ASEAN in transformation: How technology is changing jobs and enterprises

Gary Rynhart,
Senior Specialist on Employer’s Activities
Jakarta 17 April 2017
1. Current context and types of new technologies
2. Outline of ILO Research project
   • Initial desk Research (Frey & Osbourne Simulations)
3. Survey Findings
   • Enterprises and young people
4. Sector findings
5. Main Implications for Indonesia
Technological uptake faster than ever before

The Upward Skills Curve

- Industrial Revolution: technology benefited low-skilled jobs
- 20th century: middle-skilled, “routine” task content became automated

Job polarization in the US occupational distribution after 1980

Source: Katz and Margo (2013).
Routine, **medium-skill** occupations now *compete* with computers

Abstract, **high-skill** occupations have *benefited* from computers

Repetitive, **low-skill** jobs now being automated for the first time
HOW THE RESEARCH WAS CONDUCTED

RESEARCH METHODOLOGY

1. Frey & Osbourne
2. Enterprise and student surveys
   • 330 interviews
   • Over 4,000 enterprise surveys and 2,700 student surveys
   • 6 national and regional consultation meetings
   • Extensive secondary research
3. Sectoral approach of five prominent sectors in ASEAN
4. Textile and E&E sectors in China also included
WAGE WORKERS AT HIGH-RISK OF AUTOMATION IN ASEAN-5
SIMULATIONS ON JOBS SUSCEPTIBLE TO DIGITALIZATION

Source: ASEAN in transformation: Future of jobs at risk of automation (ILO, 2016)
WAGE WORKERS AT HIGH-RISK OF AUTOMATION IN KEY SECTORS IN ASEAN-5

SIMULATIONS ON JOBS SUSCEPTIBLE TO DIGITALIZATION

Source: ASEAN in transformation: Future of jobs at risk of automation (ILO, 2016)
ASEAN IN TRANSFORMATION: HOW TECHNOLOGY IS CHANGING JOBS AND ENTERPRISES

KEY SURVEY FINDINGS
YET ASEAN’S INCOMING WORKFORCE IS OPTIMISTIC ABOUT FUTURE WORK OPPORTUNITIES

2,700 students in ASEAN-10 say that 2025 will bring greater opportunities for

Good work for young women 63%
Starting a business 58%

Maintaining relevant skills 54%
Productive and well-paid work 56%
Interesting and rewarding work 58%

Source: ASEAN in transformation: Perspectives of enterprises and students (ILO, 2016)
YOUNG PEOPLE’S AREA OF INTEREST

Top choice of study: Business, commerce and finance is the top choice of study in ASEAN (almost 30%)

STEM+ICT uptake

Male student

ASEAN 49%  
Indonesia 50%

Female student

ASEAN 27%  
Indonesia 24%

Top career choice—Male

ICT 14%

Finance or insurance 9%

Manufacturing 8%

Top career choice—Female

Finance or insurance 11%

ICT 10%

Arts and entertainment 8%

Source: ASEAN in transformation: Perspectives of enterprises and students (ILO, 2016)
ASEAN AND INDONESIAN BUSINESSES ARE NOT AT THE FOREFRONT OF TECHNOLOGY INNOVATION

Of 4,000 enterprises in ASEAN-10 and 732 enterprises in Indonesia:

- ASEAN 16% Indonesia 19% Protects IP
- ASEAN 21% Indonesia 20% Invests in R&D
- ASEAN 27% Indonesia 35% Upgrades technology
- ASEAN 28% Indonesia 34% Protects data

Source: ASEAN in transformation: Perspectives of enterprises and students (ILO, 2016)
Enterprises report that **affordability and skills** are the **biggest obstacles** to technology upgrading.

- **High fixed capital cost**
  - ASEAN 29%
  - Indonesia 34%

- **Lack of skilled workers**
  - ASEAN 13%
  - Indonesia 14%

- **High licensing cost**
  - ASEAN 10%
  - Indonesia 12%

Source: ASEAN in transformation: Perspectives of enterprises and students (ILO, 2016)
INCREASINGLY SKILLS DEFICITS & MISMATCHES

Technology is driving up demand for technically-skilled workers who are difficult to find.

Skills most important:
- Technical knowledge
  - ASEAN 39%
  - Indonesia 37%

Skills most difficult to find:
- Strategic thinking and problem solving
  - ASEAN 32%
  - Indonesia 30%
- Foreign language skills
  - ASEAN 27%
  - Indonesia 34%
- Innovation
  - ASEAN 25%
  - Indonesia 32%
- Creativity
  - ASEAN 25%
  - Indonesia 23%

Source: ASEAN in transformation: Perspectives of enterprises and students (ILO, 2016)
Looking to 2025: Business sentiment is strong

Enterprises think 2025 will bring greater opportunities for:

- Rising domestic demand
  - ASEAN 39%
  - Indonesia 36%

- Rising exports within ASEAN
  - ASEAN 27%
  - Indonesia 26%

- Technological advances
  - ASEAN 26%
  - Indonesia 27%

- Falling trade and transport costs
  - ASEAN 20%
  - Indonesia 18%

Indonesian enterprises were slightly less optimistic about the opportunities created by skills upgrading among the local workforce (22%) in comparison to ASEAN neighbours (24%)

Source: ASEAN in transformation: Perspectives of enterprises and students (ILO, 2016)
ASEAN in transformation:
How technology is changing jobs and enterprises

MAIN SECTOR FINDINGS
Automation and robotics
- Automation is increasingly applied across all sectors
- Automotive (43%) and electronics (21%) sectors are the main drivers of robot growth
- In ASEAN, robots sales increased for Indonesia, Vietnam, Malaysia and Singapore in 2014

Internet of Things (IoT)
- Connected devices embedded with sensors to grow from 10 billion today to 30 billion devices by 2020

Additive manufacturing or 3D printing
- Global market grew 29% between 2012-13
MAIN SECTORIAL FINDINGS
AUTOMOTIVE AND AUTO PARTS

Significance
• ASEAN was the 7th largest global producer of vehicles in 2015
• more than 800,000 workers
• Regional leaders: Thailand and Indonesia

Main technologies in ASEAN
• Robotic/automation is becoming more attractive
• Spikes in minimum wages cited as driver to automate

Impact on enterprises and people
• Robots smaller, cheaper, more adaptable & able to collaborate with people
• Increasingly replacing lower-skilled jobs
• Higher skilled jobs increasingly sought
MAIN SECTORIAL FINDINGS
ELECTRICAL AND ELECTRONICS (E&E)

Significance
• ASEAN’s E&E directly employs over 2.5 million workers
• E&E exports almost tripled over the past decade, reaching US$382 billion in 2014
• Regional leaders: Thailand, Malaysia and Singapore

Main technologies in ASEAN
• Robotic automation, the IoT and 3D printing

Impact on enterprises and people
• Automated processes are replacing low-skilled jobs in assembling and packaging
• Demand for higher skills with strong technical, engineering and science fields will increase (especially women)
MAIN SECTORIAL FINDINGS
TEXTILES, CLOTHING AND FOOTWEAR (TCF)

Significance

- Over 9 million people in ASEAN, the majority of whom are young women
- Indonesia, Thailand and Viet Nam join the top rankings of TCF exports

Main technologies in ASEAN

- Robotic automation and “Sewbots” form the biggest future threat to both enterprises and workers in ASEAN’s TCF sector

Impact on enterprises and people

- Of all the sectors analyzed, TCF is at highest risk of displaced workers.
- This risk disproportionately affects female workers
- More engineers and technical experts will be needed with backgrounds in STEM will be needed
MAIN SECTORIAL FINDINGS
BUSINESS PROCESSING OUTSOURCING (BPO)

Significance
• BPO developed in the 1990s
• GDP contribution of 7% in 2016
• Over 1 million workers were employed, mostly young graduates and women (59% of the workforce)

Main technologies in ASEAN
Cloud computing and robotic process automation (RPA)

Impact on enterprises and people
• BPO players need to shift services towards knowledge process outsourcing (KPO), focusing on specialized knowledge and skillsets
• Highly educated employees with certifications in medicine, business, law, finance, accounting and data analysis will be required
MAIN SECTORIAL FINDINGS

RETAIL

Significance

• Employs a total of 44.6 million workers in ASEAN (16% of total employment and 44% of employment in the service sector)
• Retail sales in ASEAN countries accounted for US$767 billion in 2013

Main technologies in ASEAN

• The IoT converging with other technologies (cloud and big data).

Impact on enterprises and people

• New technologies will optimize inventory management, product tracking and shopping intelligence
• Future required skills include data management, digital marketing and social media, in-depth product knowledge and soft skills
ASEAN IN TRANSFORMATION:
HOW TECHNOLOGY IS CHANGING JOBS AND ENTERPRISES

INDONESIA KEY FINDINGS
INDONESIA: KEY FACTS

• Two critical manufacturing sectors: TCF and automotive

• Indonesia 2\textsuperscript{nd} largest TCF exporter, US$16.3 billion in 2015 (half the regional leader, Viet Nam).

• TCF exports represented 25\% of Indonesia’s total manufactured exports in 2015 (the largest manufacturing export)

• Indonesia 2\textsuperscript{nd} largest exporter of motor vehicles and auto parts in ASEAN, totalling US$5 billion, about one fifth of the level of the regional leader, Thailand
INDONESIA HIGHLIGHTS

OVERVIEW

Total employment in TCF and automotive and auto parts (thousand) and share of total manufacturing employment (per cent), Indonesia, 2016

Source: Adapted from ILO: ASEAN in transformation: How technology is changing jobs and enterprises, op. cit.
JOBS AT RISK OF AUTOMATION IN INDONESIA

Distribution of employment at risk of automation, ASEAN-5 and Indonesia

Notes: The outer ring represents average risk of automation across ASEAN-5, the inner ring represents risk of automation in Indonesia.

Source: Adapted from ILO: ASEAN in transformation: The future of jobs at risk of automation, op. cit.
JOBS AT RISK OF AUTOMATION IN INDONESIA

Probability of occupying a high-risk, automatable job by gender, age and education levels, ASEAN-5 and Indonesia

Source: Adapted from ILO: ASEAN in transformation: The future of jobs at risk of automation, op. cit.
INDONESIAN AUTOMOTIVE SECTOR
TECHNOLOGY UPTAKE

• Robotic automation is likely to be the most disruptive technology in Indonesia’s automotive sector.
• Automation will reduce the number of low-skilled assembly line workers
• Collaborative robots, or ‘cobots’ are increasingly
• Also making the workplace safer in the sector
Factors driving robotic automation in the automotive sector include:

1. Cost-reduction agreements are driving automation (e.g., the same parts must be made more cheaply/quantity increased with the same resource intensity).
2. Increases in minimum wage levels
3. Consumer demand for better quality performing cars
4. Government regulations to lower carbon emissions and environmental consciousness
5. Driverless cars
INDONESIAN TCF SECTOR
TECHNOLOGY UPTAKE

• 70% of technology out of date (2012 Indonesia’s Ministry of Labour)

• Robotic automation and automated sewing machines are likely to have the greatest impact on Indonesia’s TCF sector

• Automated sewing machines are becoming widely available in the market

• in 2016, Adidas (Indonesia) reported using automated cutting to reduce manual cutting to 30 per cent.
1. **Inside Indonesia:** improve product quality and labour productivity, increase workplace safety, and reduce environmental impact
   - Higher demand for technicians with backgrounds in STEM
   - Lower demand for manual workers

2. **Outside Indonesia:** Main destination countries (such as US) and major regional competitors (China) will
   - Incorporate automation into their most labour intensive production processes
   - Re-shore TCF production to destination countries from Indonesia
INDONESIA KEY FINDINGS

1. Over half of ALL jobs in Indonesia are at high risk.
2. Impact greatest on low-skilled workers, women, youth and less educated workers.
3. Demand for high-skilled workers with strong STEM backgrounds will increase.
4. Co-bots are collaborating with skilled human workers.
5. In the TCF sector, robots are progressively taking on dangerous and manual tasks.
MAIN OVERALL FINDINGS

• Technology through automation and robotics is already happening across Asia in the TCF sector.

  ✓ BOTH ‘incremental’ and ‘game-changing’ technology

• Automation through robotics has resulted in labour productivity/major growth gains in China’s TCF sector (with less workers)

  ✓ The rise of the workerless factory

• Transformative technology will be externally driven

  ✓ what we call ‘game-changing tech-adoptions’

• Current political discourse: This increases the chance of reshoring production to market destination countries
RECOMMENDATIONS

1. **Take this really seriously**
   - ✓ Limited evidence of awareness of threats/more on opportunities

2. **New sectors will emerge**
   - ✓ Technology will impact on All jobs

3. **Need to rethink how we skill/educate**
   - ✓ Definitely need to promote STEM, particularly among young women

4. **Address standard structural issues in particular those with a tech focus**
   - ✓ Address high electricity costs as it constrains technology adoption in manufacturing enterprises
   - ✓ Access to finance: major constraint and integral to financing technological adoption
3. RECOMMENDATION: *the old development model no longer the route it was*

DON’T DO
NORMAL STUFF!!!!
THANK YOU

Gary Rynhart,
Senior Specialist on Employers’ Activities