



# **HUMAN CAPITAL DYNAMICS IN CAMBODIA: RETURNS TO SKILLS, TRAINING, AND PRODUCTIVITY**

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# Human Capital Dynamics in Cambodia: Returns to Skills, Training, and Productivity

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## **Table of Contents**

1. Executive Summary
2. Introduction and Background
3. Key Trends in Cambodia
4. Skills Development Policies in ASEAN
5. The Labour Market Trends and Skills Development in Cambodia
6. Methodological Framework for Analyzing Returns to Skills
7. Key Policy Recommendations
8. Annex 1: Key Variables for Skills and Productivity Study in Firm Level Study
9. Annex 2: Literature Review: Enhancing Skills Training for Rural Workers in Vietnam's TCLF Sector
10. Annex 3: Literature Review: VET and Tracer Studies in Asia

## **Executive Summary**

Cambodia's socio-economic development faces significant challenges stemming from a narrow economic base, over-reliance on external forces, and a legacy of human capital deficits resulting from its turbulent past. While the country is positioned to benefit from its first demographic dividend, realizing this potential necessitates addressing critical skill gaps and mismatches in the labor market. Integration into regional and global economies through the Asian Economic Community (AEC) presents both opportunities and risks, requiring a strategic and proactive approach to human capital development. Current TVET systems in Cambodia, while showing signs of improvement, suffer from fragmented governance, inadequate funding, low quality assurance, and a mismatch between training provision and labor market needs. Addressing these shortcomings requires concerted efforts from the government, private sector, and development partners to create a more responsive, efficient, and effective TVET system.

In this study, we will explore the human capital and skills dynamics of the Cambodian labour market in terms of the structural transformation of the domestic economy. The mean and median of educational attainment of workers are only at primary and lower education. It is becoming very critical for the Cambodian economy to develop the human capital development strategies for the next phase of growth to higher value-added GVC activities and transit to upper middle income growth economy by 2050. The Cambodian economy will be graduating from LDC status to developing status in 2029. The study will also explore the skills requirements and human capital development policies for the transition from LDC to developing country status of Cambodia. In particular, the study will explore the skills requirements for undertaking 'double-product transformation'

<sup>2</sup>required for market access to developed countries such as the European Union. The study will examine the returns to skill and impact of training on the productivity of the Cambodian manufacturing and services industries. The study will also focus on sectoral analysis for textiles, garment, and footwear, and key manufacturing activities such as electrical and electronics, chemical, and agro-processing industries. The study will also provide key policy recommendations to map the skills and training framework for the next stage of sustainable and inclusive development of Cambodia.

### **Key Recommendations**

- To overcome the challenges outlined above and capitalize on opportunities presented by regional integration and demographic shifts, the following recommendations are crucial:
- **Strengthen TVET Governance and Coordination:** Establish a clear legal framework for TVET, consolidating oversight and responsibilities under a single authority, fostering better coordination among relevant ministries and stakeholders. Consider a national TVET council to guide policy and strategy.
- **Improve TVET Quality and Relevance:** Implement a competency-based curriculum aligned with industry needs and future labor market demands. Establish a robust quality assurance system, including accreditation and certification mechanisms, to enhance the credibility of TVET programs.

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<sup>2</sup> See footnote 3 on double transformation:

Under the LDC graduation, export products need to undergo two stages of transformation (for example, produce the fabric and sew) as opposed to the “single transformation” rule applicable to LDCs, which enables garment exporters to take advantage of preferential tariffs for garments produced from imported fabric.

- **Increase Access and Equity:** Expand access to TVET, particularly in rural areas and for marginalized groups, addressing geographical barriers and financial constraints through scholarships, subsidies, and flexible training options. Promote lifelong learning opportunities.
- **Enhance Teacher Development:** Invest in training and professional development for TVET instructors, equipping them with modern pedagogical skills, industry expertise, and competency-based assessment techniques. Establish clear career paths and incentives to attract and retain qualified teachers.
- **Strengthen Industry Engagement:** Foster strong partnerships between TVET institutions and the private sector through internships, apprenticeships, and collaborative curriculum development. Establish Sector Skills Councils or similar bodies to bridge the gap between education and industry needs.
- **Diversify TVET Funding:** Develop a sustainable and diversified funding model for TVET, incorporating government budgets, private sector contributions, and innovative financing mechanisms like skills levies, to ensure adequate resource allocation.
- **Improve Labor Market Information:** Develop a comprehensive and reliable labor market information system to anticipate future skill demands and inform TVET planning and curriculum development.
- **Promote Public Awareness:** Conduct targeted public awareness campaigns to enhance the perceived value and quality of TVET, addressing misconceptions and attracting skilled students and employers.

- It is critical to evaluate the ‘returns to skills’ and mapping of skills to current and emerging occupations in the Cambodian labour market to increase the implementation, monitoring and evaluation of policies as the economy emerges from LDC graduation. The next phase of this study will include:
  - Developing the analytical and empirical framework on “returns to skills” at individual and firm level with key monitoring indicators to evaluate and calibrate manpower policies in the Cambodian economy.
  - The tracer study will be undertaken to evaluate the pre- and post-outcomes of the skills training in the Cambodian labour market.<sup>3</sup>
  - Develop key new indicators on the “skills-needs” index at occupational using O-net framework<sup>4</sup>.

By implementing these recommendations, Cambodia can transform its TVET system into a powerful engine for economic growth, social inclusion, and sustainable development, ensuring a skilled and competitive workforce capable of meeting the nation's evolving needs.

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<sup>3</sup> The employee tracer study will be able to identify the returns to skills training of employees to retain and maintain themselves in the labour market in terms of wage increase and promotions. The employers tracer study will be able to identify the relevance of the skills training of workers in terms of wage increase, promotions, and ability undertake more value-added activities in the respective companies.

<sup>4</sup> See labour market forecasting and O-net skills matching framework <https://www.bls.gov/opub/mlr/2021/article/mapping-employment-projections-and-onet-data.htm>

## 1. Introduction and Background

The ASEAN member states are undergoing significant structural transformation since the Asian Financial Crisis of 1997. For the past two decades, ASEAN member states (AMS) are in a structural transformation in improving its productivity and efficiency of domestic economy in terms of shifting to more value-added activities in the global production value chain (GVC), increasing the GVC activities in the service industries and activities, adopting new technologies, and better organisational structures to remain competitive. We are observing ASEAN LDCs of Cambodia, Laos, and Myanmar still being in the low 2<sup>nd</sup> stage unbundling of production process, and developing ASEAN members of Indonesia, Malaysia, Thailand, and Vietnam which are in the higher value-added stage of the 2<sup>nd</sup> stage of unbundling.<sup>5</sup> The developed ASEAN country of Singapore is increasingly in the 3<sup>rd</sup> stage unbundling, and the effects are increasing the intensity of higher value-added global production value-chain (GVC) activities in both the manufacturing and services sectors and shifting Singapore to position itself at higher stage of value-added activities to remain regionally and globally competitive. The key factor for the transition to higher

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Recent evidence indicates East Asia is undergoing both 2<sup>nd</sup> stage of production fragmentation and the 3<sup>rd</sup> stage of unbundling of “people-to-people” linkages and activities in the manufacturing, services and global production value-chain in East Asia (Baldwin, 2011; Kimura, 2018; Kimura, Thangavelu, Findlay, and Chen, 2024). Most of the developed ASEAN countries of Indonesia, Philippines, Thailand and Vietnam are at the middle-stage of 2<sup>nd</sup> unbundling; Malaysia is the later stage of 2<sup>nd</sup> unbundling and ASEAN LDCs of Cambodia and Lao PDR are now at the beginning stage of 2<sup>nd</sup> unbundling. Singapore, the city-state, is already in the beginning stage of 3<sup>rd</sup> unbundling.

In the second stage unbundling, the ICT revolution and technological improvements lowered communication costs leading more production unbundling. We observed greater movement of ideas and more industry-wise division of labour. In the 3<sup>rd</sup> stage unbundling, we will observe further ICT revolution and technological improvements leading to lowering the face-to-face transaction cost and more “people-to-people” transaction. At this stage, economies will experience more “task” based activities and more fragmentation in “skills” and services sector activities. We expect more Business-to-Consumer and Consumer-to-Consumer activities.

value-added activities in the GVC is the development of human capital for sustainable and inclusive economic growth of ASEAN (Thangavelu, 2016, 2017) .

Human capital, generally defined as formal schooling and job training, contributes to economic growth through its impact on productivity of workers and firms, and also in complementing the implementation of new technologies (Bartel and Lichtenberg, 1987). As opposed to general education, on-job training has several added advantages to both firms and workers. This is because firms have the option to select the right type of skills to be upgraded so that the training programmes can enhance their employees' productivity.

However, existing studies suggest that participation in training is mostly concentrated on more educated and well-informed workers, as opposed to more disadvantaged low skilled and older workers (Thangavelu and Wang, 2021). The difference in training participation between skilled and unskilled workers have several important economic implications, such as the widening wage inequality between the skilled and unskilled workers, and the increasing difficulty for low skilled workers to hold onto their jobs in a rapidly changing economic structure. There could also be other impacts such as falling firm-level productivity, labour mobility and the lack of incentive to implement new technologies in the economy.

Cambodia has been addressing the skills and human capital development policies in Cambodia: Skills Development Roadmap, 2030; IDP 2015-2025; T&A Industry ITM; SDF, and MLVT. The Cambodia: Skills Development Roadmap focuses on 5 key pillars: (a) improving the quality of technical and vocational education and training, (b) improving the outreach, (c) industry relevant TVET, (d) good governance and leadership, and (e) sustainable funding.

In this study, we will explore the human capital and skills dynamics of the Cambodian labour market in terms of the structural transformation of the domestic economy. The Cambodian economy is close to the ‘skills-trap’ equilibrium as the mean and median education attainment of its workers are only at primary and lower education. It is becoming very critical for the Cambodian economy to develop the human capital development strategies for the next phase of growth to higher value-added GVC activities and transit to upper middle income growth economy by 2050. The Cambodian economy will be graduating from LDC status to developing status in 2029. The study will also explore the skills requirements and human capital development policies for the transition from LDC to developing country status of Cambodia. In particular, the study will explore the skills requirements for undertaking ‘double-product transformation’ required for market access to developed countries such as the European Union<sup>6</sup>. The study will examine the returns to skill and impact of training on the productivity of the Cambodian manufacturing and services industries. The study will also focus on sectoral analysis for textiles, garment, and footwear, and key manufacturing activities such as electrical and electronics, chemical, and agro-processing industries. The study will also provide key policy recommendations to map the skills and training framework for the next stage of sustainable and inclusive development of Cambodia.

The paper is organized as follows. The next section will focus on key macroeconomic trends of Cambodian economy. In section 3, we discuss the skills development policies in the ASEAN region. The labour market trends and skills development of Cambodia is

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<sup>6</sup> Under the LDC graduation, export products need to undergo two stages of transformation (for example, produce the fabric and sew) as opposed to the “single transformation” rule applicable to LDCs, which enables garment exporters to take advantage of preferential tariffs for garments produced from imported fabric.

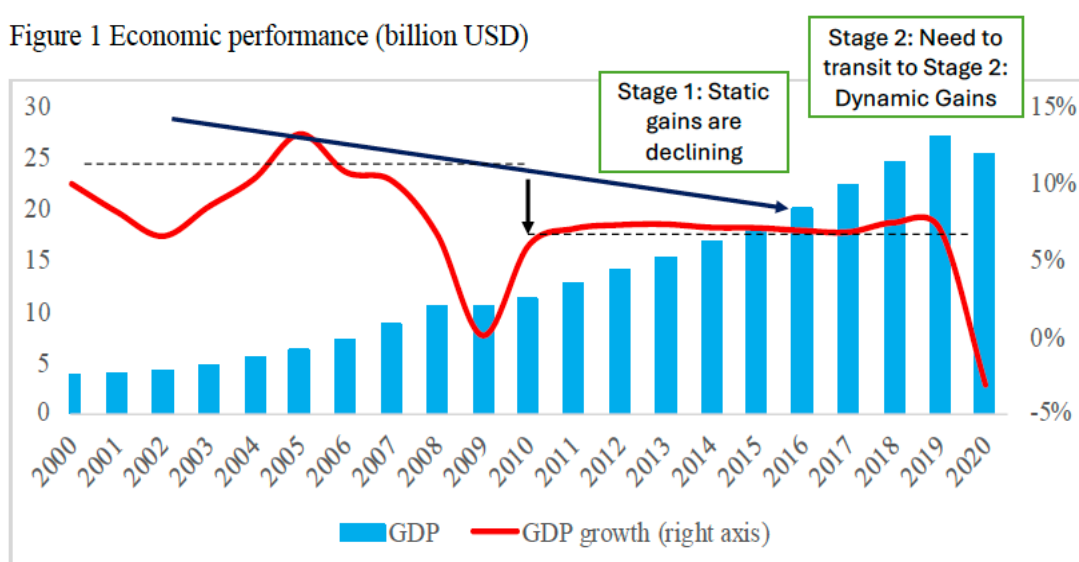
provided in section 4. In section 5, we provide the methodological framework for analyzing the Returns to Skills. Section 6 provides the policy recommendations and the next stage of research.

## 2. Key Economic Trends of Cambodia

### 2.1. The Structural Transformation, Challenges and Opportunities for Cambodia

The Cambodian economy is very progressive and one of the fastest-growing economies in ASEAN. The average annual growth of Cambodia has been around 7%–8% for the past decade (see Figure 1). In addition, Cambodia is also in a transition and is transforming its economy into a lower-middle income growth economy in terms of its industrial transformation. The manufacturing industry is growing at an average rate of 7.6% with a share of nearly 40% of GDP, services with a growth rate of 3.4% with a share of 36.1% of GDP, and agriculture accounting for 17% of GDP with an annual growth rate of 1.6% in 2023<sup>7</sup>.

**Figure 1. Economic Performance (GDP) of Cambodia**



GDP = gross domestic product

Source: World Bank

<sup>7</sup> World Bank: <https://thedocs.worldbank.org/en/doc/c6aceb75bed03729ef4ff9404dd7f125-0500012021/related/mpo-khm.pdf>

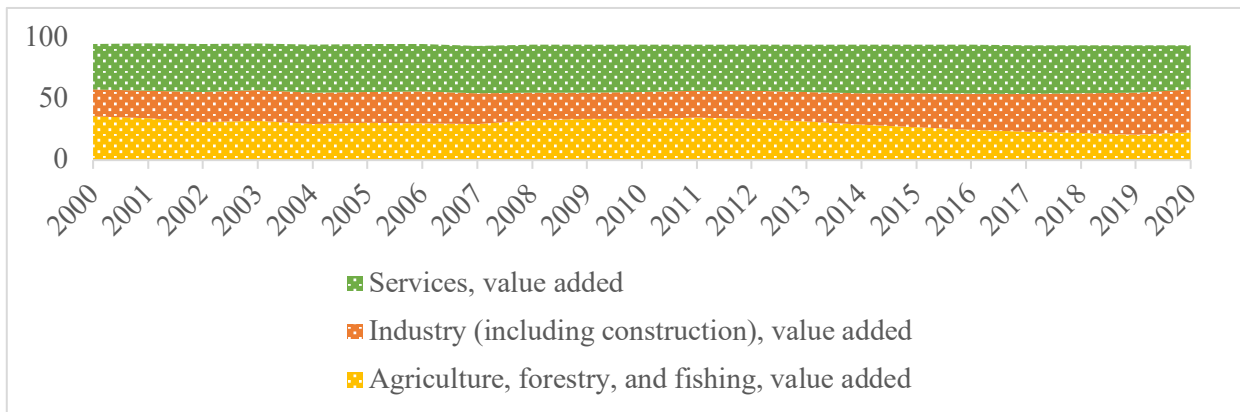
The growth of the Cambodian economy has been driven by the liberal and open economic and trade policy adopted by the government. Cambodia is one of the most liberal and open economies in ASEAN. The economy adopts an open economic policy in terms of trade and foreign direct investment (FDI). However, several key issues have affected the growth of the economy in terms of key fundamentals on progressive institutions, human capital development, and the strong competitiveness of domestic industries. In Figure 1, we observe a structural shift in GDP after the global financial crisis (GFC), when the economy shifted from double-digit growth to around an average of 5% from 2010 to 2019. The shift in lower-level growth trend reflects the rebalancing effects that Cambodia might be reaching the ‘Lewis’s Turning’<sup>8</sup> of exhausting the surplus unskilled labour.

The Cambodian economy is driven by manufacturing and services as the twin engines of growth (see Figure 2). The manufacturing sector accounted for 36.5% of GDP in 2019 and has shown a rising trend since GFC. We also observe a rising share of services in GDP since the GFC, rising from 40% in 2010 to 41% in 2019. Although the agriculture sector has remained an important sector, its share of GDP declined from 36% in 2010 to around 22% in 2019 and further to 17% in 2023 through the rapid industrialisation of the economy.

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<sup>8</sup> Lewis Turning Point is given as a threshold at which the economy would move from a vast supply of low-cost workers to a labor shortage economy (Lewis, 1954).

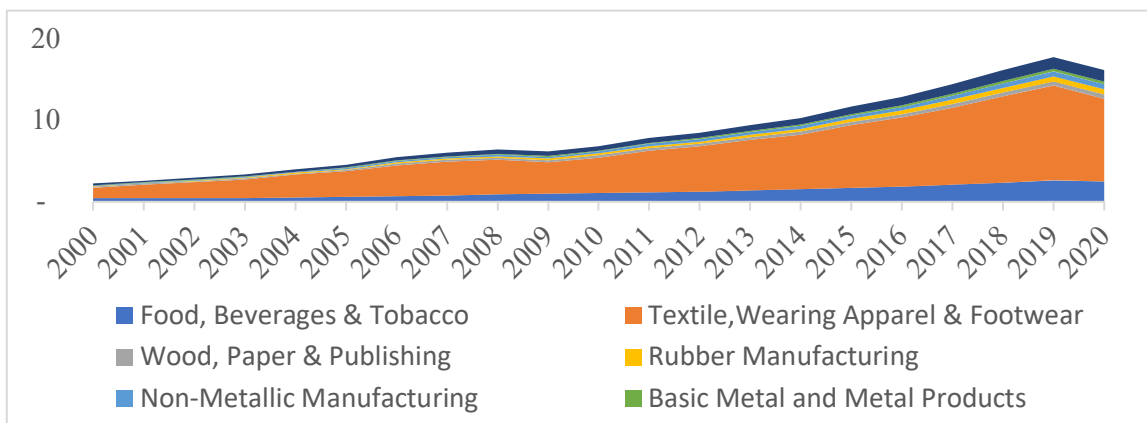
**Figure 2. Sectoral GDP (% of GDP)**



Source: World Bank

In manufacturing activities, the textile and garment sector remain the dominant sector, accounting for a major part of production and export activities. The other key manufacturing activity is in the food, beverage, and tobacco sector, which maintains economic activity of around 10%. We also observe rising trends in non-metallic manufacturing, transport equipment, and electronics parts and components (see Figure 3). The diversification of production and export of the domestic industries is critical to maintain the competitiveness of the Cambodian economy. It is critical to shift to higher stage of GVC activities to create more sustainable development for the Cambodian economy as the ASEAN and East Asia shifts to more integration and complex network of GVC activities.

**Figure 3. Cambodia's Manufacturing Subsectors (KR trillion)**



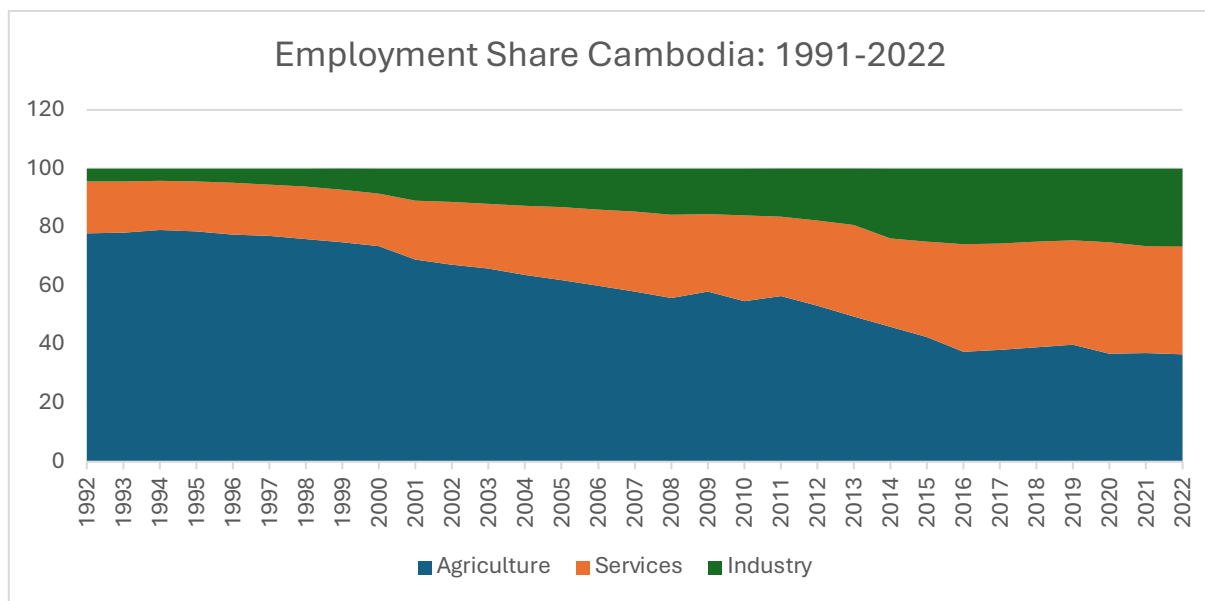
Source: National Institute of Statistics.

## **2.2. Labour force structure**

Cambodia's labour force consists of a young and dynamic workforce. According to World Population Prospects (2024), the population of Cambodia in 1995 was about 9.6 million, and increased to 17.5 million in 2024. The population is projected to increase to 22.3 million in 2055. With the annual population growth rate at 1.9% in the past decade, Cambodia on average added approximately 164,000 people to the labour market each year. The working-age population (15–64) reached 11.3 million in 2024 from 5.1 million in 1995.

As the structural transformation accelerates, the share of employment in agriculture has shown a sharp decline. As clearly shown in Figure 4, employment in agriculture dropped from 58% in 2007 to around 37% in 2022. Correspondingly, the employment share in industry and service sectors steadily increased, absorbing new entrants to the labour market. The share of employment was around 36% for services, and the share of manufacturing was around 27%, respectively, in 2022 for the Cambodian economy (see Figure 4). We also observe that the unemployment rate in the economy is showing a declining trend and was less than 1% in 2019.

**Figure 4. Labour Structure (% of total employment)**



Source: World Bank.

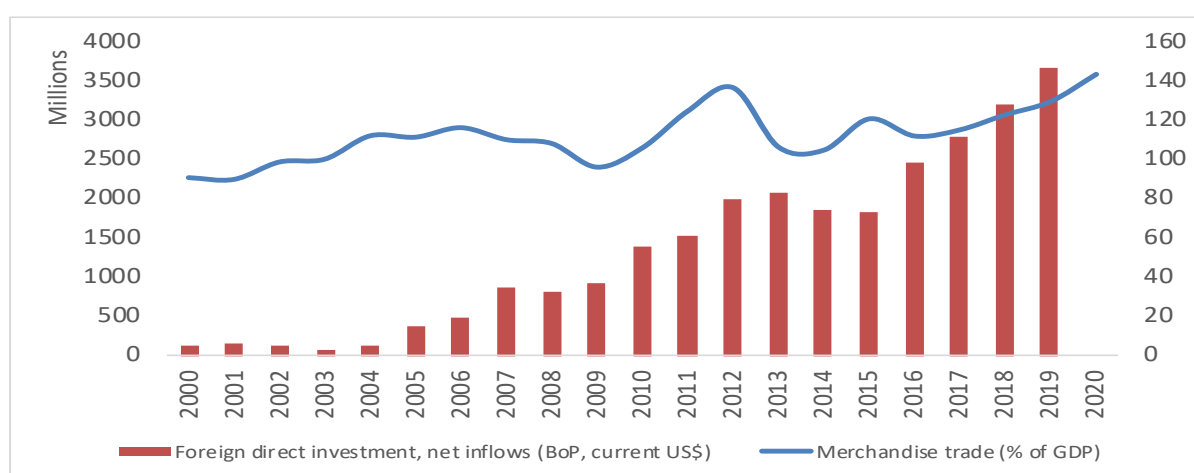
As the GVC activities in the East Asian region shift to higher stage of regional integration and adopt the complex network due to technological advancement of digital technologies, there is a need to develop more integration of domestic capacity to align the domestic economy to regional integration strategies driven by multinational corporations. The domestic absorptive capacity is driven by skills of domestic workers and the ability of domestic companies to complement the production activities of multinational firms in the region.

Although Cambodia has high endowment of young population, the average and mean educational attainment of Cambodian workers is still at primary and lower education, which hampers the domestic absorptive capacity to complement the activities of the multinational companies and to shift the domestic economy to higher GVC activities. There is a critical need to develop the higher skills of the Cambodian worker through vocational and technical education and increase the general educational attainment of workers in line with the structural transformation of the GVC activities in the region.

### 2.3. Trade and investment

Cambodia is an open economy that relies heavily on trade and investment for economic growth. Merchandise trade accounted for more than 100% of GDP for the past 2 decades. The economy has been running a current account deficit as domestic production could not support the demand, leading to an excessive import of industrial materials as well as consumption of products from abroad. In 2022, imports accounted for almost 84.8% of GDP, whilst exports were around 70% of GDP<sup>9</sup>.

**Figure 5. Trade and Foreign Direct Investment (US\$ billion) (left vertical axis is foreign direct investment and right vertical axis is the share of merchandise trade % of GDP)**



Source: World Bank.

The economy relies heavily on FDI to augment its domestic investment in economic activities. FDI activities have been stable from 2000 to 2020. China continued to be the leading investment capital source for Cambodia, followed by the ASEAN region. In 2020, FDI from China, including Hong Kong and Taiwan, accounted for 47.4% of the country's

<sup>9</sup> <https://wits.worldbank.org/CountrySnapshot/en/KHM/textview>

total FDI, an increase of 0.3% compared to the previous year. It was followed by FDI from ASEAN, namely Singapore, Malaysia, and Thailand, accounting for 19.5% of the total in 2020.

Although China will remain the key investor in Cambodia, there is a need to diversify the investment activities of key East Asian countries in the domestic economy. The key opportunities from foreign direct investment (FDI) activities are to capture the returns from technology, the network effects of the multinational activities, and to increase the transfer of knowledge to local industries to create the next set of domestic multinational firms in manufacturing and services activities in the region. However, the current FDI activities is attracted by cheap and low labour activities such as labour-intensive industries, leading to activities in the low value-added activities in the regional GVC. As Cambodia embarks on open regionalism through multilateral and bilateral FTAs such as RCEP, Cambodia-China FTA and Cambodia-Korea FTA, there is a need to create more conducive investment environment through investment facilitation for multinational activities from Korea and Japan to create a more competitive investment activities in the economy. This will be critical for the next stage of structural transformation of the economy in the regional GVC activities.

### **3. Skills development policies in the ASEAN**

#### **3.1. Human Capital **Development** Policy: Managing 'Skills-Trap' and 'Skills-Gap'**

ASEAN human capital policies are to manage the uneven impact of trade and globalization. Human capital policy creates both inclusive and sustainable development strategies for the domestic economy. There are two components to human capital development: education; and training and re-tooling. Education is the flow of human capital, and it adds to the stock of

human capital. However, the heightened pace of job destruction and the creation of new types of jobs that accompanies the current period of fragmented growth are causing a greater depreciation of existing human capital. Addressing this issue requires a strong environment of skills training and re-tooling to maintain the stock of human capital as the needs and demands of the markets evolve. The human capital dynamics requires the complementarity of education and skills development policies in the domestic economy.

The pace of industrialisation is also increasing the need for globally competitive workforce in ASEAN. The transition to higher value-added activities has increased the demand for skilled jobs that complement the new technologies. We are observing different skills and human capital development in ASEAN. The pace of industrialisation is much faster than the rate of accumulation of human capital through the polytechnics and universities, resulting in a labour market mismatch in skills and hence the “skills-gap” in developing AMS of Indonesia, Malaysia, Singapore, Thailand, and Vietnam (Thangavelu, 2017). This indicates that the demand for new skills has outpaced the supply of workers with relevant skills to participate in the labour market. This clearly indicates the inability of the labour market and manpower policy to increase the competitiveness of the supply workers with the relevant skills. With the need to anchor multinational activities and facing a “skill gap”, the economy is relying heavily on skilled foreign workers to meet these demands. Unlike multinational activities and trade, the movement of people creates additional social costs, such as the taking up of the economic and social space as the economy matures.

As we observe ‘skills-gap’ with rapid pace of industrialization, we are also observing ‘skills-trap’ where unskilled workers do not reach the key threshold level of human capital in education and industrial skills to transit to higher level of training in

technologies and competencies. These unskilled workers are ‘trapped’ in low-skilled jobs with low wages and gradually shift to the informal labour market. The ‘skills-trap’ equilibrium also indicates a ‘wage-trap’ equilibrium, where the wages of these vulnerable workers will stagnate with very low productivity. The bi-polar equilibria of ‘skills-gap’ and ‘skills-trap’ are occurring concurrently in the domestic economy as it participates in the regional and global production value chain (Thangavelu, 2023).

### **3.2. ‘Skills-Gap’ and Future Skills Strategies**

The rapid industrial and structural transformation creates imbalances in supply and demand of skills in the domestic economy. This is intensified by technological changes leading to ‘creative-destruction’ of firms and jobs (Thangavelu, 2023). This necessitates shifting to a “learning for all” model, which the Singapore Government is introducing through different initiatives, among which the SkillsFuture initiative stands out strongly. Under this initiative in Singapore, a SkillsFuture fund with an initial credit of \$500 is created for each Singaporean aged 25 and above. This credit can be used to pay for a whole range of courses. The SkillsFuture fund is effectively a lifelong learning fund, from which the Government co-funds with individuals on their investments in human capital development. This creates greater flexibility for individuals to invest in themselves early, and by doing so, support a portfolio of human capital stock. This portfolio of human capital will allow the economy to undertake new value-added tasks, which are important with the rising prevalence of global value chain (GVC) activities. This allows the population to diversify their skills and ride out an era of fragmented growth better.

### **3.3. ‘Skills-Trap’ and Progressive Wages**

The progressive wage model was introduced by Singapore in 2014 and by Malaysia in 2023 to manage the ‘skills-trap’ equilibrium of unskilled workers in the Singapore labour

market with wage stagnation and low productivity growth (Ho, 2023, Aun, 2024). The key policy framework is to (a) target specific sectors to diversify the skills of workers, (b) provide structured training for workers in line with accredited certification that leads to progressive wage and productivity growth, and (c) create inclusive growth for the vulnerable workers in the domestic economy.

The key to the human capital dynamics framework is to complement both the Progressive Wage with Future Skills framework with accreditation with formal certification and competency framework.

### **3.4. Key Trends in the Human capital and Skill Development in ASEAN**

Human capital development remains a cornerstone for ASEAN's socio-economic growth, regional integration, and adaptability to global economic trends. By investing in education, vocational training, and workforce mobility, ASEAN seeks to address diverse developmental needs across its member states. Countries such as Singapore, Malaysia, Vietnam, the Philippines, and Thailand exemplify varying approaches shaped by their socio-economic contexts. ASEAN skills development programmes are given in Table 1.

Human capital is central to innovation, productivity, and competitiveness (Mukhametova, 2020). Its significance has been amplified by the transition to digital economies, necessitating aligned investments in skills and technology (Berezhnaya, 2019). Recent research highlights that education and lifelong learning are critical for equipping populations to meet the demands of Industry 4.0 (Emelyanov & Nekrasova, 2016; Berezhnaya, 2019). ASEAN's collective efforts aim to bridge disparities in access to quality education and foster a skilled and mobile workforce. This foundation not only supports economic resilience but also enhances regional competitiveness in a rapidly

evolving global landscape. The Skills development programmes for ASEAN are given at

Table 1.

**Table 1: ASEAN Skills Development Programmes**

<b>Country</b>	<b>Program Name</b>	<b>Details</b>	<b>Participants (Gender/Age)</b>	<b>Funding Allocated</b>
Vietnam	National Target Program on Employment	Skills training in agriculture, tourism, and ICT to meet the challenges of Industrial 4.0. Includes soft skills development for rural and urban populations.	60,000 workers trained in 2023 (50% women; aged 18–40).	\$500 million (2021–2025).
Thailand	Thai-German Dual Education Program	A dual vocational training initiative focused on manufacturing and technology, with support from private companies.	8,000 students annually (40% women; aged 16–30).	\$10 million annually (govt. & industry-funded).
Singapore	SkillsFuture and WorldSkills ASEAN	Lifelong learning credits for citizens and vocational training for youth. Includes digital workshops and technical competitions like WorldSkills ASEAN.	SkillsFuture: Tens of thousands annually (open to all ages); WorldSkills: 170 youths (44% women, aged 18–25).	SGD 1 billion annually.
Philippines	TESDA Skills Training Programs	Training in various industries, including construction, ICT, and healthcare, aligned with national employment strategies.	2.8 million enrolled in 2023 (54% women; aged 17–40).	PHP 14 billion (~\$250 million) in 2023.

Myanmar	Workforce Development Program	A collaborative program between USAID and the Ministry of Education focusing on manufacturing and agricultural workforce skills.	4,200 trained (45% women; aged 16–30).	\$4.5 million (USAID-funded, 2021–2024).
Laos	TVET Strengthening Program	Skill-building in agriculture, mechanics, and other trades through Technical and Vocational Education and Training (TVET) centres.	3,500 students (44% women; aged 15–25).	\$12 million (ADB grant).
Malaysia	My Digital Workforce Initiative	Focused on IT and digital skills for job seekers and professionals transitioning to tech roles. Includes Digital Skills for Jobs.	80,000 participants annually (55% women; aged 20–40).	MYR 300 million (US\$66.7 million) annually
Indonesia	Pre-Employment Card Program	Provides unemployed and job-seeking citizens with training in areas like digital marketing, entrepreneurship, and technical skills.	16 million participants since 2020 (52% women; aged 18–50).	Rp 4.8 trillion (US\$306 million) in 2024. <sup>10</sup>
Brunei	Lifelong Learning Programs	A vocational training and adult education through IBTE. Focus on technical skills and retraining initiatives for the workforce.	5,000 annually (55% male; aged 18–50; 45%	BND 5 million annually

<sup>10</sup> <https://en.antaraneews.com/news/303759/pre-employment-program-focuses-on-digital-sector-in-2024-minister>

			female, aged 18-50). <sup>11</sup>	
Cambodia	Skills Development Fund (SDF)	Targets key sectors like manufacturing and tourism through training grants to address industry-specific skills gaps.	12,000 trained (50% women; aged 16–35).	\$10 million (ADB-funded).

**Table 2: Selected ASEAN Countries Skills Development Framework and Policy Gaps**

Country	Key Skills Focus	Programs and Policies	Outcomes	Skills Gaps/Challenges
<b>Malaysia</b>	Digital skills, technical skills	<b>Industry4WRD, TVET Reforms</b>	Increased Industry 4.0 readiness	Persistent skills mismatch in ICT
<b>Vietnam</b>	STEM skills, technical skills	<b>National STEM Day, TVET Reform</b>	Improved participation in STEM sectors	Lack of infrastructure in rural schools
<b>Singapore</b>	Adaptability, lifelong learning	<b>SkillsFuture, ALP</b>	Globally competitive workforce	Access barriers for low-income workers
<b>Philippines</b>	Vocational skills, ICT skills	<b>TESDA Programs, K to 12 Reform</b>	Increased TVET participation	Skills mismatch in healthcare and ICT
<b>Thailand</b>	Vocational skills, technical skills	<b>DVT, STEM Integration</b>	Higher employability in manufacturing	Digital infrastructure limitations

<sup>11</sup> [https://asean.org/wp-content/uploads/2022/10/20221006-1.Country\\_Report\\_Brunei.pdf](https://asean.org/wp-content/uploads/2022/10/20221006-1.Country_Report_Brunei.pdf)

ASEAN has recognized human capital as a pivotal driver of innovation and long-term growth. Regional frameworks like the ASEAN Work Plan on Education (2021–2025) aim to harmonize education systems, enhance workforce readiness, and address skills gaps. These initiatives underscore the importance of equipping workers with digital skills and promoting lifelong learning (Golikova et al., 2019).

The ASEAN Qualifications Reference Framework (AQRF) plays a crucial role in aligning educational qualifications and enhancing labour mobility across the region (Caparas, 2016). By aligning educational qualifications across member states, the AQRF facilitates the recognition of skills and enhances cross-border workforce mobility. This framework supports ASEAN's broader vision of creating an integrated and competitive regional labour market (Caparas, 2016).

Despite these efforts, challenges persist (see Table 2). Disparities in education quality across urban and rural areas limit equitable access to opportunities (Sanzo-Navarro et al., 2017). Additionally, industries report widespread skills mismatches, particularly in high-demand sectors like ICT, healthcare, and advanced manufacturing. Research suggests that investments in digital literacy and vocational training are essential to bridging these gaps and ensuring sustainable development (Miho & Su-Hong, 2019).

ASEAN also faces demographic shifts that further complicate human capital development. Aging populations in countries like Singapore and Thailand demand urgent reskilling initiatives, while rapidly growing youth populations in Cambodia and Myanmar require robust investments in education and employment opportunities (Nimmo, 2019). These dynamics highlight the importance of targeted and context-specific strategies for human capital development.

By prioritizing regional collaboration and leveraging collective strengths, ASEAN can overcome structural barriers and unlock its workforce's full potential. Continued focus on education reform, workforce adaptability, and innovation will enable ASEAN to navigate the complexities of globalization and secure its trajectory toward equitable growth.

### **3.5. Malaysia: Bridging Digital Transformation and Workforce Readiness**

Malaysia's human capital strategies are deeply intertwined with its aspiration to transition into a high-income knowledge economy. Initiatives like the Industry4WRD National Policy emphasize embedding advanced technologies such as AI, robotics, and big data into industrial systems. Concurrently, the government has been reforming the Technical and Vocational Education and Training (TVET) system to align education outputs with market demands (Economic Planning Unit, 2021). Research underscores that targeted TVET reforms and public-private partnerships can boost employability, though societal perceptions of TVET as inferior to academic pathways remain a challenge (Fang & Chang, 2019).

### **3.6. Vietnam: Building Innovation through STEM Education**

Vietnam has heavily invested in STEM education to drive its industrialization agenda. The National Strategy for Education Development (2011–2020) prioritizes STEM initiatives such as National STEM Day to engage students in science and technology (Nguyen et al., 2019). Partnerships with multinational corporations, including Samsung and Intel, have supported workforce upskilling in electronics and renewable energy sectors. However, rural-urban disparities in education quality persist, with infrastructure and access to digital tools being notable limitations (Baidybekova & Sauranbay, 2022).

The Textile, Clothing, Leather, and Footwear (TCLF) industry is a cornerstone of Vietnam's economic landscape, contributing substantially to national exports and providing employment to millions of workers. Despite its strategic importance, the sector faces critical challenges, particularly among rural workers who comprise a significant portion of its workforce. These challenges include limited access to formal skills training, geographic isolation, and misalignment between training programs and the industry's specific demands. A comprehensive approach integrating innovative solutions is required to address these pressing issues. The review of rural-focused skills training initiatives in Vietnam's TCLF sector is provided in the Annex 2. In summary, the TCLF training initiatives emphasize the mechanisms such as public-private partnerships (PPPs), digital learning platforms, mobile training units, and gender-targeted programs.

### **3.7. Singapore: A Model for Lifelong Learning and Workforce Adaptability**

Singapore's SkillsFuture initiative stands as a global benchmark in fostering lifelong learning. Through financial incentives and tailored training programs, SkillsFuture aligns workforce capabilities with emerging market needs, particularly in AI, digital marketing, and advanced manufacturing (SkillsFuture Singapore, 2023). Research corroborates Singapore's success, noting that its focus on continuous education and skills adaptability significantly contributes to economic resilience (Emelyanov & Nekrasova, 2016). However, as its aging population grows, Singapore faces the challenge of reskilling older workers and improving accessibility for low-wage earners (Lonska & Mietule, 2015).

### **3.8. The Philippines: Aligning Education Reform with Employment Needs**

The Philippines' K to 12 Basic Education Program has extended schooling to 12 years, incorporating technical-vocational tracks to prepare students for employment. The

Technical Education and Skills Development Authority (TESDA) has expanded its online programs, particularly in high-demand sectors like ICT and healthcare (TESDA, 2021). Yet, the country grapples with significant youth unemployment and brain drain. Studies suggest that effective alignment of curricula with industry needs can mitigate these issues and enhance workforce productivity (Emelyanov & Nekrasova, 2016).

### **3.9. Thailand: Focusing on Vocational Education and Regional Equity**

Thailand has prioritized vocational training to meet its Thailand 4.0 vision of transitioning to value-added industries. The Dual Vocational Training (DVT) system exemplifies efforts to integrate academic learning with practical industry experience (NESDC, 2021). However, the effectiveness of these programs is hindered by regional disparities, particularly in rural areas where education quality and access to technology remain limited (Baidybekova & Sauranbay, 2022).

### **3.10. Challenges in Human Capital Development Across ASEAN and Lessons for Cambodia**

There are several key challenges for human capital development in ASEAN in terms of access to quality education, skills mismatch, gender inequalities, and regional disparities in policies, and quality of skills development infrastructure that will have direct implications for Cambodia as it develops the progressive skills development framework.

#### **a. Education Access and Quality**

Educational disparities across ASEAN are significant, with rural and marginalized communities suffering the most. Countries like Cambodia, Myanmar, and Laos face challenges in ensuring universal primary education, while Vietnam and the Philippines contend with poor infrastructure and teacher shortages, particularly in remote areas

(Nguyen & Le, 2019). For example, many schools in rural areas lack basic facilities such as electricity, internet access, and digital tools, which limits the integration of technology into learning. Furthermore, inconsistencies in education quality exacerbate these disparities, as schools in urban areas often benefit from better resources and qualified teachers compared to their rural counterparts (UNESCO, 2021).

Foundational skill gaps, particularly in literacy and numeracy, remain pervasive in several ASEAN countries. This issue not only limits students' readiness for higher education but also affects their employability in a rapidly changing labour market. Research suggests that addressing these gaps through targeted interventions at the primary and secondary levels can significantly boost long-term economic growth (Hanushek & Woessmann, 2015).

#### **b. Mismatch Between Skills and Market Needs**

Skills mismatches are one of the most critical challenges facing ASEAN's workforce. Rapid advancements in technology and the transition to Industry 4.0 have created demand for workers proficient in digital skills, STEM fields, and advanced manufacturing. However, ASEAN's education systems often produce a surplus of graduates in non-technical fields, leaving critical skill gaps in high-demand sectors (ILO, 2020).

TVET systems are essential to addressing these mismatches, but outdated curricula, insufficient industry engagement, and low enrolment rates hinder their effectiveness. For instance, while Thailand's dual vocational training programs have shown promise, the lack of alignment between academic institutions and industry requirements often results in graduates lacking practical, job-relevant skills (ADB, 2014). Moreover, industries report that many job applicants lack soft skills such as critical thinking,

teamwork, and adaptability, further widening the gap between education and employment needs.

### **c. Gender Inequality in Education and Employment**

Gender inequality remains a persistent barrier to human capital development in ASEAN. Despite improvements in female enrolment rates, women continue to face systemic obstacles in transitioning to higher education and skilled employment. In rural and marginalized communities, cultural norms and early marriage often restrict girls' access to education. Additionally, women are underrepresented in STEM fields and high-demand sectors, limiting their contributions to economic development (UNESCO, 2020). Efforts to close the gender gap include ASEAN initiatives such as the ASEAN Gender Outlook (2022), which advocates for targeted policies to promote female participation in STEM and address workplace biases. However, implementation challenges and entrenched societal norms continue to impede progress. Addressing these issues requires a comprehensive approach, including public awareness campaigns, gender-sensitive education policies, and mentorship programs.

### **d. Lifelong Learning and Reskilling**

The rapid pace of technological change underscores the importance of lifelong learning and reskilling. Workers need continuous access to training opportunities to remain relevant in a dynamic labour market. However, many ASEAN countries lack comprehensive frameworks for lifelong learning. Countries like Singapore have established successful initiatives such as SkillsFuture, but other nations struggle with limited funding, inadequate infrastructure, and low public awareness of training programs (Schwab, 2020).

Low-income workers and those in informal sectors face additional barriers to reskilling. Financial constraints, lack of time, and limited access to training centres prevent many from participating in lifelong learning initiatives. The COVID-19 pandemic further highlighted these disparities, as industries accelerated the adoption of digital technologies, leaving untrained workers at risk of displacement (ADB, 2022). Addressing these barriers requires coordinated efforts among governments, educational institutions, and private sector stakeholders.

#### **e. Demographic Shifts**

ASEAN is experiencing significant demographic changes, with varying impacts across member states. Countries like Thailand and Singapore face aging populations, which place pressure on workforce productivity and economic growth. These nations must prioritize reskilling older workers, extending retirement ages, and promoting lifelong employability to mitigate the effects of demographic decline (Nimmo, 2019).

Conversely, countries like Cambodia and Myanmar contend with young and rapidly growing populations that require substantial investments in education and training. Failing to provide these opportunities risks creating a generation of underemployed or unemployed youth, potentially leading to social and economic instability. Balancing these demographic dynamics is critical to ensuring sustainable growth across the region.

#### **f. Regional Disparities in Policy Implementation**

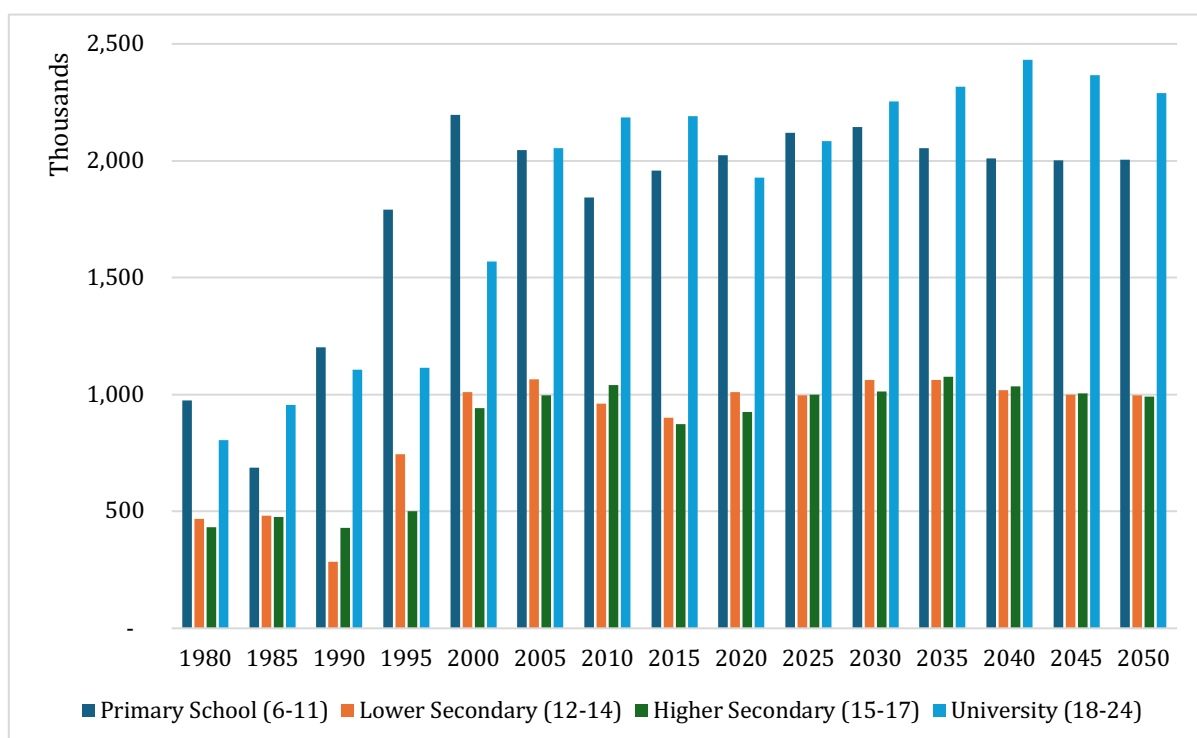
While ASEAN's regional frameworks provide a robust foundation for collaboration, their implementation remains uneven. The ASEAN Qualifications Reference Framework (AQRF), for example, has yet to achieve full adoption across member states, limiting its potential to harmonize qualifications and facilitate labour mobility (ILO, 2020). Similarly,

the ASEAN Work Plan on Education relies heavily on the capacity of individual countries to translate regional goals into actionable policies, resulting in disparities in progress. Wealthier nations like Singapore and Malaysia have made significant strides, while lower-income countries struggle with limited resources and institutional capacity (ASEAN Secretariat, 2021).

#### 4. The labour market trends and skills development of Cambodia

In spite of substantial educational progress being made in the last decades, Cambodia’s labour forces still possess low level of education and skills, with 75% of them having completed only primary level or lower (CSES, 2023). Skills training of worker is also low with TVET share in total secondary enrolment standing at only 2.3% in 2023, compared to 11.4% and 18% in Thailand and Indonesia, respectively (UNESCO, 2020).

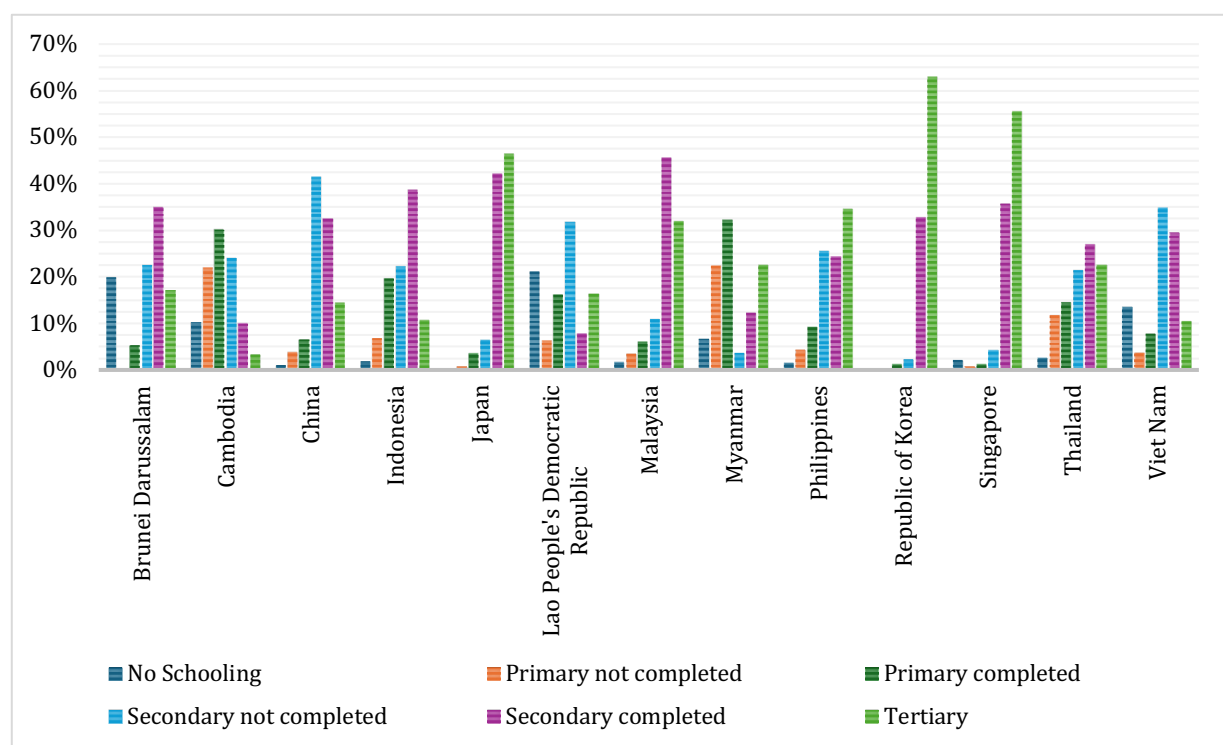
**Figure 6. Figure Cambodia's training age population ('000), 1980-2050**



Source: World Population Prospects: The 2024 Revision, UN Population Division, 2024

Moreover, rural-urban and gender disparities in literacy and education attainment are still wide. In 2022, about 67% of rural population aged 25+, who are the main source of labour supply to the urban industrial sector, have not completed primary education, compared to only 32% in Phnom Penh. At the same time, the male-female literacy gap of population aged 15+ still stood at 13.2% in 2022 in spite of being narrowed from a 20.4% rate in 2004 (CSES, 2013).

**Figure 7. Main educational attainment structure of some Asian countries, 2025**



Source: Barro, Robert and Jong-Wha Lee, April 2010, "A New Data Set of Educational Attainment in the World, 1950-2010." *Journal of Development Economics*, vol 104, pp.184-198. Updated: 2021 September.

Though the improved basic literacy and numeracy skills have so far contributed to productivity improvement, and induced structural transformation in the Cambodia's economy, the current educational structure poses as a significant challenge for the country to sustain a successful catching up through the process of social and productive

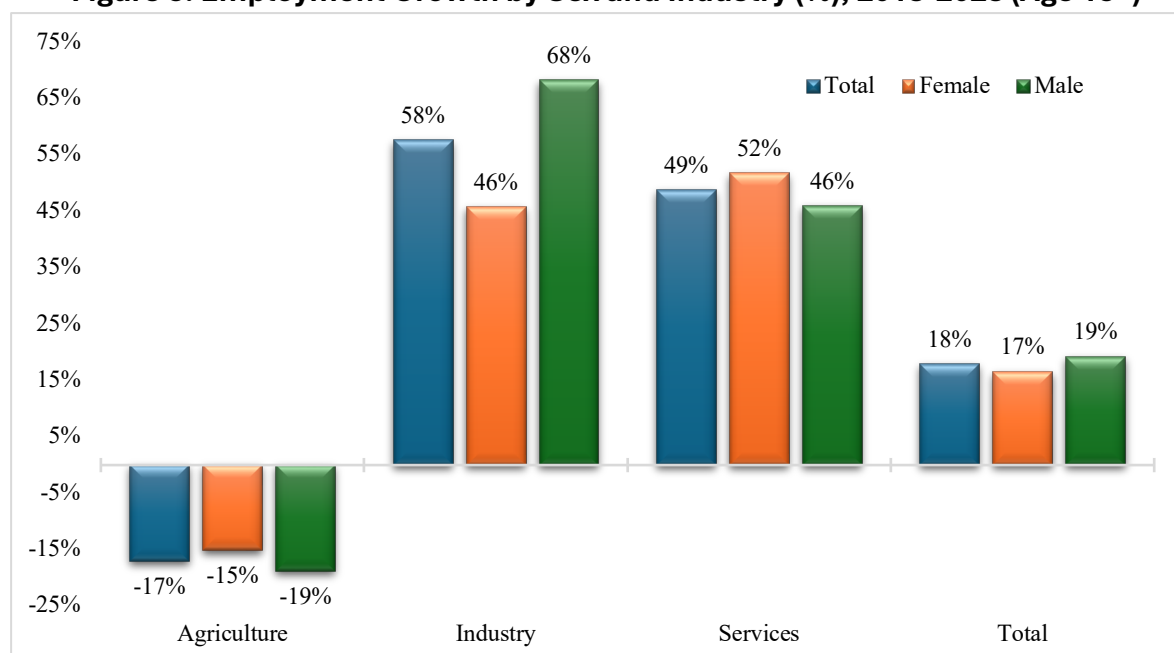
transformation. Compared with some high performing Asian countries, Cambodia's education attainment structure falls into L-shape, which would put the country on a bumpy road to successfully graduate into higher income status (Figure 7).

The transformation of knowledge structure in the labour force needs to precede structural transformation in the economy, as it determines the options and space for diversification into new industries. In contrast to Cambodia, countries like Brunei Darussalam, Malaysia, the Philippines, Singapore, and Thailand exhibit a strong "middle" pattern. These nations have a relatively low percentage of individuals with no schooling and steady progression through primary and secondary education, leading to a high percentage of individuals completing tertiary education. Overall, Figure 7 highlights the diverse educational landscape across Southeast Asia. While some countries have achieved significant progress in education, others continue to face challenges in ensuring equitable access and completion rates. The "missing middle" pattern observed in Cambodia underscores the need for targeted interventions to improve secondary education completion and bridge the gap between primary and tertiary education. Addressing these challenges is crucial for fostering economic growth and human development in the region.

The upshots from this structure have now started to emerge as practical issues for the Cambodia's economy as employers are facing difficulties in filling vacancies, while young entrants into the labour market having difficulties in securing productive employment. The analysis of employment growth in Cambodia from 2013 to 2023 reveals a high overall increase of about 50%, with female participation outpacing male growth in services sector. The agricultural sector experienced a slight decline, while industry and services witnessed notable growth. This shift towards industry and services aligns with

Cambodia's economic development strategy and highlights the need for a skilled workforce. To support this transition, Cambodia must invest in education and vocational training, focus on STEM education, and address gender-based disparities in the labour market. Additionally, creating sufficient job opportunities for the growing youth population is essential for preventing youth unemployment.

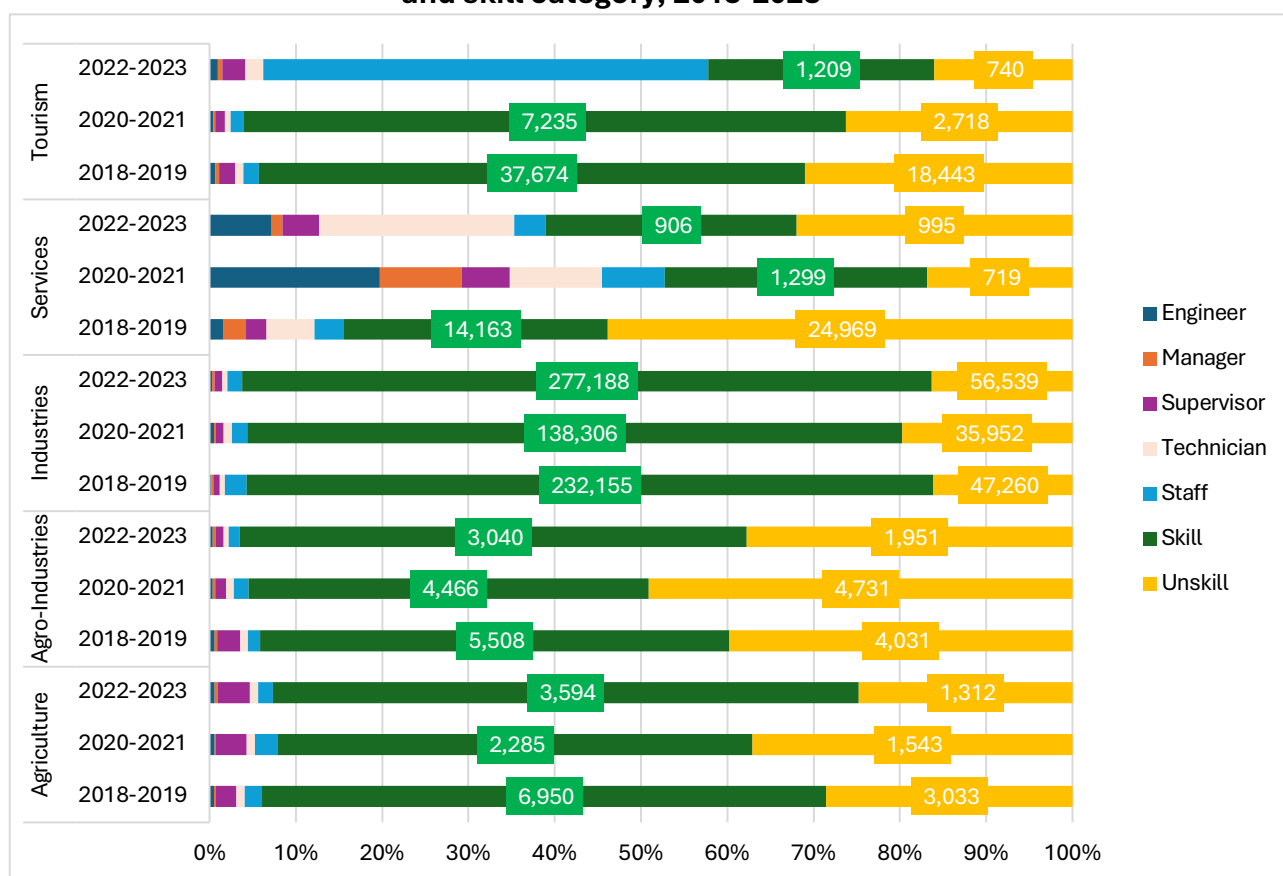
**Figure 8. Employment Growth by Sex and Industry (%), 2013-2023 (Age 15+)**



Source: Cambodia Socio-Economic Survey (CSES), 2013 & 2023.

Figure 9 illustrates the workforce demand generated by Qualified Investment Projects (QIPs) in Cambodia across various industries and skill categories from 2018 to 2023 (the Council for the Development of Cambodia – CDC). The data reveals a significant increase in overall workforce demand during this period. Agriculture, Agro-Industries, and Industries have consistently experienced a high demand for unskilled labour, accounting for a substantial portion of the total workforce requirement. However, the demand for skilled and supervisory personnel within these sectors has also grown, albeit at a slower pace.

**Figure 9. Workforce demand of qualified investment projects by industry and skill category, 2018-2023**



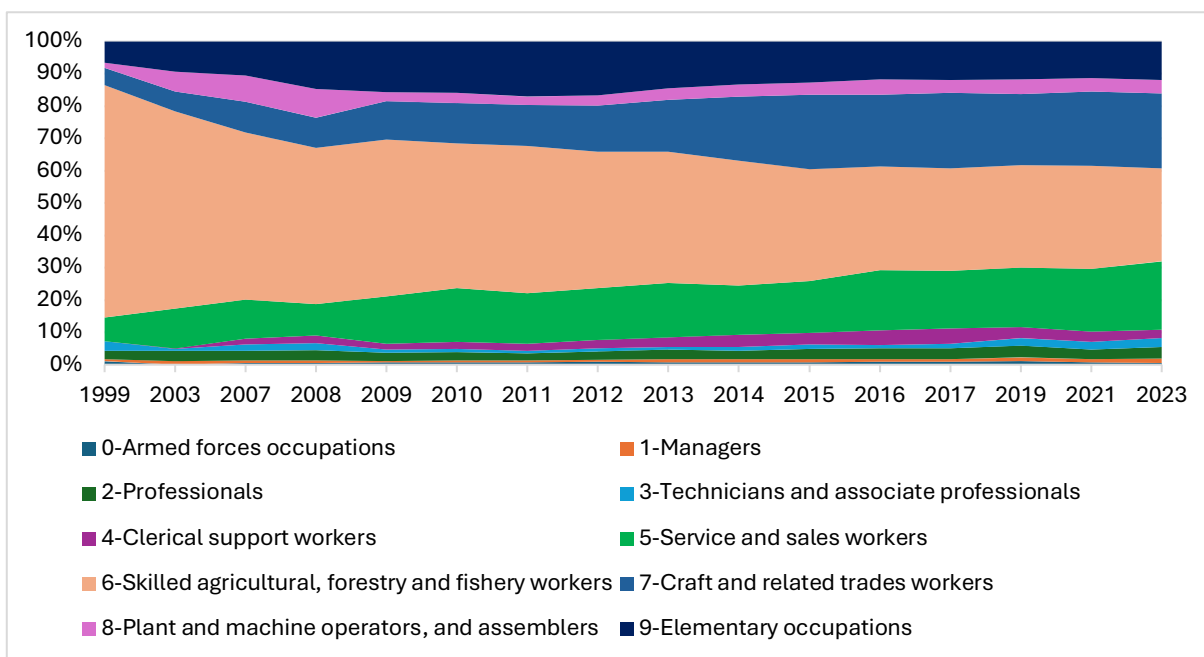
Source: Council for Development of Cambodia, 2023

The Services sector has witnessed a substantial increase in demand for all skill levels, particularly for managers, supervisors, and technicians. This reflects the growing sophistication of Cambodia's service industry and the increasing reliance on skilled professionals. Tourism, while being a relatively smaller sector in terms of workforce demand, has shown a steady increase in demand for various skill levels, from unskilled workers to supervisors and managers. This suggests that the tourism industry is becoming more diversified and sophisticated, requiring a more skilled workforce. In summary, the employment generated from QIPs projects in Cambodia has expanded significantly across all industries. While unskilled labour remains in high demand, there is a growing need for skilled professionals, particularly in the Services and Tourism

sectors. This trend highlights the importance of investing in education and skills development to meet the evolving needs of Cambodia's economy.

Cambodia's workforce is primarily composed of low-skilled workers, particularly in agriculture, forestry, and fishery (see Figure 10). While the country has made progress in shifting towards more advanced sectors, the need for a more skilled workforce remains urgent. The predominance of low-skilled labour, especially in agriculture, poses challenges for human resource development. As Cambodia continues to industrialize, it's crucial to invest in education and training to equip its population with the skills necessary for higher-value occupations.

**Figure 10: Labor demand share by occupation level (1999–2023)**



Source: CSES 2023.

Table 3 presents key indicators of human capital development for several countries in East Asia and the Pacific. By comparing Cambodia's data to its regional peers, we can gain valuable insights into its relative performance. In terms of child health, Cambodia's probability of survival to age 5 is comparable to other countries in the region, except for Singapore and Brunei Darussalam. However, its expected years of schooling and

adjusted years of school completed are lower than many of its neighbours, suggesting that there is room for improvement in educational attainment. Cambodia's harmonized test scores are also relatively low compared to other countries, especially those in the high-income category. This indicates that there is a need to improve the quality of education to ensure that students acquire the necessary skills. The fraction of children under 5 who are not stunted is slightly higher in Cambodia compared to some other countries, highlighting the ongoing challenge of malnutrition. However, Cambodia's adult survival rate is comparable to its regional peers, indicating that the country has made progress in improving public health. Cambodia's Human Capital Index (HCI) is lower than most other countries in the region, particularly those in the high-income category. This suggests that there is significant potential for improvement in Cambodia's human capital development. While Cambodia has made progress in certain areas of human capital development, it faces challenges in terms of educational attainment, quality, and child nutrition.

**Table 3. Human Capital Index and its components 2020.**

Country Name	Income Group	Probability of Survival to Age 5	Expected Years of School	Harmonized Test Scores	Learning-Adjusted Years of School	Fraction of Children Under 5 Not Stunted	Adult Survival Rate	Human Capital Index 2020 (LB)	Human Capital Index 2020
Brunei Darussalam	High income	0.99	13.2	438	9.2	0.80	0.88	0.62	0.63
Cambodia	Lower middle income	0.97	9.5	452	6.8	0.68	0.84	0.47	0.49
China	Upper middle income	0.99	13.1	441	9.3	0.92	0.92	0.64	0.65
Indonesia	Upper middle income	0.98	12.4	395	7.8	0.72	0.85	0.53	0.54
Japan	High income	1.00	13.6	538	11.7	-	0.95	0.80	0.80
Korea, Rep.	High income	1.00	13.6	537	11.7	-	0.94	0.79	0.80
Lao PDR	Lower middle income	0.95	10.6	368	6.3	0.67	0.82	0.44	0.46
Malaysia	Upper middle income	0.99	12.5	446	8.9	0.79	0.88	0.60	0.61
Myanmar	Lower middle income	0.95	10.0	425	6.8	0.71	0.80	0.46	0.48
Philippines	Lower middle income	0.97	12.9	362	7.5	0.70	0.82	0.50	0.52
Singapore	High income	1.00	13.9	575	12.8	-	0.95	0.87	0.88
Thailand	Upper middle income	0.99	12.7	427	8.7	0.89	0.87	0.60	0.61
Vietnam	Lower middle income	0.98	12.9	519	10.7	0.76	0.87	0.67	0.69

Source: Human Capital Index, World Bank, 2020. \*Note: LB = Lower Bound, UB = Upper Bound

Table 4 offers a comprehensive overview of the Global Talent Competitiveness Index (GTCI) for several countries in Eastern, Southeastern Asia, and Oceania. GTCI measures a country's ability to attract, develop, and retain talent. Compared to other countries in the region, Cambodia faces significant challenges in attracting and retaining talent. Singapore, Australia, and New Zealand consistently rank among the top countries globally, demonstrating their strong talent ecosystems. Countries like Japan, Korea, and Malaysia also occupy relatively high positions, reflecting their efforts to invest in education and develop skilled workforce. On the other hand, countries like Laos, Myanmar, and the Philippines, along with Cambodia, face more significant challenges in talent competitiveness. These countries often struggle to attract and retain talent due to factors such as limited educational opportunities, economic development, and quality of life. Overall, the table highlights the diverse levels of talent competitiveness across the region. While some countries have established themselves as global talent hubs, others continue to face challenges in attracting and developing skilled talent. Cambodia's steady improvement in its GTCI score is encouraging, but the country still has a long way to go to compete effectively in the global talent market. Addressing these challenges requires a multifaceted approach, including investments in education, research and development, and creating a conducive environment for innovation and entrepreneurship.

**Table 4: Global Talent Competitiveness Index in Eastern, Southeastern Asia and Oceania Region.**

Country	Global Talent Competitiveness Index									
	Score					Ranking				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Australia	71.1	72.5	75.1	71.9	73.9	12	10	11	9	8
Brunei Darussalam	49.9	52.2	51.6	49.3	51.7	36	38	47	41	41
Cambodia	26.6	27.1	27.4	28.4	29.7	107	117	119	103	106
China	45.4	49.6	57.2	51	52.6	45	42	37	36	40
Indonesia	38.6	41.8	42.1	37	40.3	67	65	80	82	80
Japan	61.6	66.1	68.7	59.8	61.7	22	19	20	24	26
Korea, Rep.	54.2	59.6	63.2	59.1	62.2	30	27	27	27	24
Lao PDR	33.6	34.5	32.5	29	30.8	91	98	105	99	101
Malaysia	58.6	60	59.7	48.3	51.4	27	26	34	45	42
Mongolia	36.4	39.6	42.8	39.8	41.3	77	75	77	71	76
New Zealand	71.1	69.8	73.9	66.9	67.3	11	16	15	18	18
Philippines	40.9	47.5	44.6	38.1	39.2	58	46	70	80	84
Singapore	77.3	78.5	79.4	75.8	77.1	2	3	2	2	2
Thailand	38.6	41.3	45.5	39.2	40.8	66	67	68	75	79
Viet Nam	33.4	35.1	40.9	39.3	41.5	92	96	82	74	75

Source: Global Talent Competitiveness Index. INSEAD 2019-2023.

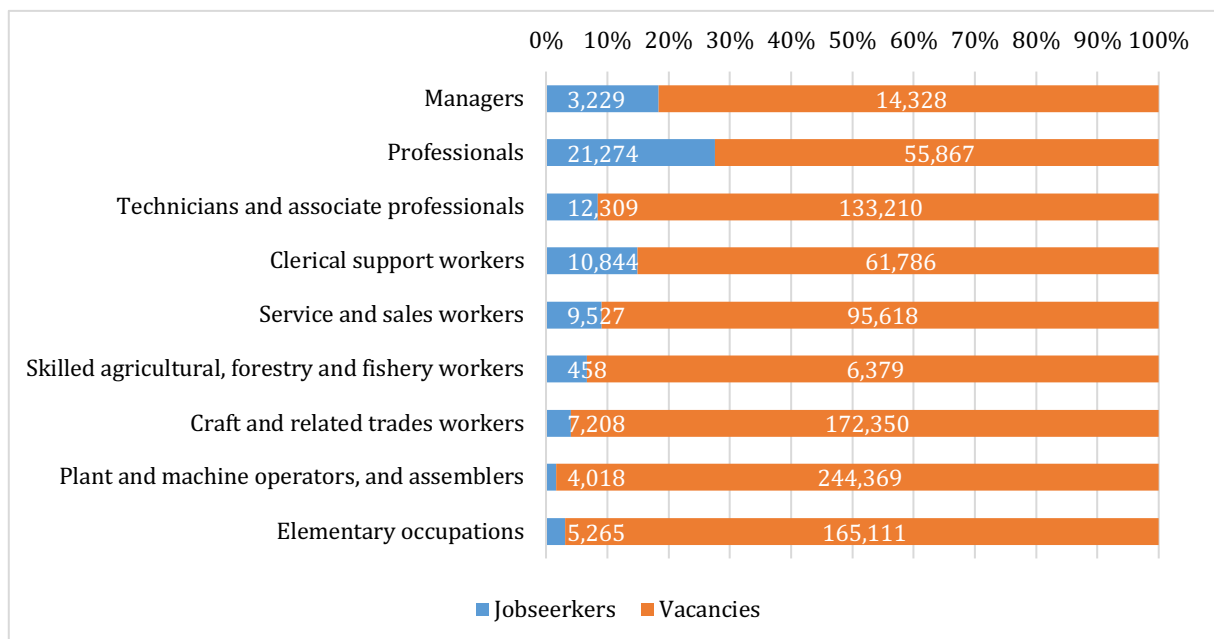
Source: Global Talent Competitiveness Index. INSEAD 2019-2023.

The real difficulties in meeting current demand for manual and non-manual skilled workers can be seen from the flow data of jobseekers registered and vacancies collected by the National Employment Agency (NEA) between 2010 and 2015 (Figure 11). In spite of not being nationally representative, the data provide a bird eye's view of current issues of skill shortage and mismatch in the Cambodia labour market.

Figure 11 illustrates the number of registered jobseekers and vacancies in Cambodia from 2019 to September 2024, categorized by occupation level. Overall, the number of both jobseekers and vacancies has increased significantly during this period. However, the distribution of jobseekers and vacancies across different occupations is uneven. Managers and professionals have consistently experienced a lower proportion of

jobseekers relative to vacancies, suggesting a strong demand for these skilled workers. In contrast, elementary occupations have a significantly higher proportion of jobseekers compared to vacancies, indicating a potential mismatch between supply and demand in this sector. The Figure also reveals that while the number of jobseekers in skilled agricultural, forestry, and fishery workers has remained relatively low, vacancies in this sector have increased, suggesting a growing demand for skilled workers in this industry. In summary, the Cambodian labour market has experienced a significant increase in both jobseekers and vacancies. However, there are disparities in the distribution of jobseekers and vacancies across different occupations.

**Figure 11 Registered Jobseekers and Vacancies, 2019-2024 (Sep)**

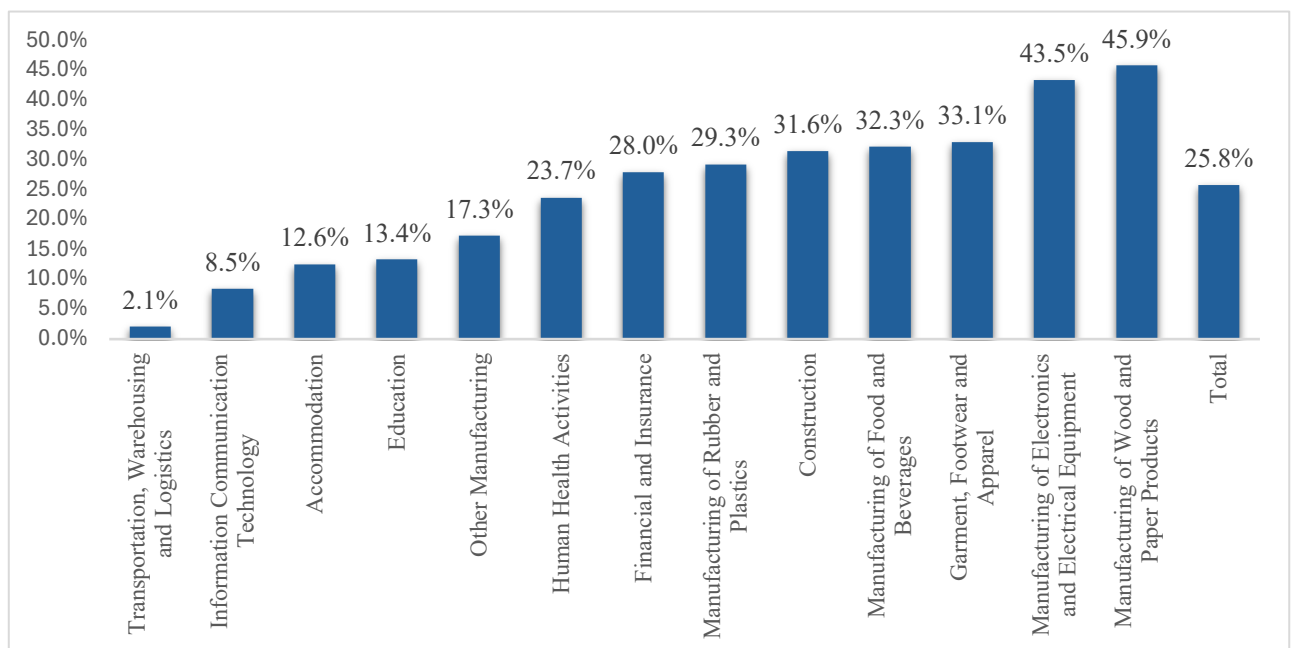


Source: NEA, September 2024.

The data from the Ministry of Labour and Vocational Training, 2024, displays the share of establishments with at least one hard-to-fill vacancy across various sectors. The highest percentages are seen in the manufacturing of wood and paper products (45.9%) and the

manufacturing of electronics and electrical equipment (43.5%), indicating these industries face significant recruitment challenges. Other sectors with high shares of hard-to-fill vacancies include garment, footwear, and apparel (33.1%), manufacturing of food and beverages (32.3%), and construction (31.6%). Financial and insurance establishments also report a considerable share at 29.3%. Sectors such as human health activities (23.7%) and other manufacturing (17.3%) encounter moderate difficulties. In contrast, transportation, warehousing, and logistics (2.1% and 8.5% respectively), as well as accommodation (13.4%) and education (12.6%), report lower levels of recruitment challenges.

**Figure 12. Share of establishments reporting hard-to-fill vacancies in the establishments with vacancies by sector**



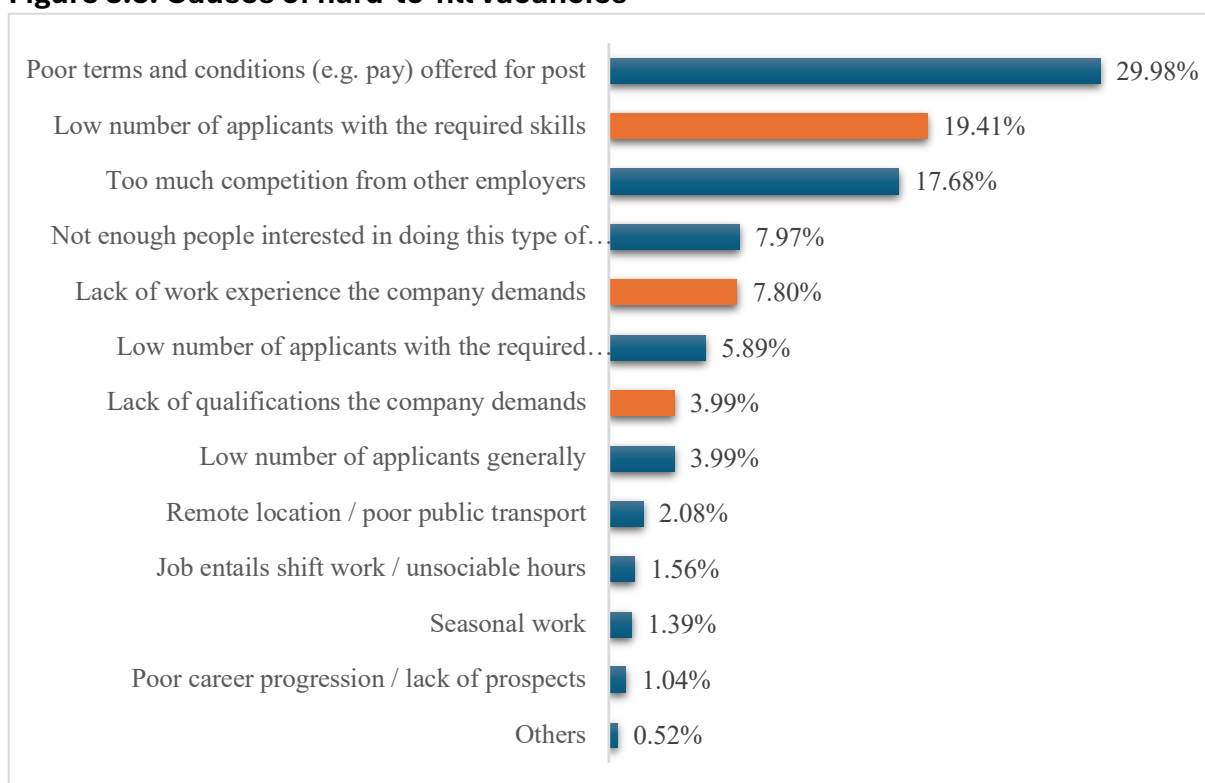
Source: Ministry of Labour and Vocational Training, 2024

These recruitment difficulties can be caused by skills shortage and other factors such as labor market rigidities. Conceptually, ‘skills shortage’ is a disequilibrium capturing the difference between market demand and supply. It is indicated by evidence of

recruitment difficulties, where the reason for the difficulties is insufficient job applicants with the right skills (lack of skills, qualification and/or work experience). A parallel disequilibrium concept for firms' existing workforces is internal 'skills gap', where incumbent workers lack adequate skills to perform their jobs competently. The opposite of skills shortage is skilled worker unemployment, while the opposite of skills gap is employees' perceptions of skills under- utilization (Green and Mason, 2015, p.189).

According to the Ministry of Labour and Vocational Training, 2024, the graph illustrates various reasons why certain job vacancies face difficulties in attracting applicants is given in Figure 12.

**Figure 3.8. Causes of hard-to-fill vacancies**



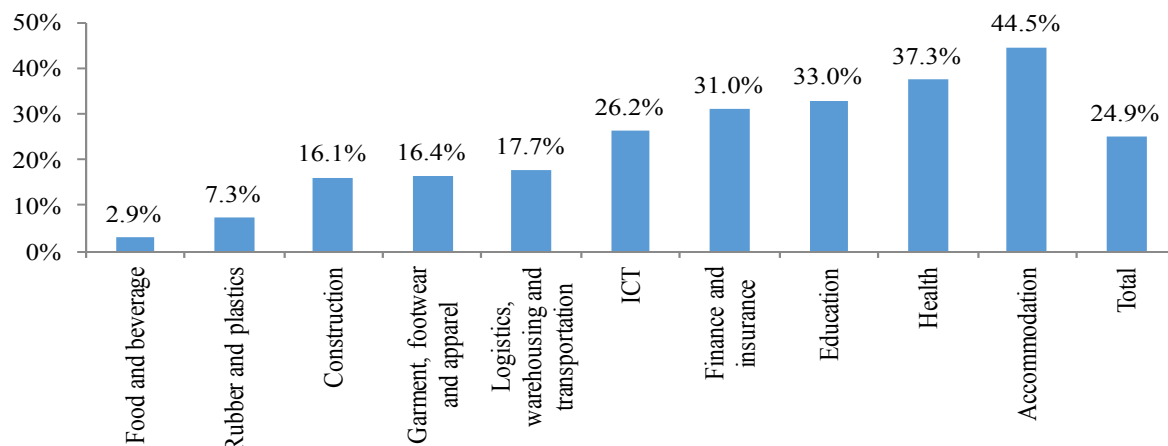
Source: The Ministry of Labour and Vocational Training, 2024

The most significant issue is the poor terms and conditions (e.g., pay) offered for the post as reported by 29.98% of establishments. This is followed by a lack of applicants with the required skills, which affects 19.41% of vacancies. 17.68% reported competition from

other employers is another significant factor. A smaller but notable portion of establishments struggle due to a lack of interest in the type of work 7.97%, and 7.80% of establishments are hindered by the lack of work experience demanded by companies. Other issues, such as the low number of applicants with required qualifications (5.89%) and general qualification shortages (3.99%), further contribute to recruitment difficulties. Additional factors include the remote location of the job (2.08%), shift work (1.56%), and limited career progression prospects (1.04%). Seasonal work and other minor issues were cited less frequently, at 1.39% and 0.52%, respectively.

The Figure 13 below shows the information on the share of establishments with skills shortage vacancies. About one-fourth of total establishments experience skills shortages (24.9% of establishments with at least one vacancies). Notably, the highest proportion of establishment facing skills shortages was found in accommodation with 44.5% of establishments with at least one vacancy, followed by health with 37.3% and education with 33.0%. In addition to the accommodation sector, it is worth highlighting that a high share of establishments with skills shortage results in a high turnover rate as discussed in the previous section. Finance and insurance, and ICT sectors followed with the proportion above the average level of 31.0% and 26.2%, respectively. At the same time, the percentages of the other sectors were between 17.7% in logistics and 2.9% in the food and beverage sector, as shown in the figure below.

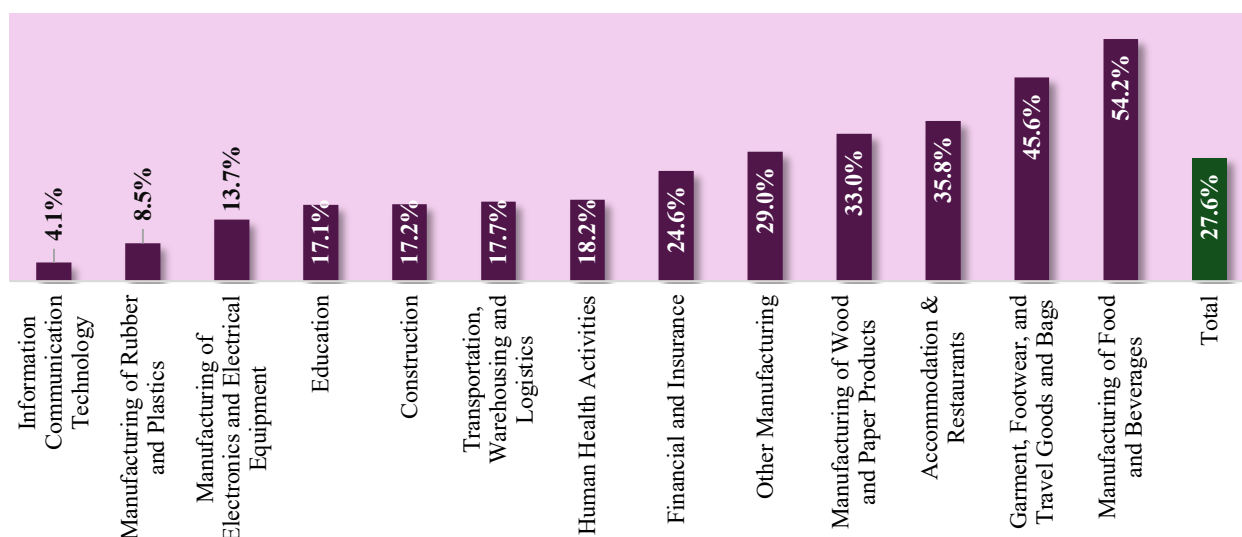
**Figure 13. Share of establishments with skills shortage vacancies in establishments with vacancies by sector**



Source: NEA, 2017

At the same time, employers have also reported about growing problems of skill gap of their existing workers, as defined above. Though it appeared to have been improved over time, this incidence is still widespread and particularly acute manufacturing of food and beverages, garment, footwear, and travel goods and bags, accommodation & restaurants, manufacturing of wood and paper products and other manufacturing (Figure 14).

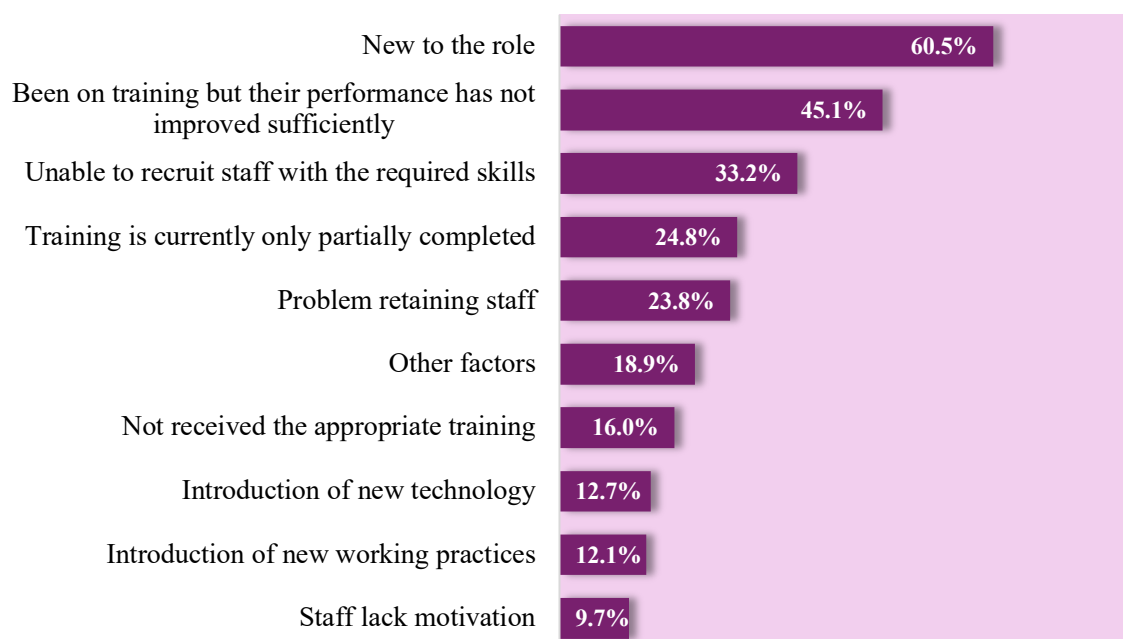
**Figure 14. Share of establishments affected by skills gaps by sector**



Source: Ministry of Labour and Vocational Training, 2024

The main factors reported by employers are associated with new role of the staff, been on training but their performance has not improved and unable to recruit staff with the required skills (Figure 14). Lack of proper working skills and attitude can be attributed to a lack of adequate training. But these also reflect the lack of engagement by the part of employers in on-the-job-training, dual training program or apprenticeship that would improve the youth’s job readiness or enable employees to acquire necessary work-related skills. They may also reflect the lack of skills and knowledge of managers in good management practices.

**Figure 15. Factors associated with employees not performing to the required level by Sectors**



Source: Ministry of Labour and Vocational Training, 2024

In the Cambodian labour market, the skills shortages and gaps cause the mismatches in the Cambodia’s labour market. However, not all the mismatches are driven by only skills shortages and gaps. They also involve the extent to which the people working in jobs matched their qualifications and skills. Examining the mismatch by occupation reveals that large share of skilled workers are under-qualified i.e., 70% for manager, 50% for

professional and 82% for technicians and associate professionals. For semi-skilled workers, about 40% of clerical support workers are over-qualified which implies high-skilled workers unable to find employment have been working in jobs not matching their qualification levels. For workers in other occupations in this skill category, all of them are under-qualified. These include nearly 60% of craft and related trade workers; 50% of plant and machine operators and assemblers, service and sale workers; and 72% of skilled agriculture workers. For unskilled workers, almost 30% of them are overqualified (Al Echkar, 2014).

These show that the mismatches are driven not only by skills shortages, but also by weak skills demand, training deficit, and labour market inefficiencies such as lack of information flow and wage rigidity. In this sense, successfully tackling this problem requires close coordination between education and training strategy and industrial development strategy with participation from all stakeholders, especially employers, training providers and government.

#### **4.1. Skills Development Programmes in Cambodia**

The skills development programmes of Cambodia are given in Table 5 below. Although the skills development strategies are embedded in the Cambodian Industrial Development Policy 2015-2025 and Industrial Transformation Map for Textile and Apparel Industry 2023-2027, the key skills development programmes are given in the Cambodian Skills Development Roadmap 2023-2035.

The Cambodian Skills Development Roadmap 2023-2035 is a comprehensive plan to improve the nation's workforce skills and boost economic development. It focuses on five key areas: enhancing the quality of technical and vocational education and training (TVET), raising awareness and participation in TVET programs, ensuring TVET programs

are relevant to industry needs, improving governance and leadership in the TVET sector, and securing sustainable funding for skills development. The roadmap aims to create a highly skilled workforce that can adapt to the changing needs of the economy, with a focus on areas like technology, innovation, and the green economy. It emphasizes collaboration between the government, private sector, and educational institutions to achieve these goals.

The Skills Development Fund (SDF) is a Cambodian government initiative that funds training programs to equip workers with the skills needed for a growing economy. It focuses on key sectors like manufacturing, construction, and technology, and supports various training types, including upskilling, reskilling, and pre-employment training. SDF emphasizes a demand-driven approach, partnering with the private sector and training institutions to ensure programs are relevant to industry needs. It also offers specialized programs like the Joint-Training Program, which encourages collaboration between businesses and training providers, and the Skills Matching Program, which provides pre-approved courses for businesses to upskill their workforce.

The TVET system is designed to enable young people to pursue a practical education at an early age, to equip them with the right skills and competencies for the workplace. TVET has 38 public institutes<sup>12</sup> which are under the supervision of the Ministry of Labour and Vocational Training. TVET institutes provide short and long course training for trainees, students, youth and the public to ensure that everyone receives equitability and in all circumstances training.<sup>13</sup> The period of Short-course training programs for one week are

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<sup>12</sup> SEAMEO VOTTECH Regional Centre. [https://seavet.seameo.org/docs/TVET\\_Cambodia\\_2015.pdf](https://seavet.seameo.org/docs/TVET_Cambodia_2015.pdf)

<sup>13</sup> ASEAN-ROK Technical and Vocational Education and Training Mobility (TEAM) Programme – Component 1: ‘Enhancing the Competitiveness of Human Resources through Responsive TVET Curriculum Supported by Involvement of Industries and Labor Market Information’. 2022. Country Report: Cambodia

electrical installation, water supply, air conditioning repair, machine repair, car repair, motorcycle repair, mobile phone repair, computer, food & beverages services, bakery, tailor, salon, cosmetics, wedding embellishment, animals raising, vegetables growing, fruits and vegetables processed, and other skills, this short-course training is conducted both in school and in community. Long-course training (one year and upper) including architecture, civil construction, electricity, electronics, mechanics, air-condition, automotive, entrepreneurship, accounting, computer science, information technology, telecommunications, business, tourism and other skills.

The TVET 1.5M aims to provide 1.5 million young people from poor and vulnerable households with free vocational training and a monthly allowance. The program offers a variety of courses in key sectors such as manufacturing, construction, electronics, tourism, digital technology, and automotive. TVET 1.5M aims to equip young people with the skills they need to secure employment and improve their livelihoods, thereby contributing to poverty reduction and economic growth in Cambodia. The key features of TVET 1.5M are: (1) free training, (2) monthly allowance: 280,000 riel (approximately US\$70) per month for living expenses (initial 4 months only), (3) diverse courses and (4) wide accessibility across different provinces.

**Table 5 Comparison of Skill Development Measures**

Policy and program	Alignment with Skill Development
Cambodia Industrial Development Policy 2015-2025	IDP is a long-term strategy that seeks to transform Cambodia's industrial structure from a labour-intensive to a skill-driven industry by 2025. Several objectives of IDP include the increasing industrial activities, increasing industrial and agro-industrial exports, economic resilience and diversification, improving the quality of employment, and maximizing domestic benefit.
Cambodia Skills Development Roadmap 2023-2035	This roadmap aims to produce a highly skilled workforce in Cambodia, responding to both current and future labor market needs. It focuses on strengthening the quality of Technical and Vocational Education and Training (TVET), enhancing branding and outreach, ensuring industry-relevant TVET, promoting good governance and leadership, and focusing on funding and sustainability.
Textile and Apparel (T&A) Industrial Transformation Map 2023-2027	This map aims to transform the T&A industry by focusing on four key areas: product mix and international trade, skilling and productivity, technology and sustainability, and infrastructure and governance. It addresses the need for skilled manpower, product diversification, and technology adoption in the T&A sector. Develops a skills framework for the T&A industry, establishes a Sector Skills Council (SSC) for the T&A industry, and develops advanced skillsets for the T&A industry.
Skill Development Fund (SDF)	The SDF is a funding mechanism that supports demand-driven skills development aligned with private sector needs. It focuses on key sectors such as manufacturing, construction, electronics, tourism, digital technology, and automotive, and offers upskilling, reskilling, and pre-employment training programs. It also provides funding for training programs and encourages public-private partnerships.
TVET	TVET provides competency-based training focused on technical and practical skills. It offers a variety of training programs aligned with Cambodia's Qualification Framework (CQF), ranging from short courses to Bachelor's and Master's degrees in technical fields.

## 5. Methodological framework for Analysing the Returns to Skills

The studies on returns on skills are limited and most of the studies are focused on the developed countries. The current studies are also focused on early career youths that tend to make the estimation biased and skewed (Hanushek and Woessmann, 2008; Haider and Solon, 2006). Furthermore, individual skills may take time to be revealed (Altonji and Pierret, 2001). Importantly, returns to skills may also depend on a country's specific labour market and social institutions. The literature has pointed out several

internal sources to the firms for these differences, including product innovation, investments in information technology and R&D, firm structure decisions, or human resource management practices, such as pay incentives, teamwork and investment in training (e.g., Acemoglu and Pischke 1998, Ichniowski et al. 1997).

In this section, we develop the framework for estimating the returns to skills for the Cambodian economy (which will be implemented in the next phase with the survey data).

### **5.1. Empirical Model of the Impact of Skills and Training on Productivity**

The impact of skills and training on the productivity and structural transformation of the Cambodian economy is undertaken with two empirical analyses.

### **5.2. Returns to Skills Study at Individual Level**

The returns to skills framework of Hanushek et al. (2015) using the extended Mincer wage framework (Mincer 1970, 1974). The study by Hanushek et al. (2015) provides the analytical and empirical framework to capture the return to skills, and the policy framework to understand the skills policy framework of the respective countries.

The extended Mincer equation is given as:

$$\ln Y_i = \beta_0 + \gamma S_i + \beta_1 E_i + \beta_2 E_i^2 + \beta_3 G_i + \varepsilon_i \quad \text{Equation (1)},$$

where  $Y_i$  is the hourly wage of individual labour  $i$ ,  $S_i$  is the average skill of the individual labour  $i$ ,  $E_i$  is years of actual labour market experience of individual labour  $i$ ,  $G_i$  is the gender variable, and  $\varepsilon_i$  is the stochastic term. The key variable in our analysis is coefficient  $\gamma$  that measures the impact of human capital and hence the 'return to skill (training)'. The study will consider a cross-sectional and panel data framework depending on the data collected from the tracer survey of the skills of workers. The key variable is the average skilled variable of the worker,  $S_i$ , that has to be measured at individual worker level and this is expected to be implemented through the tracer survey

(tracer survey of workers who have completed the training under MLVT and others, including industry-training provider partnering programs under the Skills Development Fund (SDF)) in the second phase. In our study, we capture skills by the level of training the individual attains through the training programmes under MLVT. The skills training programmes will be identified by horizontal and progressive skills training programme. For example, individuals who have undergone multiple training programmes under MLVT are considered as more skilled as opposed to individuals with only single training programme. We will also try to capture the public (training provided by MLVT) and private training provided by the firms. This will be captured under the tracer survey. We will also be able to use the individual scores of the training programmes of MLVT if they are available to capture the level of skills of individual workers<sup>14</sup>.

We also try to identify the impact of training of workers by different skilled worker as defined by the occupational categories as given in the footnote below. We will divide the sample by different skills categories to identify the impact of training programmes on individual income.

The survey will **be** cover the key sectors of (a) garment, textile, and footwear, (b) manufacturing of electronic and electrical parts, (c) automotive parts, and (d) agro processing. The individual hourly wages and other control variables at the individual level such as age, education, gender, household income, parent's educational attainment, etc. are expected to be obtained from Cambodian Economic Census data and Commune database.

### **5.3. Skills on Productivity Study at the Firm Level**

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<sup>14</sup> In Hanushek et al. (2015), skills are measured by the cognitive skills as given by the Programme for the International Assessment of Adult Competencies (PIAAC).

The second empirical analysis will examine the impact of skills on productivity at the sectoral and firm level. The empirical study will follow the framework of Cima et al. (2022) and Thangavelu, Kuoch, and Hing (2024). The study by Cima et al. (2022) provides the empirical framework of measuring the skill-index at the firm level and examines the impact of skills on the productivity of Portuguese manufacturing industries. Thangavelu, Kouch, and Hing (2024) examined the impact of skills on labour productivity using the Cambodian Economic Census level data of 2022. The framework adopted the simple Cobb Douglas production framework to study the impact of skills (share of skilled workers) and urban amenities on labour productivity at the firm level. The study highlights the impact of the share of skilled workers on the labour productivity of the manufacturing firms in Cambodia.

The empirical model of the impact of skills<sup>15</sup> on labour productivity at the firm level is given as:

$$y_{ft} = \alpha + \gamma S_{ft} + \beta X_{ft} + \eta_f + \vartheta_t + \varepsilon_{ft} \quad \text{Equation (2),}$$

where  $y_{ft}$  is the log of gross output value-added per worker of a firm  $f$  in year  $t$ ,  $S_{ft}$  is the skill-index measured by average skills index of firm  $f$  in year  $t$ ,  $X_{ft}$  is the firm level control variables such as number of workers, share of part-time workers, share of female workers, capital (investments), and second level polynomial of the tenure of the firm. The year dummy is given as  $\vartheta_t$  and the firm fixed effects is given as  $\eta_f$ . The key variable in our

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<sup>15</sup> The skills of workers will be defined as skilled, semi-skilled and unskilled in terms of the occupational status of the workers. The skilled workers are given as Managers, Professionals, Technicians and Associate Professionals. The semi-skilled workers are given as clerical support workers, service and sales workers, skilled agricultural, forestry and fishery workers, and craft and related trade workers. The unskilled workers are given as plant and machine operators and assemblers. We will use the ISCO-08 occupational classification to define the skilled, semi-skilled and unskilled workers in the analysis (see <https://ilostat.ilo.org/methods/concepts-and-definitions/classification-occupation/>).

analysis is the  $\gamma$  coefficient that captures the average workforce skills and its impact on the productivity of the firms.

We will adopt the simple framework of the skill-index with a weighted average of education, age (used as a proxy for experience and this could be captured in the survey) and public and private sector training of the workers at the firm level (Pfeifer and Wager (2014); Haltiwanger et al. (1999)). We will also adopt the second skill-index of workers as measured using Cima et al. (2022) framework that captures the worker's position in terms of education, age and ability (unobserved) distribution in each year respectively. The unobserved ability component is captured with a wage analysis with high dimensional fixed effects. The Cima et al. (2022) skill-index is given as:

$$Skill_{it} = a_{it,school} \times a_{it,age} \times a_{it,unobserved} \text{ Equation (3)},$$

where  $a_{it,school}$  is the worker  $i$  position in terms of education (years of schooling and also the highest educational attainment) in time  $t$  to overall average,  $a_{it,age}$  is the worker  $i$  position in terms of age in time  $t$  to the overall average, and  $a_{it,unobserved}$  is unobserved ability component of the worker  $i$ . We will follow closely the methodology adopted by Cima et al. (2022) in measuring the various components of skill-index at the firm level as given in Equation (3). For example, the unobservable component in Cima et al. (2022) is measured by a worker's fixed effects obtained from wage equation estimation. We will also explore other firm level skills measurements in the literature as given below at Table 6 based on the availability of data.

**Table 6: Measurements of Skills at Firm Level**

Papers	Skills Measurement at Firm Level
Hamilton et al. (2003)	Ratio between the maximum and the minimum individual productivity levels among all team members
Pfeifer and Wager (2014); Haltiwanger et al. (1999)	Share of workers by category: age, gender, education, qualification
Ilmakunnas and Ilmakunnas (2011)	Standard deviation and dissimilarity, variety and diversity indexes for age and education
Parrota et al. (2014)	Herfindahl indexes to measure the cultural, educational and demographic (age and gender) diversity
Iranzo et al. (2008)	Total within-firm skill dispersion decomposed into within and between-occupations. The skills is measured by the worker's fixed effect obtained from wage equation.
Portela (2001)	Measuring skill: a multi-dimensional index

Source: Cima et al. (2022).

#### 5.4. Data

The tracer study<sup>16</sup> in the second phase study on the trainees completed the training from MLVT and others, in particular the SDF, will be the key data to capture the skill-index (see Annex 4 for literature review of the tracer study and the expected list of key variables for the survey). The other primary data is from the Cambodia Economic Census 2022, provided by the National Institute of Statistics (NIS), to analyse industrial agglomeration, urban amenities, and their effects on firm productivity in Cambodia. The 2022 Economic Census offers detailed statistics on the distribution of establishments and persons engaged, including characteristics such as industry, size, legal status, type of ownership,

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<sup>16</sup> Tracer studies are used to identify the outcome of vocational training of workers by tracing the outcome after their training in terms of promotion, wage increase, employment retention, and improvement in their wage bargaining. See Trace Studies at ILO: <https://www.itcilo.org/courses/tracer-studies-measuring-impact-vocational-training>.

revenues, expenses, and regional location. This comprehensive dataset covers a wide range of establishments, including markets, factories, companies, handicraft businesses, online businesses selling goods and services, schools, universities, pagodas, hospitals, and health centres. There were 753,670 establishments in Cambodia. Compared with the results of the economic census 10 years ago, the number of establishments in 2022 increased by around 49%, with an annual growth rate of 3.7%. The decision to use the 2022 dataset is driven by several key reasons. Firstly, it provides the most recent and relevant information, reflecting the current economic landscape and business environment in Cambodia. Using the latest data ensures that the analysis is based on up-to-date statistics, which is crucial for accurately assessing the impact of industrial agglomeration and urban amenities on firm productivity. Additionally, the 2022 Economic Census includes a broader range of variables and more detailed information compared to previous censuses, allowing for a more comprehensive and nuanced analysis.

The Cambodia Economic Census 2022 collects detailed information on business establishments, including annual revenues from sales of goods and services. For entities that maintain a balance sheet or income statement, annual revenues are properly recorded and converted into US dollars. The total revenue is calculated as the sum of revenues from selling goods and supplying services. For entities without a balance sheet, total revenues are estimated by multiplying the average daily revenue by 365 (NIS 2023). This approach, adopted by the NIS in producing the final census report, ensures that even firms without formal accounting records are included in the analysis. As a result, it provides a more comprehensive and accurate representation of the economic landscape, capturing the full spectrum of business activities across Cambodia. The

census also collects detailed information on employment, capturing the total number of employees in each establishment. This includes self-employed proprietors, unpaid family workers, paid directors, regular employees, and other types of workers. See Annex 1 for more details on the data set required for the study.

### **5.5. Measure of Productivity**

In most firm-level empirical studies, two widely used measures of productivity are labor productivity and total factor productivity (TFP). These measures help in understanding the efficiency and performance of firms in utilizing their inputs to generate outputs.

**Labor productivity** is a straightforward measure, calculated as the ratio of total output (often proxied by sales or value-added) to the number of employees. It indicates how much output each worker produces on average, providing insights into the efficiency of labor use within the firm. Labor productivity is particularly useful in comparing productivity across firms or industries with similar labor input structures. On the other hand, **TFP** is a more comprehensive measure accounting for the contributions of all inputs used in production, including labor, capital, and sometimes intermediate inputs. TFP captures the efficiency with which a firm turns all its inputs into outputs, thereby reflecting technological progress, management practices, and other efficiency improvements that are not solely attributable to labor or capital. However, due to missing capital investment data, we used labour productivity as the measure of productivity in the study<sup>17</sup>. We observed that several seminal works, including Amiti and Wei (2009) and Lin, Li et al. (2011), use labor productivity in their productivity studies.

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<sup>17</sup> The study will include variety fixed effects to control for structural differences across sectors.

## **6. Key Policy Recommendations**

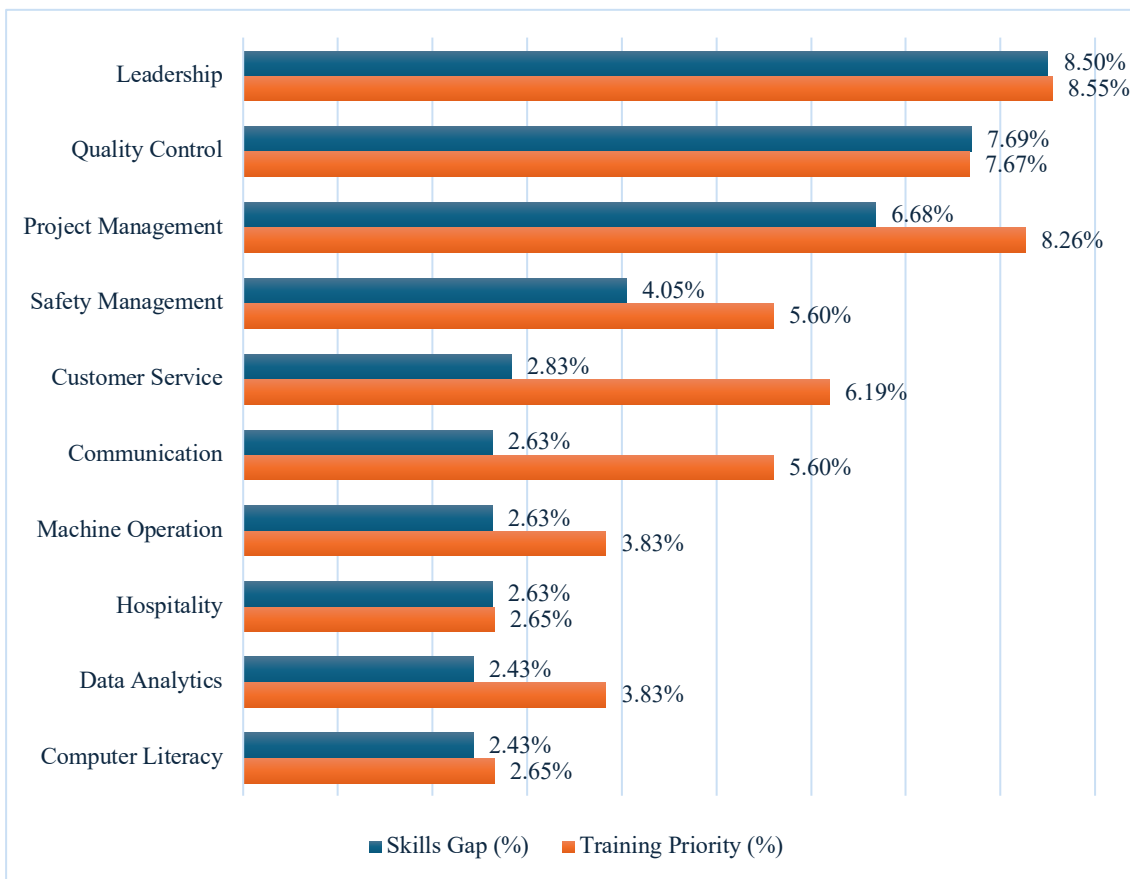
There are several key observations and policy recommendations from this study. The policy observations have to be verified with the second phase study on the returns on skills.

### **6.1. Poor quality human capital: lack of basic technical skills, and language and writing skills**

The skills shortages and gaps are the results of a complicated interaction of labour market mechanism under the economy, which is undergoing rapid structural transformation, including non-responsive training system. The problems cause the loss of competitiveness and increase costs for the firms and economy as a whole.

Although Cambodia has more than sufficient supply of labor, the majority of Cambodian workforce have attained education only at primary level. Most of the youths and unskilled rural surplus workers have been transitioning into the labor market, and the industrial and service sectors with inadequate skills. Though education attainment and basic literacy rate have risen remarkably in the past decades, Cambodia education and training systems have been viewed by all stakeholders as having yet to fully responsive to and impart graduates with all the needed skills for world of work, and the ever-changing economy and society. As skills shortages and gaps become more apparent, they have posed as a challenging constraint to industrial diversification and modernization of Cambodia's economy. Figure 16 outlines the skills gap and training priority across various sectors relevant to Cambodia's workforce development. This has to be verified in the second phase study.

**Figure 16. Skills gaps and training priorities reporting by employers**



Source: EuroCham skills gap assessment, 2024

Notably, *leadership* emerges as a critical area needing attention, with the highest skills gap of 8.50% and a training priority of 8.55%. This suggests a pressing need for enhancing leadership capabilities to drive organizational effectiveness and development in the country. *Quality control* and *project management* also indicate significant skills gaps at 7.69% and 6.68%, respectively, with substantial training priorities (7.67% and 8.26%). These figures highlight the importance of reinforcing standards and methodologies in production and project execution, essential for improving competitiveness in a global market.

Additionally, skills like *safety management* (4.05%) and *customer service* (2.83%) reflect a growing recognition of safety protocols and customer engagement, which are vital in

fostering a positive business environment. While *communication* and *machine operation* feature lower skills gaps of 2.63%, they remain relevant as foundational skills necessary for effective business operations. The data also underscores the need for ongoing training in *data analytics* and *computer literacy*, both of which are increasingly important in the digital age. Overall, this table serves as a valuable indicator for policymakers and training institutions in Cambodia, emphasizing the need to strategically target human resource development efforts to address existing skills gaps and enhance workforce readiness.

## **6.2. Poor system for training workers: current TVET and forward-looking government policies in training**

Given the lower education attainment, and growing skills shortages and mismatches, TVET plays a key role in upgrading the Cambodia's labour force skills and shifting economic and social structural changes and transformation. After re-gaining its important status in the government policy priorities and commitments, TVET system in Cambodia has been improved remarkably. However, it has yet to develop enough capacity to be responsive to the labour market demand and to supply sufficient quantity and quality of skilled labour.

Table 8 provides data on the number of Technical and Vocational Education and Training (TVET) graduates in Cambodia from 2013-2014 to 2022-2023.

**Table 8. Number of graduates in TVET, 2013 to 2023**

Type/Year of graduates	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
<b>Short-term (Public, Private, NGO)</b>	<b>75,229</b>	<b>45,934</b>	<b>23,220</b>	<b>22,438</b>	<b>38,887</b>	<b>46,138</b>	<b>36,221</b>	<b>25,187</b>	<b>24,735</b>	<b>25,904</b>
Public	63,034	27,686	17,800	16,233	29,656	38,818	27,697	17,467	12,595	8,282
Private, NGO	12,195	18,248	5,420	6,205	9,231	7,320	8,524	7,720	12,140	17,622
<b>Certificate I, II, III (Public)</b>	<b>1,246</b>	<b>714</b>	<b>1,229</b>	<b>2,135</b>	<b>2,168</b>	<b>3,178</b>	<b>4,610</b>	<b>14,721</b>	<b>15,817</b>	<b>13,815</b>
<b>Tertiary (Public, Private, NGO)</b>	<b>8,270</b>	<b>6,568</b>	<b>7,596</b>	<b>12,204</b>	<b>10,583</b>	<b>12,341</b>	<b>10,353</b>	<b>10,063</b>	<b>12,783</b>	<b>15,143</b>
Diploma, technician	2,740	2,565	2,768	4,179	4,908	5,884	4,673	4,595	5,666	5,854
Bachelor and postgraduate	5,530	4,003	4,828	8,025	5,675	6,457	5,680	5,468	7,117	9,289
<b>Total</b>	<b>84,745</b>	<b>53,216</b>	<b>32,045</b>	<b>36,777</b>	<b>51,638</b>	<b>61,657</b>	<b>51,184</b>	<b>49,971</b>	<b>53,335</b>	<b>54,862</b>

*Source: TVET Management Department, Ministry of Labor and Vocational Training, 2024*

Overall, the number of TVET graduates has increased over the years, with a peak in 2018-2019 and a slight decline in the following two years. Most graduates come from short-term programs, followed by tertiary education programs. Within tertiary education, the number of bachelor and postgraduate graduates has steadily increased, indicating a growing demand for higher-level technical skills. While the number of public and private TVET graduates has fluctuated over the years, the number of NGO graduates has shown a general upward trend, suggesting a growing role of NGOs in providing TVET education. The graduates by qualification level shows a growth in the number of graduates with diplomas and bachelor's degrees, indicating a shift towards higher-level technical skills. However, the number of graduates with certificates I, II, and III has also increased, suggesting a continued need for skilled workers at various levels.

For student numbers, during the last decade the total number of TVET graduates has increased more than 3 folds from less than 30,000 in 2004-05 to more than 90,000 in 2012-13 (Table 8). The number of graduates received secondary (certificate I, II, III) and tertiary TVET training, however, constitutes only a small fraction of total number of graduates. In addition, more than 90% of graduates received non-formal short-term

training. Given the large share of Cambodia's labor force having attained low education and living in rural area, non-formal training is essential for equipping them with proper skills to shift to industrial and service sectors, and to higher value-added agricultural activities. However, the current training is focused overwhelmingly on agriculture skills with little attention paid to impart skills for rural workers who plan to shift to industrial and service sectors.

It is clear that the TVET system in Cambodia is fragmented and has not supplied the right mixes of skills required by the labor market and for socio-economic development of the country. Though the CQF will provide more flexible pathways between education/ training and work, the system does not support the formal skilling of and provide access to those who have dropped out from school before finishing grade 9, and hence the lifelong learning for Cambodia's workforce. These are due to no existing frameworks for linkage of non-formal and informal training, and for recognition of prior learning and practical experience. Most importantly, there is proper quality assurance, accreditation and recognition in the training. From the demand side, TVET has been viewed negatively by employers and citizens as inferior and of poor quality. These issues arise from the lack of adequate legal framework, coherent governance and coordination, stakeholder engagement, proper quality assurance and accreditation system, and adequate financing.

The MLVT TVET Strategic Plan of Cambodia represents a comprehensive framework aimed at revolutionizing technical and vocational education and training within the country. Encompassed within it is the Strategic Action Plan for the period from 2019 to 2023, which concentrates specifically on elevating the quality and effectiveness of TVET programs across various sectors. Key initiatives within this plan include fostering

collaboration among diverse stakeholders, which is essential for harmonizing efforts and resources, as well as a strong emphasis on curriculum development to ensure that educational offerings are relevant and up to date with industry demands.

Moreover, the strategic plan prioritizes skill development for young people, recognizing that equipping the youth with the necessary competencies is vital for driving economic growth and enhancing employability. In addition to the immediate objectives, the Cambodia Skill Development Roadmap for 2023-2035 acts as a pivotal strategic document, steering stakeholders towards cohesive and aligned goals in TVET. This roadmap emphasizes a forward-looking approach, encouraging all stakeholders—from government bodies to educational institutions and private sector partners—to engage in structured planning and implementation of effective skill development initiatives that respond to both current labor market needs and future economic trends. Overall, the strategic plan and accompanying roadmap underscore Cambodia's commitment to building a skilled workforce capable of meeting the dynamic challenges of the global economy. However, there is a need for a comprehensive framework to evaluate and monitor the skills development in Cambodia. The second phase study will provide the framework and identify the key gaps in skills development and provide more calibrated pathway for skills development for the next phase of human capital development in Cambodia.

Cambodia's Technical and Vocational Education and Training (TVET) system is crucial in aligning the country's educational outcomes with the demands of a rapidly evolving economy. As the nation transitions from an agrarian economy to a more industrialized one, it requires a workforce skilled enough to thrive across diverse sectors. This shift

underscores the urgent need to develop a robust TVET framework that can effectively address existing challenges and seize new opportunities.

#### **6.2.1. Labor Market Information and Alignment with Economic Strategies.**

Efforts are underway to improve labor market information (LMI) systems and enhance the alignment of education with national economic development strategies. The Ministry of Labor and Vocational Training (MLVT) is collaborating with industry stakeholders to anticipate future skills needs and adapt training programs accordingly. Developing a robust LMI system that provides up-to-date data on workforce trends and future demands is essential. Encouraging multisectoral collaborations will further ensure that training programs are responsive to changing economic conditions and innovations.

Overall, Cambodia is on a promising path towards strengthening its TVET sector through legal reforms, quality enhancements, and strategic alignment with industry needs. Implementing these recommendations will foster the creation of a dynamic and effective TVET system, ultimately contributing to the country's sustainable economic growth and workforce development. The second phase study will strengthen the monitoring and information collection and labour market dissemination framework to reduce information mismatch on skilled development by workers and employers.

#### **6.2.2. Best Practices from Other Countries**

This study also identified best practices adopted by other ASEAN member countries. For example, countries such as Malaysia and the Philippines have implemented effective models for TVET teacher training. For instance, Malaysia's Centre for Instructor and Advanced Skill Training (CIAST) has successfully trained approximately 25,000 public TVET trainers and offers ongoing professional development opportunities. Similarly, the Philippines provides a "Train the Trainer" program focused on equipping instructors with

essential pedagogical skills. Both Malaysia and Australia have also developed TVET teacher capability frameworks that outline the necessary skills for effectively delivering and assessing CBT. In contrast, the National Technical Training Institute (NTTI) in Cambodia primarily emphasizes pedagogical skills, neglecting modern CBT approaches and the importance of industrial experience. The current teaching methods also fall short of promoting higher cognitive skills, such as problem-solving. Moreover, skilled workers who contribute to training have not been formally recognized or certified, limiting their pathways for professional advancement.

### **6.3. Lack of government and private funds for training and retooling workers: role of public private partnership (PPP)**

Fiscal and budget policies governing investment in skills development vary significantly across countries, shaped by national priorities and development objectives. While many nations focus on boosting productivity for economic advancement, others—such as the Philippines—emphasize cultivating human resources for the global export of skilled labor. Countries with well-developed skills policies benefit from substantial financial contributions from government budgets, as well as additional support from employers, industries, and individuals.

In Cambodia, however, Technical and Vocational Education and Training (TVET) is often undervalued and perceived as a secondary educational option, despite its potential to drive economic and social progress. Currently, public financing for TVET predominantly supports formal, centre-based institutions. Yet, numerous successful funding models worldwide demonstrate that a diversified financing approach is essential for effective skills development. For example, Australia strategically allocates government funding to mid- to high-level skills training tailored to industry needs.

At present, Cambodia lacks a clear and coordinated connection between national fiscal policies, industrial development strategies, and TVET goals. Similar to other developing countries, the funding for TVET in Cambodia mainly relies on government budgets, student fees, and supplementary sources such as grants and loans from development partners. This heavy reliance on external funding sources leaves the system vulnerable. Moreover, private TVET institutions are primarily financed through tuition fees, which can be prohibitively high for many students.

The prevailing perception of TVET in Cambodia—as low quality and lacking in rigor—deters investment and exacerbates concerns about inadequate quality assurance. Currently, public financing for TVET is insufficient to equip young people with the skills needed for competitiveness at both regional and national levels.

### **6.3.1. The Evaluation of New Programmes**

#### **Skill Development Fund (SDF)**

In 2018, SDF was established and it was a project to test a new and innovative co-financing mechanism to foster demand-responsive and sustainable skills development. SDF benefits from strong government support, signalling a commitment to skill development and LDC graduation goals. Its demand-driven approach ensures training programs are relevant to the private sector, and the partnership platform fosters effective collaboration between stakeholders. Since 2019, The Ministry of Economy and Finance has taken the lead in piloting the SDF through the ADB-financed Skills for Competitiveness Project.<sup>18</sup> The SDF has provided funds to train more than 121 projects with a total of 16,075 trainees in partnership with the private sector.<sup>19</sup>The proposed Skills

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<sup>18</sup> ADB. Cambodia: Skills for Competitiveness Project.

<sup>19</sup> SDF Annual Report 2023. <https://sdfcambodia.org/resources/english-sdf-annual-report-2023>

for Future Economy Sector Development Program will establish the SDF as a permanent fund to promote public–private partnerships. The program will mobilize resources from industry associations and other stakeholders to support TVET through the expansion and strengthening of the SDF. The SDF targets upskilling and/or reskilling prospective and existing workers from the industry to stimulate a demand-driven skills training project through public-private partnerships. Between 2018 and 2023, SDF has secured significant financial backing, with USD 8.31 million approved for projects. This funding comes primarily from the Royal Government of Cambodia and key development partners like the Asian Development Bank (ADB) and the French Development Agency (AFD). In 2023, the SDF pilot project was transformed into a permanent trust fund by the Royal Government of Cambodia under Sub-decree 97 RNKr.BK dated May 18, 2023, after successfully piloted and recognized by the government, private sector, and development partners. While SDF has made significant strides in supporting skills training, a critical weakness remains namely limited private sector involvement. The low numbers of participating business associations (16) and individual enterprise (297) in the SDF network reveal a lack of private sector engagement (Footnote 10).

### **The TVET 1.5M program**

TVET 1.5M aims to provide vocational training to 1.5 million young Cambodians from poor and vulnerable households, has several notable strengths. Additionally, the government's strong commitment to the program signals its importance in Cambodia's development agenda. Until now, approximately 42,449 individuals registered for skills training, and about 16,223 have already completed their courses.

However, Cambodia's TVET 1.5M program faces significant hurdles in preparing its workforce for the demands of Industry 4.0. The program's curriculum is outdated and

focuses on traditional skills instead of the cutting-edge technologies needed for the modern economy. This skills gap is reflected in the low employment rate of graduates, with only 5,181 out of 16,223 finding jobs after completing the program. A study of training programs in Cambodia found that 56% of training institutions surveyed have programs dedicated to 4IR skills development, while 71% reported plans to develop or expand programs for 4IR by 2025. Of training institutions surveyed, 62% stated that additional financial and technical support is needed for 4IR skills development.<sup>20</sup>

Moreover, the limited course offerings in certain provinces could restrict the program's reach and impact. Additionally, there may be a lack of awareness of the training opportunities among some demographics, hindering enrolment and participation. The program's potential shortage of professional and academic certifications could limit the recognition of acquired skills and their value in the job market. This highlights the urgent need for the TVET 1.5M program to modernize its curriculum and training methods to better align with the needs of Industry 4.0 and improve employment outcomes for its graduates. Additionally, industry engagement in the development and delivery of training modules is needed to overcome employers' concerns that job seekers lack foundational and soft skills to make them employable.

### **6.3.2. Recommendations for Improvement**

- **Develop a Comprehensive Skills Funding Strategy:** The Skill Development Fund in Cambodia is still at the initial stages. The Cambodian government should create a holistic funding strategy that aligns fiscal policies with industrial development and TVET objectives. This strategy should prioritize

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<sup>20</sup> Cambodia Academy of Digital Technology and Cambodia Development Resource Institute. 2021. Demand for and Supply of Digital Skills in Cambodia. Phnom Penh.

immediate industry needs as well as future skill requirements. The best practices could be adopted from ASEAN member countries such as Singapore and Malaysia.

- **Diversify Funding Sources:** Promote public-private partnerships (PPPs) to leverage additional funding. Implement co-investment models where the government, industry, and educational institutions collaborate to ensure mutual benefits and deliver quality education.
- **Enhance Public Perception of TVET:** Launch awareness campaigns to highlight the value and quality of TVET. Showcasing successful alumni stories and emphasizing the positive economic contributions of skilled professionals can help shift public perception.
- **Implement Performance-Based Funding:** Establish a performance-based funding system for TVET institutions that rewards providers based on outcomes such as graduate employment rates, employer satisfaction, and the alignment of training with market needs.
- **Strengthen Quality Assurance Mechanisms:** Introduce robust quality assurance frameworks to enhance credibility in the TVET system. This includes implementing certification and accreditation processes for programs and institutions, assuring stakeholders of the education quality provided.
- **Engage Stakeholders in Policy Development:** Foster collaboration among industry stakeholders, educational institutions, and community leaders to create and implement policies that address actual workforce demands, ensuring effective allocation of funding and resources.

- It is critical to evaluate the ‘returns to skills’ and mapping of skills to current emerging occupations in the Cambodian labour market to increase the policy implementation, monitoring and evaluation of policies as the economy emerges from LDC graduation. The next phase of this study will include:
  - Developing the analytical and empirical framework on “returns to skills” at individual and firm level with key monitoring indicators to evaluate and calibrate manpower policies in the Cambodian economy.
  - Develop the framework to analyse the impact of skills on firm level productivity using firm level data/
  - The tracer study will be undertaken to evaluate the pre- and post-outcomes of the skills training in the Cambodian labour market.<sup>21</sup>
  - Develop key new indicators on the “skills-needs” index at occupational using O-net framework<sup>22</sup>.

By adopting these recommendations, Cambodia can refine its fiscal and budget policies related to TVET, establishing a more effective and respected system that meets the needs of its economy and workforce. Ultimately, these changes will drive the nation’s growth and development.

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<sup>21</sup> The employee tracer study will be able to identify at the returns to skills training to retain and maintain themselves in the labour market in terms of wage increase and promotions. The employers tracer study will be able to identify the relevance of the skills training of workers in terms of wage increase, promotions and ability undertake more value-added activities in the respective companies.

<sup>22</sup> See labour market forecasting and O-net skills matching framework  
<https://www.bls.gov/opub/mlr/2021/article/mapping-employment-projections-and-onet-data.htm>

## References

- Amiti, M. and J. Konings (2007). "Trade liberalization, intermediate inputs, and productivity: Evidence from Indonesia." *American Economic Review* **97**(5): 1611-1638.
- Ann, Lee Hwok, 2024. "Malaysia's Progressive Wage Policy: Looming Questions for the Pilot Project", ISEAS-Yusof Ishak Institute, Issue: 2024, no. 48.
- Asian Development Bank (ADB). (2022). *Southeast Asia Rising from the Pandemic*. Manila: Asian Development Bank. Retrieved from <https://www.adb.org/sites/default/files/publication/779416/southeast-asia-rising-pandemic.pdf>
- Asian Development Bank (ADB). (2014). *Innovative strategies in technical and vocational education and training for accelerated human resource development in South Asia*. Asian Development Bank. Retrieved from <https://www.adb.org/publications/innovative-strategies-tech-voc-education-training-human-resource-development-south-asia>
- ASEAN Secretariat. (2021). ASEAN Work Plan on Education 2021–2025. ASEAN Secretariat. Retrieved from <https://asean.org/wp-content/uploads/2022/04/Public-Release-ASEAN-Work-Plan-on-Education-2021-2025.pdf>
- Baidybekova, S., & Sauranbay, S. (2022). The role of human capital in the economic development of countries. *Economy and Society*, *2*(111–125). Retrieved from <https://dx.doi.org/10.51176/1997-9967-2022-2-111-125>
- Berezhnaya, A. (2019). Human capital role in the formation of regional investment-innovative systems. *Regional Economics and Management*, *10*, 12–15. Retrieved from <https://dx.doi.org/10.36683/2500-249x-2019-10-12-15>
- Bartel, A. P. and F.R. Lichtenberg. (1987), The Comparative Advantage of Educated Workers in Implementing New Technology, *Review of Economics and Statistics*, *69*, 1-11.
- Caparas, M. V. G. (2016). Intra-ASEAN Labor Mobility: AEC's Continuing Story of Unity in Diversity. *Singapore: ASEAN Economic Integration in Southeast Asia*. DOI: [10.1142/9789813141674\\_0006](https://doi.org/10.1142/9789813141674_0006).
- Cima, Joana, Miguel Portela, Ana Catarina Pinata, Martin Silva, 2022. "Workforce Skills and Firm Productivity", Working Paper, Economics and Research Department, Banco de Portugal, Portugal.

- Economic Planning Unit Malaysia. (2021). Twelfth Malaysia Plan (2021–2025). Economic Planning Unit. Retrieved from [https://www.ekonomi.gov.my/sites/default/files/flipping\\_book/TwelfthPlan/mobile/index.html](https://www.ekonomi.gov.my/sites/default/files/flipping_book/TwelfthPlan/mobile/index.html)
- Emelyanov, S., & Nekrasova, N. (2016). The leading role of human capital in the process of countries' progressive economic development. *Economic Annals*, 157(5). Retrieved from <https://dx.doi.org/10.21003/EA.V157-0005>
- Fang, Z., & Chang, Y. (2019). Human capital and productivity growth in ASEAN countries for 2000–2010: A Malmquist Index Analysis. *Shanlax Journal of Economics*. Retrieved from <https://dx.doi.org/10.34293/economics.v7i4.555>
- Golikova, N. V., Tovmach, L. N., Melnikova, M., & Romanova, O. N. (2019). Perspectives of regional human capital development in the context of economic digitalization. Retrieved from <https://dx.doi.org/10.17308/MEPS.2019.2/2048>
- Hanushek, E. A., & Woessmann, L. (2015). The knowledge capital of nations: Education and the economics of growth. *MIT Press*.
- Hanushek, Eric A, Guido Schwedt, Simon Wiederhold, Ludger Woessman, 2015. "Returns to Skills around the World: Evidence from PIAAC", *European Economic Review*, 73, pp. 103-130.
- Haltiwanger, John C., Julia I. Lane, and James R. Spletzer (1999). "Productivity Differences across Employers: The Roles of Employer Size, Age, and Human Capital." *The American Economic Review*, 89(2), 94–98.
- Hamilton, Barton H., Jack A. Nickerson, and Hideo Owan (2003). "Team Incentives and Worker Heterogeneity: An Empirical Analysis of the Impact of Teams on Productivity and Participation." *Journal of Political Economy*, 111(3), 465–497.
- Ilmakunnas, Pekka and Seija Ilmakunnas (2011). "Diversity at the workplace: Whom does it benefit?" *De Economist*, 159(2), 223–255.
- Iranzo, Susana, Fabiano Schivardi, and Elisa Tosetti (2008). "Skill dispersion and firm productivity: An analysis with employer-employee matched data." *Journal of Labor Economics*, 26(2), 247–285.
- Ho, Terence, 2023. "The Growing Scope and Impact of the Progressive Wage Model", *Singapore Labour Journal*, 2023.
- Kim, M., & Su-Hong, P. (2019). Deliberation for integrated regional human resource development. *Journal of Regional Policy Studies*, 21(4), 7–10. Retrieved from <https://dx.doi.org/10.46260/KSLP.21.4.7>

- Ky, S. 2023. Labor Demand Forecasting: The case of Cambodia. *Bulletin of Applied Economics*, 10(2), 89-105. doi: 10.47260/bae/1025
- Lin, H.-L., H.-Y. Li and C.-H. Yang (2011). "Agglomeration and productivity: Firm-level evidence from China's textile industry." *China Economic Review* 22(3): 313-329.
- Lonska, J., & Mietule, I. (2015). The impact of human capital development on the economic and social development of a country: Empirical study. *Economic and Regional Research Journal*, 2(268). Retrieved from <https://dx.doi.org/10.17770/ETR2015VOL2.268>
- Mukhametova, A. (2020). Managing the development of the region through the use of human capital. *European Proceedings of Social and Behavioural Sciences*, 10, 37. Retrieved from <https://dx.doi.org/10.15405/epsbs.2020.10.03.37>
- National Economic and Social Development Council. (n.d.). *Thailand's Economic Corridors Development*. Retrieved November 25, 2024, from [https://www.nesdc.go.th/ewt\\_dl\\_link.php?filename=social&nid=13553](https://www.nesdc.go.th/ewt_dl_link.php?filename=social&nid=13553)
- Nimmo, S. (2019). *The Older Worker*. In P. A. Nylén (Ed.), *Occupational Medicine* (pp. 123–139). Oxford University Press. DOI: [10.1093/MED/9780198808657.003.0007](https://doi.org/10.1093/MED/9780198808657.003.0007).
- Nguyen Mau Duc, N. Q. Linh, & C. Yuenyong. (2019). *Situation of organizing STEM activities in Vietnamese Schools*. Published in the *Journal of Physics: Conference Series*. DOI: [10.1088/1742-6596/1340/1/012030](https://doi.org/10.1088/1742-6596/1340/1/012030)
- Parrotta, Pierpaolo, Dario Pozzoli, and Mariola Pytlikova (2014). "Labor diversity and firm productivity." *European Economic Review*, 66, 144–179.
- Pfeifer, Christian and Joachim Wagner (2014). "Age and gender effects of workforce composition on productivity and profits: Evidence from a new type of data for German enterprises." *Contemporary Economics*, 8(1), 25–46.
- Portela, Miguel (2001). "Measuring skill: a multi-dimensional index." *Economics Letters*, 72(1), 27–32.
- Sanso-Navarro, M., Vera-Cabello, M., & Ximénez-de-Embún, D. P. (2017). Human capital spillovers and regional development. *Journal of Applied Economics*, 24(2). Retrieved from <https://dx.doi.org/10.1002/JAE.2541>
- Schwab, K. (2020). The Fourth Industrial Revolution. *World Economic Forum*. Retrieved from <https://www.weforum.org/about/the-fourth-industrial-revolution-by-klaus-schwab/>

- SkillsFuture Singapore. (2023). Lifelong learning framework for workforce adaptability. Retrieved from <https://skillsfuture.sg>
- TESDA. (2021). TESDA online programs and K to 12 alignments. Technical Education and Skills Development Authority. Retrieved from <https://tesda.gov.ph>
- Thangavelu, Shandre Mugan, Somean Kuoch, Vutha Hing, 2024. “Labour Market Dynamics, Productivity, and Skills in Cambodia: Firm Level Analysis”, presented at the Second Workshop, 5<sup>th</sup> Phase Study on Services and GVC, 25-26 July 2024, ERIA, Jakarta.
- Thangavelu, Shandre Mugan, 2023. “Pandemic Shock, Structural Transformation, and Structured Training in Singapore”, ERIA Working paper, forthcoming.
- Thangavelu, Shandre Mugan, and Wang Wenxiao, 2021. “Skills and Human Capital Policies of ASEAN”, in Fukunari Kimura, Mari Pangestu, Shandre Mugan Thangavelu, and Christopher Findlay edited “Handbook of East Asian Economic Integration”, 2021, Edward Elgar, U.K.
- Thangavelu, Shandre Mugan, 2017. “Innovation, Foreign Labor and Sustainable Growth in Small Open Economy: Dynamic Model for Singapore Economy”, Journal of Economic Integration, vol. 32(3), pp. 723-758.
- Thangavelu, Shandre Mugan, 2016. “Productive contribution of local and foreign workers in Singapore manufacturing industries” Journal of Economic Studies, Vol 43 issue 3, 2016.
- UNESCO. (2020). Global education monitoring report, 2020: Inclusion and education: all means all. United Nations Educational, Scientific and Cultural Organization. Retrieved from <https://doi.org/10.54676/JJNK6989>

## Annex 1

### Key Variables for Skills and Productivity Study at the Firm Level

Variable	Description
<b>Workforce characteristics</b>	
Wage	Real hourly wage (base wage and regular benefits divided by the normal monthly hours of work) in 2019 euros
Schooling	Number of schooling years <sup>a</sup>
Tenure	Number of years at the firm
Age	Worker's age
<b>Firm characteristics</b>	
Log of value-added per worker	Logarithm of gross value-added <sup>b</sup> in 2019 euros divided by the number of workers
Log of value-added per hour	Logarithm of gross value-added in 2019 euros divided by the number of hours worked (normal and overtime monthly hours multiplied by the 11 months of work per year)
Percentage of female	Share of female workers at the firm
Percentage of part-time	Share of part-time workers at the firm
Log of firm size	Logarithm of the number of workers at the firm
Average tenure	Average of workers' tenure at the firm

## **Annex 2:**

### **Literature Review: Enhancing Skills Training for Rural Workers in Vietnam's TCLF Sector**

#### **Introduction**

The Textile, Clothing, Leather, and Footwear (TCLF) industry is a cornerstone of Vietnam's economic landscape, contributing substantially to national exports and providing employment to millions of workers. Despite its strategic importance, the sector faces critical challenges, particularly among rural workers who comprise a significant portion of its workforce. These challenges include limited access to formal skills training, geographic isolation, and misalignment between training programs and the industry's specific demands. A comprehensive approach integrating innovative solutions is required to address these pressing issues. This literature review aims to provide an in-depth analysis of rural-focused skills training initiatives in Vietnam's TCLF sector, emphasizing mechanisms such as public-private partnerships (PPPs), digital learning platforms, mobile training units, and gender-targeted programs. Drawing on key studies and reports, this review evaluates the impacts of these interventions and identifies pathways for enhancing their effectiveness to foster sustainable development and equitable workforce opportunities.

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#### **Challenges in Rural Skills Development**

##### **Geographic Isolation and Limited Access**

The majority of TVET institutions are concentrated in urban centers, creating a disparity in access to formal training for rural workers. Geographic isolation further exacerbates this divide, as transportation costs and time commitments deter many from participating in training programs. According to the Asian Development Bank (ADB, 2020), only 30% of

rural workers have access to formal TVET programs, compared to 70% in urban areas. This lack of accessibility significantly limits rural workers' opportunities for skill enhancement and career progression, perpetuating income and employment inequalities between urban and rural regions. Innovative solutions such as mobile training units and digital learning platforms are being explored to bridge this gap.

### **Financial Barriers**

Low-income rural households face significant financial hurdles in accessing skills training, as evidenced by the ADB (2020) assessment. Transportation costs remain a critical challenge, especially for trainees in remote areas who must travel long distances to reach training centers. Material costs, including specialized tools like sewing machines or digital devices, add another layer of financial strain. Moreover, opportunity costs—the income foregone while attending training—further discourage participation. Despite the presence of government subsidies, 60% of rural trainees reported financial barriers as a primary reason for non-enrolment. To address these issues, initiatives such as scholarships, travel stipends, and subsidized training materials are being explored to reduce these barriers and enhance access.

### **Outdated Infrastructure**

Many rural training centers lack modern equipment and facilities, significantly limiting their ability to deliver practical, industry-aligned training. For instance, several centers rely on outdated sewing machines and manual tools that are incompatible with the automated technologies widely used in modern TCLF factories (ILO, 2024). This equipment mismatch not only reduces the effectiveness of training but also diminishes the trainees' readiness for employment in competitive industrial settings. To address this, initiatives are underway to modernize infrastructure, such as upgrading to digital

sewing machines and introducing computer-aided design (CAD) tools, which have been shown to improve trainees' skill levels and employability (ADB, 2020). For example, a pilot program in Binh Duong provided rural training centers with advanced embroidery machines, leading to a 30% increase in graduate employment rates within automated production facilities (ILO, 2024). Additionally, integrating TCLF-specific modules within Vietnam's National Qualification Framework (NQF) can ensure standardized skill certifications, offering clear competency descriptors to meet international quality benchmarks.

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### **Mobile Training Units**

Mobile training units have effectively addressed rural training challenges by bringing practical, industry-relevant courses directly to remote communities. These units, equipped with essential tools like industrial sewing machines, provide short-term, hands-on training tailored to TCLF industry needs.

- **Impact on Accessibility:** In Thanh Hoa province, localized delivery through mobile training units demonstrated a significant impact by reducing travel costs and increasing training participation by 40%. This improvement was particularly pronounced among rural women, who often face logistical and financial barriers to attending traditional training centers. For example, surveys conducted during the program highlighted that over 60% of participants cited proximity and affordability as key reasons for enrolling. Additionally, the program's focus on tailoring schedules to community needs further supported attendance, creating pathways for women to access opportunities previously out of reach (ADB, 2020).

- **Flexible Scheduling:** Mobile training programs have significantly improved accessibility for rural workers by integrating flexible scheduling that caters to their unique time constraints. Many participants, particularly women, must balance training with household or agricultural duties. By adapting to their availability, these programs have achieved a 25% increase in completion rates. For instance, tailored sessions conducted during off-peak hours enabled women in Thanh Hoa province to pursue garment assembly courses without disrupting their daily responsibilities. Moreover, feedback from trainees highlighted that such flexibility reduced dropouts by 30%, emphasizing its importance in creating sustainable learning opportunities (ILO, 2024).

### **Case Study: Thanh Hoa Mobile Training Project**

The Thanh Hoa project focused on garment assembly training for rural women. Equipped with portable sewing machines, trainers provided a four-week intensive course that covered basic stitching techniques and quality control. Over 80% of graduates secured jobs in nearby factories, contributing to a 15% increase in household incomes within the region (ADB, 2020). The Thanh Hoa project focused on garment assembly training for rural women. Equipped with portable sewing machines, trainers provided a four-week intensive course that covered basic stitching techniques and quality control. Over 80% of graduates secured jobs in nearby factories, contributing to a 15% increase in household incomes within the region (ADB, 2020).

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### **Community-Based Training Centers**

Localized training centers play a crucial role in bridging geographic and economic barriers by offering TVET programs directly within rural communities. These centers work

closely with local governments and TCLF firms to design region-specific curricula that address the unique needs of local industries. For instance, in the Quang Ngai province, training centers have introduced specialized modules in leather crafting and shoe manufacturing, catering to the region's demand for skilled labor in these sectors (ADB, 2020). Additionally, such collaborations have led to the development of practical training programs that include hands-on experience and job placement initiatives, with many centers reporting employment rates exceeding 85% among graduates (ILO, 2024). These efforts not only improve accessibility but also align skills training with the economic priorities of rural communities, fostering localized development and reducing rural-to-urban migration.

### **Impact on Employment**

In Mekong Delta provinces, community-based centers have played a pivotal role in fostering employment pipelines for nearby garment and footwear factories. These centers collaborate with local industries to ensure their curricula align with specific skill demands, such as precision stitching, quality control, and machine maintenance. The centers boast an 85% job placement rate, with graduates consistently filling roles in production and quality assurance departments. Moreover, targeted career support initiatives, including mock interviews and job-matching services, have further enhanced the employability of trainees. According to ILO (2024), the integration of practical, hands-on experience with classroom training has led to higher retention rates in these roles, with 70% of graduates remaining employed in the same factories after one year.

### **Enhanced Industry Alignment**

Collaborations with TCLF enterprises play a critical role in ensuring training aligns with the dynamic demands of the industry. For instance, training centers in Quang Ngai have

introduced specialized programs in leather crafting and shoe manufacturing, addressing the region's industrial focus. These programs include practical hands-on modules and partnerships with local factories to provide real-world experience, which have resulted in a 20% increase in productivity in local production facilities (ADB, 2020). Additionally, these collaborations have fostered a steady pipeline of skilled workers who are immediately employable, reducing hiring and onboarding costs for enterprises.

### **Case Study: Mekong Delta Training Centers**

Community training centers in the Mekong Delta have demonstrated remarkable success in addressing the region's skills gap. A specialized program focused on shoemaking and leather crafting attracted over 500 rural participants annually, offering both theoretical and hands-on training tailored to local industry needs. This program worked in collaboration with local footwear factories to provide apprenticeships, ensuring trainees gained practical exposure to industry operations. Post-training evaluations highlighted that 75% of participants were employed within three months, with many graduates securing positions in supervisory roles. Additionally, average earnings among trainees increased by 18% compared to non-trained workers (ILO, 2024).

The program also incorporated essential soft skills workshops, covering areas such as communication, teamwork, and leadership, which improved workplace adaptability. Factory managers reported that graduates from the program were 30% more productive and showed a 40% higher retention rate than hires without formal training. This success has prompted similar centers to expand their modules to include quality control and machine operation, further addressing the specific needs of the TCLF sector while enhancing both worker competencies and industrial efficiency (ADB, 2020).

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## **Public-Private Partnerships (PPPs)**

Public-Private Partnerships (PPPs) have been integral to advancing rural training initiatives in Vietnam by leveraging private sector resources and expertise. These collaborations ensure training programs are not only industry-relevant but also sustainable and aligned with cutting-edge technological advancements. For example, PPPs have enabled the introduction of updated curricula in vocational schools, focusing on high-demand skills such as textile testing and garment assembly. Additionally, these partnerships have contributed to upgrading training infrastructure, including providing digital sewing machines and CAD tools, which significantly enhance the practical skills of trainees. Such coordinated efforts ensure that training aligns closely with evolving industry standards, addressing the critical skills gap in rural areas.

## **Curriculum Development**

Public-Private Partnerships (PPPs) play a critical role in aligning vocational training curricula with the evolving demands of the TCLF industry. By collaborating with vocational colleges, private sector partners provide invaluable resources and insights to ensure training programs reflect modern industry standards and practices. For instance, Vinatex, a leading textile firm, has partnered with educational institutions to develop curricula that focus on high-demand skills such as textile testing, garment assembly, and pattern-making. These programs are periodically updated to include innovations like automated stitching systems and eco-friendly production methods, ensuring their relevance to contemporary industry needs (ADB, 2020). Furthermore, PPPs enable the integration of practical, hands-on learning modules, giving trainees exposure to real-world scenarios and increasing their employability. This approach not only bridges the

skills gap but also enhances the long-term sustainability of training programs in rural Vietnam.

### **Infrastructure Investment**

Infrastructure investment through Public-Private Partnerships (PPPs) has been critical in addressing the inadequacies of rural training facilities in Vietnam's TCLF sector. According to the Asian Development Bank (2020), many rural centers lack essential equipment such as digital sewing machines and CAD tools, which are standard in modern factories. Through PPPs, companies such as Vinatex have provided co-financing and direct contributions to upgrade these facilities. For instance, a project in Binh Duong province funded by private sector partners equipped training centers with automated embroidery machines, leading to a 30% improvement in graduate employment rates within automated production facilities (ADB, 2020).

These investments extend beyond equipment. The partnerships have also supported the renovation of training spaces to meet industry standards, ensuring that rural trainees are exposed to environments that replicate actual factory conditions. Additionally, industry contributions have enabled the provision of training materials and resources that otherwise would be unaffordable for many rural training institutions. These measures have not only enhanced the quality of training but also directly aligned rural skill development programs with the needs of high-tech TCLF production units.

### **Employment Pathways**

Public-Private Partnerships (PPPs) have significantly contributed to creating direct employment pathways for rural workers in Vietnam's TCLF sector. According to the International Labour Organization (ILO, 2024), many programs supported by PPPs include guaranteed job placements for trainees, particularly in partner factories and

enterprises. For instance, a PPP initiative in Quang Nam between a leading leather goods manufacturer and local training centers ensured that 90% of graduates secured employment within three months of program completion. These employment guarantees, paired with on-the-job training during apprenticeships, allow graduates to transition seamlessly into the workforce while addressing the skills demand of TCLF enterprises.

Additionally, PPPs facilitate mentorship programs where trainees gain insights from experienced professionals within the industry. In rural areas such as the Mekong Delta, mentorship opportunities have led to a 25% faster adaptation period for trainees in factory settings compared to those without prior exposure to such support mechanisms (ADB, 2020). By fostering strong employment linkages, PPPs are addressing both immediate workforce needs and long-term career development for rural workers.

### **Case Study: Vinatex Vocational Partnership**

Vinatex, one of Vietnam's largest textile firms, exemplifies the potential of PPPs in rural training. In partnership with vocational schools across rural areas, Vinatex provided substantial funding for the procurement of training equipment, the development of digital modules, and faculty training programs. Over 2,000 trainees annually participated in these courses, covering topics such as garment assembly, textile innovation, and sustainability practices. With 85% of graduates securing employment in Vinatex-affiliated factories, this partnership has become a benchmark for successful PPP models in the TCLF sector (ADB, 2020). In partnership with rural vocational schools, Vinatex provided funding for training equipment and faculty development. Over 2,000 trainees annually participated in courses on garment assembly and textile innovation, with 85% securing employment in partner firms (ADB, 2020).

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## **Digital Learning Platforms**

Digital learning platforms have become pivotal in revolutionizing skills development in Vietnam's TCLF sector. These platforms address critical accessibility challenges, especially for rural workers, by providing remote learning opportunities that overcome geographic and infrastructural barriers. For example, the "e-Vietnam" initiative facilitated the provision of internet connectivity and digital devices in rural training centers, enabling thousands of trainees to participate in virtual modules (ADB, 2020). Furthermore, these platforms equip workers with advanced technical skills such as computer-aided design (CAD) and automated stitching through virtual simulations and augmented reality tools, which enhance precision and productivity. Sustainability-focused modules, like those emphasizing water-efficient dyeing and eco-friendly production, align training outcomes with the growing demand for green manufacturing in the global market. In Quang Ngai, a program integrating digital tools reported a 40% increase in employment opportunities for participants within environmentally conscious firms, underscoring the transformative impact of technology-driven training solutions (ADB, 2020; ILO, 2024).

## **Flexibility and Accessibility**

Digital platforms have significantly reduced geographic barriers for rural workers by enabling remote access to training programs. The Ministry of Education and Training's "e-Vietnam" initiative, for example, facilitated the provision of internet connectivity and digital devices to TVET centers, allowing thousands of trainees to engage in virtual learning environments. A notable implementation was a pilot program in Ha Tinh province, where over 1,000 participants enrolled in garment design courses. This program achieved a 60% increase in course completion rates and a 70% job placement

rate within six months of graduation (ILO, 2024). The program's success was attributed to its focus on interactive modules, real-time feedback, and curriculum alignment with industry needs. Additionally, this model has proven scalable, offering a blueprint for expanding digital learning to other underserved regions.

### **Advanced Technical Training**

Digital tools, including virtual simulations and augmented reality (AR), have significantly enhanced training methodologies in Vietnam's TCLF sector. Virtual simulations provide trainees with a risk-free environment to practice complex tasks such as garment assembly and pattern-making, ensuring skill refinement without the wastage of materials. For example, training programs utilizing these simulations have reported a 30% improvement in trainees' accuracy and a notable reduction in material costs (ADB, 2020).

Augmented reality tools further complement these efforts by providing real-time guidance during tasks, enabling trainees to visualize and execute production processes with higher precision. AR-based modules implemented in rural training centers have demonstrated a 25% decrease in production errors and faster skill acquisition among trainees. Moreover, these technologies align training programs with industry-standard practices, ensuring that graduates are equipped to handle automated and semi-automated production environments prevalent in modern TCLF operations. The integration of these digital tools bridges the gap between traditional training methods and contemporary industrial requirements, preparing a workforce that meets both national and global standards (ADB, 2020).

## **Sustainability-Focused Modules**

Eco-friendly practices have become a cornerstone of digital learning curricula, reflecting the growing emphasis on sustainable production in the global TCLF sector. Modules focusing on water-efficient dyeing, waste recycling, and natural fibre sourcing have equipped trainees with the skills needed to excel in environmentally conscious export firms. A notable example is the Quang Ngai sustainability-focused training program, which integrated these practices into its curriculum. This program reported a 40% increase in employment opportunities for its graduates, many of whom secured roles in firms prioritizing green manufacturing techniques (ADB, 2020). Furthermore, these programs align with Vietnam's broader goals of meeting international environmental standards, enhancing both employability and industry competitiveness.

## **Case Study: Ha Tinh Digital Learning Initiative**

The Ha Tinh initiative exemplifies the transformative potential of digital learning in Vietnam's TCLF sector. It delivered a comprehensive curriculum focusing on garment design, production management, and sustainability practices, utilizing interactive modules and real-time feedback mechanisms. According to the ILO (2024), the program achieved a remarkable 90% job placement rate, with trainees reporting an average 25% increase in income compared to peers in traditional training programs. Furthermore, the initiative introduced modules on eco-friendly practices such as water-efficient dyeing and waste reduction, preparing participants for roles in environmentally conscious export firms. The program's success underscores the importance of integrating technology and sustainability into skills training to enhance both employability and economic outcomes.

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## **Gender Inclusion in Skills Training**

Women constitute the majority of the TCLF workforce in Vietnam; however, they are disproportionately concentrated in lower-paying, low-skill roles, often excluded from managerial or supervisory positions. Gender-focused training programs have been implemented to address these inequities by equipping women with the necessary technical and managerial skills to advance their careers. For example, programs supported by the International Labour Organization (ILO, 2024) and the Asian Development Bank (ADB, 2020) emphasize leadership training in production supervision, quality control, and sustainable manufacturing practices. These initiatives have resulted in tangible outcomes, including a 20% increase in women's average earnings and a higher representation in decision-making roles across TCLF enterprises. Furthermore, targeted efforts to upskill women have also contributed to improving workplace diversity and productivity, showcasing the broader economic benefits of gender inclusion.

## **Empowering Women Through Training**

In Mekong Delta provinces, programs offering leadership training in quality control and production management have enabled women to transition into supervisory roles. These programs, often supported by public-private partnerships and local enterprises, provide targeted skill enhancement in both technical and managerial areas. According to the Asian Development Bank (2020), participants in these programs have not only seen an average 20% increase in earnings but also experienced a higher likelihood of career progression into leadership positions. For example, a partnership initiative in Vinh Long involved mentorship sessions and practical workshops that resulted in 60% of female participants advancing to supervisory roles within a year. Additionally, these programs

contributed to broader workplace changes, including improved gender equity and productivity, as women began taking on decision-making roles traditionally dominated by men.

### **Case Study: Sustainable Textile Production Training**

A training initiative in Quang Nam focused on sustainable textile practices, such as eco-friendly dyeing and fabric recycling. Conducted in partnership with local TCLF enterprises and supported by the International Labour Organization (ILO), this program targeted rural women who traditionally had limited access to advanced technical skills. Over 75% of participants were women, and the program emphasized hands-on training using low water dyeing techniques and natural dye sources to align with global sustainability trends.

### **Impact and Outcomes**

- **Employment:** Many graduates secured roles in quality assurance and compliance departments of export-oriented firms, with 65% of participants reporting job promotions within six months of program completion.
- **Earnings Increase:** Women trainees experienced a 20% average increase in monthly income post-training.
- **Community Engagement:** The program also involved awareness campaigns about sustainable practices, engaging over 500 community members to understand the environmental impact of conventional textile production.

### **Stakeholder Involvement**

- **Local Enterprises:** Partner companies provided access to their production facilities for practical training sessions, ensuring real-world applicability of skills.

- **Government Support:** Local government agencies co-financed the training and helped scale its reach to neighbouring provinces.
- **Global Alignment:** The ILO provided technical guidance to ensure that the training adhered to international labor and environmental standards.

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### **Data on Gender Disparities**

A 2024 survey conducted by the International Labour Organization (ILO) revealed significant gender disparities in Vietnam's TCLF sector. The survey covered over 1,500 rural women workers across provinces like Quang Nam and the Mekong Delta. Results indicated that 65% of respondents felt underqualified for managerial or supervisory roles, citing limited access to advanced technical training as a major barrier. Furthermore, 70% reported that financial constraints and societal norms restricted their opportunities for career progression.

### **Insights from Stakeholder Interviews**

Interviews with employers and training facilitators reinforced the need for targeted interventions to bridge gender disparities in the TCLF sector. Employers emphasized that while women dominate production roles, they often lack access to leadership and technical training required for supervisory positions. For instance, a factory manager in Quang Nam stated, "While women dominate production roles, pathways into management remain inaccessible due to inadequate training opportunities." This

sentiment is echoed by training facilitators, who pointed out that societal norms and cultural barriers further restrict women's participation in advanced education and leadership programs.

In Mekong Delta provinces, targeted training programs have begun addressing these issues by combining leadership modules with culturally sensitive outreach. One such initiative resulted in 60% of participating women advancing into supervisory roles within a year, demonstrating the potential of tailored approaches to empower women in the TCLF sector (ADB, 2020).

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## **Recommendations**

1. **Expand Mobile Training Programs:** Increase the number and reach of mobile units to cover more remote areas and diversify training offerings.
2. **Invest in Digital Infrastructure:** Improve internet connectivity and provide affordable digital devices to rural communities.
3. **Strengthen PPPs:** Offer incentives to private sector partners to co-finance training programs and expand their reach.
4. **Promote Gender Equity:** Develop more gender-focused training initiatives to empower women in technical and leadership roles.
5. **Enhance Sustainability Training:** Integrate green production techniques into all TCLF training curricula to meet global market demands.

By addressing these areas, Vietnam can ensure a skilled, inclusive, and sustainable workforce for its TCLF industry, reinforcing its position in the global market while fostering equitable economic development.

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## **Conclusion**

The comprehensive review of Vietnam's TCLF sector highlights the transformative potential of targeted skills training initiatives for rural workers. Mobile training units, community-based centers, public-private partnerships, and digital platforms have proven effective in addressing accessibility, financial, and technical challenges. Additionally, gender-focused programs and sustainability-oriented curricula have fostered inclusivity and aligned Vietnam's workforce with global demands for environmentally friendly production practices.

Despite significant progress, gaps remain in infrastructure, funding, and scalability of programs. Addressing these issues through expanded digital learning infrastructure, stronger public-private collaboration, and a broader focus on gender equity will be essential for sustainable growth. Vietnam's TCLF sector stands at a pivotal juncture, where the integration of innovative training solutions can ensure a skilled and inclusive workforce, strengthening its competitiveness in the global market.

## **References**

1. Asian Development Bank (2020). *Vietnam: Technical and Vocational Education and Training Sector Assessment*.
2. International Labour Organization (2024). *Advancing Decent Work in Vietnam*.

### **Annex 3: Literature Review of Tracer Studies in Selected Countries**

Tracer studies have become an essential tool for evaluating the effectiveness of higher education in preparing graduates for the workforce. These studies track graduates after their transition from academia to employment. They provide critical insights into the relevance of curricula, the employability of alumni, and the alignment of educational programs with labor market demands (Schomburg, 2016). The increasing emphasis on accountability in higher education has further propelled the adoption of tracer studies. By systematically collecting and analysing alumni data, institutions can assess their impact on career paths, education applicability, and areas needing improvement (Gines, 2014). The ability to obtain real-time feedback on graduates' professional journeys allows universities to tailor their programs more effectively, ensuring they remain relevant to changing industry demands.

Tracer studies use various methodologies, including surveys, interviews, and mixed-method approaches. The study conducted at Universitas Negeri Surabaya employed a quantitative survey to collect data from Educational Management graduates (Andari et al., 2021). Meanwhile, the Philippine Normal University study combined surveys and structured interviews to explore employment characteristics and job satisfaction (Sira & Valenciana, 2018).

More advanced methodologies now incorporate digital tracking systems, leveraging alumni networks, LinkedIn profiles, and other online professional platforms to gather more reliable employment data. Some institutions have also turned to big data analytics and artificial intelligence to refine how they track graduate employment outcomes and assess long-term career development trends. These technological integrations help

address the limitations of traditional survey methods, which often suffer from low response rates and biased self-reporting (ILO, 2017).

Timing is a crucial aspect of tracer studies. Some studies collect data six months post-graduation, while others recommend waiting up to three years for more accurate employment information (Schomburg, 2016). Standardized tracer questionnaires, such as those in Indonesia, ensure consistency in data collection across institutions (Sitepu, 2018). While quantitative methods offer statistical insights, qualitative methods, such as in-depth interviews, help understand graduates' experiences in various job sectors (ILO, 2017). The inclusion of follow-up surveys every few years enables institutions to capture career progression, shifts in employment sectors, and the role of continued education in long-term professional success.

Tracer studies contribute significantly to understanding education-to-employment transitions. Findings from Indonesia's vocational education sector highlight the importance of these studies in assessing graduate employability from technical and vocational education and training (TVET) programs (Asian Development Bank, 2020). Many graduates find employment related to their field, though a significant number report a skills mismatch, indicating a need for curriculum adjustments (ETF, 2016).

In the Philippines, the Commission on Higher Education (CHED) mandates institutions to conduct tracer studies for accreditation purposes (CHED, 2014). The Iloilo Science and Technology University study found that skills learned during pre-service training strongly influenced employment outcomes (Sira & Valenciana, 2018). Graduates from institutions with industry partnerships had higher employment rates than those from less industry-connected programs (ILO, 2017). Strengthening collaborations between academia and industry can help ensure graduates are well-prepared for evolving job

market demands (Schomburg, 2016). In response, many universities are now integrating work-based learning opportunities such as internships, apprenticeships, and industry-linked projects to better prepare students for real-world employment challenges.

Despite their advantages, tracer studies face several limitations. A major challenge is maintaining contact with graduates, resulting in low response rates (ETF, 2016). Many institutions struggle with alumni engagement, especially when graduates relocate or change contact details. Efforts to improve participation include leveraging social media, alumni networks, and institutional databases (ILO, 2017). Some universities have adopted incentive-based strategies, such as offering career support services, networking opportunities, or even monetary compensation, to encourage graduate participation in tracer surveys.

Another issue is the reliability of self-reported data. Graduates may provide biased responses about their employment status or job satisfaction. Triangulation methods, such as incorporating employer feedback and labor market data, can improve accuracy (Asian Development Bank, 2020). Additionally, inconsistencies in study design make cross-institutional comparisons difficult (Schomburg, 2016). The lack of longitudinal data further limits the ability to track career progression beyond initial employment (ILO, 2017). Given that employment trends are highly dynamic, the need for continuous and structured graduate follow-ups is paramount.

The findings from tracer studies have broad implications for curriculum development, accreditation, and labor market policies. Educational institutions can use tracer data to refine curricula, ensuring that graduates acquire skills that meet industry demands (CHED, 2014). Studies from Indonesia and the Philippines suggest that incorporating practical, industry-relevant training improves employability (Sira & Valenciana, 2018).

Many studies emphasize the need for competency-based curricula that prioritize both skills development and theoretical knowledge (Asian Development Bank, 2020).

Policymakers can use tracer study data to design workforce development programs aligned with economic goals. In Indonesia, integrating tracer study findings into the IQF framework has helped align higher education with labor market needs (Sitepu, 2018).

National education policies should emphasize systematic data collection and institutional collaboration to improve employment tracking (ILO, 2017). Mandating tracer studies within policy frameworks ensures a data-driven approach to education planning (ETF, 2016). Further, policymakers should invest in the digitization of tracer studies, allowing for real-time labor market data collection and analysis. AI-driven analytics can enhance understanding of how graduate employment trends evolve, enabling more agile responses to shifts in industry demands.

Given rapid labor market changes, tracer studies must continually adapt to capture relevant information. Future studies should examine the impact of automation, artificial intelligence, and the gig economy on employment trends (Schomburg, 2016). Expanding beyond traditional employment metrics can provide a more holistic view of graduate outcomes and inform lifelong learning strategies (ILO, 2017). Another area for improvement is integrating longitudinal tracer studies. Tracking graduates over extended periods provides insights into career progression, skill adaptability, and long-term employability trends (ETF, 2016). Such data can help institutions develop continuous professional development programs for graduates (Asian Development Bank, 2020). Institutions should embed tracer studies within a larger feedback mechanism that informs institutional strategy and policymaking (ILO, 2017). Many universities are also

exploring partnerships with technology firms to develop digital career tracking systems that offer real-time insights into graduates' professional journeys.

## **Conclusion**

Tracer studies play a pivotal role in evaluating higher education's effectiveness and ensuring graduates are well-equipped for the workforce. Research underscores their utility in curriculum development, accreditation, and labor market analysis (Schomburg, 2016). While challenges exist in data collection and reliability, best practices such as systematic data gathering, employer engagement, and alumni tracking enhance their effectiveness (ILO, 2017).

Integrating tracer studies into national education policies can strengthen links between education and employment, contributing to a more skilled and adaptable workforce (Asian Development Bank, 2020). By adopting comprehensive methodologies, leveraging digital tools, and fostering institutional collaboration, tracer studies can offer deeper insights into employment trends. These measures will ensure that graduates are not only employable but also capable of thriving in dynamic economic environments.

TRACER STUDIES SUMMARY					
Paper Title	Author	Motivation	Methodology	Data	Results
<b>Tracer Study of CIT Technology Programs Graduates</b>	Sira & Valenciana (2018)	To evaluate the employability, skill relevance, and satisfaction levels of CIT graduates from 2008–2014, aligning with outcome-based education (OBE) and ASEAN integration goals.	<b>Quantitative survey</b> targeting cohorts of graduates (2008–2014). Standardized questionnaires measured employment status, skill application, and satisfaction. Data analysed using descriptive statistics.	Data collected from surveys of graduates across 13 specialization programs.	High employability (>80%) in related fields. Graduates praised technical skills but noted gaps in soft skills (e.g., communication). Satisfaction with infrastructure was moderate; recommendations for enhancing facilities and curriculum updates were highlighted.
<b>Educational Management Graduates: A Tracer Study from Universitas Negeri Surabaya</b>	Andari et al. (2021)	To assess employment and satisfaction outcomes of educational management graduates in Indonesia and align curriculum with national labour market demands and accreditation systems.	<b>Quantitative surveys and qualitative focus groups</b> targeting graduates from 2019–2020. Surveys captured employment, skill relevance, and satisfaction. Descriptive and inferential statistics analysed outcomes.	Survey responses from 2019–2020 graduates and input from employers.	<b>65% alignment of jobs with field of study</b> , strong ratings for technical competencies but soft skill deficiencies noted. Recommendations include faculty training, curriculum updates, and career guidance. Regional inequities in outcomes identified.
<b>Indonesia: Vocational Education Strengthening Project</b>	Asian Development Bank (2020)	To improve vocational education quality, expand access, and promote decentralization. The project aimed to address workforce skill gaps in Indonesia’s Labor market.	Project evaluation combining <b>survey-based feedback</b> and <b>qualitative case studies</b> from participating vocational schools. Emphasized alignment with national policy frameworks and labour market demands.	Data from 90 model vocational schools, including infrastructure improvements, teacher training outcomes, and graduate employment statistics.	Employment rate improvement within participating schools. Positive outcomes in technical skills but underemployment persisted. Decentralized management highlighted as both a strength and a challenge due to capacity gaps in under-resourced areas. Curriculum reform suggested.
<b>Experiences and Results of the Utilization of Tracer Studies in Curriculum Development in Indonesia</b>	Sitepu (2018)	To use tracer study results to revise curricula, identify skill gaps, and ensure alignment with Labor market needs under the Indonesian Qualifications Framework (IQF).	Mixed-methods approach using <b>quantitative surveys</b> and <b>qualitative competency mapping</b> . Targeted employer feedback and alumni self-reports to evaluate curriculum impact.	Tracer data from multiple HEIs, employer perspectives on workforce readiness, and qualitative graduate feedback.	Findings drove curriculum updates, particularly in integrating digital skills and soft skills (e.g., teamwork). Recommendations included strengthening employer-academic collaboration and improving data

					collection systems for tracer studies.
<b>Guide to Anticipating and Matching Skills and Jobs: Carrying Out Tracer Studies (Volume 6)</b>	ILO, ETF, and Cedefop	To provide a practical framework for conducting tracer studies, ensuring alignment between training outcomes and labour market needs, and standardizing methodologies.	Framework-based methodology, focusing on designing surveys, collecting data, and analysing graduate outcomes. Includes examples from Germany, Tanzania, and Vietnam.	Case studies, survey templates, and analytical guidelines.	Tracer studies improved curriculum alignment and resource allocation in vocational training programs. Successful examples included dual education models (Germany) and targeted skill-building in high-demand sectors (Vietnam). Challenges included low response rates and data inconsistencies.
<b>Tracer Study of PNU Graduates</b>	Philippine Normal University (Gines, 2014)	To evaluate how teacher education programs prepared graduates for the workforce, particularly during the ASEAN integration and K–12 basic education reforms in the Philippines.	<b>Descriptive research design with quantitative surveys</b> targeting 2009–2011 graduates. Cross-tabulations assessed skill relevance, employment rates, and satisfaction with facilities and services.	Data from teacher education graduates across 13 undergraduate specializations .	<b>80% employment rate</b> , strong alignment with teaching roles but noted underemployment in administrative roles. Gaps in communication and leadership training identified. Recommendations for modernizing teaching aids and career support systems provided.
<b>Tracer Study of Philippine Graduates: Bridging the Gap Between Higher Education and Employment</b>	Multiple HEIs in the Philippines	To assess how well higher education programs in the Philippines prepared graduates for employment, focusing on employability, job relevance, and curriculum alignment.	Mixed-methods approach combining graduate surveys and employer interviews. Sampling across public and private institutions, with cross-tabulations used to explore outcomes across regions and disciplines.	Survey data from graduates and qualitative employer feedback.	<b>75% employment rate</b> , but only <b>60% job alignment</b> . Employers noted deficiencies in soft skills (e.g., teamwork, communication) and digital literacy. Recommended career counselling enhancements, better job placement services, and stronger industry-academic partnerships.

## References

- Andari, S., Setiawan, A. C., Windasari, & Rifqi, A. (2021). Educational Management Graduates: A Tracer Study from Universitas Negeri Surabaya, Indonesia. *International Journal of Recent Educational Research*.
- Asian Development Bank. (2020). *Indonesia: Vocational Education Strengthening Project*. ADB Independent Evaluation Report.
- CHED. (2014). *Commission on Higher Education Handbook*.
- ETF. (2016). *Guide to Anticipating and Matching Skills and Jobs: Carrying Out Tracer Studies*.
- Gines, A. C. (2014). Tracer Study of PNU Graduates. *American International Journal of Contemporary Research*.
- ILO. (2017). *Skills Anticipation: Evaluating the Impact of Training Programmes*.
- Schomburg, H. (2016). *Carrying Out Tracer Studies*. European Training Foundation.
- Sira, K. S., & Valenciana, D. S. O. (2018). Tracer Study of CIT Technology Programs Graduates. *American International Journal of Contemporary Research*.
- Sitepu, I. V. (2018). Experiences and Results of the Utilisation of Tracer Studies in Curriculum Development in Indonesia.