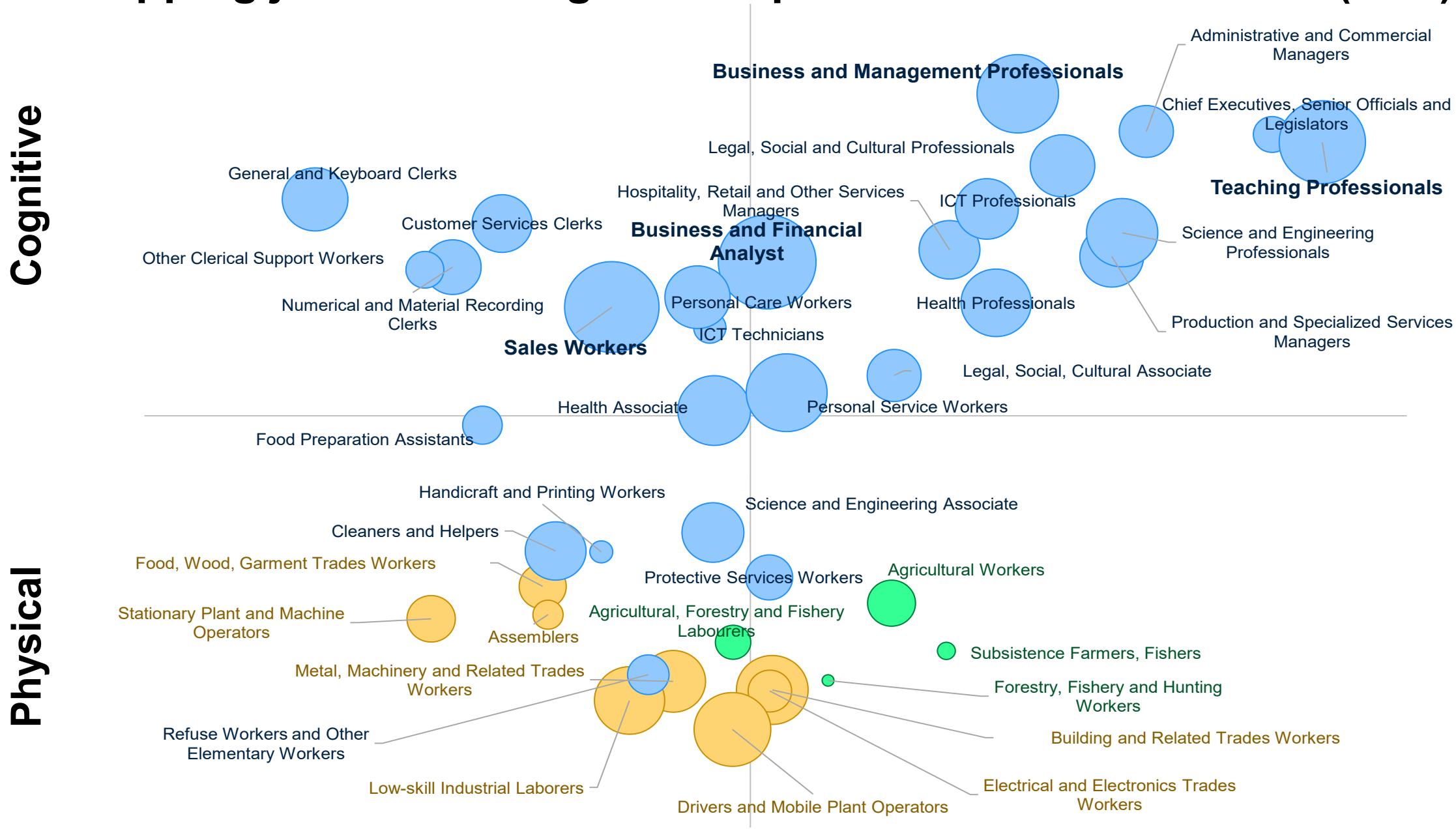
Framework:
Technical feasibility

Mapping jobs according to their predominant task content (AEs)



Source: Based on Arias et al (2025).

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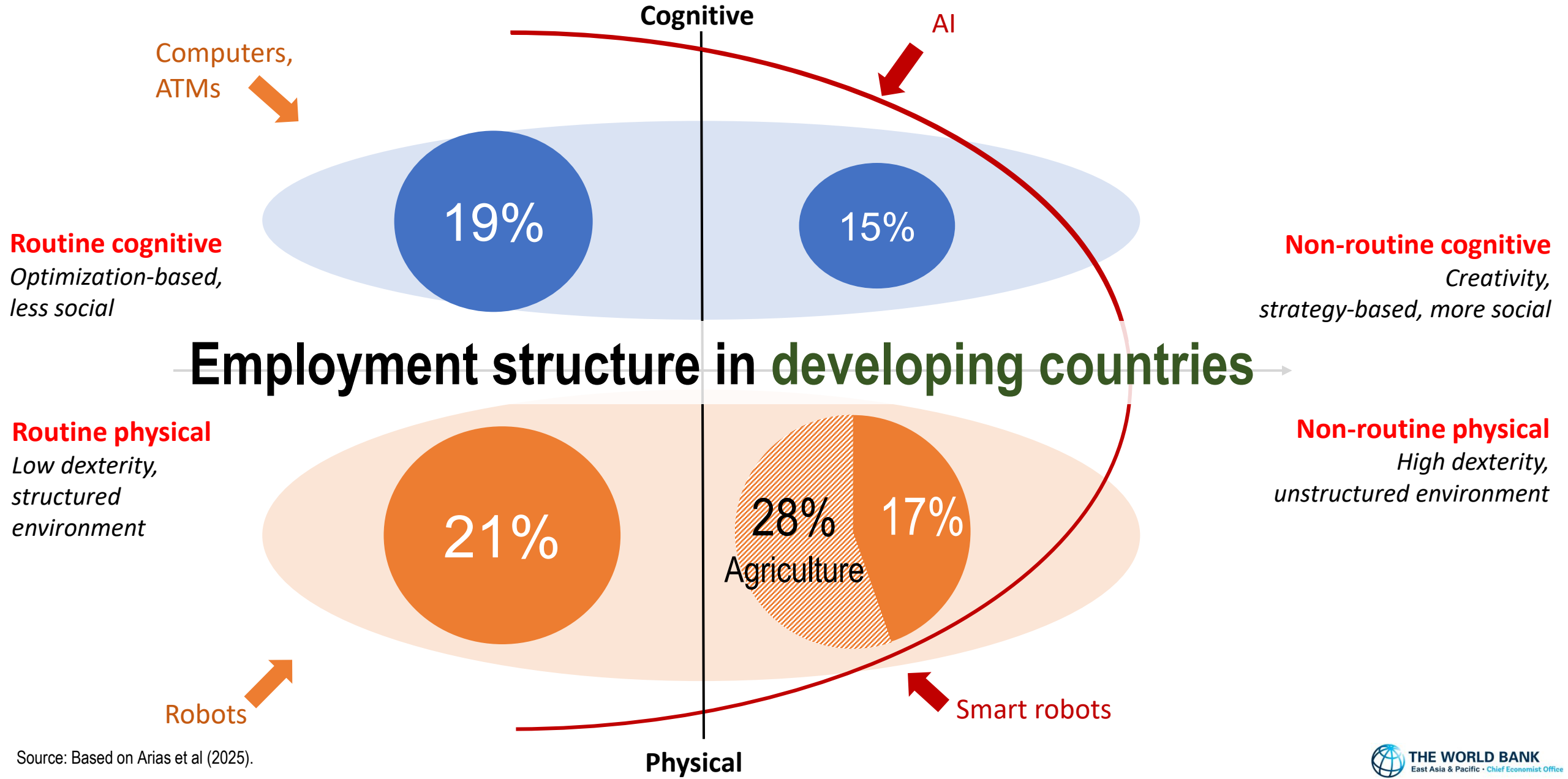
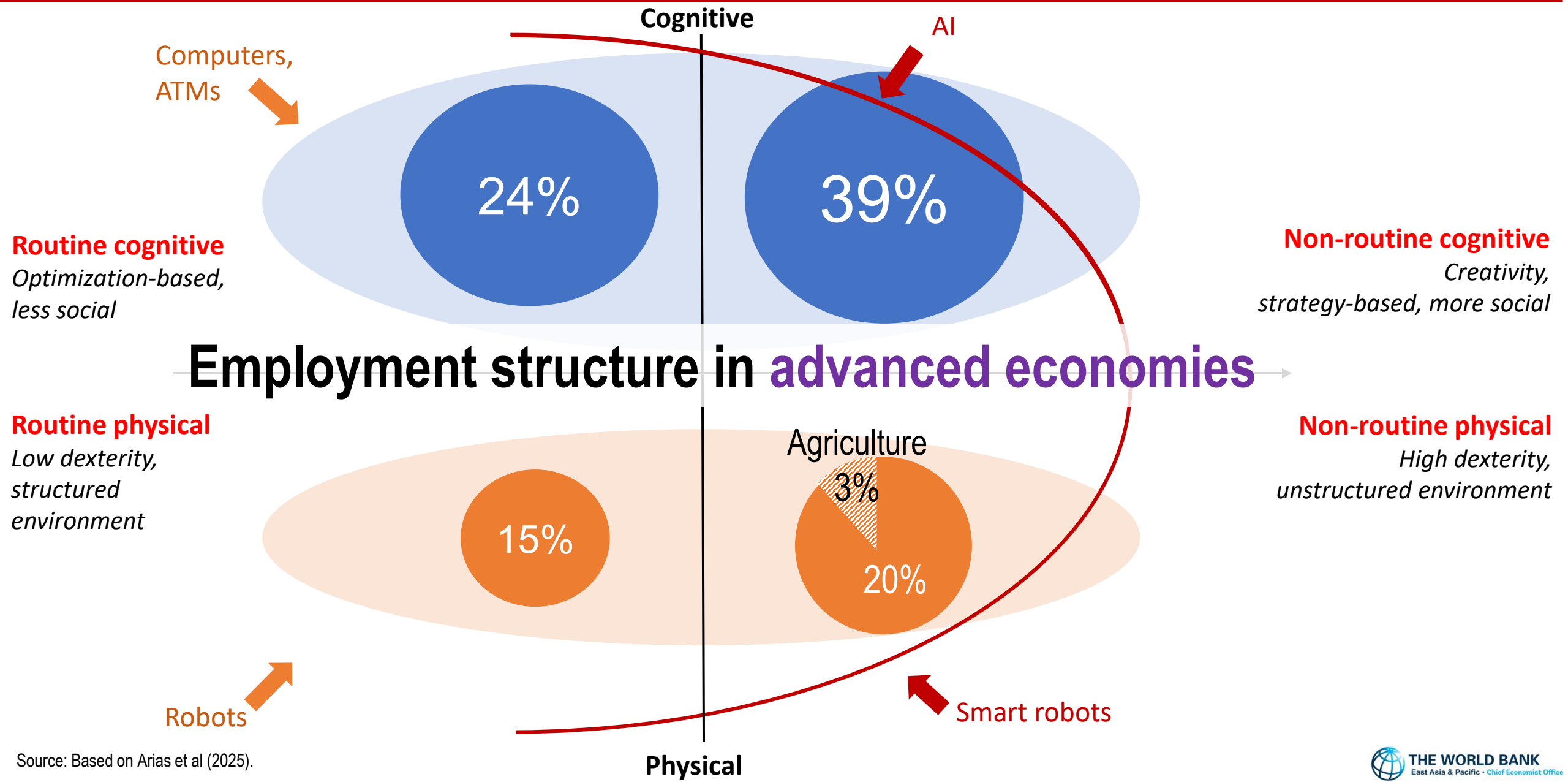
Framework:
Technical feasibility

Jobs in developing economies are more exposed to robots and other automation technologies than to AI



Source: Based on Arias et al (2025).

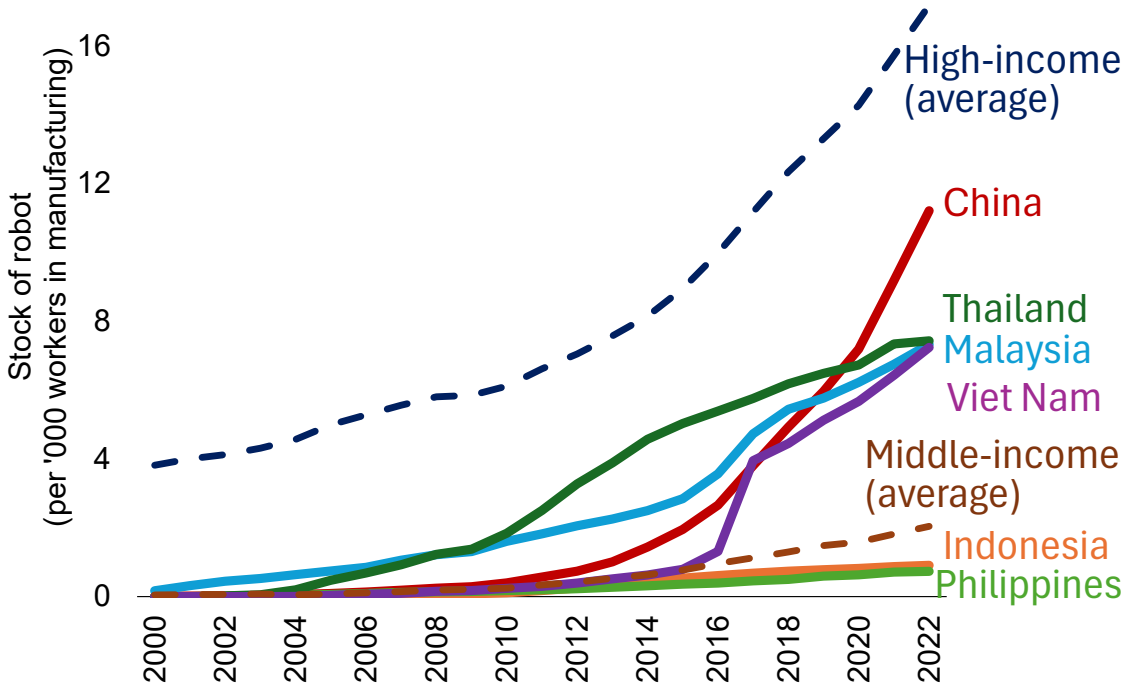
While advanced economies are more exposed to AI



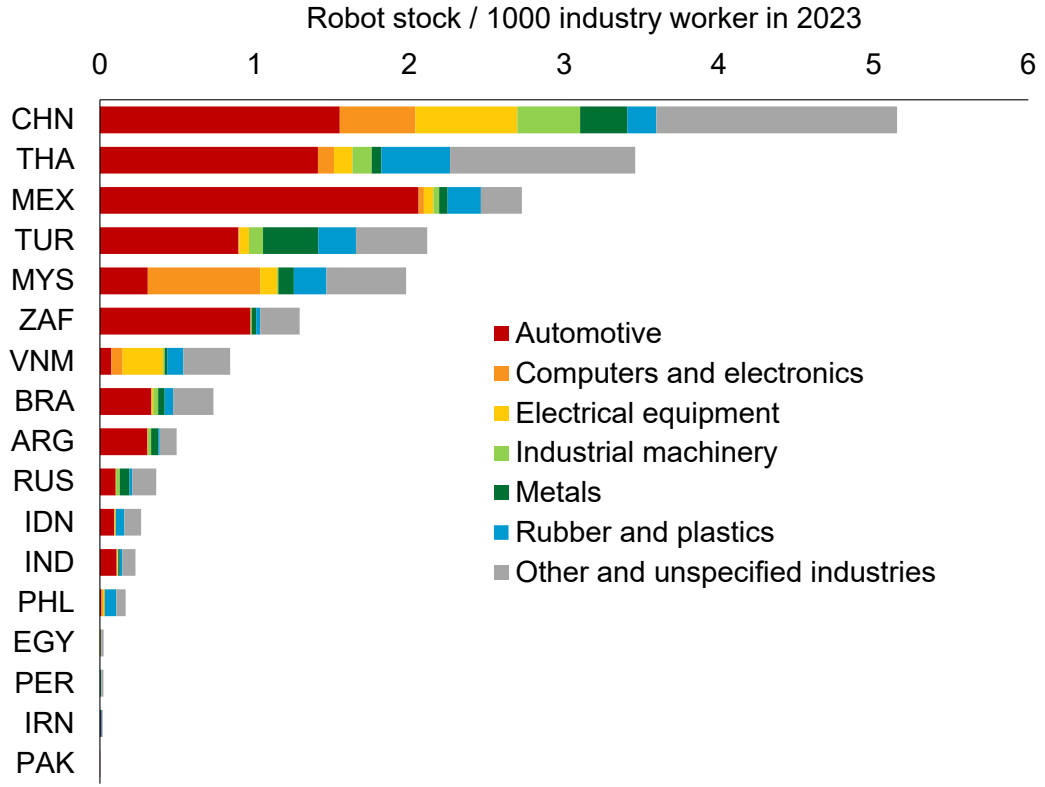
Source: Based on Arias et al (2025).

Robot adoption has expanded in developing countries especially in East Asia, from less to more sophisticated industries

Industrial robot adoption trends



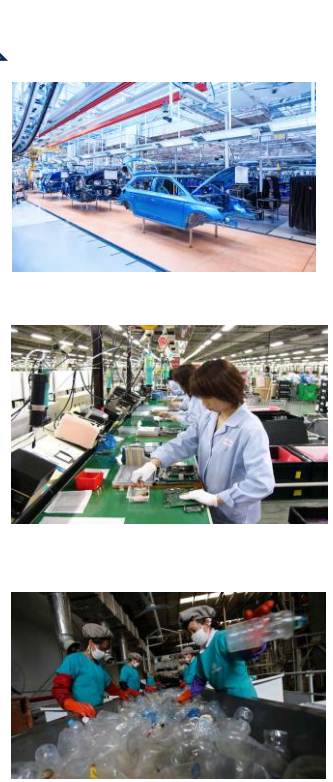
Industry composition of the stock of robots (2023)



Note: The number of manufacturing workers is fixed in a baseline year (2000).
Source: Based on Arias et al (2025) with data from the International Federation of Robotics (IFR) and OECD Employment Statistics.

Technology is adopted when it becomes economically viable: As countries develop and labor costs rise, robot adoption deepens

Robot prices

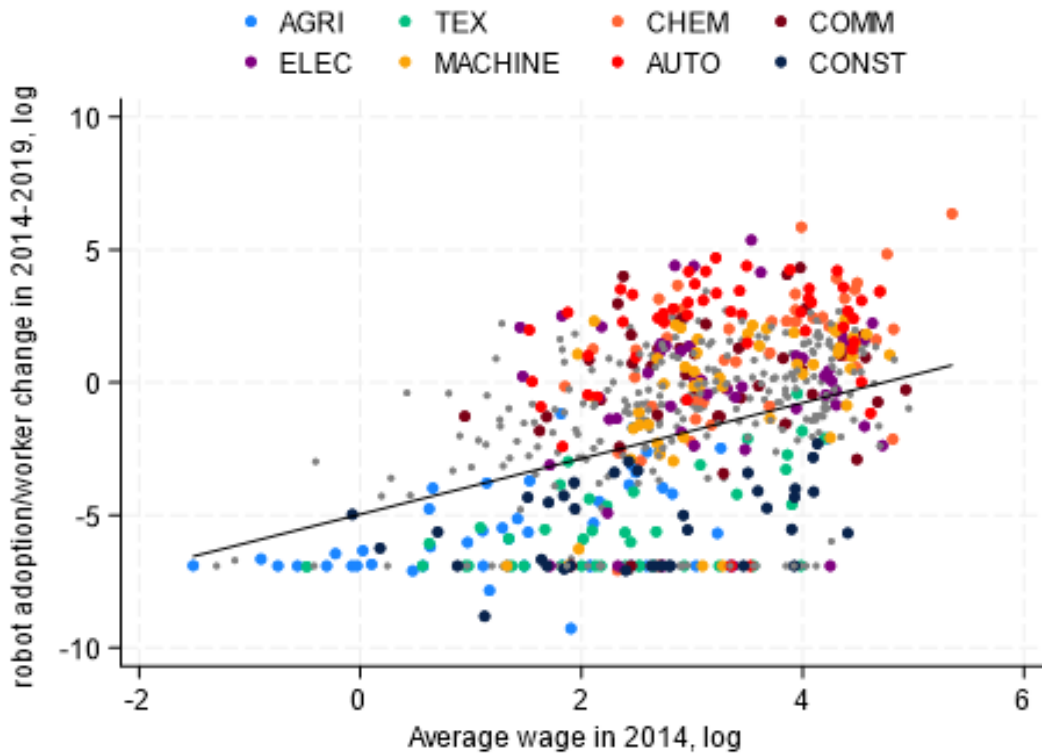


Automotives

Electronics

Rubber & Plastics

Robot adoption and wages, EAP



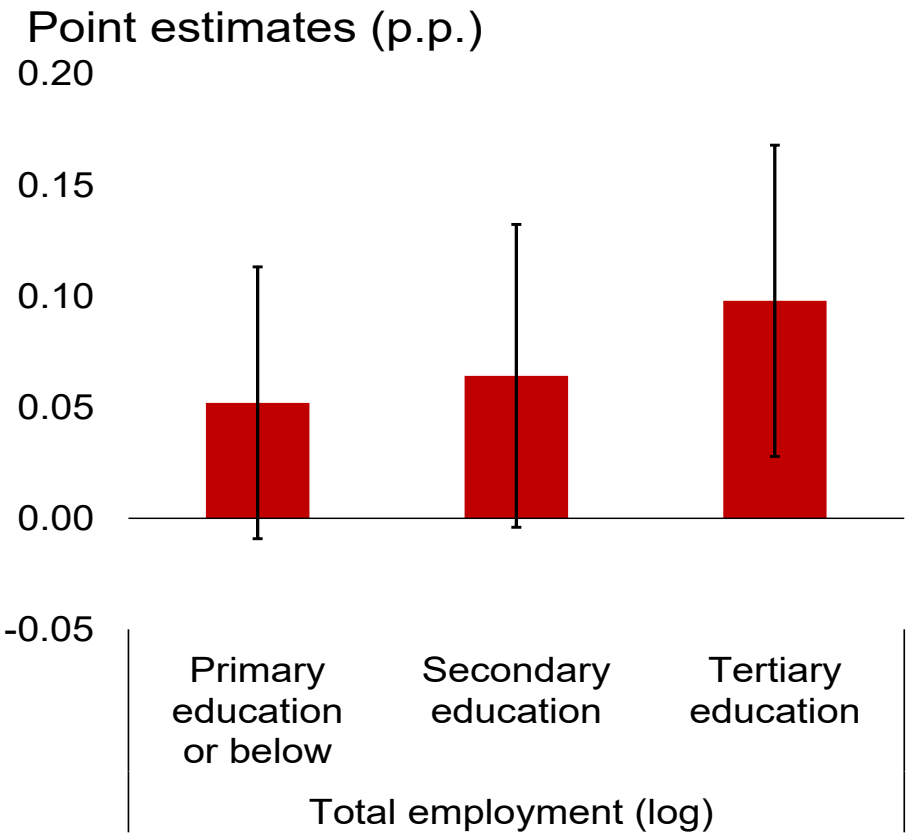
Note: The number of manufacturing workers is fixed in a baseline year (2000).
Source: Based on Arias et al (2025) with data from the International Federation of Robotics (IFR) and OECD Employment Statistics.

Impact of new technologies on jobs

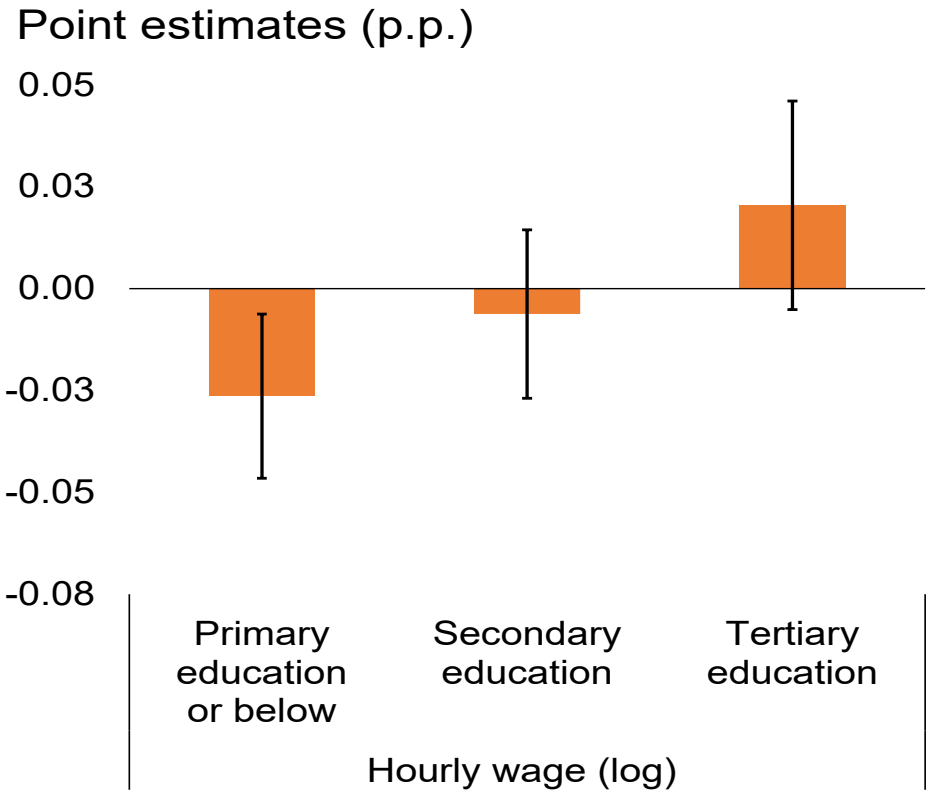
Industrial robots, AI

ASEAN-5 locations experiencing greater robot adoption have seen increases in the employment and earnings of the higher-educated, but lower average wages of the least-educated group of workers

Estimated effects of robot adoption on total employment



Estimated effects of robot adoption on average hourly wages



Source: Arias et. al. (2025). The figure shows 2SLS estimates of the effects of exposure to robots on local labor market outcomes in ASEAN-5 countries.

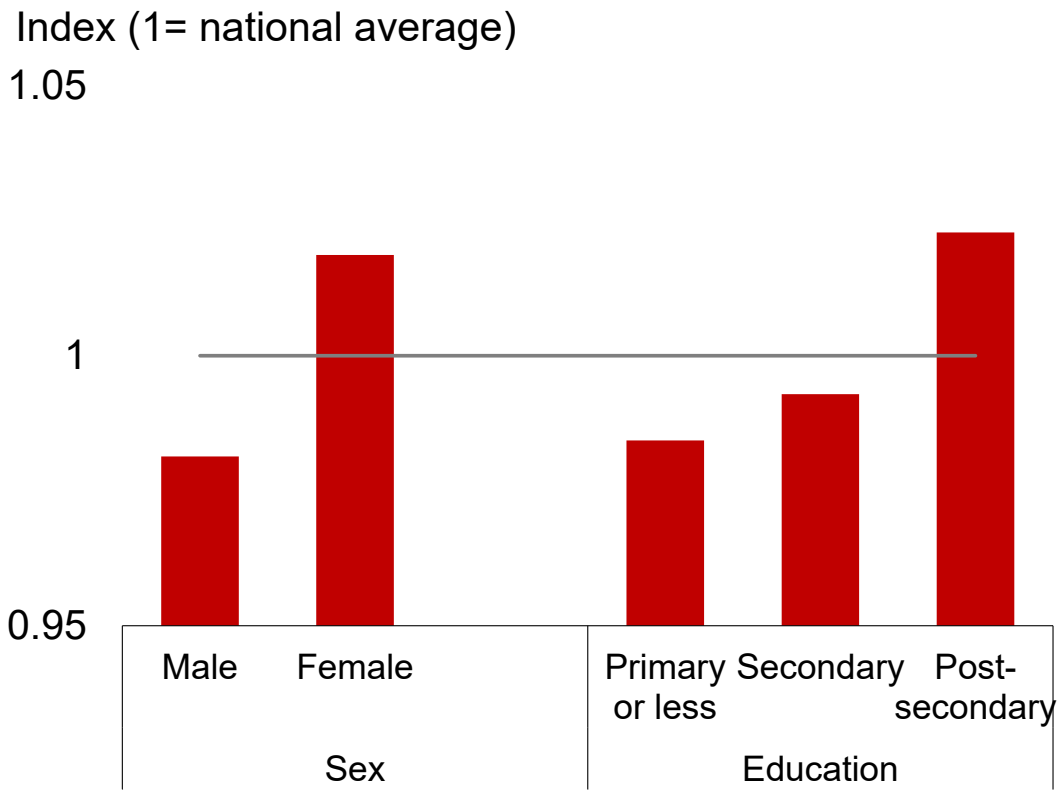
Higher exposure to AI is associated with lower earnings but not job growth; women are more engaged in AI-exposed occupations, and so are the higher-educated

Occupations exposed to AI

Lower earnings

No association with job growth (yet)

Exposure to AI by demographics, EAP countries



Source: Based on Arias et al (2025).

Conclusion: New technologies have distinct implications for jobs in EMDEs given their technical feasibility and economic viability

- As robots have become cheaper, they are already impacting routine, manual jobs in developing countries
  - ➢ While in advanced economies, industrial robots hurt manufacturing employment, in Southeast Asian economies, the labor-saving effects of robots have so far been offset by export-driven increases in the scale of production.
- AI threatens fewer jobs in developing economies because of the relatively low share of occupations involving cognitive tasks, but these countries are also less equipped to take advantage of AI.
- Developing economies may face growing automation pressures as new technologies become more affordable and labor costs rise.

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Thank you!