

ASEAN IN TRANSFORMATION

HOW TECHNOLOGY IS CHANGING JOBS AND ENTERPRISES

Cambodia Country Brief | April 2017



INTRODUCTION AND OVERVIEW OF CAMBODIA

Cambodia is an emerging economy with a growing manufacturing sector, which is predominantly driven by the textiles, clothing and footwear (TCF) sector.¹ In 2015, Cambodia's gross domestic product (GDP) was US\$18.1 billion, of which TCF manufacturing accounted for 6 per cent.²

In 2015, TCF exports in Cambodia accounted for US\$9.4 billion, after having more than doubled from US\$4.1 billion in 2010. In the same year, Cambodia was the third largest TCF exporter among the Association of Southeast Asian Nations (ASEAN), following Viet Nam (US\$42.2 billion) and Indonesia (US\$16.8 billion).³ The European Union (EU) and the United States are Cambodia's largest TCF export markets, which combined accounted for almost 70 per cent of total TCF exports in Cambodia in 2015.

Cambodia has a total labour force of almost 8 million women and men.⁴ Although agriculture provides about half of total jobs, manufacturing employment has increased and represented 18 per cent of total

¹ This country brief was prepared by Linda Vega Orozco, and benefited from technical contributions from Jae-Hee Chang, Gary Rynhart and Phu Huynh. This country brief is based on ILO: *ASEAN in transformation: How technology is changing jobs and enterprises* (Geneva, 2016).

² IMF: World Economic Outlook Database (Apr. 2016); National Institute of Statistics of Cambodia: National accounts (2015).

³ UNCTAD: UNCTADStat Database (2017).

⁴ Institute of Statistics of Cambodia: Cambodia Socio-Economic Survey (Jan. 2013).

employment in 2012.⁵ The TCF sector is an important source of employment for workers shifting away from informal agricultural jobs into formal manufacturing jobs. Indeed, the TCF sector contributed 60 per cent of all manufacturing employment, or 749,000 jobs in 2012 (figure 1). More than 80 per cent of the TCF workforce are women, whose incomes are critical to lifting rural incomes. This is because women workers send a considerable share of their incomes to their families in rural areas in the form of remittances. It is worth highlighting that the Cambodian TCF sector is composed of a youthful workforce, with an average age of 25 years.⁶

More generally, across all economic sectors in Cambodia, jobs are evenly distributed between men and women.⁷ Cambodia has a low average workforce age (34.6 years), and about one third of total workers are between 15 and 24 years of age. The country's workforce is characterized by low education and low-to-medium skill levels.⁸ Of total Cambodian workforce, 89 per cent completed primary schooling (or less), while 6 per cent and 5 per cent finished secondary and post-secondary schooling, respectively. Furthermore, about 18 per cent of the workforce is low-skilled, 72 per cent is medium-skilled and 10 per cent is high-skilled.

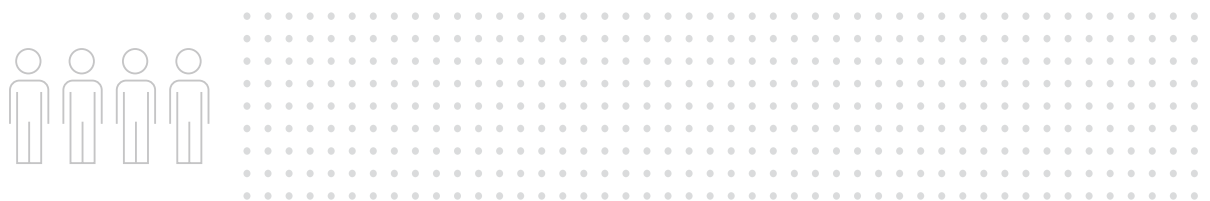
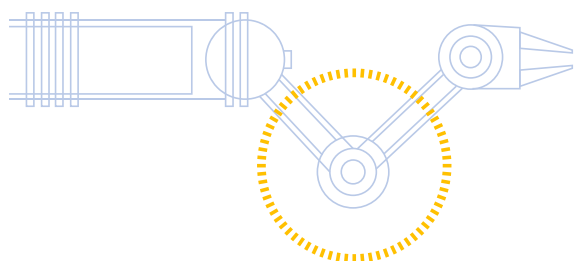
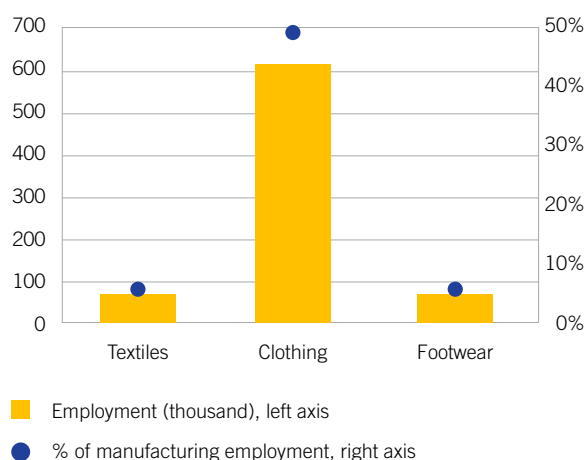


Figure 1. Total employment in TCF sub-sectors (thousand) and share of total manufacturing employment (per cent), Cambodia, 2012



Source: Institute of Statistics of Cambodia: Labour Force Survey (2012)

This country brief highlights the key findings relevant to Cambodia from the series of ILO reports *ASEAN in transformation*, which analyses current technological trends and how they are transforming enterprises and skills requirements across five major manufacturing and services sectors in the region.⁹ The regional research was complemented by surveys conducted with 4,076 enterprises and 2,747 university and technical vocational education and training (TVET) students in the ten ASEAN Member States. This Cambodia brief focuses on technology dynamics in the TCF sector as it is the main manufacturing sector that is likely to be impacted by technological advances in Cambodia.

⁵ Institute of Statistics of Cambodia: Cambodia Socio-Economic Survey, op. cit.; ILO: *ASEAN in transformation: The future of jobs at risk of automation* (Bangkok, 2016).

⁶ ILO: *ASEAN in transformation: How technology is changing jobs and enterprises*, op. cit.

⁷ ILO: *ASEAN in transformation: The future of jobs at risk of automation*, op. cit.

⁸ *ibid.* Skill-levels are defined according to the International Standard Classification of Occupations (ISCO). Low-skill occupations consist of elementary occupations; Medium-skill occupations include clerks, service and sales workers, skilled agricultural and fishery workers, craft and related trade workers and plant and machine operators and assemblers; and high skill occupations comprise managers, professionals, and technicians and associate professionals.

⁹ The five manufacturing and services sectors analysed were: automotive and auto parts; electrical and electronic parts; textile, clothing and footwear; business process outsourcing; and retail.

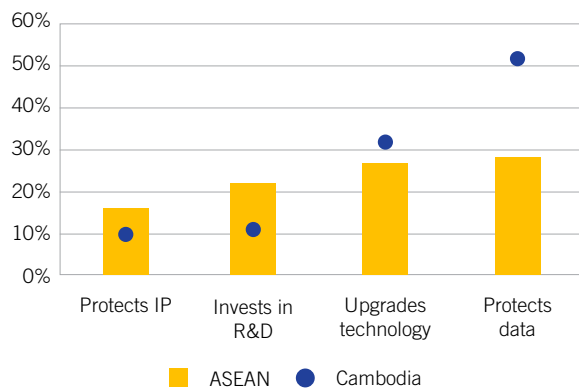
TECHNOLOGY UPTAKE AND ENTERPRISE AND STUDENT OUTLOOK

The enterprise and student surveys in Cambodia were conducted with 304 enterprises and 102 university students.¹⁰ The main findings of surveys applicable to Cambodia are highlighted below. Cambodia specific findings are compared to ASEAN regional findings.

Enterprises barriers to technological uptake

Cambodian enterprises were asked whether they conducted technology related activities (figure 2).

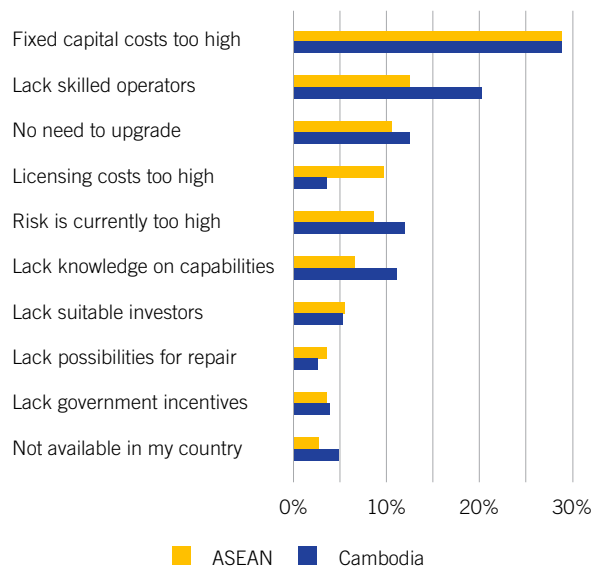
Figure 2. Which of the following does your enterprise currently do?



Source: Adapted from ILO: *ASEAN in transformation: Perspectives of enterprises and students on future work* (Bangkok, 2016).

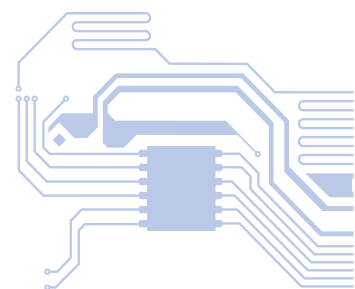
Of the total enterprises surveyed in Cambodia, 51 per cent reported protecting data and 31 per cent said they delegated responsibility for upgrading technology. These results are higher than the ASEAN averages of 28 per cent and 27 per cent, respectively. By comparison, Cambodian enterprises underperformed the region in terms of investing in research and development (R&D) and protecting intellectual property (IP), as only 10 per cent of enterprises reported doing both. This share is lower than the ASEAN average investing in R&D (20 per cent) and protecting IP (16 per cent).

Figure 3. What is currently the single biggest barrier your enterprise faces to upgrade its technology?



Source: Adapted from ILO: *ASEAN in transformation: Perspectives of enterprises and students on future work*, op. cit.

Enterprises in Cambodia face a number of barriers to upgrading technology (figure 3). Similar to the results for ASEAN as a whole, around one in four enterprises in Cambodia cited high fixed capital costs as the leading obstacle. Critically, one in five Cambodian enterprises chose the lack of skilled workers to operate the technology as the second largest barrier, compared to one in eight enterprises across ASEAN. This finding highlights significant skills gaps in Cambodia resulting from low education levels among the Cambodian workforce compared to ASEAN workforces in general. Enterprises in Cambodia also reported that technology did not need to be upgraded. This could be related to the fact that wage levels in Cambodia are relatively low compared to other countries in the region, and technology is perceived as being expensive. These findings, however, could change in the near future as technology costs decline while labour costs increase.

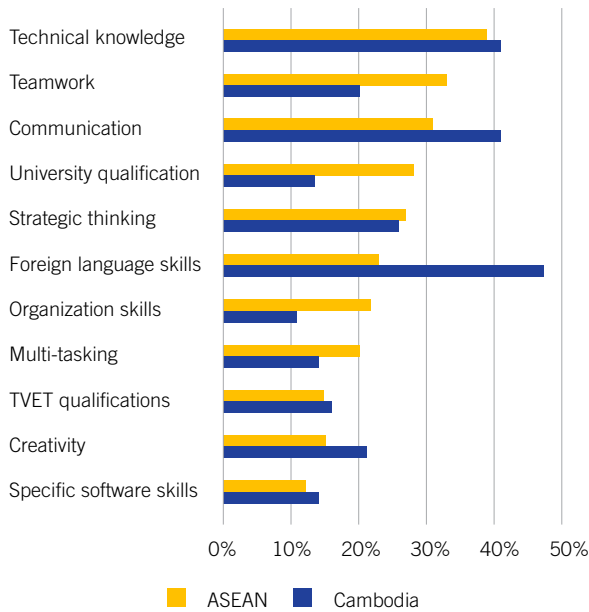


¹⁰ The ASEAN student sample was composed of 625 TVET students. However, no TVET students were surveyed in Cambodia.

Critical skills and enterprise future outlook

The survey gathered insights into the most critical skill requirements for enterprises (figure 4).

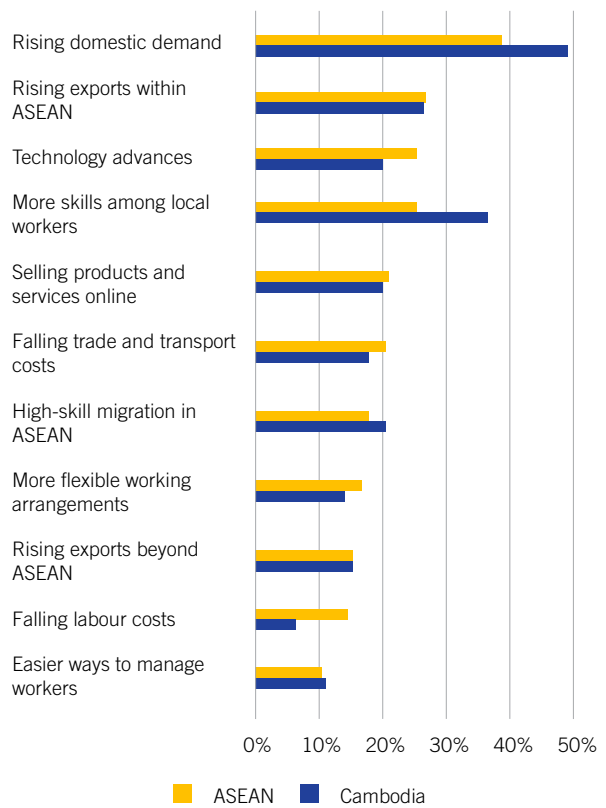
Figure 4. Which type of skills are currently the most critical for your enterprise?



Source: Adapted from ILO: *ASEAN in transformation: Perspectives of enterprises and students on future work*, op. cit.

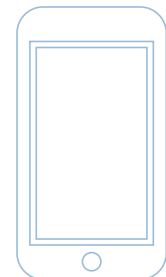
ASEAN enterprises overall cited a mix of hard skills such as technical knowledge combined with soft skills such as teamwork and communication as the most important. Conversely, Cambodian enterprises identified foreign language skills as the most important skill for their enterprises, and listed communication and technical knowledge as the second and third most critical skills, respectively. These results point to the need to balance soft and hard skills, and advance foreign language skills due to opportunities arising from increased integration with both ASEAN and non-ASEAN countries.¹¹

Figure 5. Which do you perceive are the biggest opportunities facing your enterprise up to 2025?



Source: Adapted from ILO: *ASEAN in transformation: Perspectives of enterprises and students on future work*, op. cit.

Looking ahead to 2025, enterprises across ASEAN foresee the biggest opportunities arising from expanding markets, both domestically and within the region, as well as technological innovations (figure 5). Enterprises in Cambodia highlighted rising domestic demand, higher skill levels among the local workforce and rising exports within ASEAN as the three important opportunities for their businesses up to 2025.

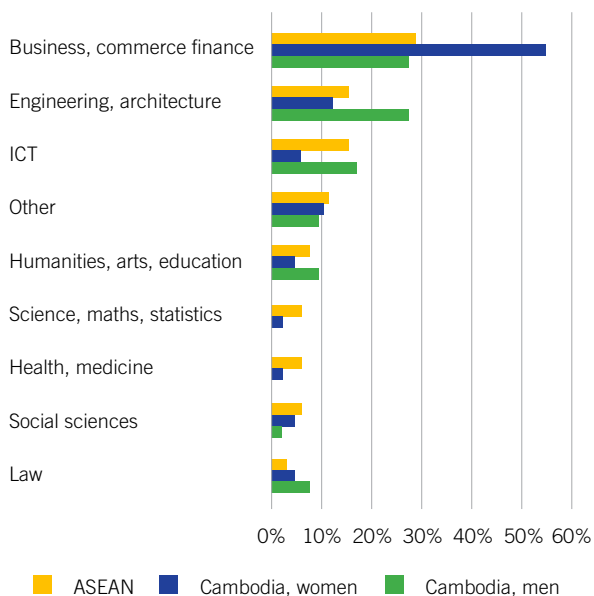


¹¹ Foreign enterprises have increasingly relocated to Cambodia. In 2010, for example, foreign enterprises from China, the Republic of Korea and Viet Nam registered in Cambodia increased by 42 per cent compared to 2009 (Kunmakara, M: Foreign firms entering Cambodia increase (5 Aug. 2010).

Students future outlook

The 102 students surveyed in Cambodia came from a diverse range of academic fields (figure 6).

Figure 6. What is your main field of study?



Source: Adapted from ILO: *ASEAN in transformation: Perspectives of enterprises and students on future work*, op. cit.

The leading discipline was business, commerce and finance (27.8 per cent for men and 54.2 per cent for women). For Cambodian men, other prominent areas of study included engineering (27.8 per cent) and information, communications and technology (ICT) (16.7 per cent). For Cambodian women, the second and third most common fields of study were engineering (12.5 per cent) and ICT (6.3 per cent). The proportion of Cambodian students who pursued science, technology, engineering and mathematics (STEM) degrees was significantly higher among men (27.8 per cent) than women (14.6 per cent).¹² These gender disparities in STEM uptake are associated with potential disadvantages that Cambodian women may encounter when entering the job market.

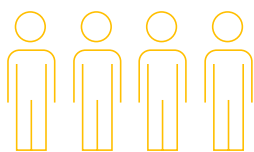
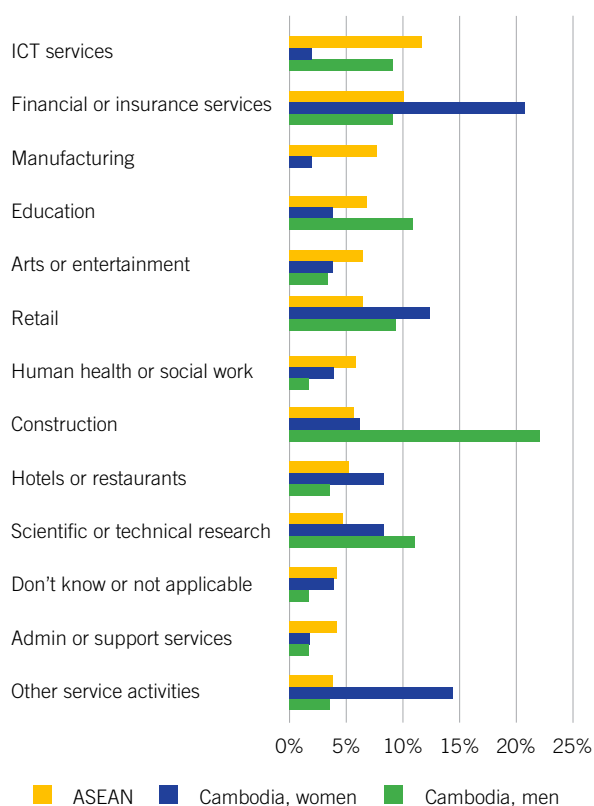


Figure 7. In which economic sector would you ideally want to work when choosing your first employment after graduation?



Notes: seven economic sectors accounting for shares lower than 4 per cent across ASEAN were not included in figure 7. These sectors were agriculture, forestry or fishing; mining and quarrying; public administration or defence; real estate activities; supply of electricity or gas; transport or storage services; and water or waste management.

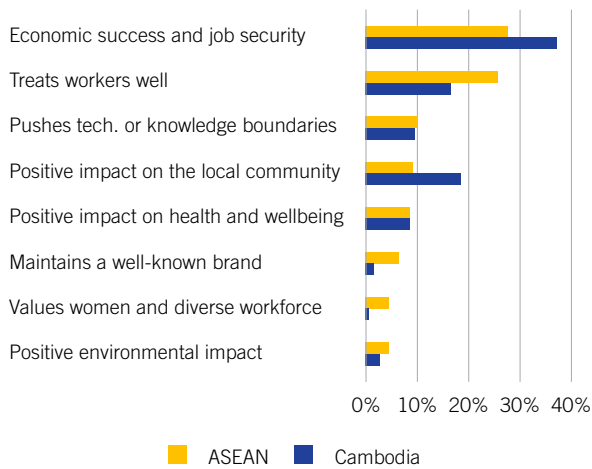
Source: Adapted from ILO: *ASEAN in transformation: Perspectives of enterprises and students on future work*, op. cit.

Students were also asked to identify the sector in which they most wanted to work after graduation (figure 7). Among Cambodian women, the most desired sectors for employment were financial or insurance activities (20.8 per cent), non-specified service activities (14.6 per cent) and retail (12.5 per cent). Among Cambodian men, the three most popular employment sectors were construction (22.2 per cent), scientific or technical research (11.1 per cent) and education (11.1 per cent). Conversely across ASEAN, the three most preferred employment sectors were ICT services (11.9 per cent), financial and insurance activities (10.2 per cent) and manufacturing (7.8 per cent)



¹² ILO: *ASEAN in transformation: Perspectives of enterprises and students on future work*, op. cit.

Figure 8. What is the most important factor for a company's reputation?



Source: Adapted from ILO: *ASEAN in transformation: Perspectives of enterprises and students on future work*, op. cit.

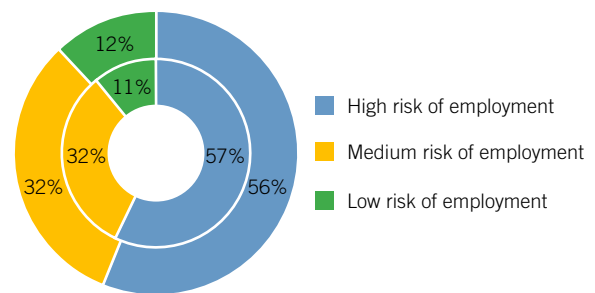
The student survey also asked respondents the most important factor for a company's reputation (figure 8). About 28 per cent of students across ASEAN and 37 per cent of students in Cambodia cited economic success and job security as the most significant aspect. Almost 20 per cent of Cambodian students reported that enterprises' positive impact on the local community was the second most important factor. Additionally, 26 per cent of students across ASEAN prioritized the company's treatment of staff, compared to 17 per cent of students in Cambodia. Similar to the ASEAN trend, students in Cambodia also highlighted the ability to advance technology as an important feature for a company's reputation.

JOBS AT RISK OF AUTOMATION

The ILO assessed what types of occupations in ASEAN-5 have a high probability of being automated.¹³ ASEAN-5 countries refer to Cambodia, Indonesia, Thailand, the Philippines and Viet Nam. These five countries combined comprise 80 per cent of the total workforce in the ten ASEAN member states.

Advances in new technologies could significantly change employment in Cambodia over the next couple of decades. The ILO estimated that 57 per cent of Cambodian workers (or over 4 million jobs) face a high risk of automation (figure 9). This proportion is almost equal to the ASEAN-5 average of 56 per cent, but higher than shares in countries where the workforce is more skilled and educated such as Thailand (44 per cent). Occupations at high risk of automation in Cambodia include stall and market salespersons, street food vendors and crop farm labourers.¹⁴

Figure 9. Distribution of employment at risk of automation



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

Source: Adapted from ILO: *ASEAN in transformation: The future of jobs at risk of automation*, op. cit.

Across all economic sectors in Cambodia, the highest shares of workers at high risk of automation are construction and retail workers accounting for 87 per cent and 81 per cent of the total workforce in their respective sectors. Additionally, the share of manufacturing wage employment in Cambodia facing a high risk of automation is 86 per cent. In the TCF sector, Cambodia's leading manufacturing sector, 88 per cent of jobs are at high risk of being automated. This could impact almost half a million sewing machine operators who primarily perform repetitive and manual tasks.



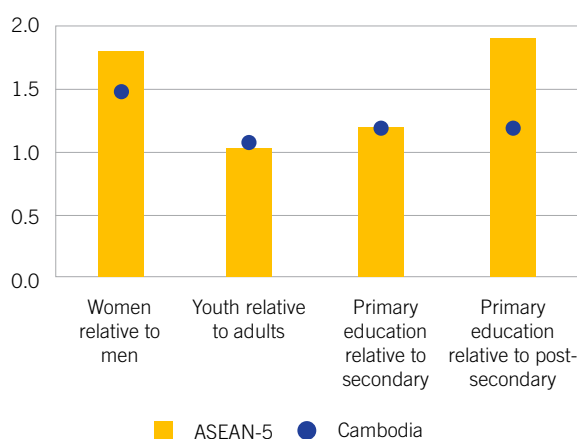
¹³ ILO: *ASEAN in transformation: The future of jobs at risk of automation*, op. cit. This study was conducted by applying a research methodology developed by Carl Frey and Michael Osborne of the University of Oxford. The ILO did not attempt to predict the precise number of jobs that would be automated or displaced, rather it identified the occupations and types of workers facing a high probability of automation over the next couple decades based on the nature of tasks involved.

¹⁴ ILO: *ASEAN in transformation: The future of jobs at risk of automation*, op. cit.

Of the total Cambodian workforce, 32 per cent faces a medium automation risk and 11 per cent faces a low automation risk.¹⁵ These medium-to-low automation shares are almost equal across ASEAN-5. Medium-risk sectors in Cambodia include service activities such as transport and storage, as well as provision of electricity, gas and air-conditioners. Low risk sectors include education and training, professional and technical activities, and human health and social workers. The three occupations at the lowest automation risk in Cambodia are: generalist medical practitioners, secondary education teachers and manufacturing supervisors.

Socio-demographic indicators including sex, age and level of education were also analysed to further understand how workplace automation affects different segments of the workforce, beyond the main occupations and sectors (figure 10).

Figure 10. Probability of occupying a high-risk, automatable job by gender, age and education levels



Source: Adapted from ILO: *ASEAN in transformation: The future of jobs at risk of automation*, op. cit.

Automation risk is likely to significantly impact specific segments of workers including women, young workers aged 15 to 24 and primary school graduates. Cambodian women are 50 per cent more likely to be employed in an occupation at high risk of automation compared to men. Young Cambodian workers aged

15 to 24 are 10 per cent more likely to having an occupation at high risk relative to adult Cambodian workers. Moreover, primary school graduates are 20 per cent more likely to be in a high risk occupation than post-secondary graduates. The aforementioned automation probabilities reveal that automation could have a major impact on the majority of Cambodian workers. Workers with lower education levels tend to perform manual and repetitive tasks that are automatable in nature; and as it was mentioned earlier, 89 per cent of the Cambodian workforce completed primary schooling (or less).

Probabilities of high automation risk in Cambodia by gender, age and education levels are similar to those in ASEAN-5. In Cambodia and across ASEAN-5, there is a strong negative correlation between both education and wages with automation risks, as low-skilled workers who earn lower average wages face higher probabilities of automation.

IMPACT OF TECHNOLOGY ON THE TCF SECTOR

Highlights of main technological innovations and impacts on the TCF sector are examined below.

TCF manufacturing in Cambodia is predominantly characterized by labour-intensive and low-skilled production. This sector operates under the Cut, Make and Package (CMP) production system, the entry stage in the international value chain whereby manufacturers carry out labour-intensive production, like cutting fabrics and sewing textiles and apparel. Through the CMP, international buyers provide inputs and product specifications to manufacturers that focus on the manufacturing process.

The Cambodian TCF sector is a traditional sourcing market for international buyers, and is highly integrated into the global market. The Cambodian TCF sector has continuously attracted investment due to its competitive minimum wages, which in 2010 were at US\$61 per month.¹⁶ Nevertheless, wage levels have

¹⁵ Occupations were classified as having low, medium or high risk of automation. These categories corresponded respectively to risk probabilities of 0 per cent to 30 per cent, more than 30 per cent but less than or equal to 70 per cent, and more than 70 per cent.

¹⁶ Minimum wage as of July 2010. See: Ministry of Labour and Vocational Training: Prakas on the minimum wage of textile, garment, and shoe-sewing workers (2010).

increased rapidly in recent years, and in 2017 the monthly minimum wage applicable to TCF workers was US\$153.¹⁷ Furthermore, in the first half of 2016, average monthly earnings of Cambodian TCF workers were estimated at US\$190.¹⁸

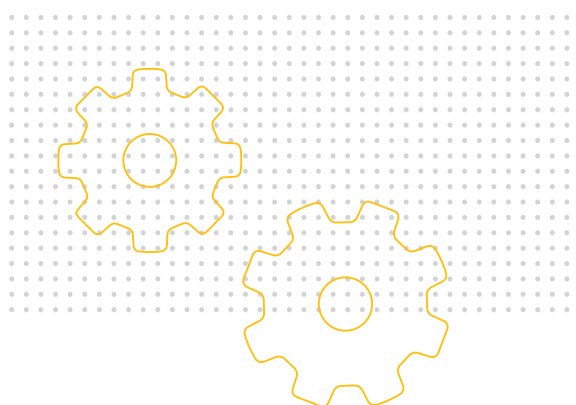
Globally, the main technologies driving the TCF sector are related to product customization technology such as additive manufacturing, body scanners and computer-aided design. Other advances impacting the sector include smart apparel, nanotechnology, automated sewing machines and robotic automation. Automated sewing machines are becoming widely available for TCF manufacturing. These machines are able to automatically sew garments on a continuous basis without human operators.¹⁹ In Cambodia, robotic automation and automated sewing machines are likely to have the greatest impact on TCF enterprises and workers.

Some Cambodian-based TCF enterprises are already redefining production methods through technological innovations in order to improve product quality and workplace productivity. For example, Hung Wah Garment Manufacturing, a supplier for international retailers including H&M and Adidas located in Cambodia, invested in automated machines to eliminate manual labour from dangerous cutting processes. Technology upgrade in the Cambodian TCF sector, however, is primarily occurring in enterprises that are connected to the global value chain, and work for big international retailers. Smaller and locally-owned TCF enterprises in Cambodia would not tend to engage in technology upgrade to the same extent as those fully integrated in the global value chain.

Technology uptake increases the potential for improving productivity in TCF manufacturing. Cambodia's labour productivity in the TCF sector is among the lowest in ASEAN and represents only 22 per cent of the level in Thailand's TCF sector.²⁰ Other challenges specific to the sector include widespread use of old technology, as well as low skills and education levels among the workforce.

Over the medium, TCF production in Cambodia will be impacted by technology uptake both inside and outside Cambodia. Inside Cambodia, enterprises could automate labour-intensive production processes in order to raise labour productivity. Such increased automation will impact on more than 650,000 Cambodian workers whose jobs would be at high risk of automation. The majority of these workers would be young women with low education levels. In terms of skills requirements, growing automation would increase the demand for technicians and high-skilled workers to operate new machinery.²¹

Outside Cambodia, technology adoption by TCF enterprises could reduce exports of the Cambodian TCF sector. Main destination countries (such as the EU and the United States) and major regional competitors (including China) could increasingly incorporate automation into their most labour-intensive production processes. Besides labour costs, offshoring also entails costs in terms of shipping, duty and reputational risks. If the total cost of incorporating automated sewing machines to automate labour-intensive tasks proves to be more efficient than offshoring, retailers may increasingly reshore TCF production to destination countries from Cambodia. Additionally, technology adoption in TCF factories in countries in other Asian countries would result in less relocation of TCF production to Cambodia, reducing the competitiveness of the TCF sector.



¹⁷ Minimum wage as of January 2017. See: Garment Manufacturers Association in Cambodia: Prakas on Determination of Minimum Wage for Workers/Employees in the Textile, Garment and Footwear Industries for 2017 (2017).

¹⁸ Average monthly wages include allowances and fringe benefits such as a monthly attendance bonus, transportation and accommodation allowances, and a daily meal allowance for overtime (ILO: *Cambodian Garment and Footwear Sector Bulletin*, issue 5 (Jan. 2017)).

¹⁹ ILO: *ASEAN in transformation: Textiles, clothing and footwear: Refashioning the future*, op. cit.

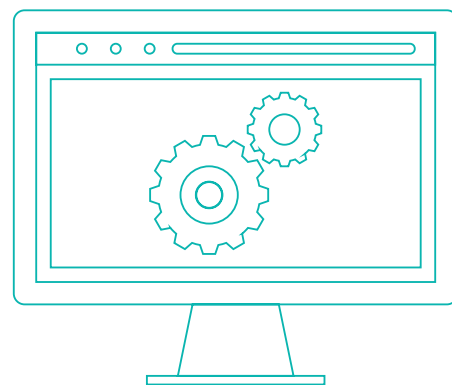
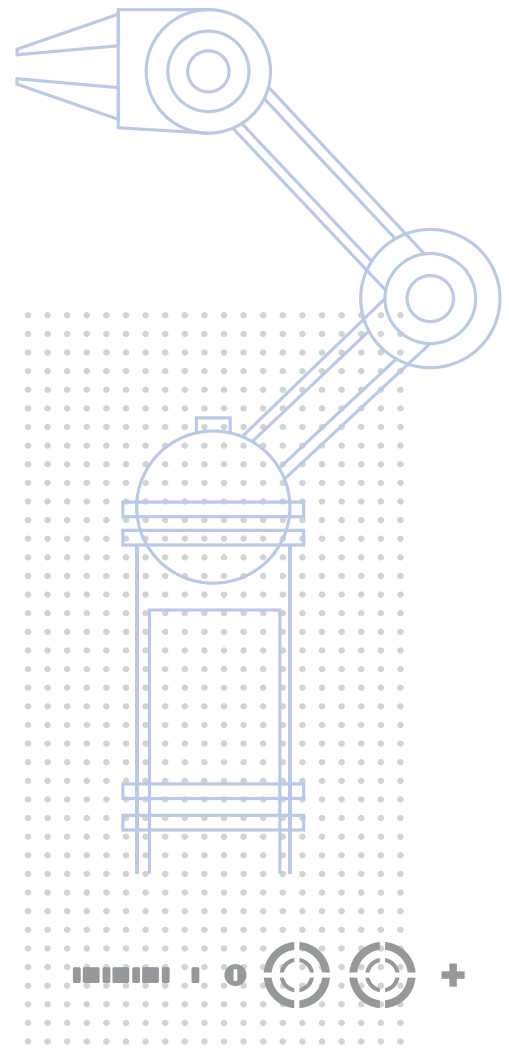
²⁰ ILO: *ASEAN in transformation: Textiles, clothing and footwear: Refashioning the future*, op. cit.

²¹ Institute of Statistics of Cambodia: Labour Force Survey (2012).

SUMMARY

In the next two decades, 57 per cent of the Cambodian workforce faces a high risk of automation. Technological advances across all economic sectors are likely to significantly impact specific segments of the workforce including low-skilled workers, women, youth and less educated workers. About 86 per cent of manufacturing occupations, and 88 per cent of TCF occupations are also at high risk being automated. The transformation of TCF factories in Cambodia is already occurring. Automatic machines and robots are increasing workplace safety, labour productivity and overall product quality by progressively taking on dangerous and manual performed by low-skilled workers.

Worryingly there seems limited awareness of the risks to the Cambodian economy from technological disruption. Robotic automation in Cambodia would increasingly transform jobs and enterprises in the TCF sector. Considering that Cambodia is heavily reliant on this sector, it is important to prioritize economic diversification as well as foster job creation and economic growth in other sectors in order to avoid significant setbacks in socio-economic development. Technological innovations in the TCF sector would also change skill requirements. Enterprises would employ a higher number of high-skilled workers and technicians, and employ fewer low-skilled workers. Given the likelihood of automation in the Cambodian TCF sector, it is critical to foster skills and encourage further education among Cambodian workers. Policymakers, employers and training institutions need to work together in order to improve foreign language skills, technical knowledge, communication and strategic thinking among the workforce. Promoting academic pursuits in STEM is important, particularly among young women who would be greatly impacted by technology uptake in the Cambodian TCF sector.



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