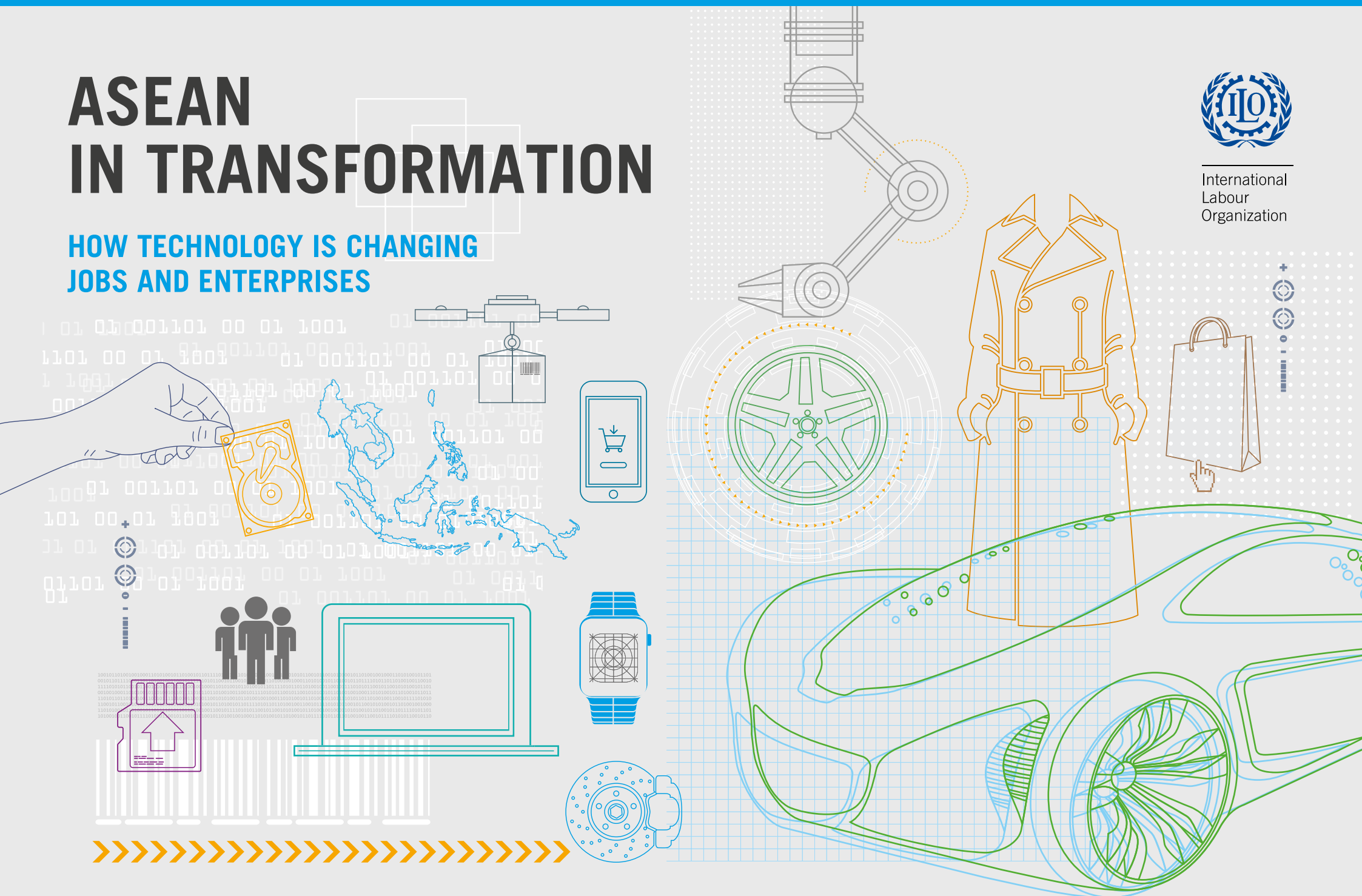


ASEAN IN TRANSFORMATION

HOW TECHNOLOGY IS CHANGING
JOBS AND ENTERPRISES



International
Labour
Organization



Henry Ford

“Walter, how are you going to get those robots to pay your union dues?”

Walter Reuther

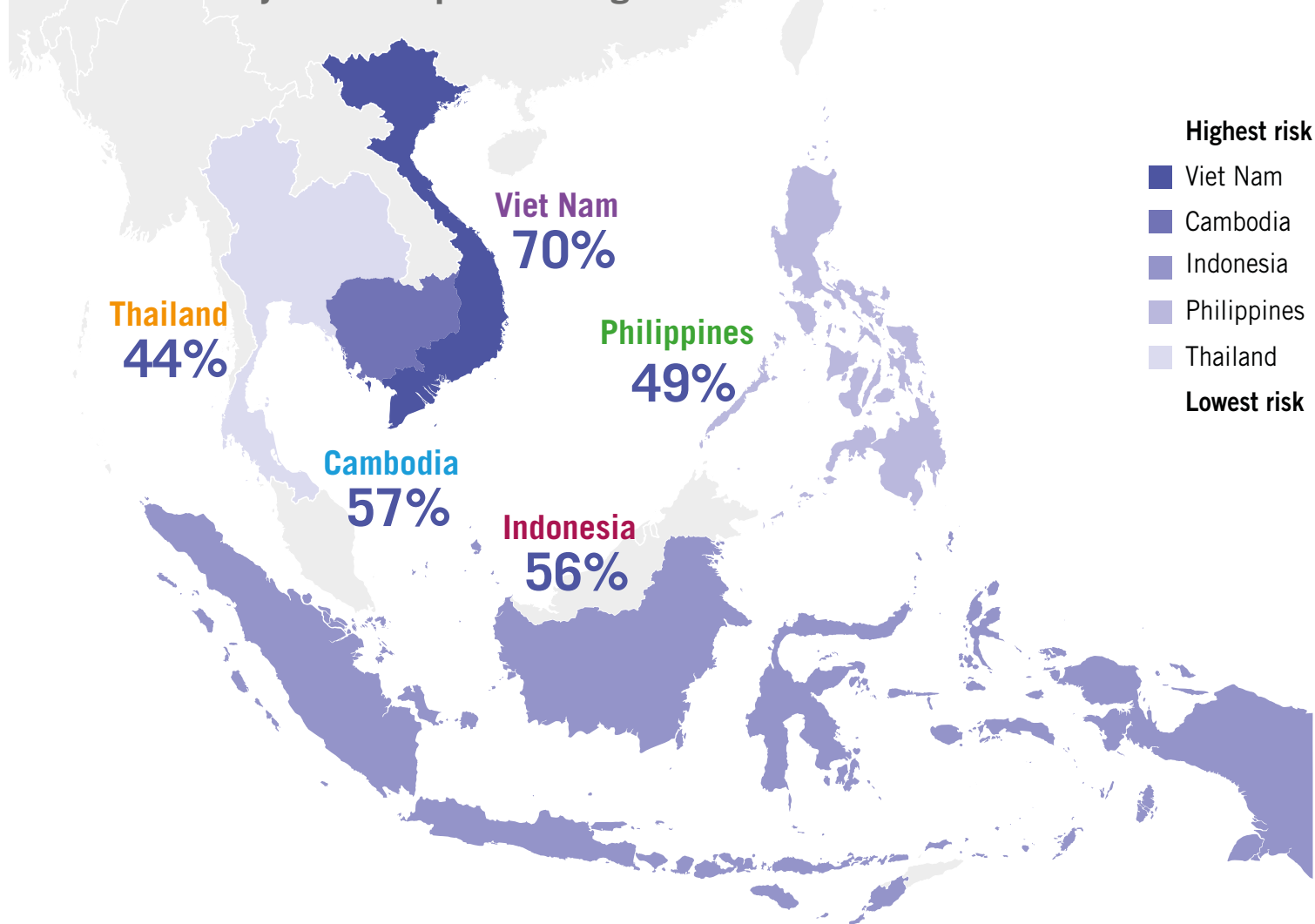
“Henry, how are you going to get them to buy your cars?”

An apocryphal conversation between Henry Ford, chairman of Ford Motor Company, and Walter Reuther, union leader of the United Automobile Workers



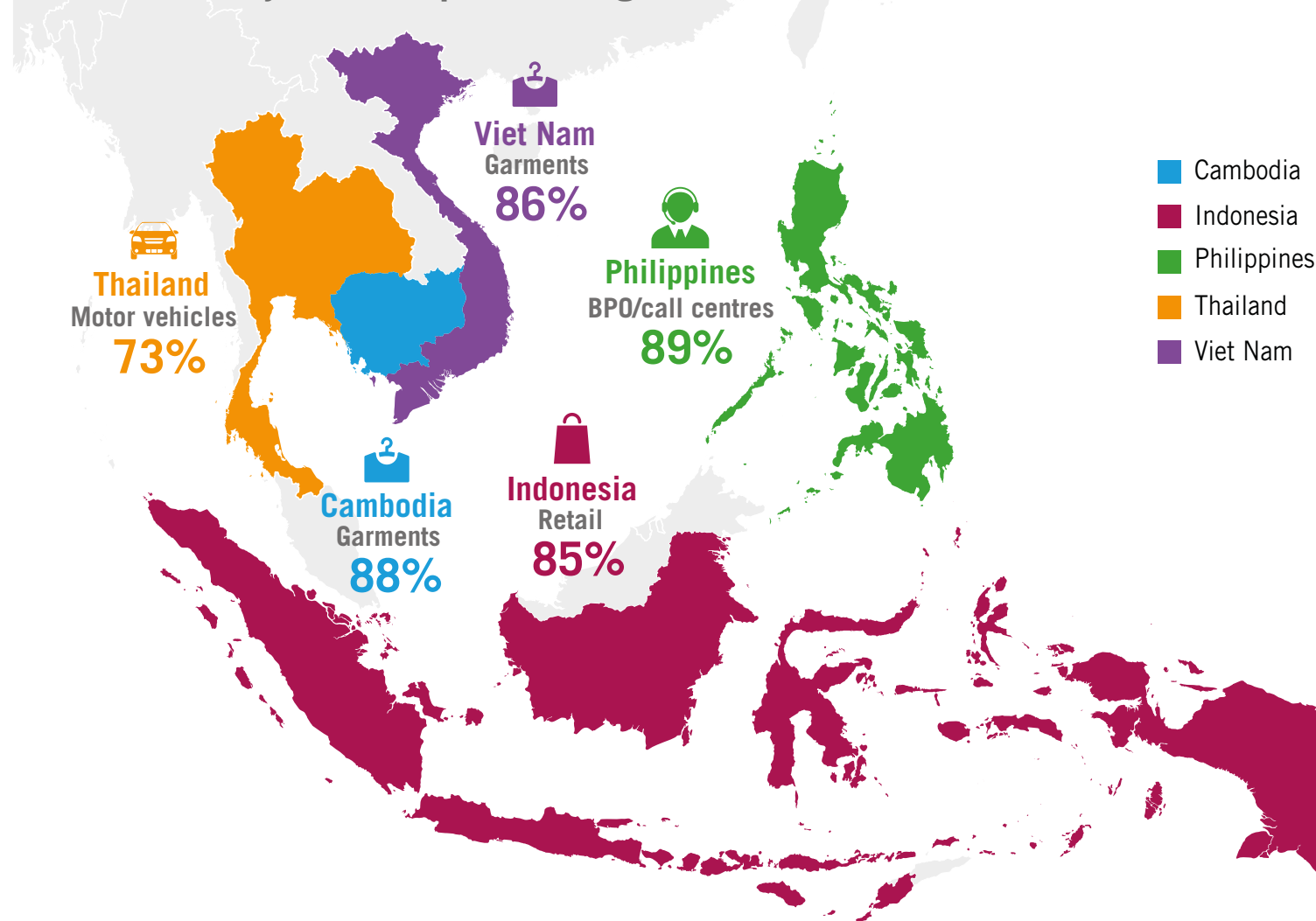
WORKERS AT HIGH RISK OF AUTOMATION IN ASEAN-5

Simulations on jobs susceptible to digitalization



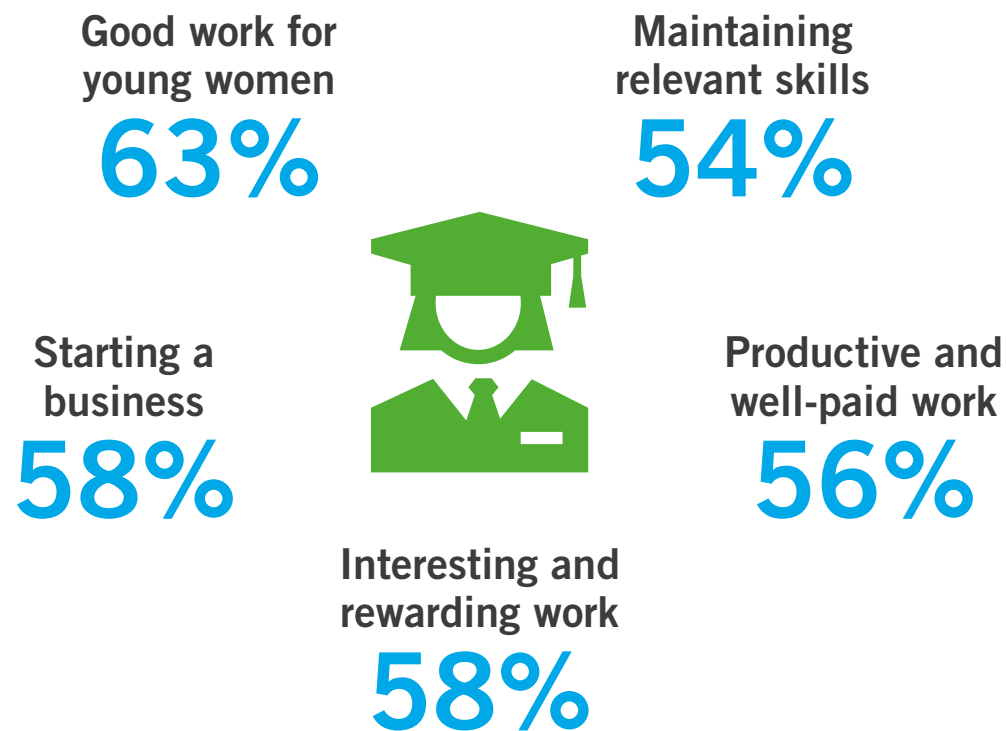
PERCENTAGE OF WAGE WORKERS AT HIGH RISK OF AUTOMATION IN KEY SECTORS IN ASEAN-5

Simulations on jobs susceptible to digitalization



YET ASEAN'S INCOMING WORKFORCE IS OPTIMISTIC ABOUT FUTURE WORK OPPORTUNITIES

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



YOUNG PEOPLE'S AREA OF INTEREST

Top choice of study: Business, commerce and finance (almost 30%)

STEM uptake



Male student

28%



Female student

17%

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%

BUT ARE THEY STUDYING FIELDS ALIGNED WITH GROWTH SECTORS?

ASEAN ENTERPRISES ARE NOT AT THE FOREFRONT OF TECHNOLOGICAL INNOVATION BUT SEE IT'S IMPORTANCE

Of 4,000 enterprises surveyed in ASEAN-10



less than
16%
protect IP



around
20%
invest in R&D

But technology is seen as a positive enabler:



Over 50%
agree that technology will increase
domestic sales, labour productivity, profits and
number of highly skilled workers employed

ENTERPRISE BARRIERS TO TECHNOLOGY UPTAKE

Enterprises report that **affordability and skills** are the **biggest obstacles** to technology implementation



High fixed
capital cost

29%



Lack of high
skilled workers

13%



High
licensing cost

10%

THE WORKFORCE IS NOT FIT FOR PURPOSE

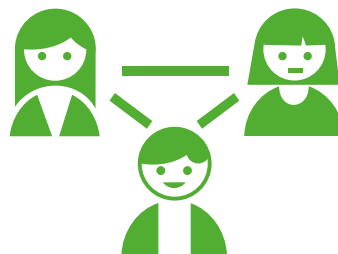
Technology is driving up enterprise demand for technically skilled workers who are difficult to find

Skills most important:



Technical
knowledge

40%



Teamwork and
communications

33%

Skills most difficult to find:



Strategic thinking
and problem solving

32%



Technical
knowledge

27%



Innovation

25%



Creativity

25%

ENTERPRISE OUTLOOK IS POSITIVE

Enterprises think 2025 will bring greater opportunities for:



Labour productivity

69%



Profits

65%



High skilled workers
employed

65%



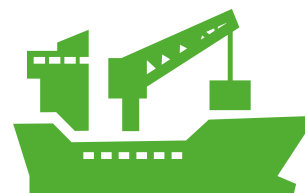
Domestic sales

64%



Women employed

46%



Export

46%

RESEARCH OBJECTIVE AND FOCUS

Develop an in-depth understanding of technological trends across different sectors:

- Focus on labour-intensive and economically important sectors
- Assess enterprises' skills needs
- Understand impact on people

Provoke thought and discussion among enterprises, workers and their representative organizations, as well as national and regional policy-makers, on how best to prepare for the discernible changes most likely to come by the year 2025.



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HOW THE RESEARCH WAS CONDUCTED

Research methodology



330
interviews



4,000
enterprise surveys

2,700
student surveys



6 national
and regional
consultation meetings



extensive
secondary research

Sectoral approach of five prominent sectors in ASEAN:



Automotive and auto parts



Electrical and electronics (E&E)



Textiles, clothing and footwear (TCF)



Business process outsourcing (BPO)



Retail

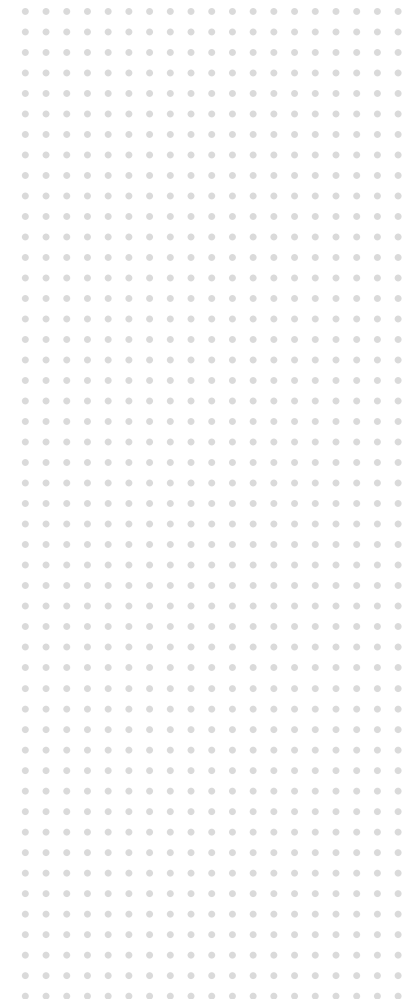
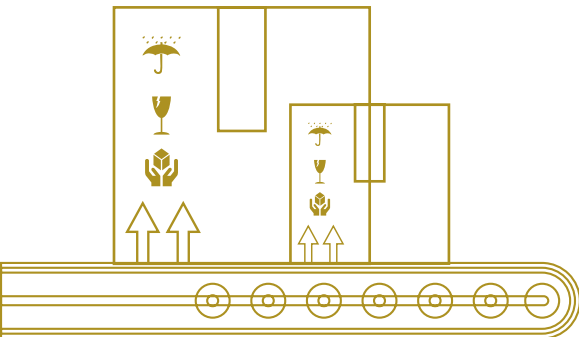
OVERVIEW OF ASEAN

- **Population: 632 million**
- **Expanding middle class: Tripled over the past 20 years**
- **Demographics and urbanization**
 - Population growth is slowing
 - Young women and men account for about 17% of the population
 - Portion of ASEAN urban population has risen above 40%
- **Workforce characteristics**
 - Only 13% are high skilled



DRIVERS OF TECHNOLOGY ENTERPRISE COMPETITIVENESS

- Continuously improve quality, precision and productivity
- Manage and stabilize total production cost and staff turnover
- Consider movements of key competing countries, like China
- Keep up with technological trends in other sectors



DRIVERS OF TECHNOLOGY

CONSUMER DEMAND AND GOVERNMENT PRESSURE

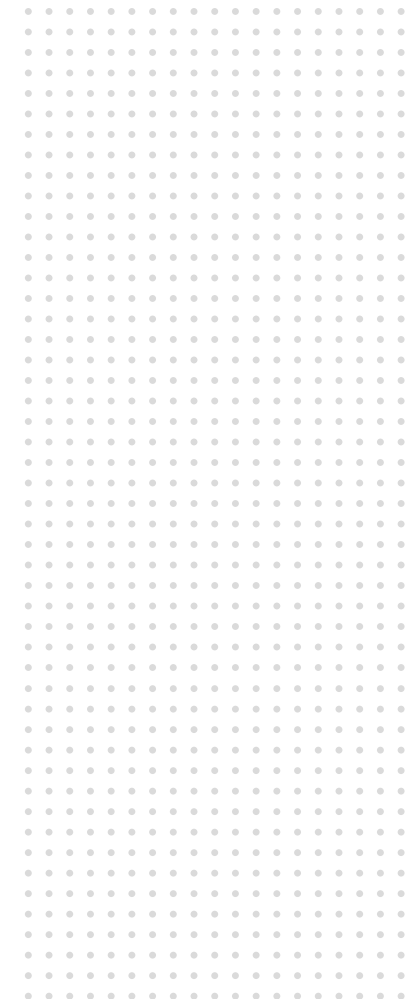
Consumers are:

- Becoming wealthier, with more disposable income in ASEAN
- Demanding sophisticated products
- Seeking instantaneous purchases and want a variety of designs/functions
- Globally, this is accentuated by consumers wanting individualized products



Governments are adding regulations to:

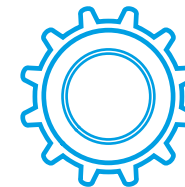
- Address environmental concerns during production and reduce waste
- Create a safer workplace



OVERVIEW OF ASEAN TECHNOLOGY

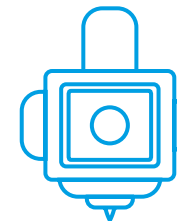
Automation and robotics

- Automation is increasingly applied across all sectors
- Automotive and electronics are the largest consumers of robots
- In ASEAN, robots sales increased for Indonesia, Malaysia, Singapore and Viet Nam in 2014



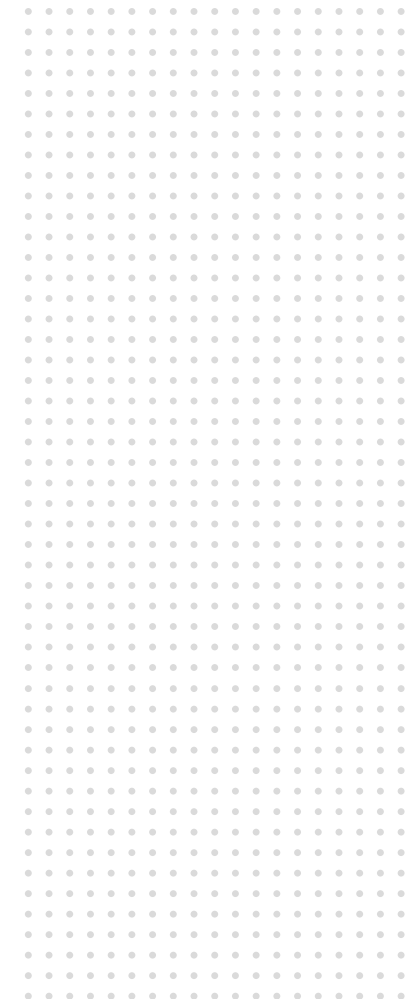
Additive manufacturing (AM) or 3D printing

- Global market grew 29% between 2012-13



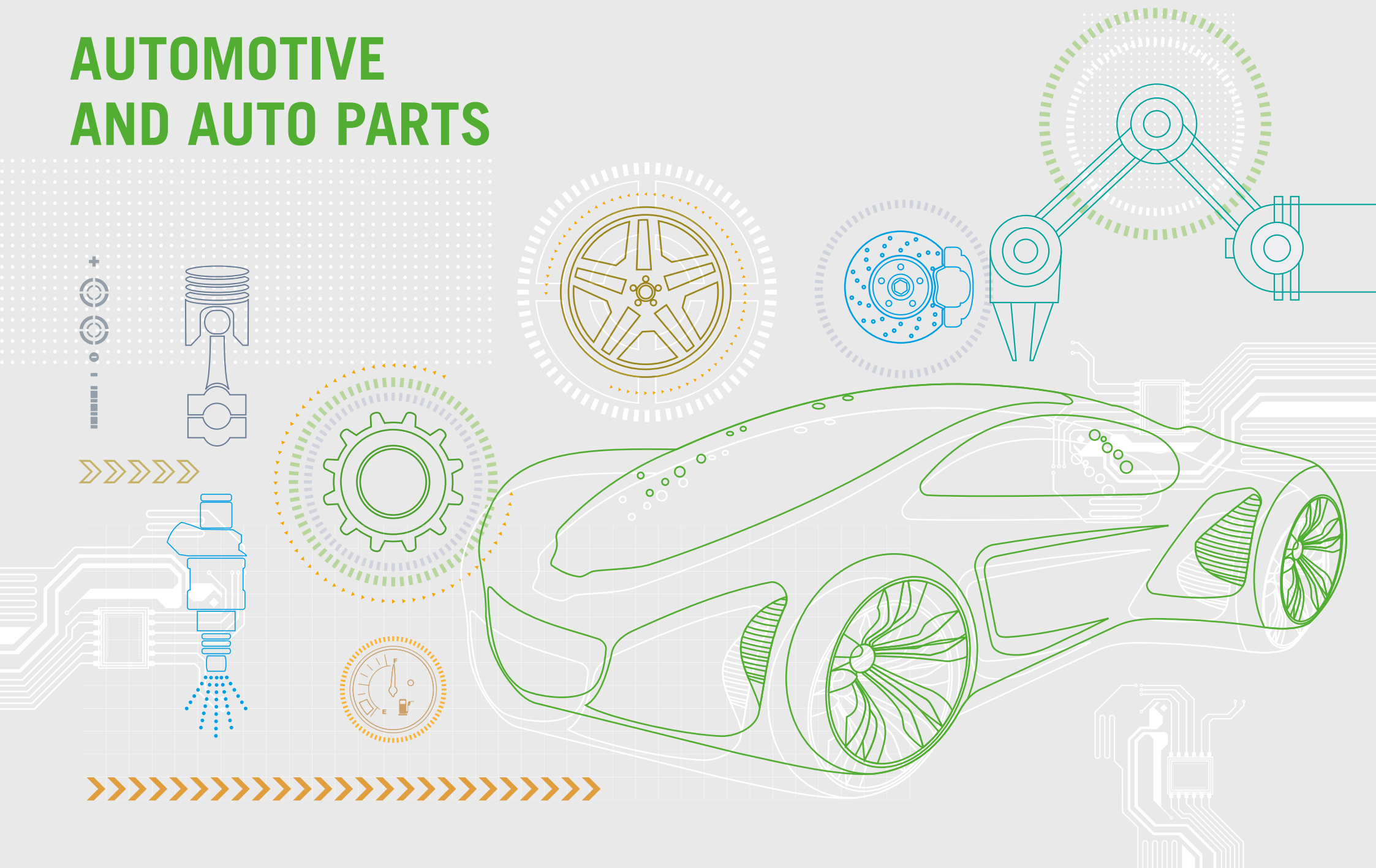
Internet of Things

- Connected devices embedded with sensors to grow from 10 billion today to 30 billion devices by 2020

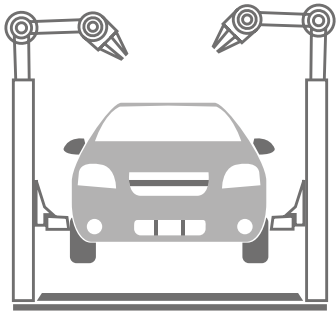


SECTOR ANALYSIS

AUTOMOTIVE AND AUTO PARTS



SECTOR SIGNIFICANCE

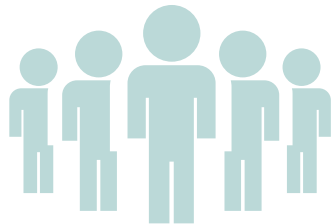


ASEAN was the
**7th largest
global
producer
of vehicles**
in 2015

More than

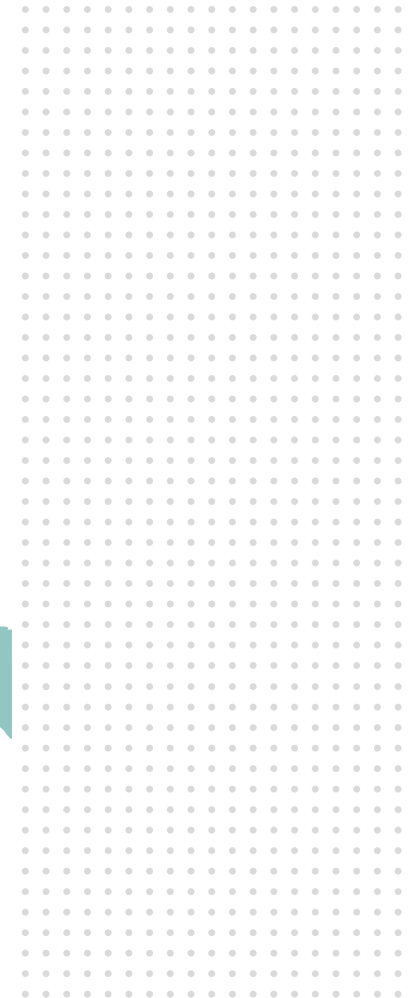
800,000

workers employed



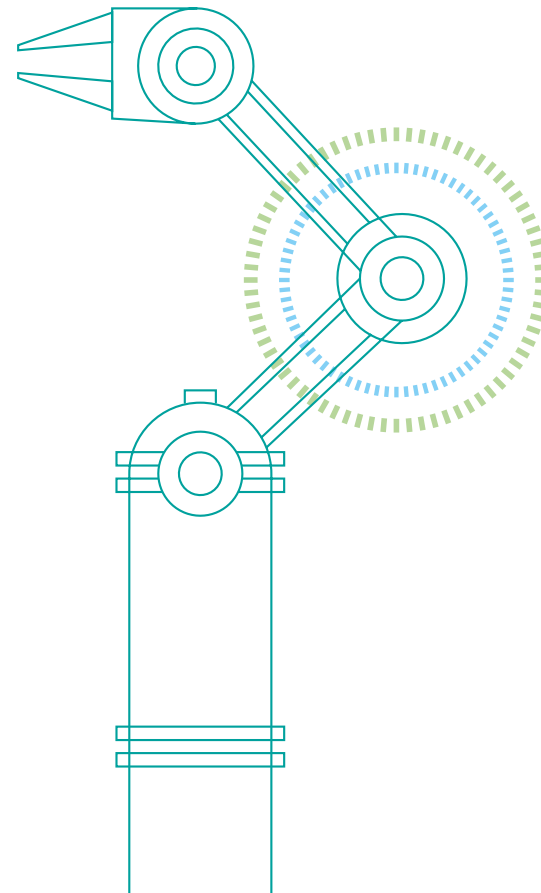
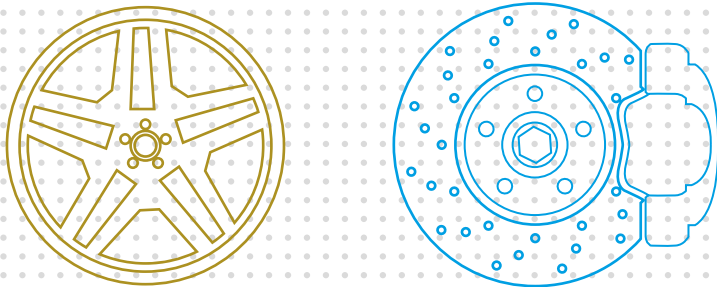
Regional leaders:

**Thailand,
Indonesia**



TECHNOLOGICAL DRIVERS

- Stronger government regulations to lower carbon emission
- A wealthier ASEAN with more disposable income demanding higher-end cars
- Increased demand for improved quality
- Enhanced pressure to manage production cost



MAIN TECHNOLOGIES IMPACTING THE SECTOR

Global trends:

- Electric/hybrid electric vehicles
- Advanced, lightweight materials
- Autonomous vehicles

In ASEAN, robotic automation is most prominent

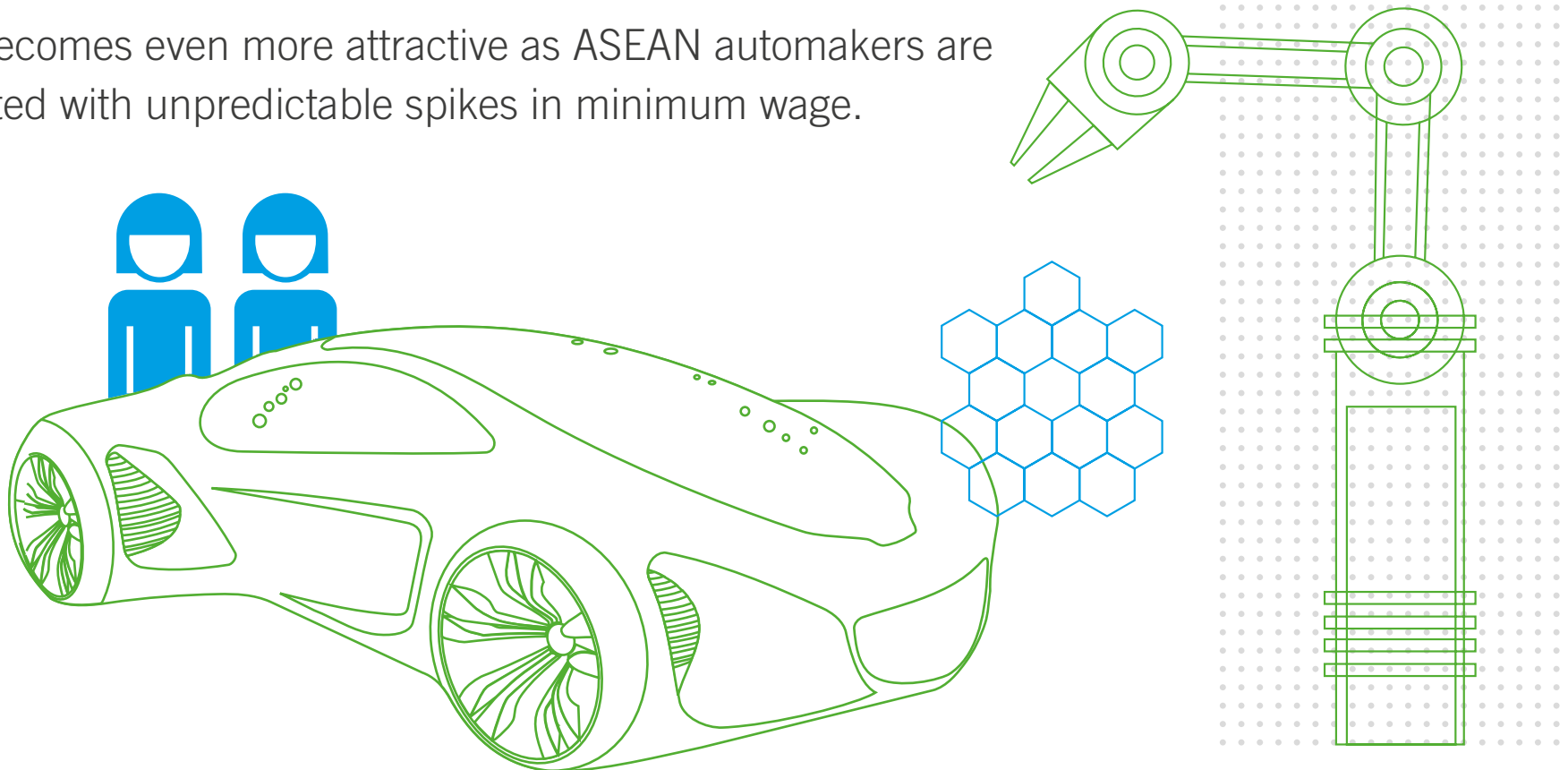
- Production-line robots are becoming smaller, better, cheaper, easier to install, more adaptable and increasingly able to collaborate with people
- Over 60% interviewed have seen significant increases in automation
- Over 70% interviewed say that cost is the major driver for automation



AUTOMATION

“Cost down” agreements between original equipment manufacturers (OEMs) and suppliers make automation attractive as it provides process improvements.

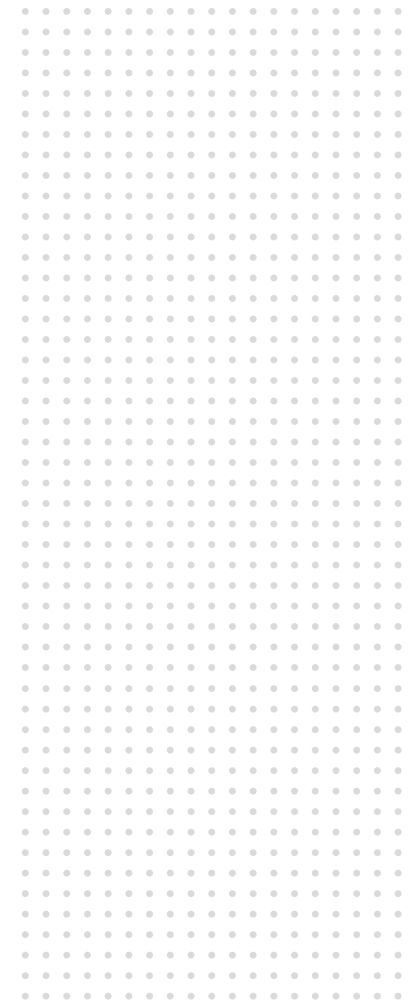
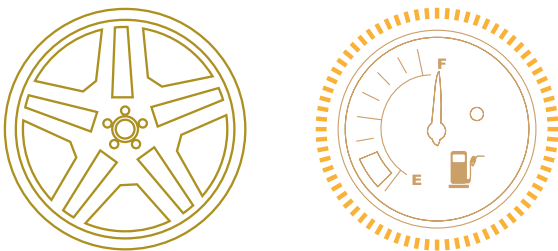
Automation becomes even more attractive as ASEAN automakers are often confronted with unpredictable spikes in minimum wage.



BARRIERS TO TECHNOLOGY UPTAKE

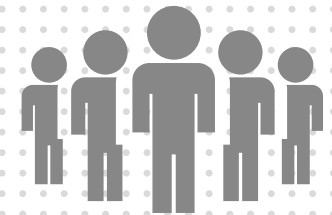
Barriers that limit consumer and production demands for advanced technologies in ASEAN are:

- The high costs of electric/hybrid electric vehicles and lightweight materials
- Unresolved legal and infrastructure issues for autonomous vehicles
- Lack of R&D
- Lack of skilled workers who can lead this effort
- Lack of technological and production capacity of local auto makers



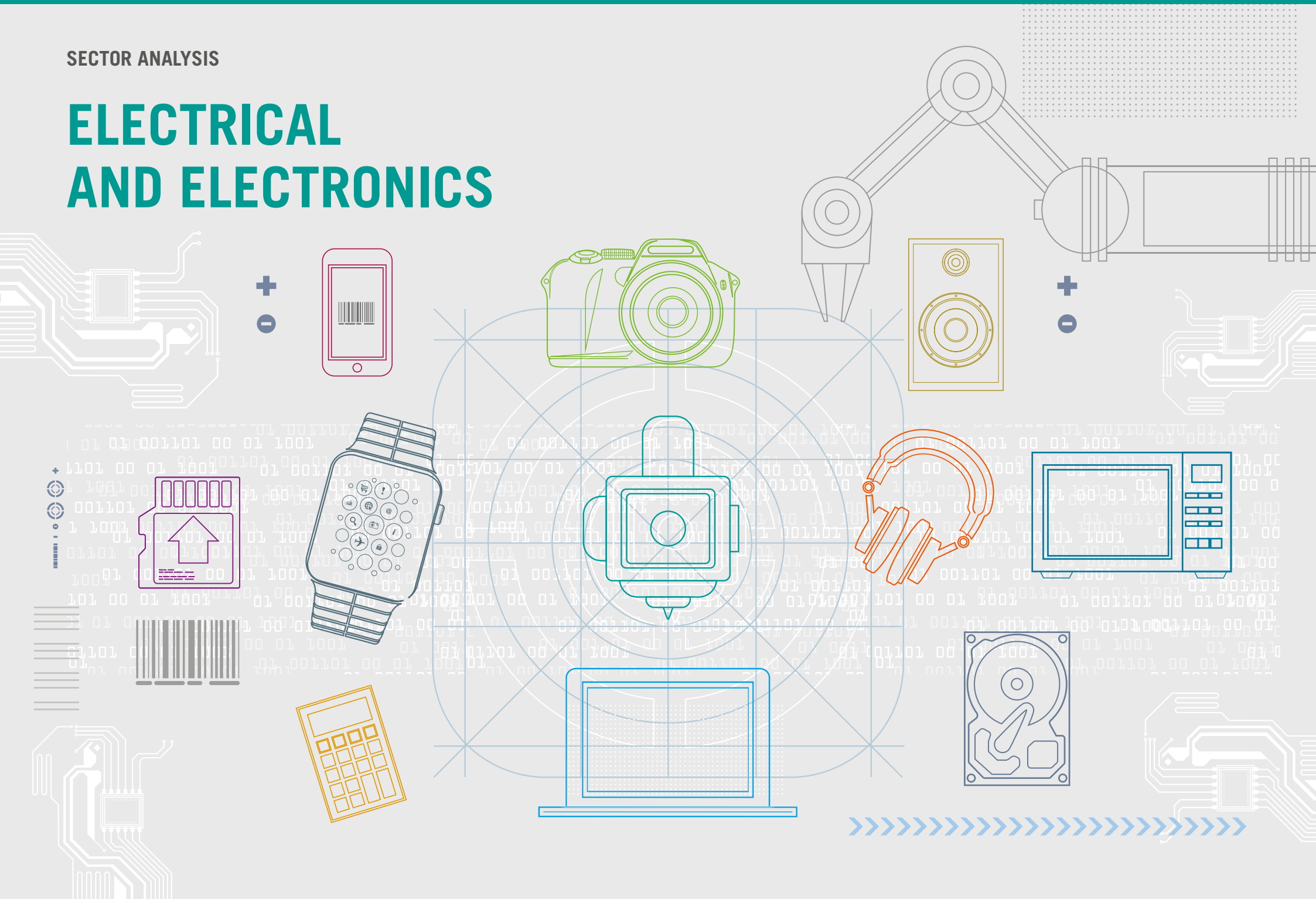
IMPACT ON ENTERPRISES AND PEOPLE

- Robots are replacing lower-skilled jobs
- The industry needs new types of higher-skilled workers who are difficult to find
 - Increased need for engineers with specialized knowledge on automation and robotic programming
 - Increased demand for workers with STEM backgrounds
- The sector needs to rebrand its image among young people and women



SECTOR ANALYSIS

ELECTRICAL AND ELECTRONICS



SECTOR SIGNIFICANCE

ASEAN's E&E directly employs over

**2.5 million
workers**

and exports reached

\$382.1 billion



Regional leaders:
**Thailand,
Malaysia and
Singapore**
(beyond ASEAN: China)



The E&E sector is becoming

increasingly connected

to every economic sector

3 MAIN TECHNOLOGIES IMPACTING THE SECTOR

Robotic automation: replacing simple tasks

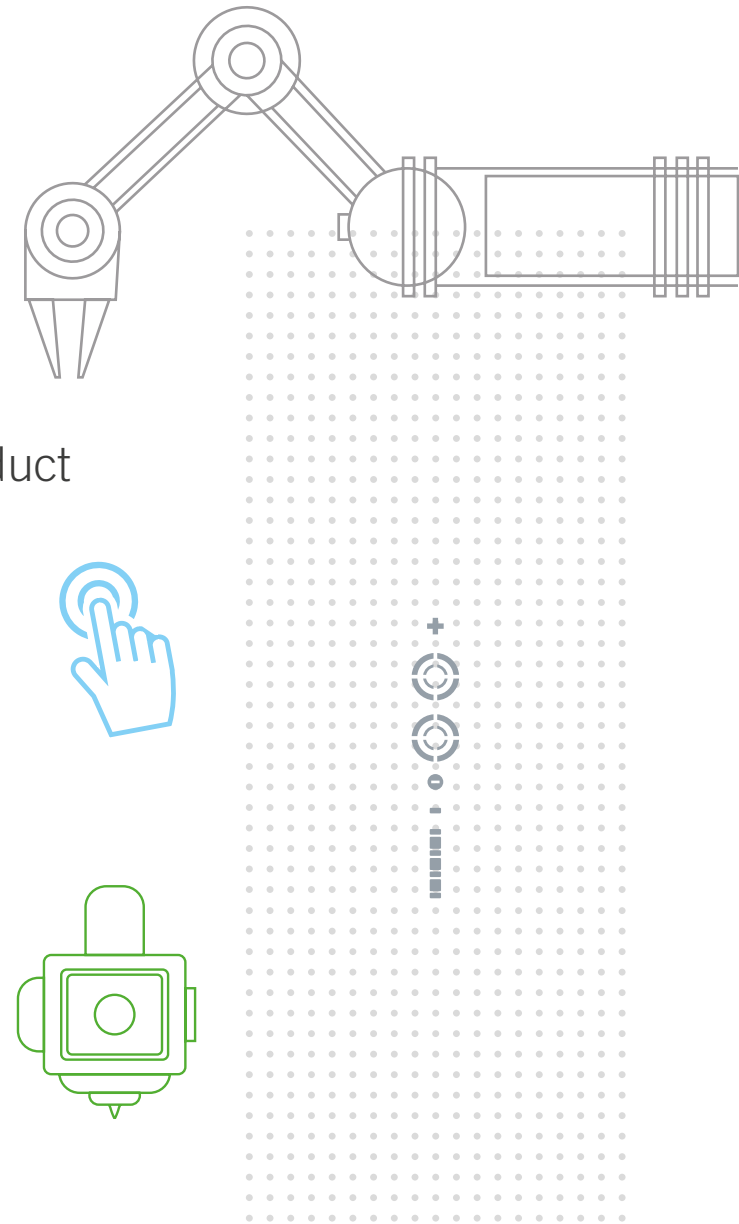
- Foxconn: replaced 60,000 workers with robots in one factory
- But poor execution of automation can be costly
- Robots today are not sufficiently flexible to account for short product development cycles and product lifespans

The IoT: presents a major growth opportunity for the entire sector

- Demand for sensors, connectivity and memory to increase
- The IoT may increase semiconductor global revenue by 3-4%

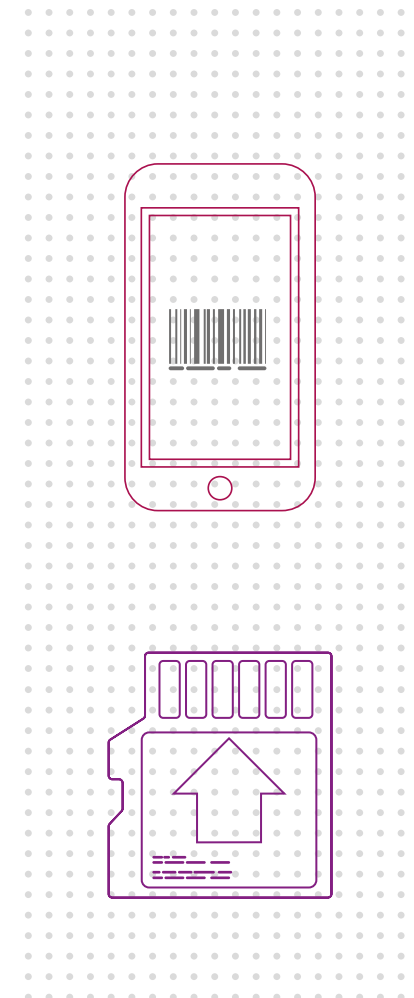
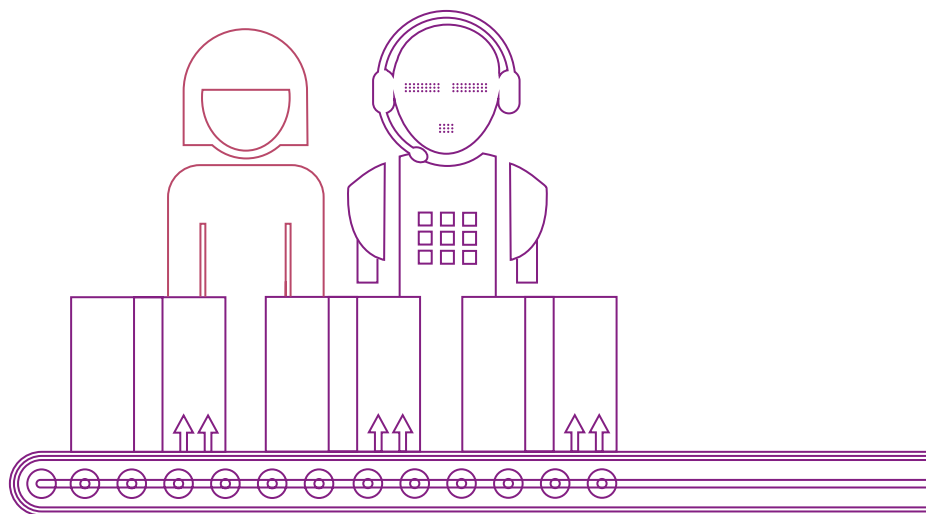
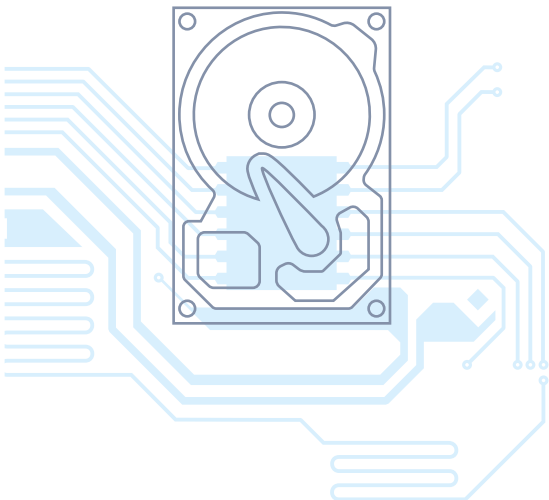
3D printing: currently limited but likely to expand

- 3D printed circuits projected to be available in market by 2018
- 3D production of simple electronic parts will appear first



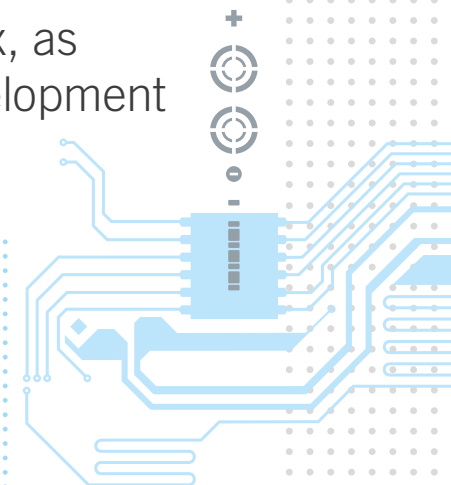
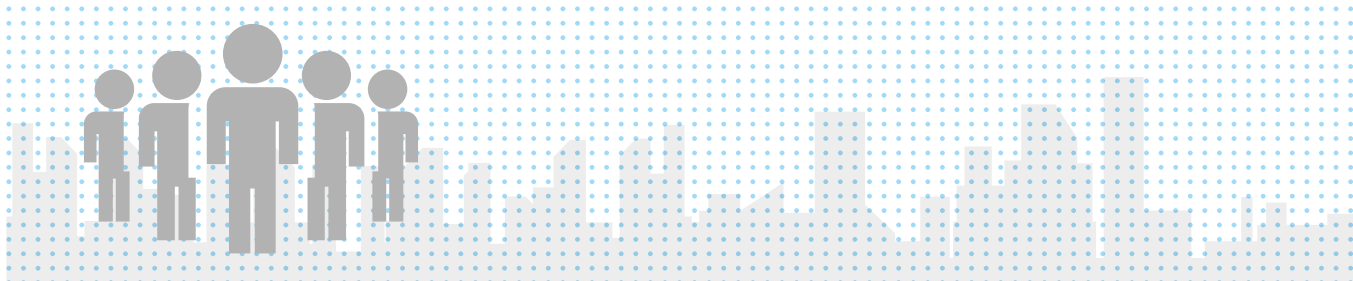
AUTOMATION

- When automation occurs, it is often “human centric”
- The technology aids workers rather than replaces them
- Collaborative robots, or “cobots” perform more repetitive and difficult to perform tasks
- Human workers have advantages in terms of adaptability and perception



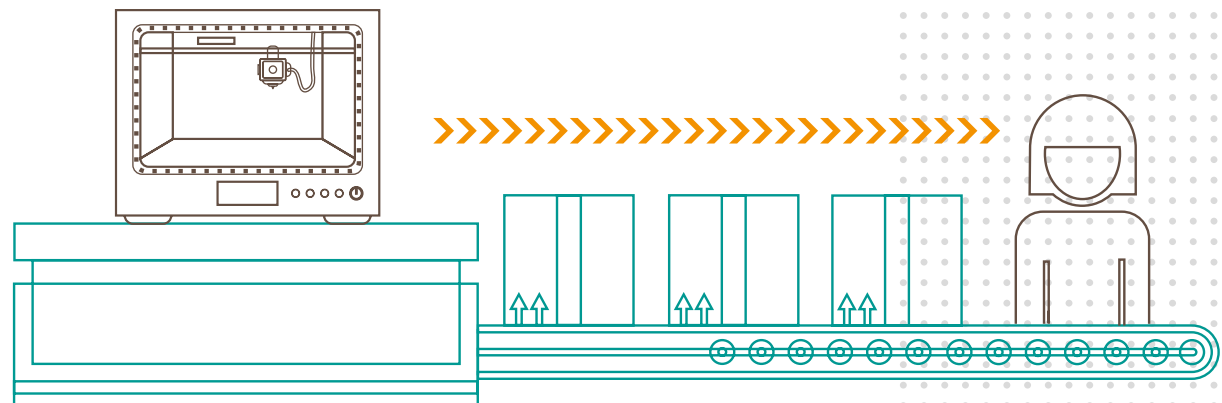
CHINA

- China has the most developed ecosystem and outpaces ASEAN in terms of E&E exports by a large margin
- Total production of selected E&E goods has increased with less people employed
- As China moves up the value chain, ASEAN may reap short-term opportunities by scooping up lower skilled work
- However, relocation decisions from China to ASEAN is complex, as they require large amounts of capital investment for initial development

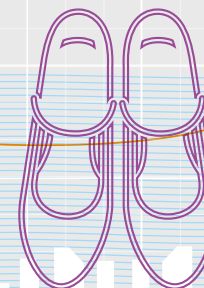
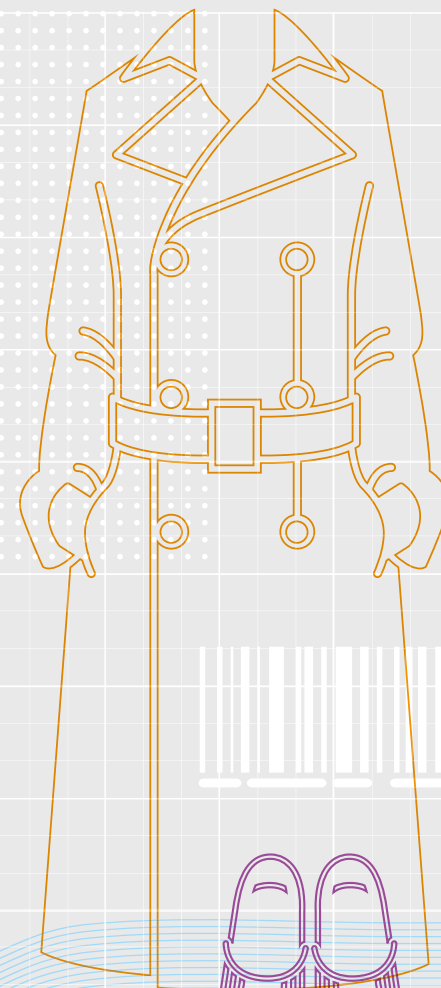
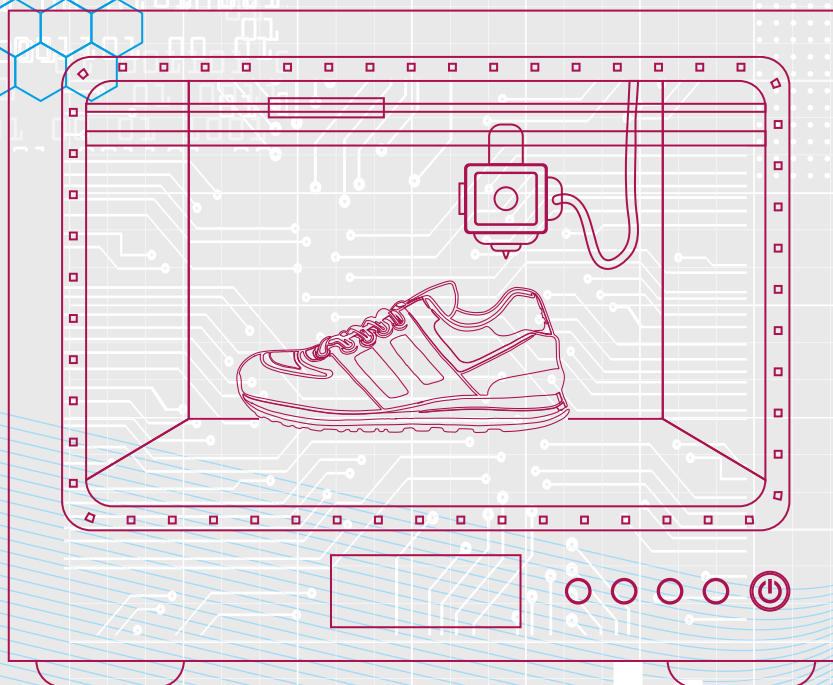
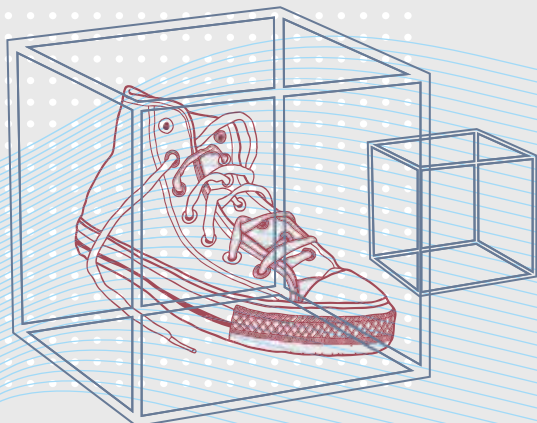
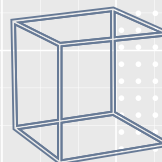
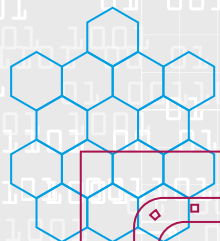


IMPACT ON ENTERPRISES AND PEOPLE

- Automated processes are replacing low-skilled jobs in assembling and packaging
- Production in E&E will be catalysed, encouraging the creation of more innovative products and new jobs opportunities
- Demand for higher skills with strong technical, engineering and science fields will increase
- Workers need to scale up their skills, especially in STEM



TEXTILES, CLOTHING AND FOOTWEAR



SECTOR SIGNIFICANCE

Provides jobs to over

9 million people
in ASEAN,

the majority of whom
are young women

The female share of
employment exceeds

70% in Cambodia, Lao PDR,
the Philippines, Thailand and Viet Nam



While globally, TCF exports are dominated by
China, a number of ASEAN economies like

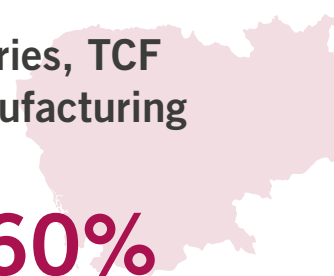


**Indonesia,
Thailand and
Viet Nam**

**join the top rankings
of TCF exports**

In some ASEAN countries, TCF
accounts for high manufacturing
employment

Cambodia 60%



TECHNOLOGICAL DRIVERS

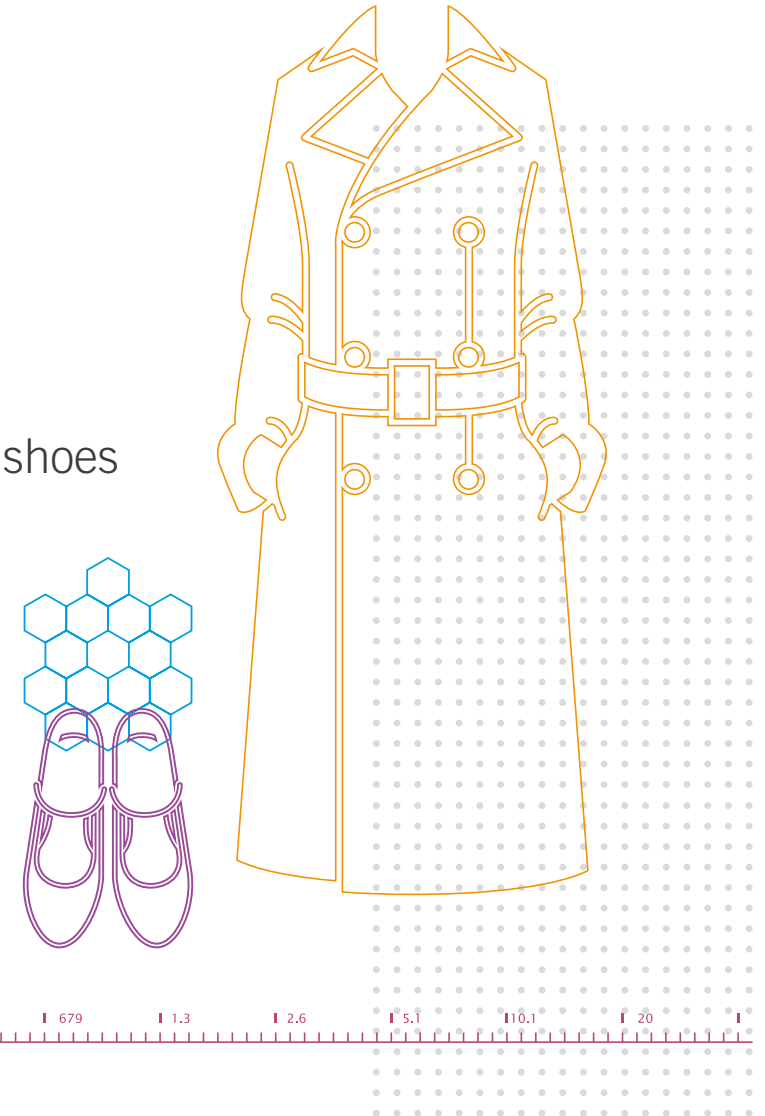
- Increased demand for customization
- Pressure to speed up production to market
- Environmental issues

Knit technology: 80% less waste than typical design for shoes

- Increased need for quality and precision
- Increased need for higher productivity

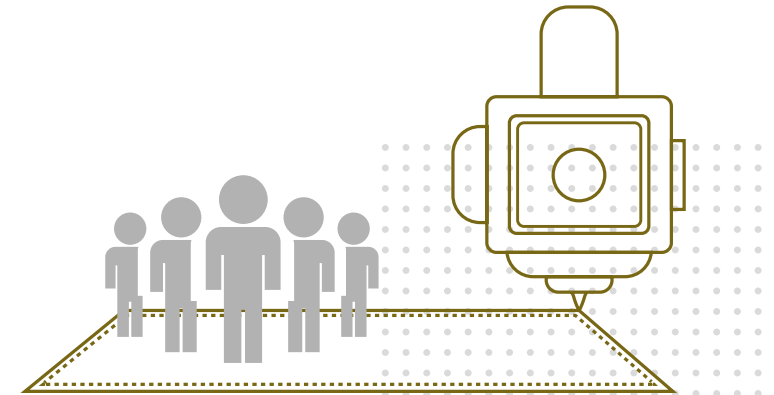
Labour productivity levels in TCF sector is significantly lower than overall manufacturing.

- China may accelerate automation



CHINA

- China monopolizes TCF production globally
 - Textile exports: 31%
 - Clothing exports: 37%
 - Footwear exports: 39%
- Rising labour costs and demographic changes make China less attractive, providing compelling reasons for companies to relocate to ASEAN
- But China has critical competitive advantages:
 - Full vertical supply chain
 - Good infrastructure
 - Higher worker productivity
 - More initiative to improve competitiveness through technology
 - TCF production and exports are increasing with less people employed



MAIN TECHNOLOGIES IMPACTING THE SECTOR

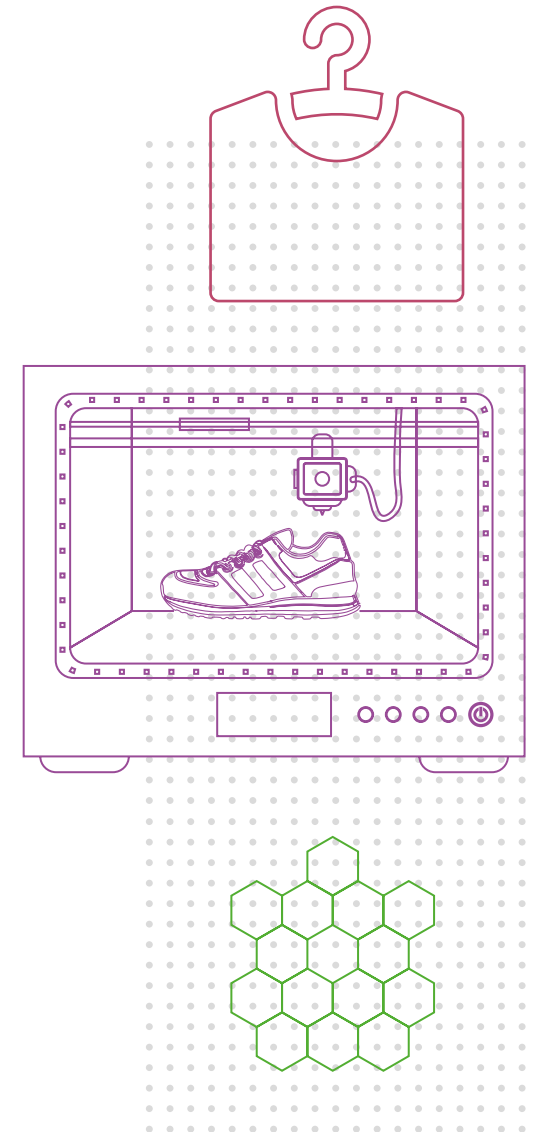
3D printing, body scanning and CAD enable enhanced individualization of apparel.

Smart apparel

- Integrates medical, fitness and wellness features that monitor heart rate, calories burned and other biometric data
- Expected to increase from US\$20 billion in 2015 to US\$70 billion in 2025

Nanotechnology

- Nanoparticles render odour-free, waterproof, UV-blocking or antistatic clothing

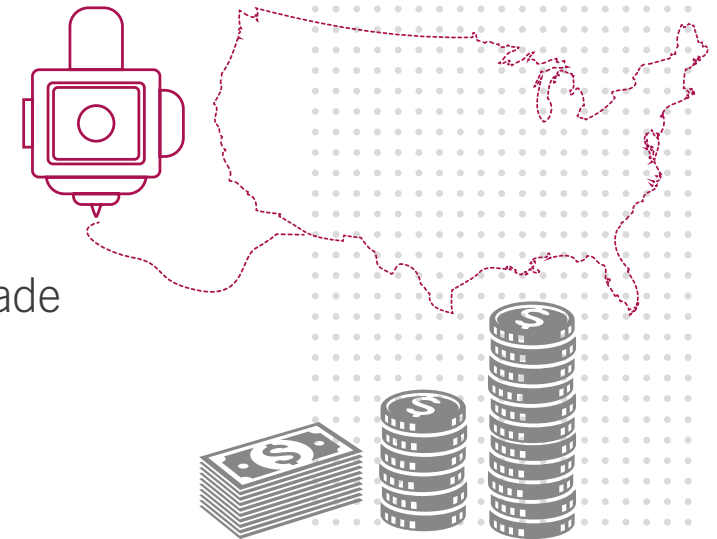


MAIN TECHNOLOGIES IMPACTING THE SECTOR

Robotic automation forms the biggest future threat to both enterprises and workers in ASEAN's TCF sector.

“Sewbots”: robots capable of sewing will change the calculus of apparel production

- Enable reshoring of production closer to destination market
- US sees immediate saving of using sewbots in 2016 of about US\$180,000 over 5 years
- China sees considerable savings if investment in sewbots are made in 2020 (robots are 50% cheaper)

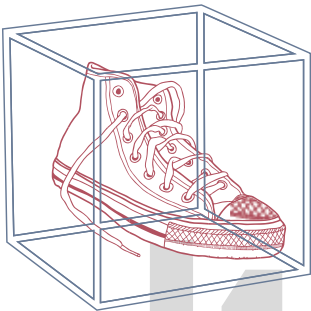


IMPACT ON ENTERPRISES AND PEOPLE

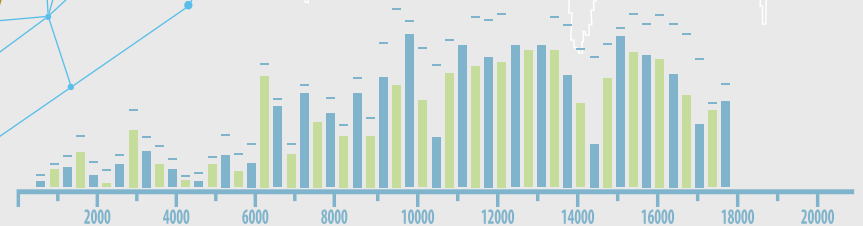
- Immediate term: better skilled production-line workers required
- Of all the sectors analysed, TCF is at highest risk of displaced workers.

This risk disproportionately affects female workers

- Enterprises lack higher skilled workers who can manage technology: more engineers and technical experts with backgrounds in medical science, material science and electronics needed



BUSINESS PROCESS OUTSOURCING



SECTOR SIGNIFICANCE

BPO in the Philippines grew
from technology and connectivity:

**GDP contribution
to reach 7% in 2016**



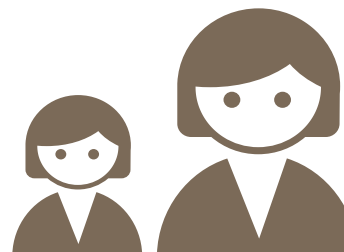
**In 2014, over
1 million workers**

were employed, mostly young graduates

Women comprise of

59%

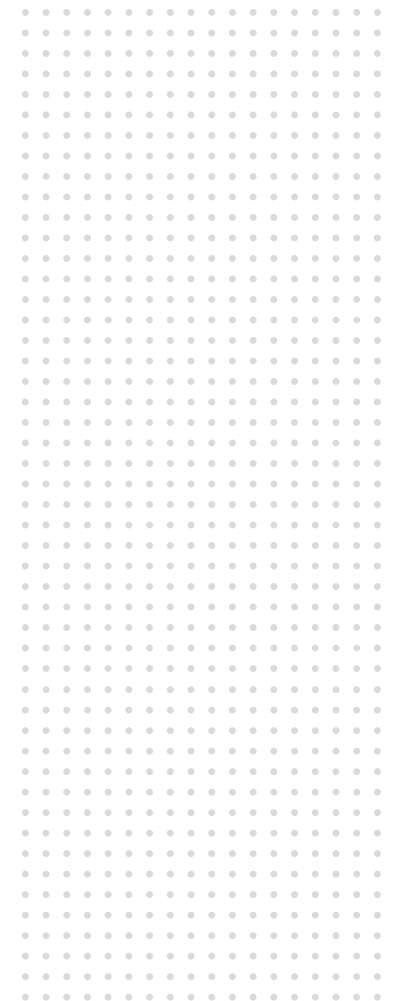
of the workforce



Call centres
(voice work)
account for

60%

of BPO employment



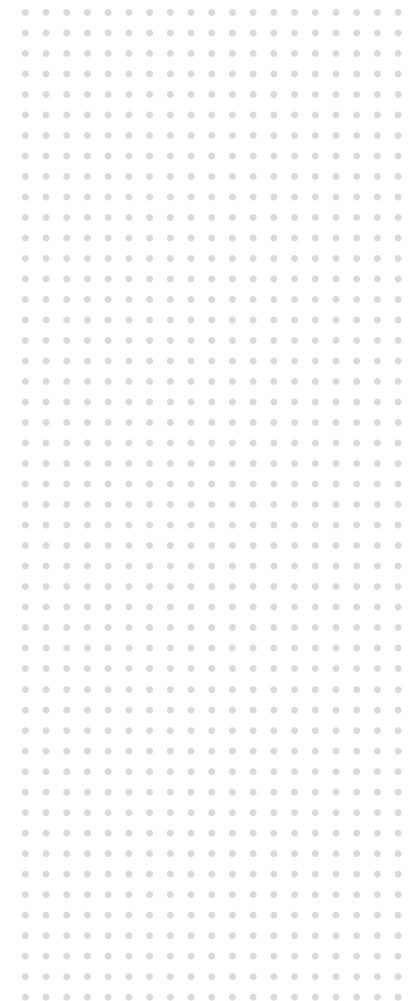
TECHNOLOGICAL DRIVERS

- Make BPO services accessible to SMEs
- Increased need for greater productivity and accuracy
- Higher value service

Improving customer experience through multiple channels,
such as Twitter and SMS

- Benefits of labour arbitrage using outsourced BPO services
is around 15-30%

Cost reduction achieved through automated technology
is around 40-75%



2 MAIN TECHNOLOGIES IMPACTING THE SECTOR

Cloud computing:

- Makes BPO services accessible to SMEs, presenting a growth opportunity

Software robots, or robotic process automation (RPA), work like human agents:

- RPA can cut down back-office costs 25-50%
- Clients move operations back to their own companies (inshore) rather than outsourcing to the Philippines



IMPACT ON ENTERPRISES AND PEOPLE

- BPO players need to shift services towards knowledge process outsourcing (KPO), processes that require specialized knowledge and skillsets
- These services will require **highly educated employees** with certifications in medicine, business, law, finance, accounting and data analysis
- The Philippines's BPO workers can no longer rely on English proficiency



SECTOR ANALYSIS

RETAIL



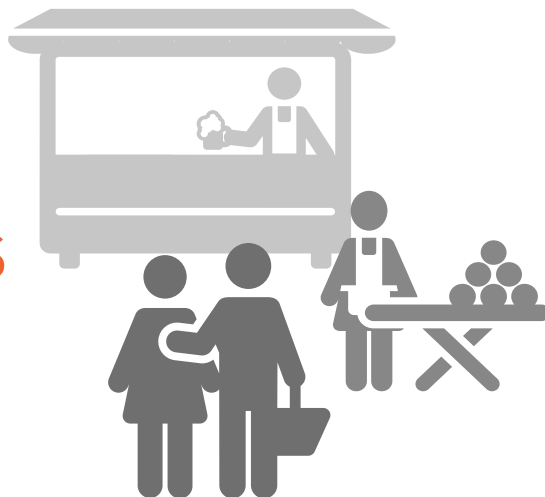
SECTOR SIGNIFICANCE

Local and traditional retail outlets

are the largest channel for retail sales

Retail sales in ASEAN countries accounted for

US\$767 billion
in 2013



Employs a total of
44.6 million
workers



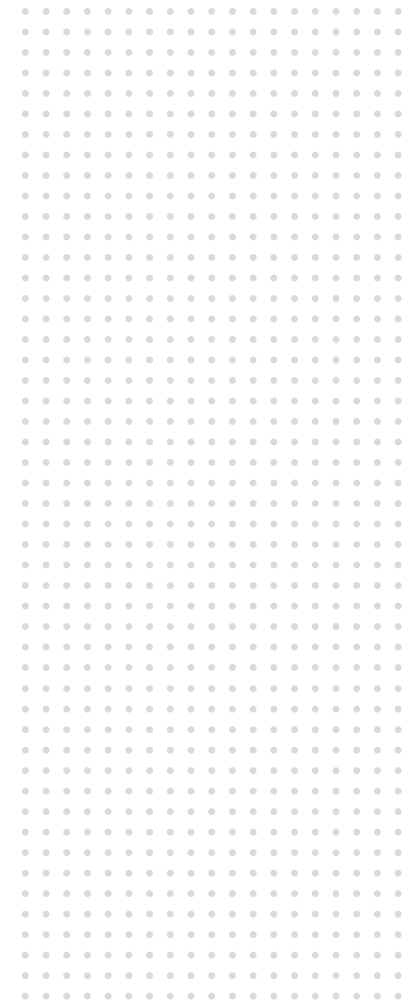
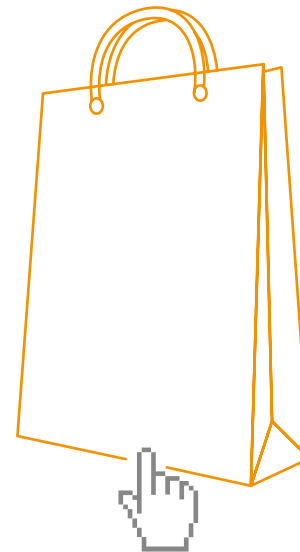
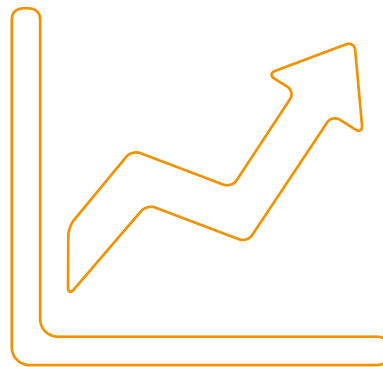
16%
of the region's
total employment



44%
of jobs in the
services sector

TECHNOLOGICAL DRIVERS

- Of the five sectors analysed, ASEAN's retail industry appears to be the least threatened by technology
- However, following factors will provide the push
 - ASEAN is becoming increasingly connected to the Internet
 - Increased urbanization
 - Increasing labour costs

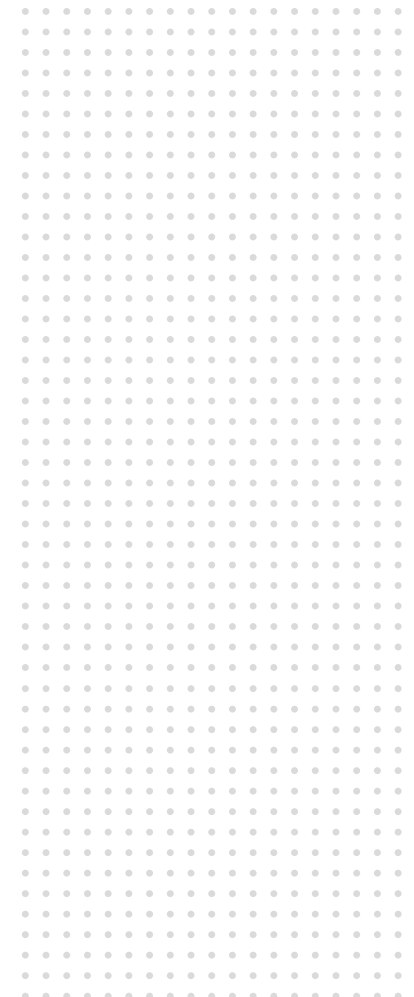


MAIN TECHNOLOGIES IMPACTING THE SECTOR

Mobile and e-Commerce platforms could displace ASEAN's "brick-and-mortar" retail establishment

- Products online can be sold more cheaply
- The spending power of tech-savvy, younger shoppers is increasing
- Currently, e-Commerce has a low share in the ASEAN retail market – less than 1% of all sales

Even in Singapore, e-Commerce accounts for only 3.4% of all retail sales

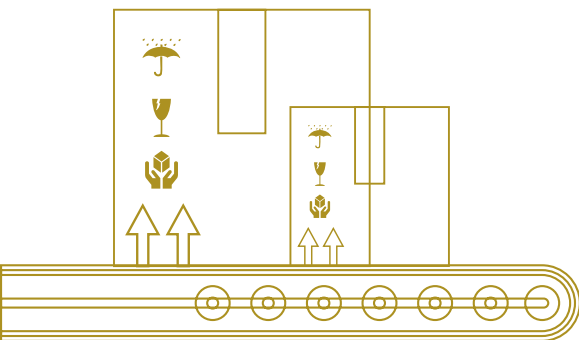
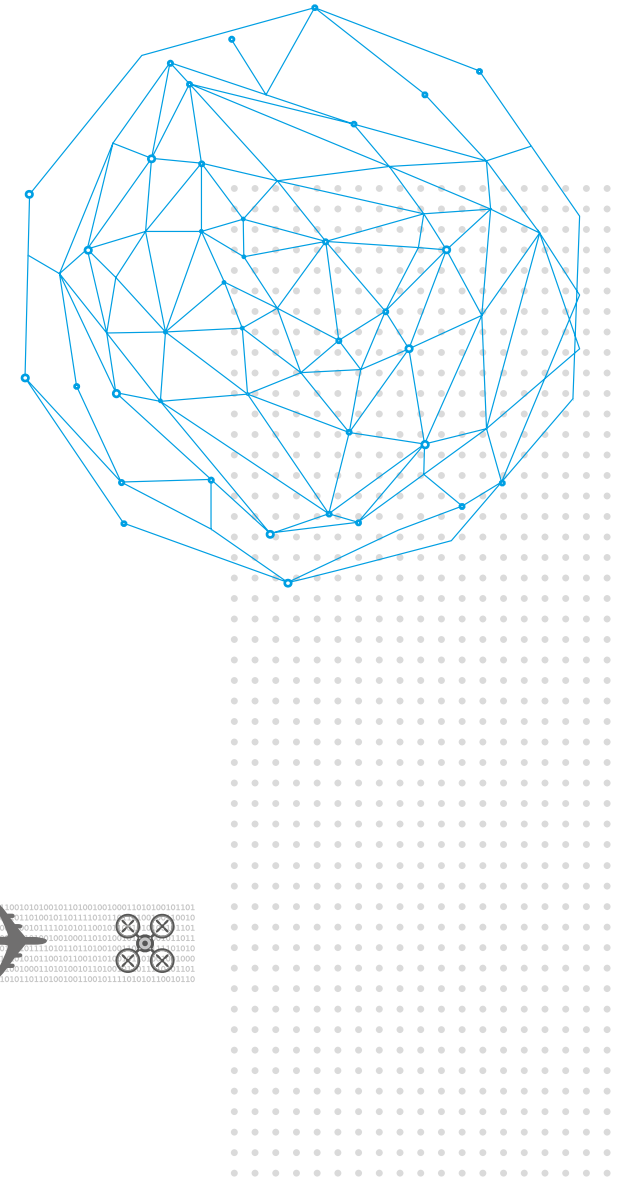


MAIN TECHNOLOGIES IMPACTING THE SECTOR

The **IoT** is converging with other technologies and seen as the most significant disruptor to come.

Combined with **cloud and big data**:

Significant improvements in optimizing inventory management, product tracking and shopping intelligence can be made

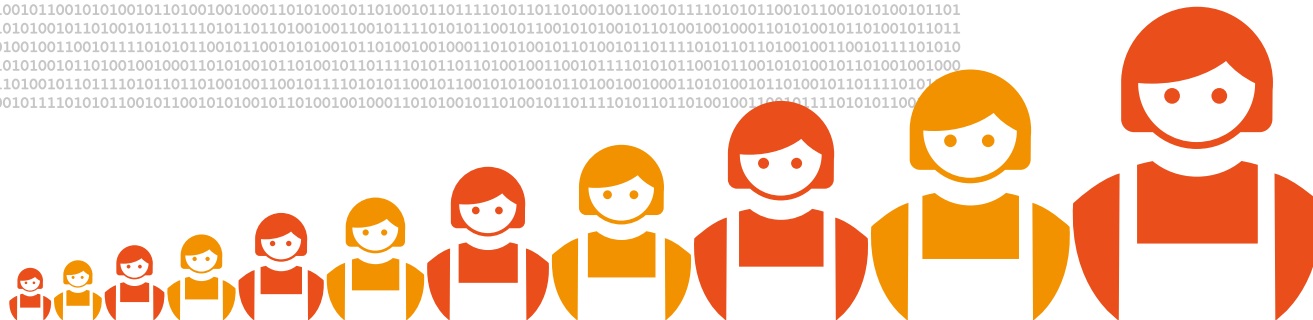


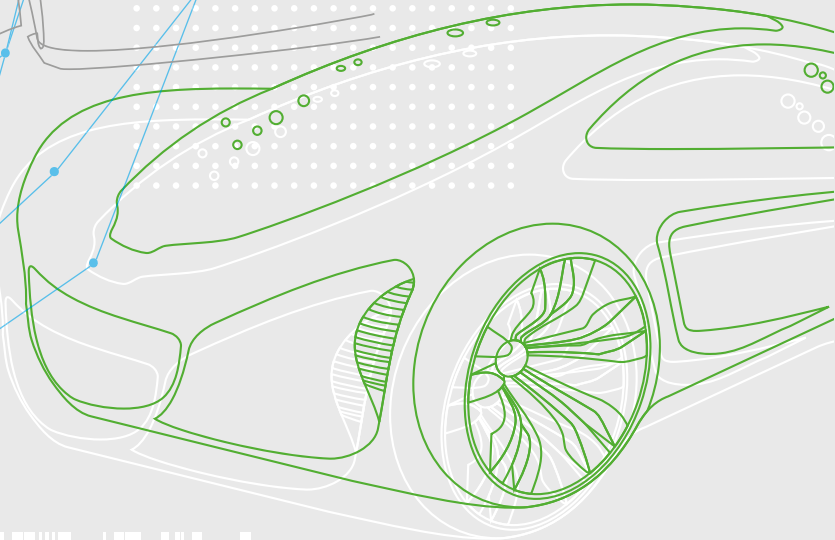
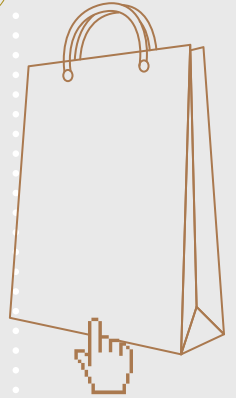
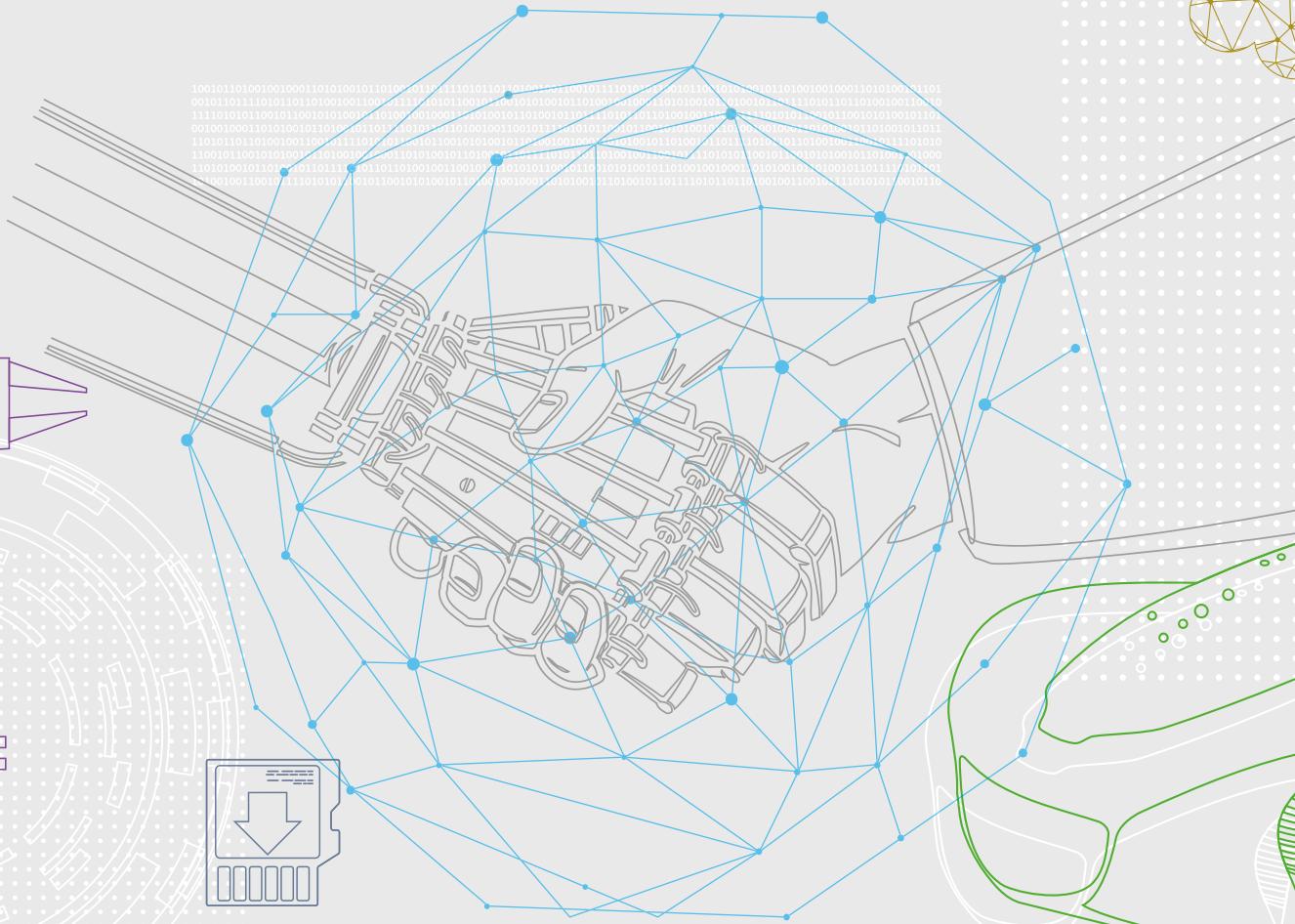
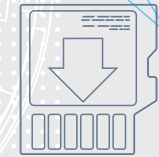
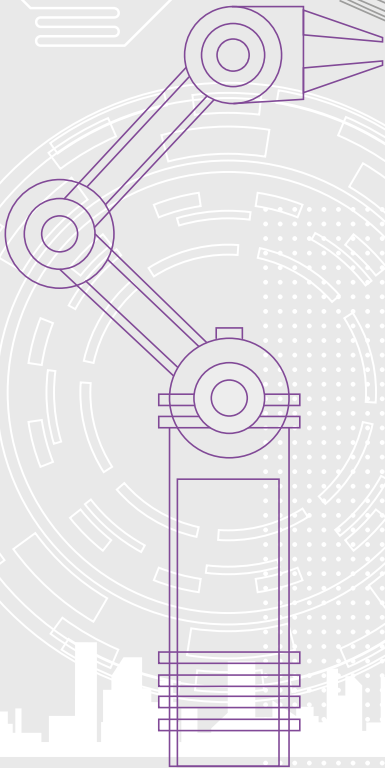
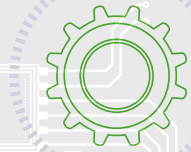
IMPACT ON ENTERPRISES AND PEOPLE

- More than 90% of enterprises agreed that labour and skills requirements will change with adoption of technology in retail
 - Data management skills
 - Digital marketing and social media skills
 - Soft skills
 - In-depth product knowledge
- While no imminent, large scale threats to ASEAN's retail workforce, modern retail outlets – who are leaders of technological upgrading – are expanding aggressively



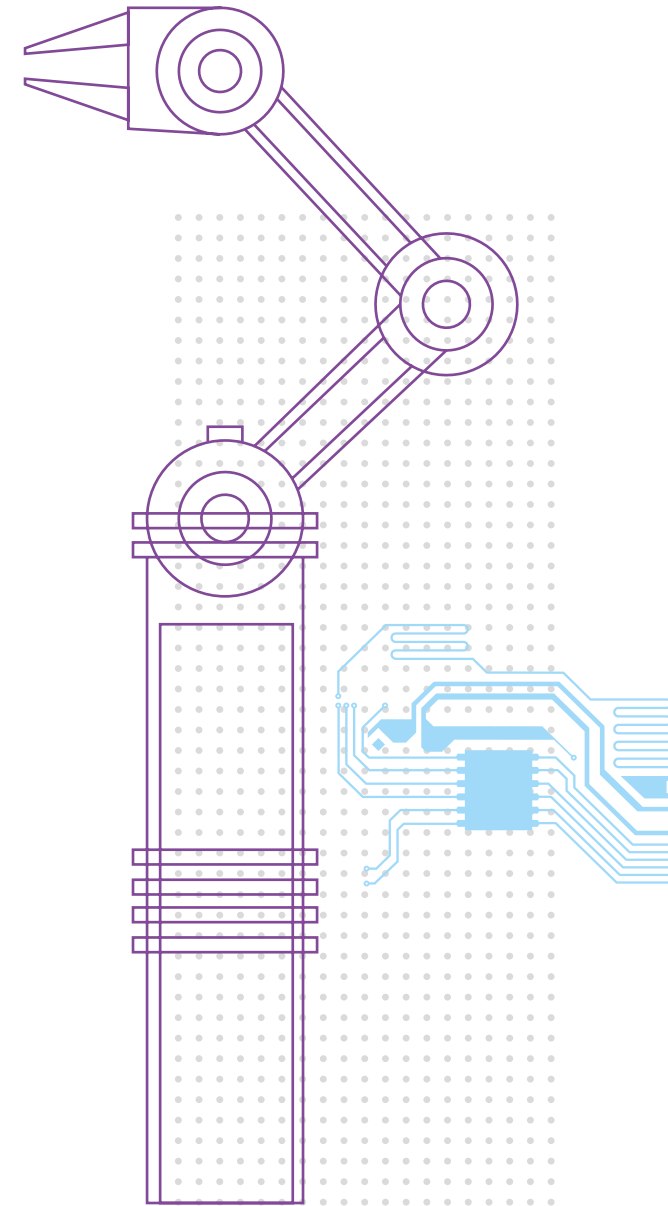
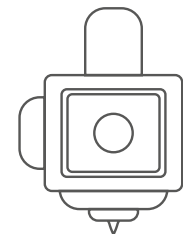
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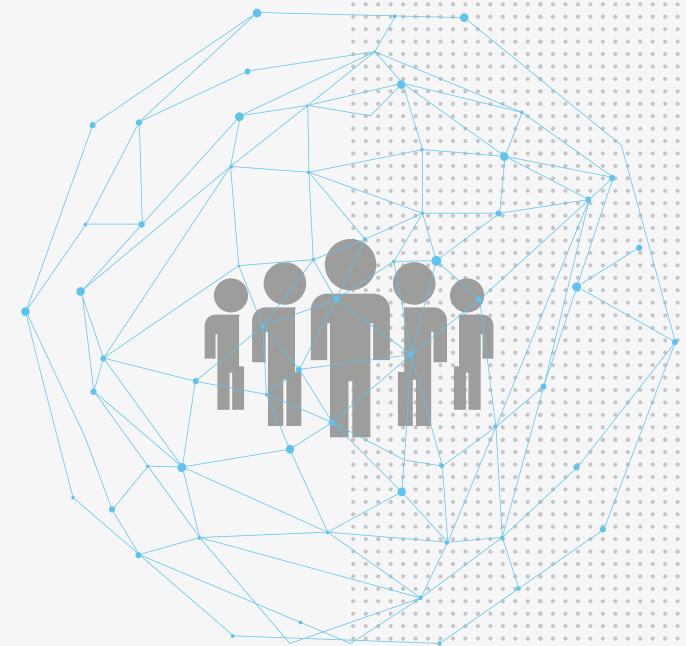
FINAL REMARKS

- Manufacturing production processes are transforming in terms of geography, jobs and efficiency
- Certain sectors and groups will face particular disruption
- Technology will “change” a lot of jobs rather than “replace” them
- Making skills, training and education systems “fit for purpose” will require major effort
- Comprehensive multifaceted growth and investment strategies are now required in the technological age



“Progress is not to be measured in technological advancement or innovation, it is to be measured by what we make of the application of that technology or innovation”.

Guy Ryder, Director General, ILO





ACT/EMP
The Bureau for Employers' Activities

Bureau for Employers' Activities (ACT/EMP)

International Labour Office, Route des Morillons 4, CH-1211 Geneva 22, Switzerland

www.ilo.org/employers