Skilled workforce in ASEAN region: Issues, challenges, and way forward

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Abstract
Southeast Asia is one of the most dynamic and fastest growing regions in the world. With a total of 646 million people and a wealth of natural resources, the region has an expanding middle class as well as a young, dynamic and increasingly well-educated population. Nevertheless, within the region, many workers are still engaged in informal employment, frequently for long hours, without reliable income and social protection coverage.¹ The region, especially the ASEAN-5 countries (Singapore, Malaysia, Thailand, Indonesia, and the Philippines), lacks industry-ready skilled workers, despite its vibrant demography. Brunei has difficulties in equipping its labour force with the necessary research and development skills, while CLMV (Cambodia, Lao, Myanmar and Vietnam) economies broadly lack coherent technical education, necessary for industrial development.² ASEAN’s renewed commitment in enhancing the quality of its human resources, recently expressed in the ASEAN Declaration on Human Resources Development for The Changing World of Work, highlights the importance of skill development through various modes (formal, non-formal, and informal learning) as an integral part of lifelong learning. This paper provides background regarding the current state of the workforce in ASEAN, including issues and challenges as well as the regional and national initiatives implemented in response. The paper also offers recommendations, especially related to human resources development through TVET, as means of addressing the existing employment issues.

1. Background
ASEAN member states (AMS) have very diverse social, economic and political backgrounds. To provide a context, this section describes the existing human resources, especially the quality of the workforce, their participation in the labour force, and the education and training provisions.

1.1 Existing skilled workforce

Table 1. Workforce indicators of ASEAN Member States

<table>
<thead>
<tr>
<th></th>
<th>Brunei</th>
<th>Cambodia</th>
<th>Indonesia</th>
<th>Lao PDR</th>
<th>Malaysia</th>
<th>Myanmar</th>
<th>Philippines</th>
<th>Singapore</th>
<th>Thailand</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCI (rank)³</td>
<td>62.82</td>
<td>57.28</td>
<td>62.19</td>
<td>58.36</td>
<td>68.29</td>
<td>57.67</td>
<td>64.36</td>
<td>73.28</td>
<td>66.15</td>
<td>62.19</td>
</tr>
<tr>
<td></td>
<td>(58)</td>
<td>(92)</td>
<td>(65)</td>
<td>(84)</td>
<td>(33)</td>
<td>(89)</td>
<td>(50)</td>
<td>(11)</td>
<td>(40)</td>
<td>(64)</td>
</tr>
<tr>
<td>Labour force Participation rate (%)</td>
<td>65.6</td>
<td>82.6</td>
<td>67.2</td>
<td>78.2</td>
<td>67.7</td>
<td>64.7</td>
<td>63.5</td>
<td>68.3</td>
<td>69.0</td>
<td>77.4</td>
</tr>
<tr>
<td>Unemployment rate (%)</td>
<td>7</td>
<td>0.2</td>
<td>5.5</td>
<td>0.7</td>
<td>3.5</td>
<td>0.8</td>
<td>5.5</td>
<td>1.8</td>
<td>0.2</td>
<td>2.1</td>
</tr>
</tbody>
</table>

² https://theaseanpost.com/article/strengthening-aseans-labour-force
³ The Global Human Capital Report 2017. HCI’s components: Capacity -- Level of formal education of younger and older generations as a result of past education investment (25%), Deployment -- Formal education of the next-generation workforce and continued upskilling and reskilling of the current workforce (25%), Development -- Skills application and accumulation among the adult population (25%), Know-how -- Breadth and depth of specialized skills use at work (25%). Know-how: High skilled employment share, medium-skilled employment share, economic complexity, availability of skilled employees.
The table shows that HCI (Human Capacity Index) which measures human resource capacity, deployment, development, and know-how, AMS range in performance from the highest (rank 11 in the world) Singapore to the lowest, rank 92 (in the world), Cambodia. The indicators on labour force participation and unemployment rate are problematic as some AMS still have a high rate of informal employment thus it is difficult to get accurate figures of labour force participation rate and unemployment rate. This is particularly true in Cambodia, Indonesia, Lao PDR, Myanmar, Philippines, and Vietnam. Pertaining to the output per worker, which is the level of total output divided by the number of workers employed, Singapore is the highest, followed by Brunei Darussalam, Malaysia, Thailand, Indonesia, and the last is Myanmar. Some countries, like Singapore and Brunei have significantly more high-skilled employment share (above 40%) while others have low high-skilled employment share. For the medium-skilled employment share, all AMS has significantly high proportion, above 60%. The availability of skilled employees, Malaysia, Singapore, Indonesia, and Philippines have sufficient number (above 4 of 1-7 scale, 7 being the best), and the rest are below 4 or even below 3 in the case of Myanmar.

### 1.2 Education and training for skilled workforce

**Table 2. Education and training indicators and funding of ASEAN Member States**

<table>
<thead>
<tr>
<th>Public spending in education (% of GDP)</th>
<th>Brunei</th>
<th>Cambodia</th>
<th>Indonesia</th>
<th>Lao PDR</th>
<th>Malaysia</th>
<th>Myanmar</th>
<th>Philippines</th>
<th>Singapore</th>
<th>Thailand</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary education enrolment rate</td>
<td>99.0</td>
<td>95.6</td>
<td>92.9</td>
<td>92.7</td>
<td>98.1</td>
<td>94.5</td>
<td>96.8</td>
<td>79.1</td>
<td>90.8</td>
<td>98.1</td>
</tr>
<tr>
<td>Secondary education</td>
<td>88.8</td>
<td>46.1</td>
<td>80.0</td>
<td>56.6</td>
<td>87.3</td>
<td>52.5</td>
<td>64.6</td>
<td>75.4</td>
<td>80.4</td>
<td>97.0</td>
</tr>
</tbody>
</table>
On the public spending for education, Vietnam spent the highest percentage of its GDP for education (5.7%), followed by Malaysia (5.0%), Brunei, Thailand, Indonesia, Lao PDR, Singapore, Philippines, Cambodia and Myanmar (1.2%). Only Vietnam and Malaysia have spent for education close to OECD average (5.1%). Enrolment at secondary education is low in Cambodia and Myanmar, 46.1% and 52.5% respectively. Vocational education enrolment in Indonesia (upper secondary level/ISCED level 3) is the highest in the region (42.4%), followed by Malaysia, Thailand, Brunei, Cambodia and Lao PDR; Philippines, Myanmar and Vietnam have no data available. This enrolment is below the high performing countries on HCI, such as Norway, Switzerland, and Germany with 50.1%, 65.7%, and 46.8% respectively. Singapore has the highest tertiary enrolment (69.8%) followed by Thailand (48.9%), Philippines (35.8%), Indonesia (31.1%), Brunei (30.8%), and the lowest are Myanmar and Cambodia (13.5% and 13.1% respectively). Quality of education system in Singapore was perceived to be the best in the region (5.9), followed by Malaysia (5.3), Brunei and Indonesia (same score), Philippines, Lao PDR, Thailand, Vietnam, Cambodia, and Myanmar. The high performing countries on HCI, such as Norway, Switzerland, and Germany have quality of education system scores of 5.4, 6.2, and 5.3 respectively. The Extent of staff training in Singapore is also considered the best (5.5, the highest score in the region), followed by Malaysia (5.3), Philippines, Indonesia, Brunei, Thailand, Vietnam, Lao PDR, Cambodia, and Myanmar. Norway, Switzerland, and Germany have scores for this area of 5.5, 5.7, and 5.2 respectively.

### 2 Regional and national TVET initiatives in ASEAN region

#### 2.1 Regional Initiatives

There are two main regional organisations that promote TVET in Southeast Asia: (1) ASEAN (The Association of Southeast Asian Nations) and (2) SEAMEO (Southeast Asian

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4 % of total enrolment in upper secondary education (ISCED 3), following completion of compulsory general (basic) education.

Ministers of Education Organisation). Other international organisations, such as ILO and UNESCO have contributed significantly to TVET in the region, but considering that their focus is not only for AMS, this paper will not elaborate on the details of their services. Assistance from developed countries such as Germany, Switzerland, Australia, and many others are also very meaningful to the development of TVET in the region but normally it targets individual countries rather than the region as a whole except from Germany through the GIZ-RECOTVET programme. The latter has been working in the region in the area of TVET personnel since 2017 or even before under the name of Regional Cooperation Platform (RCP). In the past few years, GIZ-RECOTVET has been instrumental in supporting the development of regional knowledge platform for TVET (SEA-VET.NET), Regional TVET Teacher Standard, and capacity building for TVET personnel on IR 4.0-related courses, in partnership with SEAMEO VOCTECH. Other significant contributions are the development of Quality Toolbox for TVET teachers, private sector engagement that produced Future ASEAN Agenda for TVET, and regional policy dialogues in collaboration with ASEAN Secretariat and other partners.

SEAMEO has developed priority areas (Seven Priority Areas of 2015-2035) and ASEAN has developed strategic goals stipulated in the ASEAN Workplan on Education 2016-2020. In response to issues and challenges on education for work, SEAMEO Priority Area 4 is specifically targeted for TVET and states: “Promoting TVET among learners, teachers, and parents with more visible investment and relevant curricula that focuses on creativity and innovation with a clear pathway to Lifelong Learning (LLL), Higher Education (HE), and regional mobility.” In this priority area, SEAMEO has come up with the Action Agenda 2018 covering recognition of non-formal education, development of competency standard, students and staff exchange, Massive Online Open Courses (MOOCs), annual High Officials Meeting on Southeast Asian TVET. 

Under the ASEAN Work Plan on Education 2016-2020, Sub-goal 4 states: “Support the development of TVET and Lifelong Learning” through Priority Area (4.1) Maximizing access to TVET for employment and sustainable development, (4.2) Strengthening regional harmonisation for the advancement of quality TVET transformation through networking, partnerships and mobilization of TVET personnel and resources, (4.3) Establishing regional quality assurance and recognition for TVET and/or non-degree (diploma or certificates only) institutions, and (4.4) Reducing the gaps between vocational skills demand and supply across ASEAN.

In response to the SEAMEO Priority number 4 and ASEAN Sub-goal 4, the following is a list of significant initiatives.

a. **TVET Consortium.** Consortium for TVET institutions to increase opportunities for cross-border TVET internship, apprenticeship, academic exchange, SEA-TVET consortium was established in 2015 with the objectives: (1) to create networking among TVET providers, (2) to provide opportunities for participating institutions to work together in student and

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staff exchange and industrial attachment; and (3) to share best resources/practices and
to generate new/innovative ideas through research collaboration.\(^8\)

b. **Quality assurance.** There are a few initiatives that support the development of quality assurance in TVET; among others (1) East Asia Summit-TVET Quality Assurance Framework, June 2012\(^9\), (2) the ASEAN Guiding Principles for Quality Assurance and Recognition of Competency Certification Systems, August 2016\(^10\), (3) Guidelines for the Quality Assurance of TVET Qualifications in the Asia-Pacific Region by UNESCO-Bangkok\(^11\), and (4) Quality Toolbox for better TVET Delivery: Practical Instruments for TVET Teachers and Managers, December 2019.\(^12\)

c. **Regional standards for TVET personnel.** Two regional standards were completed, for TVET teachers and in-company trainers. The first edition of Regional TVET Teacher Standard was completed in July 2017\(^13\) and the revision was completed in March 2020. The standard for In- Company Trainers in ASEAN Countries was completed in March 2019\(^14\).

d. **Regional Knowledge Platform for TVET.** A regional knowledge platform for TVET in Southeast Asia, called SEA-VET.net has been launched in 2018 and the new feature on IR 4.0 and digitalisation was added in September 2019.

e. **Mobility of professional and skilled workers in ASEAN.** To facilitate the mobility of professionals and skilled workers in ASEAN, two significant arrangements have been agreed through Mutual Recognition Arrangements for professionals and Mutual Recognition of Skills for skilled workers. Eight (8) areas of Mutual Recognition Arrangements (MRA) have been signed by relevant ASEAN ministries\(^15\): (1) MRA on Engineering Services (9 December 2005), (2) MRA on Nursing Services (8 December 2006), (3 & 4) MRA on Architectural Services and Framework Arrangement for the Mutual Recognition of Surveying Qualifications (19 November 2007); (5&6) MRA on Medical Practitioners and MRA on Dental Practitioners (26 February 2009); (7) MRA Framework on Accountancy Services (26 February 2009) and subsequently as MRA on Accountancy Services (13 November 2014); and (8) MRA on Tourism Professionals (9 November 2012).

Mutual Recognition of Skills (MRS) is to facilitate the mobility of skilled workers in ASEAN Member States (AMS). ILO has been supporting the ASEAN Member States (AMS) on Mutual Recognition of Skills since 2012 by facilitating a series of consultation meetings to push forward the implementation of the MRS. Started with Cambodia, Lao PDR, and Myanmar, then Thailand, Philippines, Vietnam in areas such as plastering, masonry,
bricklaying, building electrical wiring, sewing machine operation, transport and logistics.\textsuperscript{16}

f. **Qualification Framework.** The ASEAN Qualification Reference Framework (AQRF) endorsed by the ASEAN Economic Ministers in August 2014 and the ASEAN Labour Ministers in May 2015 aims to accommodate different types of National Qualification Frameworks (NQFs) that are at different stages of development.\textsuperscript{17} At present, AMS have been working on the referencing process; 4 countries (Malaysia, Philippines, Thailand and Indonesia) have completed the referencing report.

### 2.2 National Initiatives

The national initiatives listed below were based on the papers presented by TVET High Officials appointed as the Governing Board Members for SEAMEO VOCTECH, the Regional Centre for TVET under SEAMEO. The country-level initiatives included in this section are those created in the last 10 years that have shaped TVET development in the respective country.

**Brunei.** TVET transformation is carried out by renaming the institution, course restructuring, expansion of apprenticeship options, reviewing progression opportunities, upgrading the training environment, introducing a new scheme of teaching service, and renaming of Department of Technical Education (DTE) to Institute of Brunei Technical Education (IBTE) and the seven vocational and technical institutes (VTIs) under it. Establishment of Brunei Polytechnic in 2012 was also a significant step in preparing higher level TVET in Brunei.

**Cambodia.** The country has been strengthening TVET through programmes that reduce poverty and achieve socio-economic development for all Cambodians through: (a) promotion of vocational and skills training to ensure continuing improvement in national productivity; (b) creation of jobs in the formal and non-formal sectors; (c) an increase in agricultural productivity to create jobs in rural areas; and (d) the establishment of technical vocational education and training (TVET) networks to assist both men and women, especially the poor, disabled and vulnerable, to respond to labour market needs. (ADB’s Strengthening TVET project).

**Indonesia.** The country has been revitalising TVET at the secondary level by (a) creating a roadmap for SMK (secondary Vocational schools), (b) improving the curriculum and synchronising it with the employers’ expectations (link and match), (c) increasing the quantity and the competence of teachers and other TVET personnel, (d) strengthening the collaboration with other Ministries/Bureaus, local governments, and industries, (e) enhancing the access to certification for SMK graduates and accreditation for SMK, and (d) establishing a taskforce to develop SMK.

Revitalising polytechnics was aimed at empowering and preparing polytechnic’s and diploma’s graduates ready for employment according to the needs of industry or society. These would be achieved by (a) strengthening collaboration with industry, (b) 50 per cent of

\textsuperscript{16} https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/documents/project/wcms_707535.pdf
the trainers will be recruited from industry, (c) curriculum adjustment to meet the needs of industry and (d) professional certification and competency assessment can take place in polytechnics.

Realising the pivotal roles of TVET for economic and social development, the President of Indonesia issued the Presidential decree No 82/2019 which emphasises the importance of streamlining the structure of the organization in all ministries and brought about new directorates, one of them being the Directorate General of Vocational Education effective from December 2019. Before this, there was no high-level management at the level of directorate general, only at the level of directorate managing vocational education under the Ministry of Education.\(^{18}\)

There are many other ministries overseeing TVET, but coordination is still very scarce. By appointing the Coordinating Ministry for Economic Affairs to lead the revitalisation of TVET, it is hoped that the communication barrier and lacking coordination would be addressed.

**Lao PDR.** Strengthening TVET project in Lao PDR is carried out through (a) increasing number of skilled workers in the labour force with formal TVET qualifications by 25% (50% increased for females) from 2011 to 2021, (b) providing accessible formal vocational training system that is more responsive to labour market needs which eventually create impact of more highly skilled and diverse workforce in Lao PDR, (c) using ADB’s Strengthening TVET Project, the intended outputs include improved quality of TVET, increased and more equitable access to TVET, increased private sector involvement in TVET strategy and delivery, strengthened governance and management of the TVET system, and effective project management and implementation. Other important initiative is the Technical and Vocational Education and Training Development Plan 2016-2020 which aims to promote the continuous development and systematization of TVET. Another significant achievement was the development of TVET Laws in Lao PDR that passed in 2013.

**Malaysia.** The country is carrying out a TVET transformation through (a) announcing steps to transform TVET in preparation high skilled workforce for Industry 4.0 and digital economy, (b) Developing a TVET Masterplan that will be coordinated by the Ministry of Human Resources (MoHR) and Ministry of Higher Education (MoHE) with the assistance of all other Ministries related to TVET, (c) Until 2025, the government is working to train and increase the number of trained teachers in TVET, targeting 20,000 more vocational trainers, (d) providing skills training to the people from bottom 40% income households or B40 (300,000 people), (e) strengthening Public-private partnerships (https://www.opengovasia.com/; Oct 28, 2017).

TVET has been a national agenda and the government of Malaysia has committed to promote TVET as a prime educational choice. To improve the image and TVET’s relevance seventy two (72) existing vocational schools and eight (8) technical schools were upgraded into vocational colleges.

**Myanmar.** The country has been undergoing major transformations from a closed to a more open economy that is more engaged in regional/global markets. It is also moving from

dependence on natural resource exploitation to balanced development “including industry and service sectors”, and from low-skilled to and higher skill and value-added. To transform TVET, the country has conducted a comprehensive education sector review including (1) Drafted 2015 TVET Law and developed 2013 Employment and Skills Development, (2) Establishment of new TVET Council reorienting TVET toward a demand-driven, competency-based approach, expanding access to TVET for the disadvantaged youth/workers, and increase private sector participation. (Sai Kyaw Naing Oo, 2015), and (3) Completed Comprehensive TVET system review in Myanmar in 2019 by the Ministry of Education, DTVET, in partnership with UNESCO and GIZ to support the development of rules and regulations which provide guiding principles to TVET policymakers in Myanmar.¹⁹

**Philippines.** The country has strengthened its TVET systems focusing on the following areas: (1) The Strengthened Technical Vocational Education Program (STVEP) helps the high school graduates find gainful employment whether or not they have a college diploma, (2) STVEP curriculum will produce students whose skills match the requirements of the job market and thus help reduce unemployment and underemployment rate in the country, (3) TESDA (Technical Education and Skills Development Authority) is continuing the efforts to enhance the image and reputation of TVET: slogans, award giving to TVET players, partners, and idols, (4) TESDA widens and strengthens partnerships, and enhances personnel capacity developments.

**Singapore.** TVET in Singapore under the Ministry of Education is run by Institute of Technical Education at the certificate level while the diploma level is run by polytechnics. Under the Institute of Technical Education (ITE), TVET transformation took place in early 2000s when vocational education was moved to a postsecondary institution with three mega campuses well equipped and high-end facilities. A new curriculum was developed that is 70 per cent practical and 30 per cent theory. Within the curriculum contents, 15 percent is dedicated to inculcating life skills. Now ITE is entering the next phase of development called “ITE Trailblazer” (2015-2019) in response to advance economy and society. The expected outcome is a move away from the existing trade-specific preparation model towards a more career-oriented and professional skills preparation model. At the polytechnic level, they have adopted several innovations such as a smart campus, problem-based learning, and teaching factory.

The Ministry of Education, Ministry of Manpower, and Ministry of Trade and Industry have been working closely on the new initiative *Skills Future Singapore.* SkillsFuture is a national movement to provide Singaporeans with the opportunities to develop their fullest potential throughout life, regardless of their starting point.²⁰

**Thailand.** TVET in Thailand is mainly under the Office of Vocational Education Commission (OVEC). Currently there are 426 colleges in Thailand, with the equivalent number of private colleges. To tackle the issue of lacking TVET teachers, OVEC has hired 14,000 teachers, introduced new apprenticeship programmes similar to dual system in Germany, and is encouraging more women to enter TVET.

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¹⁹ https://sea-vet.net/images/events/10RPD/10th_RPD_Presentation_Plenary_3_Naing_Yee_Mar.pdf
²⁰ https://www.skillsfuture.sg/AboutSkillsFuture
Thailand is now adopting Industry 4.0, which they call Thailand 4.0 to support economic growth by having more innovation, creativity and new technology. OVEC is anticipating it by offering relevant programmes and new teaching-learning strategies suitable for Industry 4.0 (Workforce Blueprint, 2017).\(^{21}\)

**Vietnam.** TVET in Vietnam is shifted more under the Ministry of Labour, Invalids and Social Affairs (MoLISA). The stakeholders involved among others are General Directorate of Vocational Training (GDVT), including the National Institute for Vocational Training (NIVT), the Vietnamese Vocational Training Accreditation Agency (VVTAA) and other relevant departments, representatives of the business sector, such as the Vietnam Chamber of Commerce and Industry (VCCI), sector associations and enterprises, as well as TVET institutions. TVET strategy 2011-2020, TVET law, and Vietnam Vocational Training Accreditation Agency (VVTAA) have been developed and established as pathways in transforming TVET in Vietnam.

### 3 Pressing and Lingering Issues of workforce in ASEAN

During the 36th ASEAN Summit, the Heads of State and Government of ASEAN made a Declaration on Human Resources Development\(^{22}\) on 26\(^{th}\) June 2020 that covers strategic issues on preparing ASEAN human resources. Those issues include lifelong learning (LLL), future skills due to industrial development, innovation and the use of technology in teaching-learning, Mutual Recognition of Skills (MRS), Public-Private partnership (PPP), career progression, relevant competencies based on demand, engaging qualified teaching personnel, strengthening labour market information, infrastructure development toward IR 4.0, and establishment of ASEAN TVET Council central pool of funds. ASEAN TVET Council is a new entity functioning as a platform for coordination, research and development on innovations and monitoring of regional programmes that support the advancement of TVET in the region.\(^{23}\) The Heads of State and Government of ASEAN agreed to develop a roadmap for the implementation of this Declaration through concrete strategies and actions that will complement the work plans of the ASEAN Labour Ministers Meeting (ALMM), ASEAN Education Ministers Meeting (ASED), ASEAN TVET Council (ATC) and other relevant Sectoral Bodies.

Considering the issues raised in the Declaration together with other pressing issues identified by SEAMEO, the section will elaborate the following: Future skills acquisition in the context of lifelong learning, education and training in response to IR 4.0 requirements, TVET personnel, Quality Assurance, industry collaboration and sustainable development.

#### 3.1 Future skills and Lifelong Learning

\(^{21}\) https://www.bangkokpost.com/business/1298403/thailand-4-0-drafter-lays-out-blueprint


Future skills have been a hot topic since technological changes have been happening very fast through digitalisation. Previously, these skills were also termed as 21st century skills, transversal skills, transferable skills, employability skills, common skills, soft skills, or life skills. In the region, these skills have been mapped and integrated in the curriculum, teaching-learning process, and assessment in all AMS regardless of different skills set and ways of integrating them. The most common integration of transferable/future skills set in the curriculum is by identifying relevant skills normally carried out at the national level or at the institutional level and then applying these across different course subjects. The approaches to teaching transferable skills are normally integrated in all course subjects, even though some prefer to offer it as a special programme, such as through extra-curricular activities, projects, fieldtrips, team-building activities and others. Assessment of transferable skills also varies. Some institutions, such as in Brunei, are using a checklist to monitor the progress of students in meeting the set criteria at the end of every semester or year, and others are not assessing the skills at all, only part of enrichment.

The World Economic Forum (WEF) along with the Boston Consulting Group (BCG) conducted a meta-analysis of research on so-called “21st century skills” which resulted in a list of 16 skills structured into three types: (1) foundational literacies, (2) competencies, (3) character qualities (see Figure 1 for the list).

![Figure 1: 21st century skills](source: WEF & BCG 2015)

The OECD identifies six new “task-based skill indicators”: ICT skills, readiness to learn and creative problem solving, managing and communication, self-organization, marketing and

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accounting, and STEM (science, technology, engineering, mathematicsskills that are to be conceptualized as additional to three cognitive skills of literacy, numeracy and problem solving (Grundke et al. 2017, 38).

From various studies on future skills, the following list are the common grouping of skill types:

- **Cognitive Skills** with the following sub-types: (Numeracy and literacy as foundation skills, Low-order cognitive skills on the level of understanding and applying, High-order cognitive skills on the level of analyzing, evaluating / critical thinking, creating / innovating.
- **ICT skills / digital literacy** (e.g. proficient application of hardware devices and software tools; programming; appraisal of potential impact of ICT applications) STEM skills.
- **Social skills** (e.g. communication, cooperation in teams, conflict resolution, empathy, emotional intelligence.
- **Learnability** (e.g. readiness to learn, learning motivation, curiosity, effective self-learning strategies).
- **Character qualities** (e.g. ethical reflection and action, social and cultural awareness, agility, adaptability, persistence, initiative)
- **Problem-solving in complex, technology-rich environments** (Euler, 2020).

The issue now is whether all of these skills should be inculcated to our students the same way and the same set of generic skills regardless of different level and programmes or different future occupations. Considering that generic skills requirements are different across occupational categories (for example, masonry workers versus engineers), then the set of generic skills and the level of mastery should vary according the job requirements. (Sakamoto & Sung 2018, 8, SEAMEO VOCTECH, 2014).

### 3.2 Future TVET Agenda in response to digitalization (IR 4.0)

Based on Future ASEAN Agenda for TVET developed by the regional working group of “Business and industry cooperation in TVET” in June 2019; an initiative by the ASEAN Secretariat with support from the German government’s Regional Cooperation Programme for TVET in ASEAN (RECOTVET), there are several recommendations that correspond to preparing TVET for IR 4.0/digitalisation. Recommendation 6 states, “Develop a future workforce strategy that creates a common understanding of Industry 4.0 and its impact on ASEAN education systems and labour markets”; recommendation 33, “Adapt TVET curricula to better prepare students for the future of work”, and recommendation 44,” Conduct more research on (future) skills needs, particularly sector-specific research”. Under recommendation 6, it is suggested having a regional roadmap that will help AMS who are in different stages of readiness for Industry 4.0 to learn from each other. Under recommendation 33, TVET schools should carry out a complete overhaul of their curricula including sufficient focus on the provision of soft skills, such as the ability and desire for lifelong learning and having collaboration with industry. Recommendation 44 stresses the

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importance of research on future skills and how the study should be conducted and shared for wider and meaningful impact.

The importance of TVET in response to IR 4.0 and digitalisation has been highlighted in High Officials Meetings (HOM) of SEA-TVET, 3rd HOM in Kuala Lumpur, Malaysia, 4th HOM in Manila, Philippines, and 5th HOM in Bandar Seri Begawan, Brunei Darussalam. From these meetings, the High Officials agreed to have studies that provide better understanding of the current status and readiness of TVET institutions and industry for IR 4.0 and develop roadmaps for the region to progress accordingly. The 5th HOM also launched a special feature of the regional knowledge platform for TVET in ASEAN, SEA-VET.net, on Industry 4.0 and Digitalisation in Southeast Asia. This feature publishes research reports and other publications, training programmes, meetings, seminars and conferences related to IR 4.0 and digitalisation.

Considering the potential impact of IR 4.0 especially on TVET and unclear future skills required for these industrial changes, collaboration among countries and various players are needed. The new established ASEAN TVET Council should play important roles in coordination regional efforts, particularly when involve various ministries in AMS.

### 3.3 TVET Personnel

TVET personnel especially teachers, trainers, and managers are amongst frequently discussed in the national and regional meetings. The supply of TVET teachers and instructors are still a pressing issue due to a lack of quality and quantity in most countries. Most TVET teachers are recruited from fresh graduates of vocational and technical colleges and universities, thus lacking industrial experiences. To address this issue, national and regional efforts have been exerted by providing training and relevant experience to enhance teacher’s industrial experience. The ASEAN Work Plan on Education 2016 – 2020 lists several projects to improve the quality TVET teachers, such as Project no 37, “Training for professional TVET teachers”, Project 38, “Strengthen regional harmonisation and quality improvement in TVET (TVET Personnel Education)” through the development of Regional Standard for TVET Teachers and Standard for In-company Trainers. Under SEAMEO Priority Area no 4, TVET Consortium was established in 2015 with one of the objectives is to provide TVET teachers and students for exchanges in other ASEAN countries and ASEAN+3 (PR China, Japan, and South Korea). Up to this moment, the regional standard for TVET managers or principals has yet to be developed.

Regardless of the existing capacity building for TVET personnel both at the country level and at the regional level such as the those provided by SEAMEO, e.g. SEAMEO VOCTECH and partners such as GIZ, KOICA and others, the number of training and trainees were still very limited.

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26 https://sea-vet.net/industry-4-0-digitalisation
27 http://tvet-online.asia/issue/5/paryono-3/
3.4 Quality assurance

This issue has been part of the agenda of ASEAN in the workplan 2016-2020 and partly addressed by developing various frameworks and guidelines, such as the ASEAN Guiding Principles for Quality Assurance and Recognition of Competency Certification Systems, Guidelines for the Quality Assurance of TVET Qualifications in the Asia-Pacific Region\(^{30}\), and Quality Toolbox for better TVET Delivery: Practical Instruments for TVET Teachers and Managers. Implementation and the institutional level, however, still requires monitoring and further follow-ups.

3.5 Industry collaboration

Industry collaboration is always a key to success in running TVET. Various efforts at the institutional level have been exerted and regulations at the national level have been formulated in AMS, but lack of collaboration with industry still remains a persistent issue in the region. Partly, TVET is primarily government-lead in AMS and students far outnumber the capacity of industry to train. We can find various forms of collaboration between school and industry, such as in the form of industrial attachment, internship, apprenticeship, workplace-based learning, and dual training programmes, but the quality is still poor in most places and the collaborations are scarce.\(^{31}\)

3.6 Green TVET

Greening TVET stems from the sustainable development agenda and is linked with the concept of a green economy which emphasises responsible economic practices that support further economic growth, positive social development, and responsible natural resource management.\(^{32}\) The TVET sector has the capacity to leverage employment opportunities and economic productivity, competitiveness and quality as well as meeting the challenges of economic change and development (Montague 2013, 210).\(^{33}\)

In Southeast Asia, many of the policies still focus on green practices, such as 3R (Reduce, Reuse, Recycle) initiatives, but are still limited in the creation of green jobs. Similarly, the findings by Montague\(^{32}\) state that in ASEAN (1) “There is a common vision for the greening of TVET in ASEAN countries, but the respective implementation strategies differ, (2) The level of greening in TVET depends on the particular economic dynamics and structure in a given jurisdiction, (3) The greening process in farming and the textile and shoe industry is still marginalized, despite the fact that it is the source of livelihood for the majority of the population”. Efforts should be taken to change the perspective that greening TVET is not only about sacrifices but also about opportunities for creating future jobs for TVET graduates in a green economy.

4 Way forward

There have been several initiatives taken at the regional and national levels addressing various issues of preparing a qualified workforce in AMS through TVET. With the existing workforce and education and training provisions, there are areas that need improvement.

\(^{30}\) https://unesdoc.unesco.org/ark:/48223/pf0000259281


\(^{32}\) http://tvet-online.asia/issue/6/baumgarten-kunz/

Considering that TVET goals are to prepare a future workforce for employment and life, offering relevant and quality programmes is a priority. Creating an environment conducive to learning and offering guidance for a smooth transition from school to work are also necessary to address the issue of persistent youth unemployment in the region. Those lingering issues should also be addressed continuously and holistically by bringing different players such as education and training providers, all relevant government ministries, industry, and community to manage TVET. The fact that many ministries are in charge of managing TVET has been an obstacle to the progress of TVET in some countries due to a lack of coordination both nationally and regionally. The establishment of ASEAN TVET Council on 26 June 2020, can hopefully improve the communication and coordination among ministries that have been an issue so far.

Mapping and integrating future/21st century skills in TVET programmes are essential in this digital era. From the long list of these skills, teachers need to select the most important skills for the students’ intended occupation. This effort should also be accompanied by implementing innovative teaching-learning processes and suitable assessment methods so that these future skills are successfully imparted to the students. Encouraging lifelong learning by providing opportunities for anyone to pursue their education and training and have their prior learning recognised is important. This is still lacking in the most AMS.

Quality and quantity of TVET personnel have been a persistent issue in most AMS. Continued effort through improving pre-service and in-service teacher education training must be taken, including providing opportunities for teachers to acquire relevant industrial experience.

Standards for teachers and in-company trainers have been developed, as were TVET quality assurance and qualification frameworks. Referencing processes still need to continue until the implementation has successfully taken place at the institutional level.

In some AMS, TVET is developed with the goal of alleviating poverty. Some countries use TVET to address unemployment and others to address socio-economic development by helping industry, individuals, and the nation to progress. The priority is dictated by country’s situation and strategic short, medium or long-term plan. Because education is considered to be a tool for development, TVET is pragmatic and can be used as a tool to alleviate poverty and unemployment and more importantly to promote sustainable development (UNEVOC, 2009).  

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