



International  
Labour  
Organization

# ASEAN in Transformation

## How technology is changing jobs and enterprises

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ACT/EMP  
The Bureau for Employers' Activities

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# Overview

- ❑ **Research** background
- ❑ **Employment** and **technology** dynamics
- ❑ **Policy** implications



- ❑ **Research background**

- ❑ Employment and technology dynamics

- ❑ Policy implications

# Fourth Industrial Revolution

1. Unprecedented **pace** of change
2. Wider **scope** of disruption
3. **Depth** of change on systems
4. Transformative, interconnected **technologies**
  - ❖ Robotic automation
  - ❖ Artificial intelligence
  - ❖ Big data analytics
  - ❖ Internet of things
  - ❖ 3-D printing
  - ❖ Autonomous vehicles

# Research methodology

1. Frey & Osborne and background analysis
2. Focus on five prominent sectors in ASEAN
3. Enterprise and student surveys
  - ❖ 330 key stakeholder interviews
  - ❖ More than 4,000 enterprises and 2,700 students surveyed
  - ❖ 6 national and regional focus group discussions

# Range of jobs at risk of automation

## Sample occupations by ease of technological automation and complementarity

		Ease of automation	
		High (Routine tasks)	Low (Non-routine tasks)
Ease of complementarity	Low (Manual-intensive skills)	<b>A</b> Cashiers Typists Machine operators	<b>B</b> Landscapers Home health aides Security personnel
	High (Cognitive-intensive skills)	<b>C</b> Bookkeepers Proofreaders Clerks	<b>D</b> Doctors Lawyers Managers

Source: ILO:ASEAN in transformation: Future of jobs at risk of automation (2016).

# Technology cannot automate all jobs (yet)

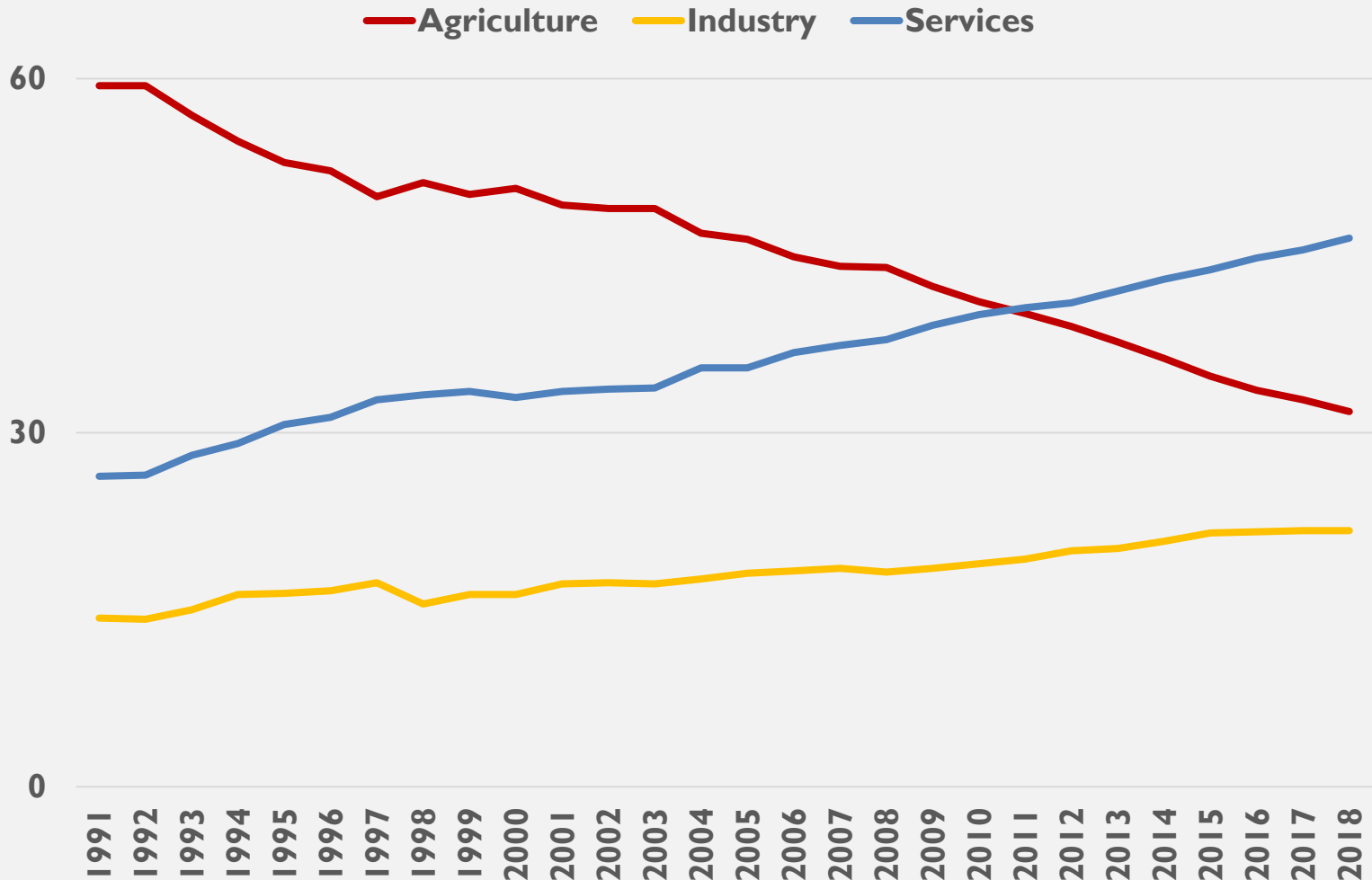
## Workplace tasks that face lower automation risks

Type of tasks	
Perception and manipulation	Finger and manual dexterity
	Cramped workspaces
Creative intelligence	Originality
	Fine arts
Social intelligence	Social perceptiveness
	Negotiation
	Persuasion
	Assisting and caring for others

Source: Frey and Osborne (2013).

# What are the prospects for shifting workers?

Employment by economic sector in ASEAN, 1991–2018 (% distribution)



Source: ILO: ILOSTAT Database.





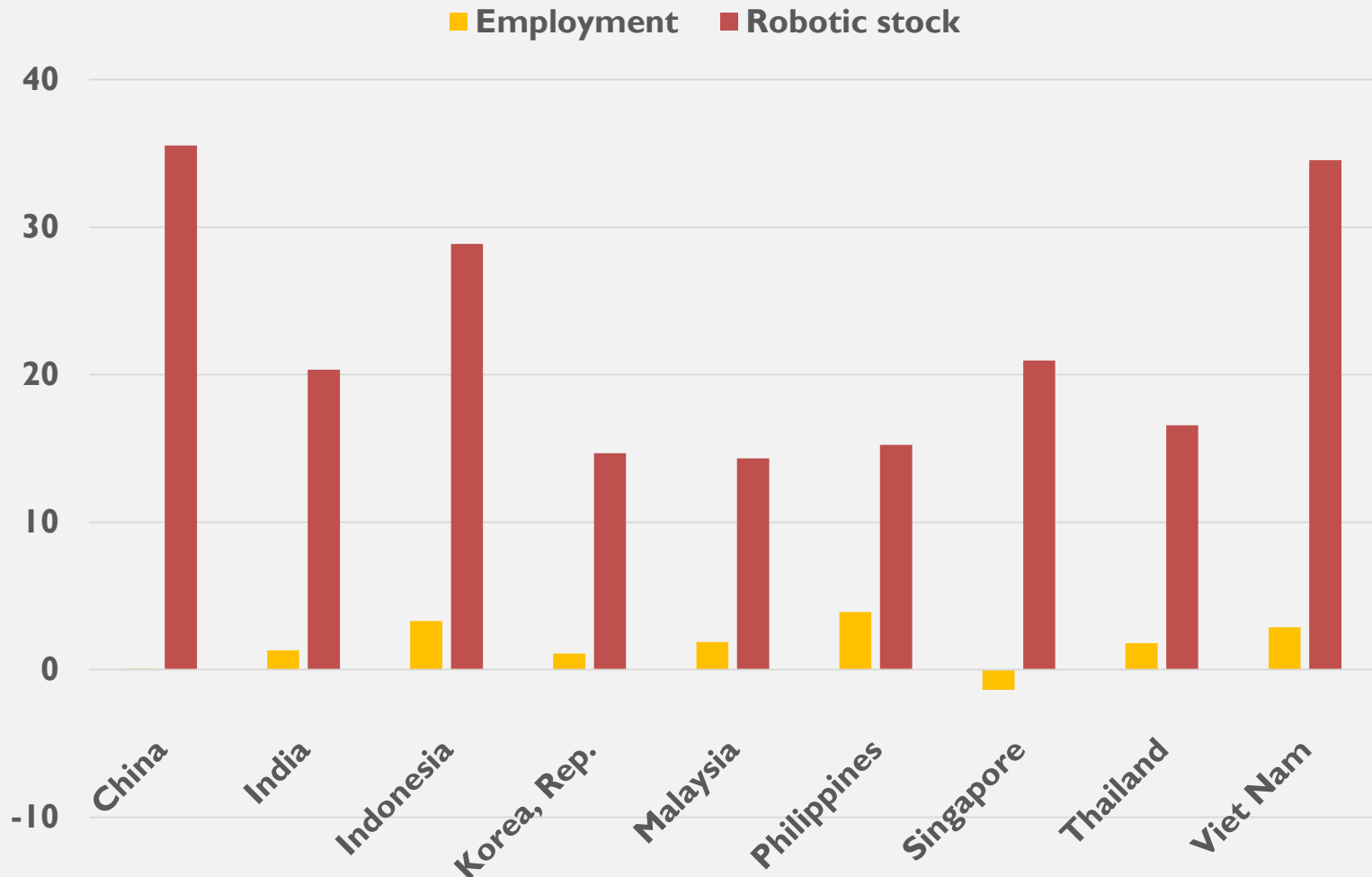
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# Robotics rising with industrial employment

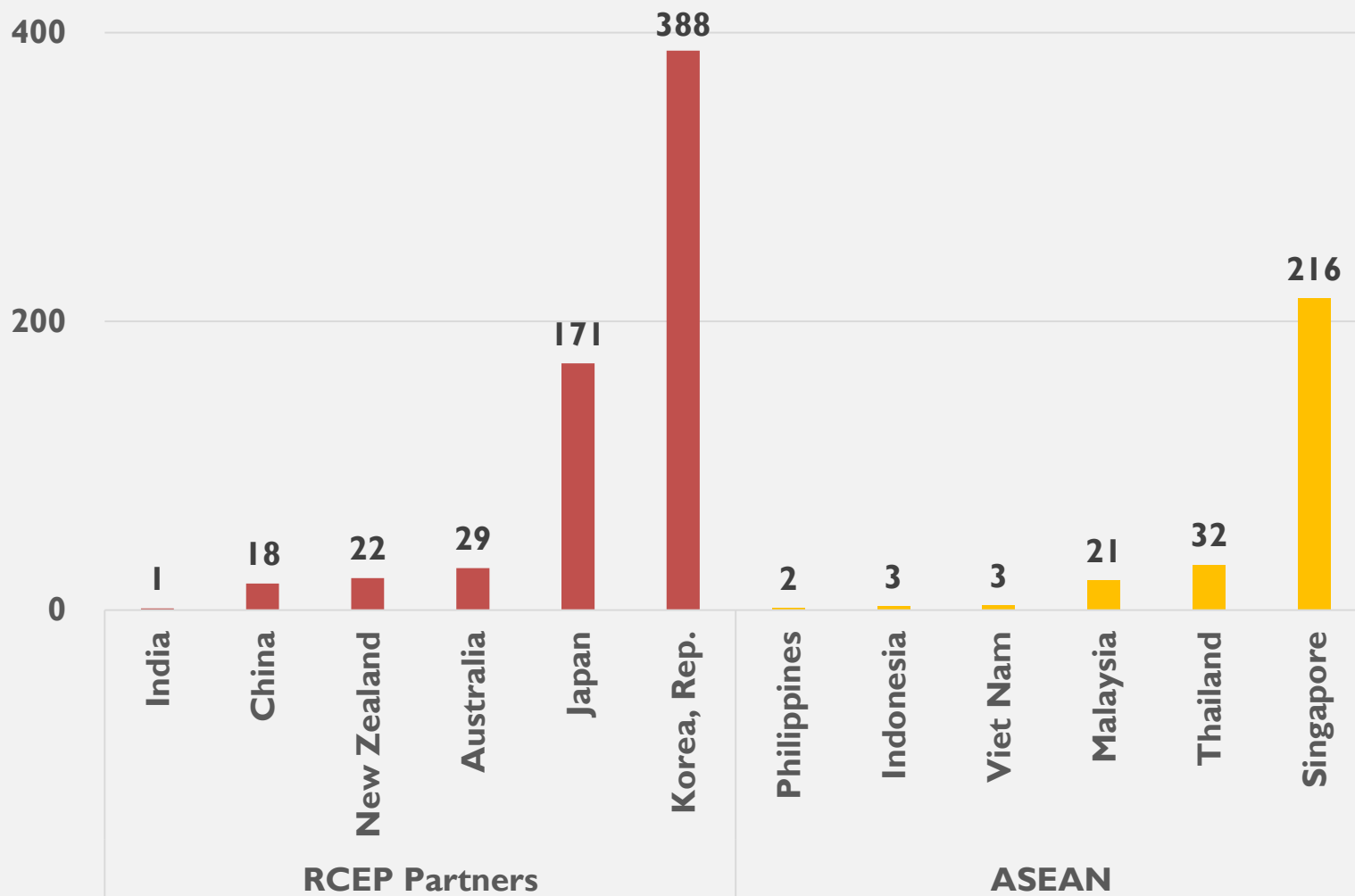
Annual growth in industrial employment and robotics, 2011-16 (CAGR, %)



Source: Author's estimates based on ILO (2017), International Federation of Robotics (2017) and World Bank (2017).

# Still large scope for automation in ASEAN

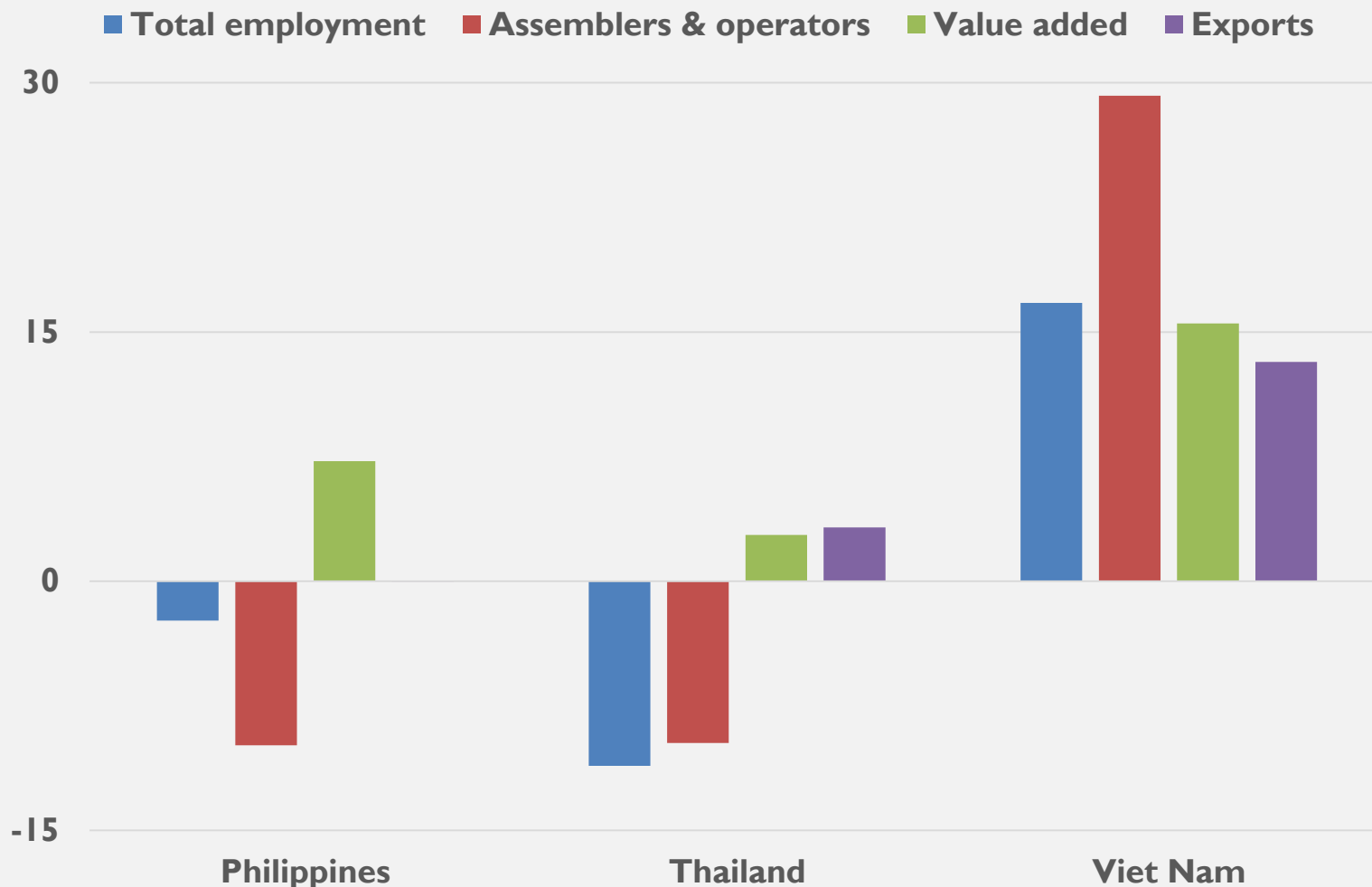
Industrial robots per 10,000 industrial workers, 2016



Source: Author's estimates based on ILO (2017), International Federation of Robotics (2017) and World Bank (2017).

# Net decrease in electronics employment

Change in employment, GVA and exports in electronics manufacturing, 2015-17 (CAGR, %)



Source: Author's estimates based on national labour force surveys, national accounts data and UNCTADStat Database.

Note: Viet Nam GVA is a proxy based on industrial production; Thailand GVA covers 2015-16. Asia Pacific [www.ilo.org/employers](http://www.ilo.org/employers)

# Weaker demand for automotive assemblers

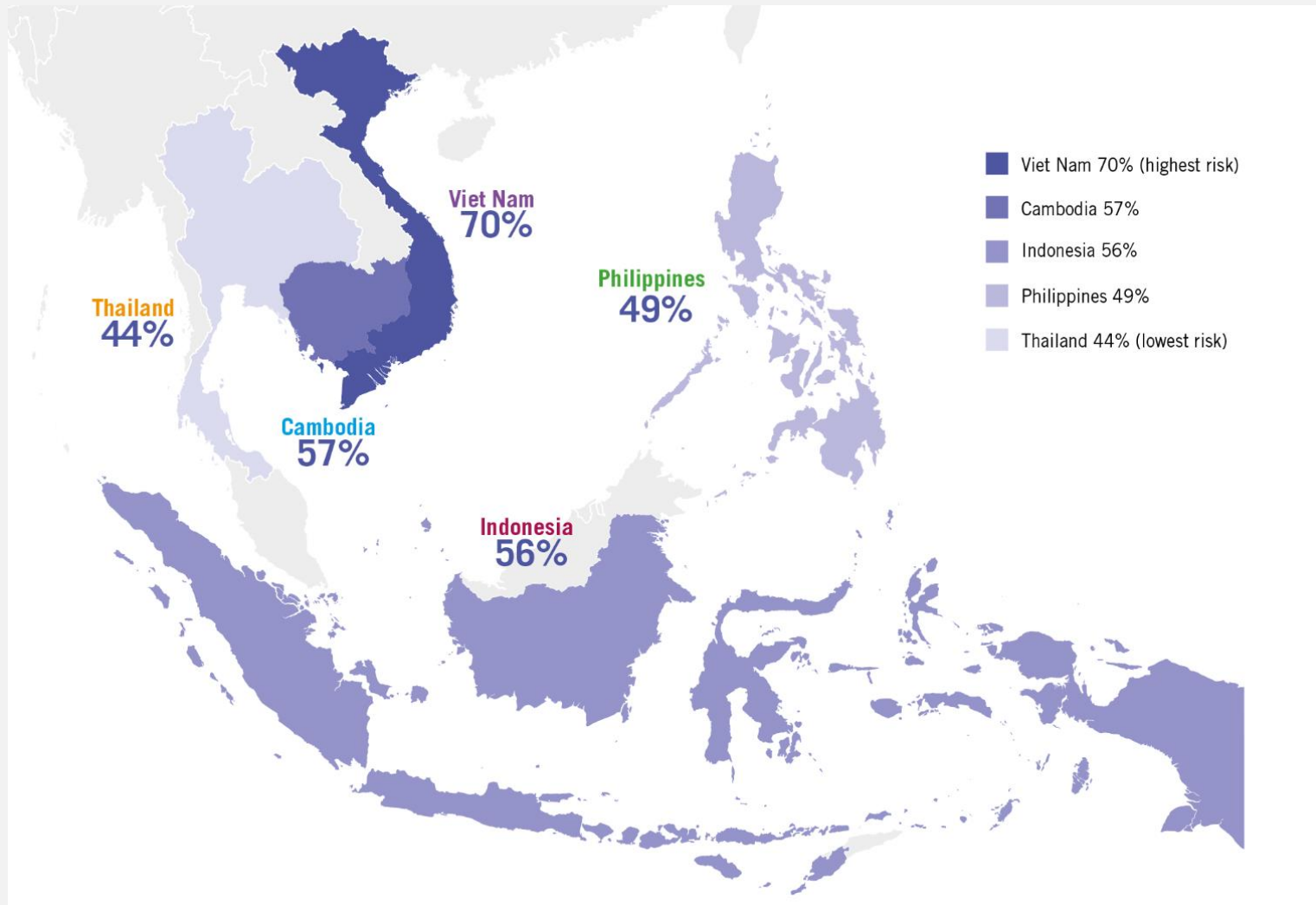
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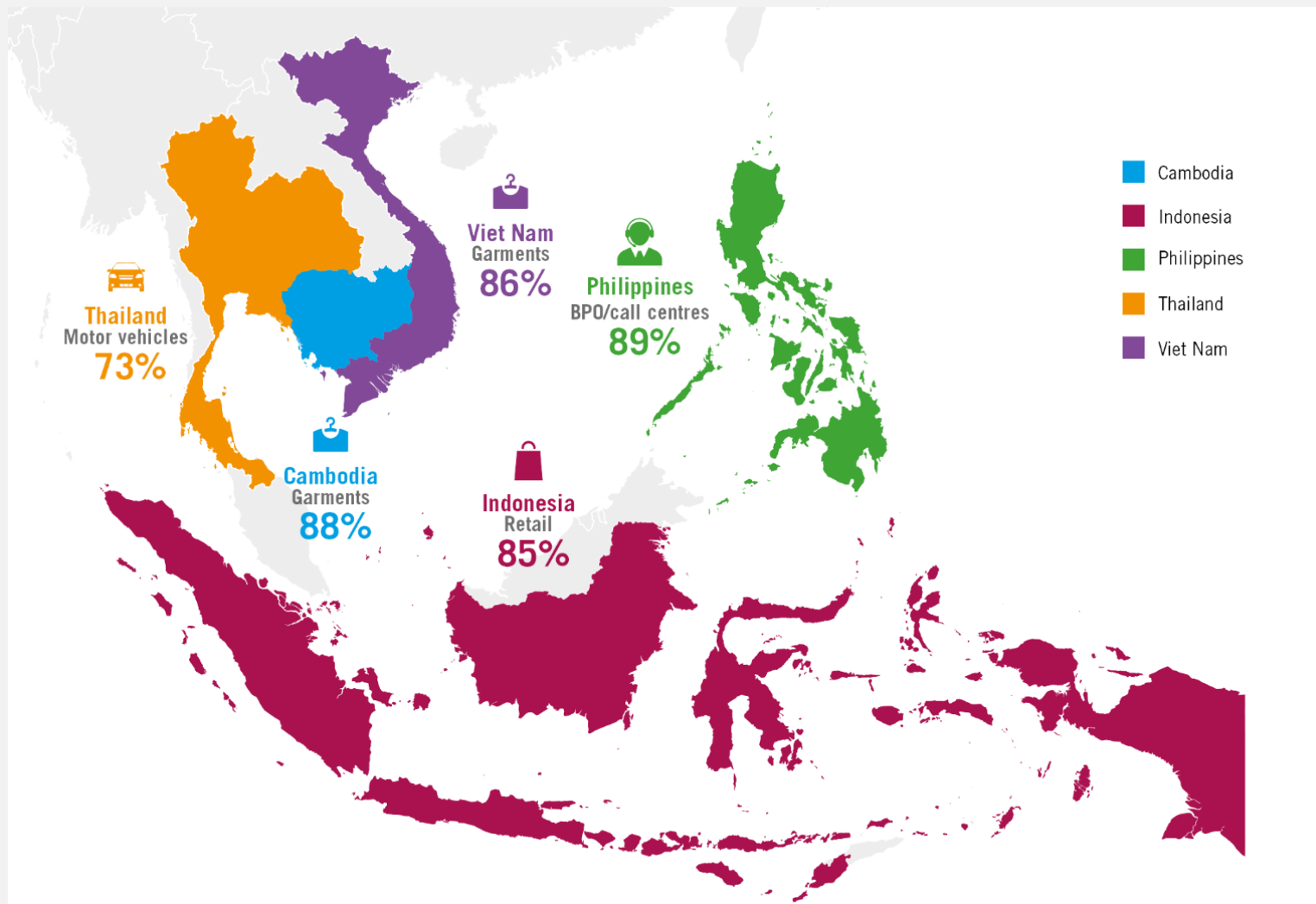
Note: Viet Nam GVA is a proxy based on industrial production; Thailand GVA covers 2015-16. Asia Pacific [www.ilo.org/employers](http://www.ilo.org/employers)

# More than half of ASEAN workers at high risk



Source: ILO: ASEAN in transformation: Future of jobs at risk of automation (2016).

# Key sectors at high risk of automation



Source: ILO:ASEAN in transformation: Future of jobs at risk of automation (2016).

# Women and the less qualified at high risk

## Vulnerable workers at high risk of automation in Cambodia

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**Women** workers are

**50%**

more likely than men



Workers with **primary education** are

**20%**

more likely than those with tertiary



# ■ Pace and scope of tech adoption will vary

1. Technological **feasibility** and **costs**
2. **Wage** and **skill** levels
3. Demographics and labour **supply**
4. Policies and **regulations**
5. **Social** acceptance

# Costs and skills are slowing tech adoption

## Biggest barriers to technology upgrading in Cambodia

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**Fixed capital costs  
too high**



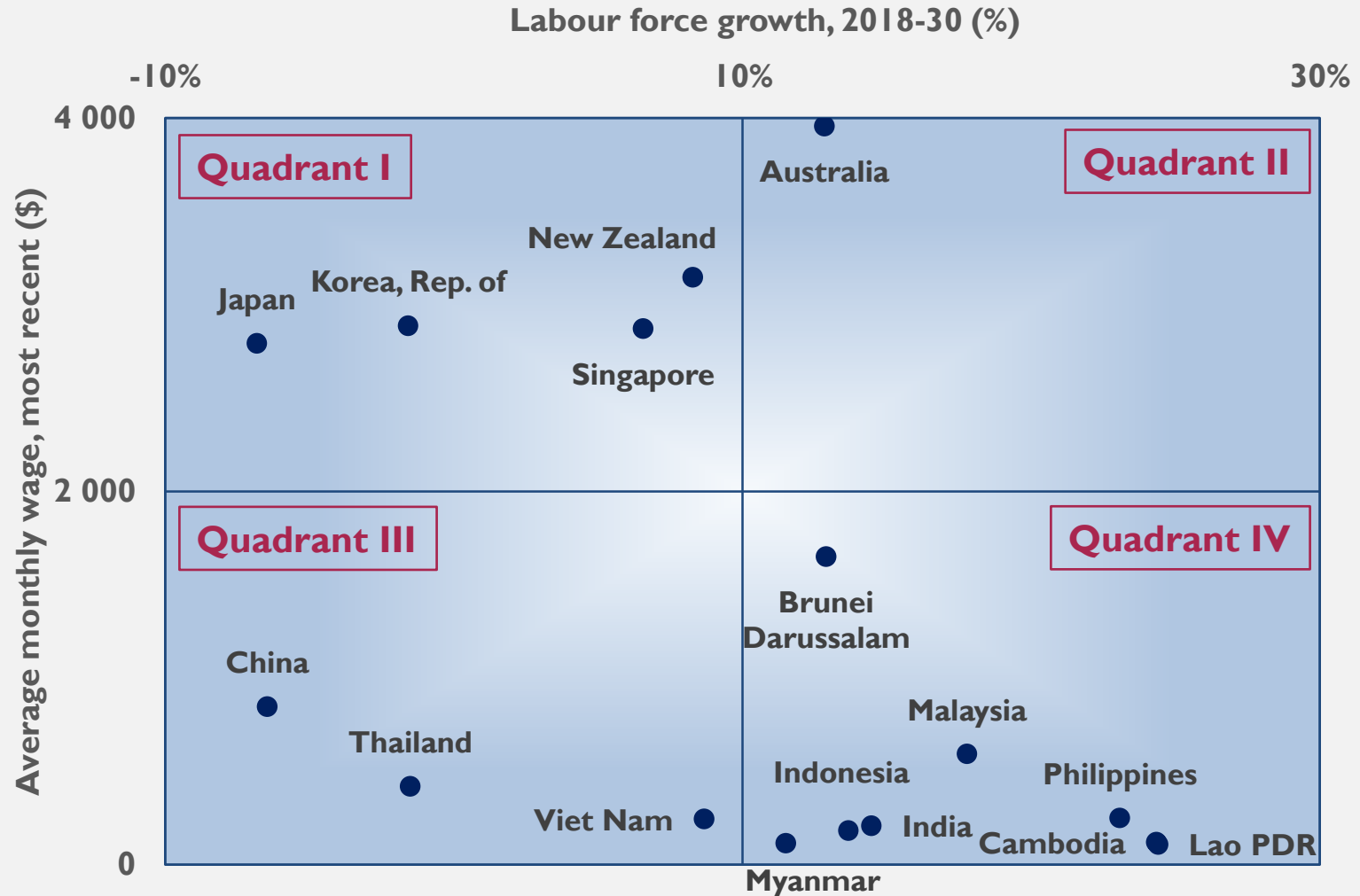
**Lack skilled  
operators**

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*Source:* ILO:ASEAN in transformation: Perspectives of enterprises and students (2016).

*Note:* Responses of 304 enterprises to the question “What is currently the single biggest barrier your enterprise faces to upgrade its technology?”

# Labour shortages & high wages as key drivers



Source: Author's estimates based on ILO: ILOSTAT Database; National Statistical Offices; World Bank (2017).


# Strong outlook for people-centric & tech jobs

Selected occupations at low risk of automation by employment size in Cambodia, 2016 (000s)



Source: Author's estimates based on Cambodia Socio-Economic Survey (2016).

Note: \* includes associates and technicians.

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# Key areas for policy action



**Diversify economy**



**Strengthen labour market policies**



**Upgrade skills**

# Develop technical, cognitive and soft skills

## Skills most critical for enterprises in Cambodia

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**Technical  
knowledge**



**Communication**



**Strategic  
thinking**



**Foreign  
language**

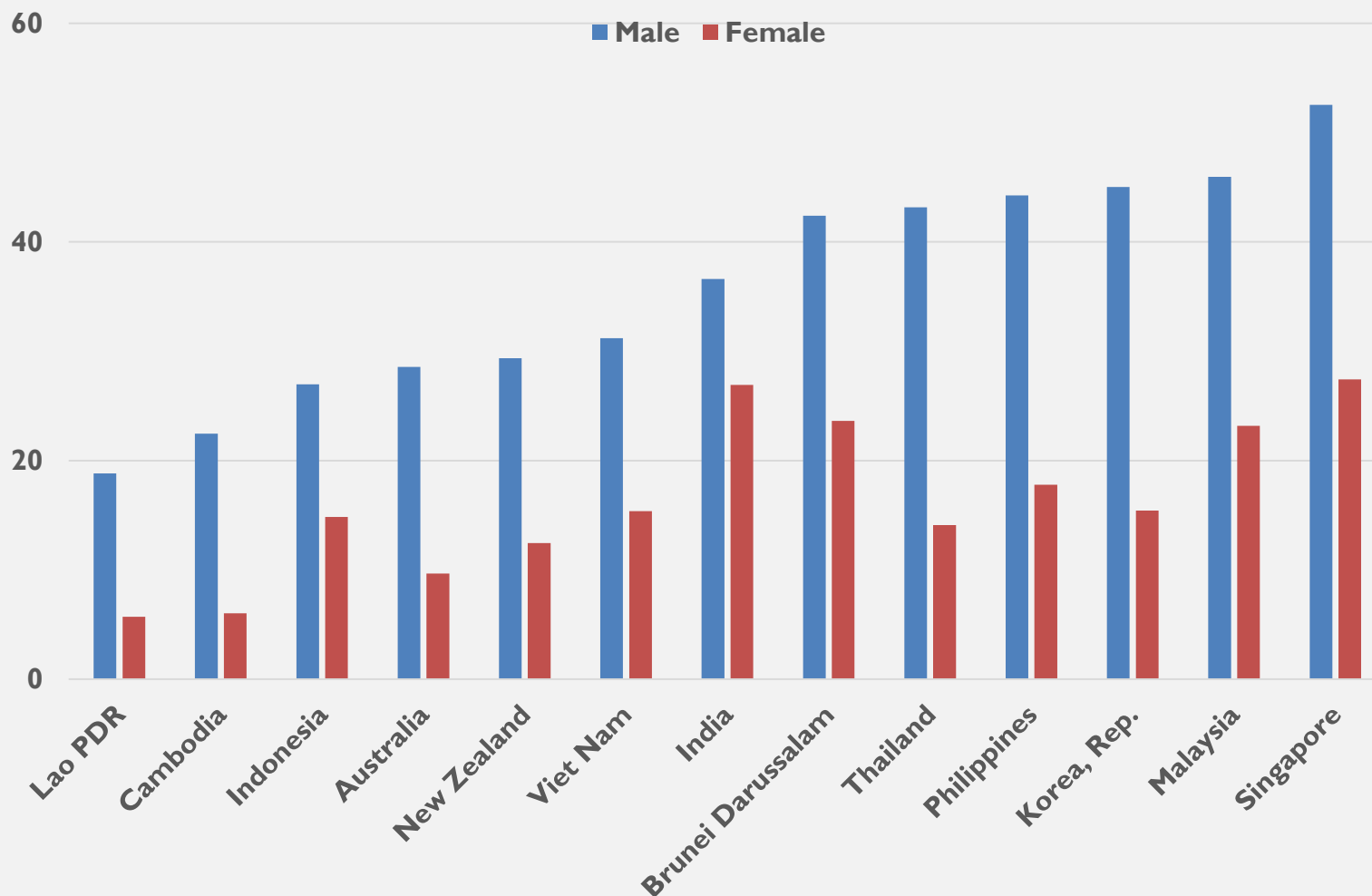
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Source: ILO:ASEAN in transformation: Perspectives of enterprises and students (2016).

Note: Responses of 304 enterprises to the question “Which 3 skills are the most critical for your enterprise?”.

# Close gap in STEM education

Share of students in tertiary education enrolled in STEM, 2017 or most recent year (%)



Source: UNESCO Institute for Statistics.





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# Thank you

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