Sub-Regional Study on Transforming TVET in Ensuring Learning and Skills to Support School-to-Work Transitions in Southeast Asian Countries

UNESCO Office, Jakarta

Sentral Senayan I, 7th Fl - Jl. Asia Afrika No. 8, Senayan, Jakarta 10270,

Indonesia

Tel: (62)-21-2519-6647)

www.unesco.org/jakarta

Editor:
Mee Young Choi, UNESCO Jakarta Office

Authors:
Jann Hidajat Tjakraatmadja, Hary Febriansyah, Yorga Permana, Lala Nurfitria, and Farenza Fadil (CK4BC/Center of Knowledge for Business Competitiveness).

Acknowledgement
The Publication of this report would not have been possible without the assistance provided by Zakki Gunawan, Aldi Surya, Ade Kurnia, Devy Kusuma Wati, Dani Fauzi, Ariella Felita Vashti, Jody P. Putra Agustian, and R. Jihad Agung Mahesa.

Disclaimer
The designations employed and the presentation of material throughout this report does not imply the expression of any opinion whatsoever on the part of UNESCO concerning the legal status of any country, territory, city or area of its authorities, or concerning the delamination of its frontiers or boundaries. The ideas and opinions expressed in this report are those of the authors; they are not necessarily those of UNESCO and do not commit the organisation.

Table of Contents

Foreword

This report focuses on discussing Technical and Vocational Education and Training (TVET) efforts in five cluster countries in Southeast Asian and its role in facilitating an ideal transition from school-to-work. It aims to provide evidence-based policy recommendations to transform TVET systems in the five countries in Southeast Asia, namely Brunei Darussalam, Indonesia, Malaysia, the Philippines, and Timor-Leste. By collecting data and assessing the current state of TVET based on each country's education documents, this report identifies challenges and barriers and provides recommendations to overcome them.

School-to-work transition aims to strengthen the articulation between education and training and the world of work, offering divers pathways to young people become members of productive and effective labour force.

The report addresses labour market mismatches, challenges, and opportunities in developing effective TVET systems for improving school-to-work transition and promoting lifelong learning. It also discusses innovations and trends in TVET to adapt to the changing labour market. More importantly, it highlights the transformative potential of TVET in the five cluster countries and offers valuable insights and recommendations for policymakers and stakeholders to enhance the effectiveness of TVET to contribute to individual growth and sustainable development, fostering a prosperous and inclusive society where everyone can thrive in the workforce.

We are deeply grateful to all the policymakers, educators, researchers, and stakeholders who have contributed their expertise and insights to this policy review. Their dedication and passion are instrumental in shaping the future of education in Southeast Asia. May this Sub-regional Policy Analysis on TVET as an essential guidepost on our path to a more inclusive and equitable educational future in Southeast Asia.

Maki Katsuno-Hayashikawa
Director and Representative
UNESCO Regional Office in Jakarta

Acronyms and Abbreviations

Acronyms/Abbreviations	Definition	First Appear
ASEAN	Association of Southeast Asia Nations	8
AUSAID	Australian Agency for International Development	30
BDNAC	Brunei Darussalam National Accreditation Agency	8
BDQF	Brunei Darussalam Qualifications Framework	9
BDTVEC	Brunei Darussalam Technical and Vocational Education Council	8
BPS	Private Education Sector	8
CEOP	Center for Employment and Professional	31
CET	Continuing Education and Training	11
CNEFP Tibar	National Center for Employment and Vocational Training	27
COPTPA	Code of Practice for TVET Programme Accreditation	18
COVID-19	Coronavirus Disease 2019	19
CRPD	Convention on the Rights of Persons with Disabilities	10
D2	two-year diploma	45
D4	Applied Bachelor's Programme	42
DFAT	Department of Foreign Affairs and Trade	31
DOLE	Department of Labour and Employment	23
DTS	Dual Training System	22
EPTF	Employment and Professional Training Fund	27
EU	European Union	29
GAP	Gender Action Plan	29
HNTEC	Higher National Technical Education Certificate	7
IBTE	Institute of Brunei Technical Education	7
ICT	Information, Communication, and Technology	11
ILO	International Labour Organisation	30
INDMO	National Institute for Labour Force Development	27
ISQ	Industrial Skills Qualification	7
KPI	Key Performance Indicator	8
LPK	*Lembaga Pelatihan Kerja* (Training Institutions)	14
MBOT	Malaysian Board of Technologists	18
SEN	Special Education Needs	12
SLB	*Sekolah Luar Biasa* (Disability Formal School)	12
SMEs	Small and Medium Enterprises	30
SMK LB	Disability Vocational Schools	12
MCOs	Movement Control Orders	20
MLSTP	Mid-Level Skills Training Project	29
MoE	Ministry of Education	7

MoEC	Ministry of Education and Culture	13
MQF	Malaysian Qualifications Framework	18
MTVET	*Majlis TVET Negara* (National TVET Council)	15
NES	National Employment Strategy	28
NESP	National Education Strategic Plan	28
NGO	Non-Governmental Organisation	22
NOSS	National Occupational Skills Standards	17
NTESDP	National Technical Education and Skills Development Plan	24
OECD	Economic Co-operation and Development	34
PB	*Politeknik Brunei* (Brunei's Polytechnic)	10
PKL	*Praktik Kerja Lapangan* (Work Placement Program)	14
PPP	Public-Private Partnerships	12
PQF	Philippine Qualifications Framework	24
PSF	Skills Framework	49
RPEL	Recognition of Prior Experiential Learning	44
SDG 4	Sustainable Development Goal 4	1
SEFOPE	Secretariat of State for Professional Training and Employment	28
SKKNI	*Standar Kompetensi Kerja Nasional Indonesia* (Indonesian National Work Competency Standards)	13
SMALB	*Sekolah Menengah Atas Luar Biasa* (Special Needs Vocational School)	14
SMK	*Sekolah Menengah Kejuruan* (Vocational High Schools)	13
SPN-21	*Sistem Pendidikan Negara Abad Ke-21* (National Education System in 21 Century)	6
TEFA	Teaching Factory	32
TESDA	Technical Education and Skills Development Authority	7
TESP	Training and Employment Support Project	29
TLNQF	Timor-Leste National Qualifications Framework	26
TVET	Technical and Vocational Education and Training	7
UNESCO	United Nation Educational, Scientific, and Cultural Organisation	1
WBL	Work-based Learning	29
WDPTL	Workforce Development Programme Timor-Leste	29
WEF	World Economic Forum	24
YEPP	Youth and Employment Promotion Programme	29

List of Tables

List of Figures

Executive Summary

Technical and Vocational Education and Training (TVET) and the transition from school to work are critical for young individuals to be prepared for entering the job market. The school-to-work transition signifies the transition from education to professional work and involves stages such as finding a job, applying theoretical knowledge and adapting to work expectations. In line with SDG-4, there is a need to improve the relevance of TVET systems, equipping individuals with the necessary skills for employment, entrepreneurship and lifelong learning. Three strategic priorities include promoting lifelong learning opportunities, fostering skills for an inclusive and sustainable economy, and ensuring inclusive and resilient communities.

UNESCO supports Member States to address current and future challenges in the field of TVET, including the transition from school to work. Recognising the significant role of TVET in achieving SDG-4, UNESCO works closely with countries like Brunei Darussalam, Indonesia, Malaysia, the Philippines, and Timor-Leste to enhance the relevance and effectiveness of their TVET systems. These countries have demonstrated a strong commitment to improving the quality of education and equipping individuals with the necessary skills for employment, entrepreneurship, and lifelong learning.

In Brunei Darussalam, Wawasan Brunei 2035 plan focuses on education and the development of a skilled workforce to improve quality of life and economic resilience. In Indonesia, TVET is aligned with SDG-4 and aims to bridge the gap between school and the world of work through initiatives such as the Job Placement Programme. Malaysia considers TVET critical to its Economic Transformation Programme, which emphasises talent development and linking education to the job market through the Malaysia Madani framework. In

Philippines TVET system managed by TESDA, addresses global competitiveness, inclusivity and Industry 4.0 adaptation. Lastly, in Timor-Leste, the Ministry of Education prioritises quality education, teacher training, and curriculum development, while improving TVET alignment with industry needs and the transition from Vocational High School to post-secondary education.

In the discussion of innovations and trends in TVET systems, there is a need to respond to rapidly changing labour markets through leveraging labour market data, tracer studies, and employer insights, expanding work-based learning to support the transition from school to work, modernising TVET curricula with new skills and competencies, strengthening TVET through private sector and community engagement. TVET is important for the transition from school to work in the sub-region of Southeast Asia, in line with SDG-4. Standardised practices are needed for better employability and mobility. Challenges include labour market mismatches and negative perceptions, but there are opportunities to partner with industry, update curricula, promote inclusivity and gender equality, and adapt to changing labour markets. Using labour market data, expanding work-based learning, and engaging the private sector and local communities are critical. TVET can transform individuals and contribute to sustainable development in the sub-region of South-East Asia, creating prosperous and inclusive societies.

Chapter 1:
Introduction

1.1 Background

Technical and Vocational Education and Training (TVET) provides theoretical and practical education to help vocational students in the middle level develop their knowledge, expertise, and skills for the future. Research conducted by Paryono in 2017 found that TVET organizations are the main suppliers of the workforce. To prepare students to be confident in the world of work, they need to be carefully prepared and debriefed to create qualified job candidates with a professional mindset and who are ready to work. Programs that are usually planned in this vision are related to the transition from school to work.

The school-to-work transition is a critical period in young people's lives, as they shift from mid-level of education to employment. In many countries, governments have implemented policies and programs to support this transition. Furthermore, school-to-work programs are designed to help them develop the skills and knowledge they need to succeed in the labour market. These programs typically include a combination of academic instruction, work-based learning experiences, and career counselling. School-to-work programs have been shown to be effective in helping young people make successful transitions from school to work. They can increase the chances of young people getting a job, earning higher wages, and staying longer in the workforce.

A Sub-regional Analysis of TVET Transformation in Support of School-to-Work Transitions is a significant study that will help to improve the efficiency and success of the vocational education sector in the sub-regional countries of Southeast Asia. The study aims to collect data and assess the current state of TVET in the region, encompassing the five (5) cluster countries of UNESCO Multisectoral

Office in Jakarta. The study also identifies the challenges and barriers to effective TVET and provide recommendations on how to overcome these challenges. The study is aligned with UNESCO's Medium-Term Strategy and global development plans and will contribute to achieving SDG 4 for Quality Education by 2030, in line with the vision and direction of The Education 2030 Framework issued by UNESCO. The Education 2030 Framework is a valuable tool for countries as they work to improve education for all. It provides a clear vision, specific targets, and a call to action. By working together, we can achieve the vision of the Education 2030 Framework and ensure that all learners have access to quality education.

1.2 The Alignment of School-to-work transition within SDG-4 framework

The Term of "school-to-work transition" encompasses the journey individuals undergo as they transition from an educational setting, often high school, or higher education to the professional workforce. It The signifies the shift from being a student to becoming an employee or an active part of the labour force. This process includes stages like job hunting, applying theoretical knowledge and acquired skills to practical work scenarios, and adapting to the expectations of the professional sphere.

Undoubtedly, the school-to-work transition holds pivotal significance as it marks the inception of a person's career, involving the practical application of academic learning. Beyond merely securing a suitable job, it entails adapting to work routines, responsibilities, and the intricate dynamics of the workplace. The success of this transition hinges on aligning an individual's education, skill set, and the prerequisites of the job market. Strategies to facilitate a seamless transition often encompass career guidance, vocational training, internships, and apprenticeships.

Unlike previous generations where pathways after schooling were clear-cut, the present scenario, especially in developed nations, sees the transition from full-time of middle education to full-time employment as more intricate. Diverse post-secondary education options, including those within TVET or higher education, along with flexible part-time work, underpin an extended transition period for many young people.

In line with UNESCO and the Sustainable Development Goal 4 (SDG-4), the school-to-work transition underscores the integration of education and training into the professional sphere, ensuring that young individuals possess the skills, knowledge, and competencies requisite for effective workforce participation. Further, SDG-4 aims to provide equitable, quality education and lifelong learning opportunities.

In complete alignment with the goal of SDG 4, which is to ensure that everyone has access to inclusive and equitable quality education and opportunities for lifelong learning, UNESCO has provided a Strategic Framework to assist its Member States within the TVET Systems. The aim is to equip all young individuals and adults with the skills necessary for employment, decent work, entrepreneurship, and continuous learning. This effort also contributes to the broader implementation of the 2030 Agenda for Sustainable Development. The anticipated outcomes are structured around UNESCO's strategic framework and priorities, such as the 2022-2029 three strategic priorities:

1) **skills for individuals to learn, work and live:** To meet the evolving demands of both society and the job market, individuals need to be lifelong learners and consistently update their skills. TVET should provide ongoing learning opportunities for everyone, irrespective of gender, using adaptable teaching methods, flexible learning approaches, pathways that span various forms of education and training, and diverse sectors. This involves recognising, validating,

and accrediting non-formal and informal learning, offering career guidance and counselling.

2) **skills for economies to transition towards sustainable development:** Developing Skills for Inclusive and Sustainable Economies: TVET systems need to furnish the skills required for inclusive and sustainable economic growth, especially considering the dual shifts toward digital and green economies. This requires collaboration with social partners, businesses, and workers. Additionally, timely collection and utilization of data on skill requirements from diverse sources, such as administrative data, surveys, and big data, are vital.

3) **skills for inclusive and resilient societies:** The world of work is undergoing significant transitions, posing challenges to societies in terms of income and wealth distribution, solidarity between different social groups and generations, and political organization. To address this, TVET systems should establish transparent and inclusive governance, maintain high efficiency, ensure strong accountability, and incorporate education for sustainable development and global citizenship education. TVET should equip learners with the knowledge, values, skills, and attitudes needed to understand their rights, empower them to participate, and contribute to a just and equitable world of work and societies.

1.3 Methodology

The methods used in this study include desk study method. The desk study method is employed to analyse various policy/program documents, case studies, and statistical research/reports from the five (5) of UNESCO Multisectoral Office in Jakarta.

Chapter 2:
Alignment of TVET Policies with SDG-4 Goals

A study of existing policies on the Technical and Vocational Education and Training (TVET) system in Brunei Darussalam, Indonesia, Malaysia, the Philippines, and Timor-Leste reveals a complex landscape that is closely linked to the critical issue of school-to-work transition. These countries, located in Southeast Asia, have been grappling with the challenge of ensuring that their TVET systems effectively bridge the gap between education and the workforce.

The review examines many policy documents, including national strategies, regulations, and education plans, through the lens of the Sustainable Development Goal 4 (SDG-4) targets, with a focus on targets that explicitly address TVET. These targets, such as 4.3: equitable access to quality technical and vocational education and 4.4: increased number of youth and adults with relevant skills, form the backbone of this analysis, which highlights the alignment of policies with the overall goal of realizing inclusive, equitable, and quality education. In addition, the examination includes country-specific visions, and collaborations in regional organizations, such as ASEAN, that aim to collectively improve TVET systems. This holistic approach offers a comprehensive understanding of the policy landscape in these countries and how they navigate the complexities of school-to-work transition through TVET.

2.1 Brunei Darussalam

Brunei Darussalam's long-term plan, Wawasan Brunei 2035 envisioned the country to be recognised for its educated and highly skilled people as measured by the highest international standards. It is one of the three main goals alongside increasing people's quality of life and economic resilience stated in the plan.

Current efforts are directed towards making graduates *employable* and equipped with competences required by industry.

In Brunei Darussalam, since TVET system was formalised in 1970s, it has progressively advanced under the country's long-term plan. The national education system known as the 21st century or *Sistem Pendidikan Negara Abad ke-21* (SPN-21), was restructured in 2009 and aims to fulfil the needs and challenges of social and economic development in the 21st century. There have been three key developments in the national education system: education structure, curriculum and assessment, and the repositioning of TVET within the education system.

TVET programmes are offered at the secondary, post-secondary, and tertiary levels. At secondary level, it is either elective courses in secondary schools or specific TVET programs run by technical or vocational schools. Students taking elective TVET courses will gain the Business and Technology Education Council (BTEC) qualification (Edexcel), a vocational qualification that is work-related and ideal for any student who prefers more practical-based learning. For the specific TVET programmes in TVET schools, participants will have Industrial Skills Qualification (ISQ) which qualifies them with a Skills Certificate or SC 1 to SC3. TVET at the post-secondary level is offered at the Institute of Brunei Technical Education (IBTE), Politeknik Brunei, and private colleges from which students will graduate with a diploma, Higher National Technical Education Certificate (HNTEC), advanced diploma, or even post- graduate diploma.

TVET Governance Authorities

The Ministry of Education of Brunei Darussalam is the sole body responsible for the governance of TVET education. Its main tasks fall under the areas of quality assurance, the development of a qualification framework, the accreditation and certification of TVET institutions, and the curriculum development. The Ministry of

Education (MoE) is divided into three agencies responsible for TVET quality assurance: 1) the Brunei Darussalam National Accreditation Agency (BDNAC), 2) the Brunei Darussalam Technical and Vocational Education Council (BDTVEC) and 3) the Private Education Sector (BPS). The BDNAC is responsible for the assessment and accreditation of qualifications recognised by the Government of Brunei Darussalam. The BDTVEC acts as the national awarding body for technical and vocational qualifications. Through this local awarding body, the provision of technical and vocational education in the country has become more flexible and effective.

To measure the success of TVET in Brunei Darussalam, three Key Performance Indicators (KPIs) are used: employability rate (6 months after graduation), employers' satisfaction rate, and students' completion rate.

Table 1: Key policy documents related to TVET Brunei Darussalam

Policy document name	Year	Description
Institute of Brunei Technical Education Order	2014	Establishment of IBTE and regulating its authority to deliver its functions, including promoting and regulating technical training and education
Politeknik Brunei Order	2014	Establishment of Politeknik Brunei and its direction to provide instruction and training in engineering, technology, sciences, commerce and other subjects of learning as well as to aid by research and other means for the advancement of knowledge and its practical application.
Education Act (2003, amended)	2011	Describing the roles of Minister of Education to provide direction of technical and vocational education. The order gives the Minister authority to establish Council on technical and vocational education.

Policy document name	Year	Description
Brunei Darussalam National Accreditation Council Order	2011	Defining the roles of Higher Education and Skills Training Providers to provide skills training programme that led to certificate, diploma, advanced diploma, or other qualifications stipulated in the Brunei Darussalam Qualifications Framework (BDQF). The framework acts as national guideline for accreditation process and encourages collaboration between public and private education providers.
The 21st Century State Education System or Sistem Pendidikan Negara Abad ke-21 (SPN 21)	2009	Re-evaluating the education structure, curriculum, and technical education in Brunei Darussalam. SPN21 repositions TVET as an alternative post-secondary education capable of producing highly skilled workers in line with the needs of the industry.
Wawasan Brunei 2035	2007	Provides national visions and strategies to achieve them.

Types of TVET Programmes

TVET programmes under the jurisdiction of MoE are those offered by secondary and post-secondary schools, Politeknik Brunei (PB), Institute of Brunei Technical Education (IBTE). There are also non-formal.

Formal TVET

Pre-vocational Courses and Industrial Skills Qualifications leading to vocational degrees are provided at lower secondary level (ISCED 2).

Duration:	1-2 years
Admission requirements:	Completion of Primary Education
Taught in:	Lower Secondary Institutions

National Technical Education Certificate courses are provided at the upper secondary level (ISCED 3).

Duration:	2 years
Admission requirements:	Completion of Lower Secondary Education
Taught in:	Upper Secondary Technical Institutions

Higher National Technical Education Certificate courses are provided at the upper secondary level (ISCED 4).

Duration:	2 years
Admission requirements:	Completion of National Technical Education Certificate
Taught in:	Upper-Secondary Non-Tertiary Technical Institutions

Higher National Diploma and Advanced Diploma Programmes are offered at the tertiary level (ISCED 5-8).

Duration:	2.5 years
Admission requirements:	Admission requirements: 'A' Levels or National Diploma
Taught in:	Polytechnics

With the Higher National Diploma and Advanced Diploma, graduates are also able to enrol in non-vocational Bachelor's degree programmes.

Figure 1: Education system of formal TVET in Brunei Darussalam

Non-formal TVET

The Continuing Education and Training (CET) Institute under the Institute of Brunei Technical Education, the Ministry of Culture, Youth and Sports, the Youth Development Centre and the Arts and Handicraft Centre offer non-formal TVET programmes.

TVET System's Role in School-to-Work Transition

The Institute of Brunei Technical Education (IBTE) has taken a proactive approach to enhance its vocational education programs by establishing an 'Industry Steering Committee.' This committee is divided into seven clusters, each focusing on specific sectors: energy and engineering, business and financial services, hospitality and tourism, building construction, agro technology, Info-Communications Technology (ICT), and maritime.

This initiative is a significant step towards aligning vocational education with the needs of the job market. By involving representatives from these diverse sectors, IBTE aims to create more opportunities for post-secondary school students who possess technical skills and are inclined towards hands-on learning. These students can now pursue Technical and Vocational Education and Training (TVET) courses, which equip them with practical skills and knowledge required by these industries. By offering these courses, IBTE is not only preparing students for successful careers but also meeting the demand for skilled workers in various sectors.

The transformation in vocational education signifies a more responsive and demand-driven approach. It aims to bridge the gap between education and industry requirements. The commitment of stakeholders, including businesses and industry representatives, is crucial in ensuring the success of this transformation. Their support, in terms of providing input, resources, and guidance, will play a pivotal role in making these vocational programs more effective and aligned with the real-world demands. Ultimately, this initiative is a positive step toward addressing the skills gap and increasing employment opportunities for technically skilled students.

2.2 Indonesia

TVET is vital for skills in the workforce development. The government of Indonesia aligns TVET policies with SDGs, notably SDG-4 for Quality Education. The improvement of TVET (Technical and Vocational Education and Training) quality in Indonesia is continuously pursued by the government, including through the development of Public-Private Partnerships (PPP) at the national, regional, and international levels. These efforts aim to align TVET programs with the labour market's needs. These steps showcase a firm dedication to enhancing the quality of vocational education, reinforcing the link between education, industry, and the business sector, and promoting the development of skilled human resources and sustainable growth in Indonesia.

TVET Governance Authorities

In the past 5 years, the Indonesian government has increasingly focused on TVET (Technical and Vocational Education and Training), believing that vocational education plays a crucial role in human resource development. One tangible form of government support and attention is the establishment of the Directorate General of Vocational Education within the organizational structure of the Ministry of Education and Culture, now the Ministry of Education, Culture, Research, and Technology. This change is outlined in Presidential Regulation No. 82 of 2019 concerning the Ministry of Education and Culture. It stipulates that the Directorate General of Vocational Education is tasked with formulating and implementing policies in the field of vocational education.

There are several key policies in the implementation of the TVET system in Indonesia, as follows:

Table 2: Key Policy Document for TVET System Indonesia

Policy document name	Year	Description
Presidential Instruction No. 9	2016	This instruction focuses on revitalizing SMK (vocational high schools) to improve the quality and competitiveness of Indonesian human resources, this instruction aims to make vocational education more relevant to the needs.
National Industry Development Plan 2015-2035	2015	This plan focuses on the development of human resources by providing competency testing centers, human resources certification centers, and Indonesian National Work Competency Standards (*Standar Kompetensi Kerja Nasional Indonesia/SKKNI*) in the field of education.
Regulations No. 59 of the Minister of Education and Culture.	2012	The establishment of accreditation bodies to ensure accreditation standards for TVET providers.
Indonesian National Education System Law No. 20	2003	The Law states that all levels of education, including their respective structures, are under the authority of the Ministry of Education and Culture (MoEC).
Manpower Act No. 13	2003	The Act regulates the national vocational training system, ensuring that the preparation for work is in accordance with demands from the labour market.

TVET System's Role in School-to-Work Transition

The TVET system in Indonesia has been designed to minimise the gap during the school-to-work transition phase. In the formal pathway, the Indonesian government has the Work Placement Program (PKL) as regulated by the Ministerial Regulation of Education and Culture No. 50 of 2020. PKL provides learning opportunities for students at the vocational school (SMK/MAK), special

needs vocational school (SMALB), and training institutions (LPK) levels through practical work experience in the workplace. PKL is conducted for a specified duration in accordance with the curriculum and the needs of the job market. With LPK, students are expected to enhance their competencies aligned with the curriculum and job requirements while fostering a professional attitude and independence for employment or entrepreneurship.

2.3 Malaysia

TVET is gaining more attention from the Government of Malaysia for its significant roles in supporting the Economic Transformation Programme in the country. It acts as a medium to synchronise the workforce upskilling in response to the needs of the industry. As an attempt to strengthen and transform TVET, the government has specifically included TVET as one of the Game Changers in the 12th Malaysia Plan (2021-2025), especially as the Policy Enabler 1: Developing Future Talent. Malaysia has committed to developing the future talent by realigning the labour market, education, and training. Improvements in TVET are expected to create TVET graduates as skilled technical workers that will contribute to the successful implementation of the industry 4.0 in Malaysia.

Furthermore, lately, in January 2023, the Malaysian government introduced a policy framework called Malaysia Madani. This framework comprises six core values, including Sustainability, Prosperity, Innovation, Respect, Trust, and Care & Compassion. Malaysia Madani is oriented towards eight targets, encompassing economic and educational aspects. The Malaysian government hopes that Malaysia Madani can be implemented in parallel with the 12th Malaysia Plan, mutually reinforcing their respective objectives. Nevertheless, with the 12th Malaysia Plan, which has been in progress for almost three years, in September 2023, the Malaysian government conducted a parliamentary session to carry out a Mid-Term Review of the 12th Malaysia Plan's implementation. This activity aims

to review the progress made, identify challenges, and make adjustments to the 12th Malaysia Plan if deemed necessary to align it with the focus of Malaysia Madani and achieve the goal of better development in Malaysia.

TVET Governance Authorities

The determination of Malaysian Government in improving the TVET has been shown through the establishment of National TVET Council (Majlis TVET Negara, MTVET). The council was formed to improve the coordination for strengthening the TVET ecosystem since early 2021.

The TVET governance in Malaysia is structured in three levels. First, the National TVET Council is led by the Prime Minister. Second, the MTVET Executive Committee is co-chaired by the Minister of Higher Education and the Minister of Human Resources. Third, an MTVET Focus Group coordinated by the General Secretary of Higher Education.

In an attempt to create a more integrated and coordinated TVET system. MTVET has rolled out six major initiatives:

1. Formulate sustainable financing model;
2. Develop policies to promote industrial participation;
3. Build a National TVET Branding Plan;
4. Establish TVET Collaboration Hub;
5. Establish a coordinating policy of TVET programmes; and
6. Build TVET Big Data programme.

Key Policy Document for TVET System

The Malaysian government has several key regulations and policies that promote the implementation of technical and vocational education in Malaysia, including:

Table 3: Key Policy Document for TVET System Malaysia

Policy document name	Year	Description
12th Malaysia Plan/*Rencana Malaysia Kedua Belas*	2021 - 2025	The Malaysian government's plans and priorities for the next 5 years include strengthening the TVET ecosystem to produce Future-Ready Talent. The developing future talent policy has two priority areas: Realigning the Labour Market for Inclusive and Sustainable Growth, and Developing Future-Ready Talent.
Malaysia Education Blueprint (Preschool to Post-Secondary Education)	2013 - 2025	Covered current performance and challenges of the Malaysian education system; a clear vision and aspiration for individual students and the education system; and a comprehensive transformation programme for the system, including key changes to the Ministry.
Code of Practice for TVET Programme Accreditation (COPTPA)	2019	It contains standards and guidelines related to the accreditation program for higher education providers and training providers that offer TVET programs. This policy has considered the seven Malaysian Quality Assurance areas and requirements that are tailored to the specific needs of each type of TVET program.
Malaysian Qualifications Framework (MQF) – first published in 2007.	2017	The MQF includes the standards for all qualifications in the higher education and training sector. MQF was first published in 2007 and revised in 2017. One of the revisions was the integration of the skills sector, as well as the vocational and technical sectors, into one sector, namely the Technical and Vocational Education and Training (TVET) sector.

Policy document name	Year	Description
Technologists and Technicians Act (Act 768) Malaysia Board of Technologist Act (MBOT, Act 768)	2015	The establishment of The Malaysia Board of Technologists (MBOT) with the primary function of recognising Professional Technologists and Certified Technicians as professionals. Additionally, MBOT also serves to provide facilities for advancing education and training, organizing professional development programs, conducting professional admission assessments, and regulating matters related to the conduct and ethics of the technologist and technician profession.
National Skills Development Act (Act 625)	2006	Establishment of the National Skills Development Council and regulating the The National Occupational Skills Standards (NOSS). As a standard, the NOSS contains a list of competences that need to be mastered by the workers to be able to work in a certain field or level of occupation.
Education Act (Act 550)	1996	Legal basis for the education system. It regulates the delivery of all levels of education from pre-primary to higher education. The Act acknowledges technical education as part of the National Education System, including those offered by public secondary schools or other institutions such as polytechnics. Community Colleges offered by various Ministries are also recognised as part of the TVET system.

TVET System's Role in School-to-Work Transition

Although education offered through formal schools has an important role in developing quality human resources, the transition between school to work has equal importance. The Malaysia 12th Plan (2021-2025) acknowledged that the gap in school-to-work transition is due to mismatch between graduates' competences and the needs of the employers, which creates an issue of unemployment. The government has given special attention as it would influence the balance in labour market. There are several TVET systems in Malaysia which support the school-to-work transition process especially in non-formal TVET. Seven different ministries are responsible for their own TVET programmes.

As mentioned above, Malaysia currently has the Madani Policy Framework. In line with Malaysia Madani Policy Framework, in July 2023, the government launched the Madani Economy framework, which outlines the governments economic targets for the next 10 years. One of the targets in this Madani Economy framework relates to increasing female workforce participation. Through this framework, the government also highlights its priority in enhancing the quality of the education system and addressing dynamics on the demand side to optimize outcomes, thereby aiming to minimize any gaps in school-to-work transition.

2.4 The Philippines

Related to the positioning of TVET education system, The Philippines now enforces a 13-year compulsory education system, consisting of 1 year of preschool, 6 years of primary school, 4 years of junior high school, and 2 years of senior high school. The Department of Education oversees primary and secondary education, while higher education is managed by the Commission on Higher Education, and TVET falls under the Technical Education and Skills Development Authority (TESDA).

The Technical Education and Skills Development Authority (TESDA) was established by the Philippine government in 1994 to oversee and manage TVET. TESDA's roles include setting standards, offering policy guidance, and collaborating with government, enterprises, and training organizations.

TESDA's key functions encompass developing competency standards that align with qualifications and the TVET Qualification Framework, certifying competencies through assessment systems with a pass rate of approximately 91.9%, and ensuring quality training by mandating TVET institutions to register with the Unified TVET Program Registration and Accreditation System. This system verifies that learners meet standards and quality, with TESDA overseeing and auditing the registered programs.

Types of TVET

There are four types of TVET in the Philippines:

1. School-based TVET

School-based TVET includes short, mid, and long-term programs, mostly in private schools. Many of the 57 TESDA-linked schools specialize in agriculture, fishery, and trade. Universities also offer TVET programs, often using Ladderized training, which mixes job training and academic studies. This approach gives a TESDA certificate after the first year and ends with a bachelor's degree.

2. Centre-based TVET

Centre-based TVET mainly offers short and mid-term courses that last from 3 to 6 months, and sometimes even a year. TESDA has 60 affiliated centres, including 15 regional and 45 provincial ones. Some centres are part of TESDA, while others are connected to government bodies like the Ministry of Agriculture, teaching agriculture and fishery. A few centres, like the National Maritime Polytechnic, offer similar TVET but work independently from TESDA's supervision.

3. Community-based TVET

Community-based TVET in the Philippines is informal education that helps people learn job skills, like carpentry or cooking. It's for young school leavers and adults without jobs. These programs teach skills needed in the local area. They help people get better jobs and make communities stronger. There are four types of providers: community centres, NGOs, local governments, and government bodies.

4. Enterprise-based TVET

Companies use three training methods in the Philippines: Apprenticeship, Learnership, and Dual Training System (DTS). These methods mix job training and classroom learning. Apprenticeship takes 4 to 6 months and needs TESDA approval. Learnership is on-the-job training for about 6 months, and after, the company might hire the trainee. Dual Training System means going between a training centre and a company for 1.5 to 2 years. It helps workers get better and saves money for companies. It helps students learn equipment, use it well, and find good jobs.

Key Policy Document for TVET System

The following key documents help guide the development of TVET in the Philippines:

Table 4: Key Policy Document for TVET System Philippines

Name of Document	Year	Key Objectives
RA 10968 – The Philippine Qualifications Framework (PQF) Act	2017	A national system for recognising qualifications based on acquired knowledge, skills, and values.
National Technical Education and Skills	2017	Aims to mobilize and strengthen the TVET Sector to attain global competitiveness and

Name of Document	Year	Key Objectives
Development Plan (NTESDP) 2018-2022		social equity for workforce inclusion and poverty reduction.
RA 10771 – Philippine Green Jobs Act	2016	Promotes eco-friendly employment and tasks the Department of Labour and Employment (DOLE) with creating a National Green Jobs Human Resource Development Plan.
RA 10931 – The Universal Access to Quality Tertiary Education Act	2016	Offers free tuition and fees at state universities, colleges, and technical-vocational institutions.
RA 10647 – The Ladderized Education Act	2014	Allows TVET graduates to proceed to college to pursue a degree without having to take the course programme all over.
RA 10533 – The Enhanced Basic Education Act	2013	Aims to provide mastery of skills for lifelong learners and prepare them for career opportunities.
RA 7796 – The TESDA Act	1994	Review and assess the education and human resources training system of the nation.
BP 232 – Education Act	1982	The framework for the establishment of an integrated system of education.

TVET System's Role in School-to-Work Transition

The TVET (Technical Education and Skills Development) system in the Philippines adopts a multifaceted approach to address its goals and challenges. One of its core strategies is the "TVET for Global Competitiveness and Workforce Job Readiness" initiative. This program aims to align training programs, curricula, and educational facilities with international standards. By doing so, it caters to a broad range of individuals, including workers seeking skill upgrades, students pursuing

higher qualifications, overseas Filipino workers navigating global job markets, and the unemployed population. Moreover, it serves as a valuable resource for equipping senior high school students, Grade 10 graduates, and out-of-school youth with job-ready competencies.

In parallel, the TVET system places a strong emphasis on promoting social equity and inclusion. It actively engages marginalised and underserved groups, such as informal workers, indigenous communities, and persons with disabilities. Through these efforts, TVET not only imparts crucial skills but also plays a pivotal role in fostering the social integration of these segments of the population.

However, the TVET system confronts a series of significant challenges. Firstly, it must adapt to the demands of Industry 4.0, where the fusion of technology and industry necessitates the development of cutting-edge skills among its workforces. To thrive in this era, TVET programs need to stay at the forefront of technological advancements.

Furthermore, addressing the growing need for 21st-century skills is paramount. The evolving job landscape requires competencies that transcend traditional skill sets. TVET must be agile in incorporating these new skill requirements into its curricula to ensure its graduates remain competitive in an ever-changing global job market.

Lastly, the TVET system must be responsive to the evolving needs of priority industries, as identified by the National Technical Education and Skills Development Plan (NTESDP). These industries, anticipated to require around six million workers during the planning period, underline the significance of tailored training programs aligned with the demands of the nation's dynamic economy. This aligns with the overarching goal of ensuring a workforce that is not only skilled but also attuned to the specific needs of key sectors driving economic growth in the Philippines.

2.5 Timor-Leste

The Ministry of Education (MoE) in Timor-Leste is responsible for all aspects of education, from policy development to infrastructure provision. The MoE's goal is to ensure that all children have access to quality basic education, regardless of their background. In Timor-Leste, formal TVET education system contains with compulsory and free primary and pre-secondary schooling is available in public schools. Private schools also exist, but they charge a modest fee. Secondary education includes general and technical high schools. Post-secondary education encompasses university and technical higher education, which offer a variety of degree programs and specialised short-term courses.

The MoE is also responsible for teacher training and curriculum development. It works with other government agencies and non-governmental organisations to provide educational opportunities to all Timorese citizens.

National TVET Qualifications Framework

The Timor-Leste National Qualifications Framework (TLNQF) was established in 2011 to unify post-secondary qualifications under guiding principles of access, equity, quality, proficiency, and relevance. It comprises ten qualification levels, emphasizing non-formal vocational training and practical skills. However, less than 25% of post-secondary TVET training providers are currently covered, highlighting the need for expansion. The TLNQF does not include qualifications from secondary schools, creating a dual vocational system. To enhance the framework, efforts include creating Industry Sub-Commissions, developing more qualifications, and incorporating language and numeracy proficiency standards across all levels. These measures aim to align TVET with industry needs and promote a seamless transition from Technical Secondary Schools to post-secondary studies.

Key Policy Document for TVET System

Various laws and regulations have been enacted to promote the growth of a skilled workforce through technical and vocational training that meets the demands of the industry. These policies included:

Table 5: Key Policy Document for TVET System Timor-Leste

Policy	Year	Key Objectives
National Education Strategic Plan (NESP) 2017-2030	2017	Describes the NESP's goal of increasing enrollment in secondary technical schools and presents an action plan for achieving these educational objectives.
Timor-Leste Strategic Development Plan 2011-30	2011	Formulate a Strategic Development Plan, and to outline several specific objectives related to TVET.
The National Technical and Vocational Education and Training Plan 2011-2030	2011	Establish a comprehensive framework for technical and vocational education and training (TVET). To acknowledge the importance of cultivating a skilled workforce.
National Employment Strategy 2011-2030	2011	The National Employment Strategy (NES) is a comprehensive plan that aims to improve the quality of the workforce and create more jobs. It does this by influencing education, health, and nutrition policies, and by investing in Technical and Vocational Education and Training (TVET).
Decree-Law of the Government No. 8	2010	Approves the curricula, implementation scheme, certification model, organization, and evaluation of technical secondary

		schools under the Law on Vocational Training.
Decree-Law of the Government No. 4	2009	Establishes the National Center for Employment and Vocational Training (CNEFP Tibar), a public institution that promotes and enhances vocational training, primarily in the construction industry.
Decree-Law of the Government No. 29	2008	Created the Employment and Professional Training Fund (EPTF) to implement programs for training and encouraging the hiring of the Timorese workforce.
Decre-Law of the Govenrment No. 3	2008	Defines the structure and competencies of Timor-Leste's Secretariat of State for Professional Training and Employment (SEFOPE). SEFOPE is responsible for labour, professional training, and employment policies, operating under the supervision of the Secretary of State for Professional Training and Employment.
Decre-Law of the Govenrment No. 8	2008	National Institute for Labour Force Development (INDMO) is created under the supervision of the Secretariat of State for Vocational Training and Employment as a legal entity with judicial capacity, administrative and financial autonomy, and property ownership. It can perform all necessary legal acts, exercise rights, and fulfill obligations for its responsibilities.

TVET System's Role in School-to-Work Transition

The Technical and Vocational Education and Training (TVET) system in Timor-Leste plays a critical role in facilitating the transition from school to work by offering a variety of programs and initiatives. These programs include the Workforce Development Programme (WDPTL), Mid-Level Skills Training Project (MLSTP), Gender Action Plan (GAP), Training and Employment Support Project (TESP), Youth and Employment Promotion Programme (YEPP), and the Basic Skills Training Project.

The initiatives focus on providing vocational training, scholarship opportunities, gender-inclusive skill development, and career services to enhance employability and prepare the workforce for the job market. The contribution significantly created to bridging the gap between education and employment, facilitating smoother transitions for young people into the workforce in Timor-Leste. Reforms and projects involving the government and non-profit sector in TVET include:

Table 6: Programme related to school-to-work transition in Timor-Leste

No.	Programmes Name	Period	Key Objectives
1.	Workforce Development Programme Timor-Leste - WDPTL	2014-2019	Offers scholarship opportunities for tertiary study in Australia, access to vocational training for employment and supports Timor-Leste to raise its participation in Australia's seasonal worker programme.
2.	Mid-Level Skills Training Project - MLSTP	2012-2018	Organising mid-level skills training through SEFOPE, in construction and automotive trades to develop a skilled and employable workforce in the sector supported by Asian Development Bank

No.	Programmes Name	Period	Key Objectives
3.	Gender Action Plan - GAP	2012-now	Offering skills training and counselling and reserving internships and recruitment for women in construction and automotive trades.
4.	Training and Employment Support Project - TESP	2013-2014	Implemented by International Labour Organisation (ILO) and funded by Australian Agency for International Development (AUSAID), supported SEFOPE and INDMO to skill people in all 13 districts for better participation in the economy through increased employability
5.	Youth and Employment Promotion Programme - YEPP	2008-2012	Supported the national TVET plan, introduced competency-based training standards, developed training tools, established youth career services within Center for Employment and Professional (CEOP) and promoted entrepreneurship.
6.	Basic Skills Training Project	2008-2012	Implemented the Basic Skills Training Project funded by Department of Foreign Affairs and Trade (DFAT) and South Australian Government and with cooperation from SEPFOPE and local industry.

Chapter 3:

Labour Market Mismatch: Challenges and Opportunities in Developing Effective TVET School to Work Transition System

Every countries in the sub-region effort to create a strong and adaptable Technical and Vocational Education and Training (TVET) system, facing various challenges and opportunities. There are two significant aspects that highlighted: the complex problem of labour market mismatch and the potential for positive change in developing an inclusive TVET system. Labour market mismatch is a significant challenge, where the skills of the workforce often did not match what employers need, resulting in problems like unemployment and underemployment. At the same time, the goal of establishing an inclusive TVET system offers the prospect of empowering people from diverse backgrounds, ensuring fair access to skill development, and fostering a more dynamic, inclusive, and productive workforce. This narration delves into the intricate journey of creating an effective TVET system, carefully examining both the obstacles and the opportunities presented by these two essential dimensions.

3.1. Improving school-to-work transition process

Move towards to build an effective Technical and Vocational Education and Training (TVET) system along the way will face challenges and opportunities. The main challenges related to school-to-work transition encountered in these five countries are concerning the mismatch between workforce skills and market demands that might be influenced by the difficulty of creating relevant curricula, and the need to ensure equitable access to TVET education. However, there are also many opportunities, such as the potential to create an inclusive education system, to engage with the industrial world, and to empower TVET graduates as agents of change in the economy.

3.1.1 Labour Market Mismatch

Brunei Darussalam faces several challenges in its TVET system, especially in the context of school-to-work transition. One of the biggest challenges is the limited capacity of the Institute of Brunei Technical Education (IBTE) to accommodate the growing number of applicants. Another challenge is the difficulty of recruiting teachers with industrial experience. This is important because TVET students need to be taught by teachers who have real-world experience in the workforce.

The government is also facing the challenge of limited support from relevant stakeholders. This is important because stakeholders can play a key role in ensuring the smooth transition of students from school to work. Finally, the government is facing the challenge of a lack of comprehensive information and data on manpower. This makes it **difficult to match skills with labour market demands**.

Indonesia's TVET system is facing a number of challenges and opportunities. One of the biggest challenges is the quality of TVET graduates, who often **do not have the skills that employers are looking for**. This can lead to high unemployment rates among TVET graduates. Another challenge is the quality of TVET teachers, who often lack the necessary qualifications and experience. The infrastructure and training equipment in SMKs is also inadequate, which makes it difficult for students to learn the skills they need. There is also a lack of standardization and certification for TVET graduates, which makes it difficult for them to find jobs. Finally, there appears to be a need for improved coordination and shared responsibilities among the various ministries involved in TVET. The different government ministries involved in TVET need to work together more effectively. This is because each ministry has its own responsibilities and priorities, which can sometimes lead to duplication of effort or gaps in coverage. For example, the Ministry of Manpower and Transmigration is responsible for providing training

and employment opportunities for workers, while the Ministry of Education and Culture is responsible for providing education and training for students. These two ministries need to work together to ensure that TVET programs are aligned with the needs of the labour market.

In the context of facilitating effective school-to-work transitions, the Technical and Vocational Education and Training (TVET) landscape in **Malaysia** faces a series of tough challenges, as depicted in the Malaysian Education Blueprint 2013-2025 and the Malaysian Education Policy Review Report 2013. This challenge encapsulates a range of issues, each of which has major implications for students' progress into the world of work.

The main challenge is the inability of the TVET system to align with the **demands of a dynamic labour market**. The gap between skills developed through TVET programs and specific needs expressed by industry has been a recurring problem. A striking illustration of this challenge emerged in 2008 when the Ministry of Human Resources reported a significant labour shortage of approximately 700,000 skilled workers in critical sectors such as manufacturing, agriculture and construction. This dissonance underscores the importance of addressing the gap between TVET offerings and industry requirements to ensure a smoother transition from school to work.

The absence of a robust mechanism for recognising credits earned at various levels of vocational and academic learning presents another challenge. This lack of credit recognition disrupts students' progress through multiple educational pathways, potentially hindering their ability to transition smoothly from school to the workforce.

Public perceptions and attitudes towards TVET programs are an additional challenge. The negative image that exists around the TVET pathway has contributed to the reluctance of students and parents to consider this pathway as

a promising option for career development. Therefore, improving perceptions around TVET is critical to creating a more positive and receptive environment in the transition from school to work. Lack of access to counselling information and career services further exacerbates the challenges faced by prospective students. A lack of comprehensive guidance and information can leave students grappling with uncertainty as they make important decisions about their educational and career paths.

One of the challenges that cannot be excluded is the low participation rate in vocational education pathways. This phenomenon raises concerns regarding the overall engagement and participation of students in TVET programs, potentially **limiting the number of skilled workers available to collaborate in the labour market**.

Within the context of facilitating effective school-to-work transitions, the Technical and Vocational Education and Training (TVET) sector in the **Philippines** grapples with three significant challenges, as stated in the NTESDP 2017-2022. Firstly, the emergence of the Fourth Industrial Revolution is **reshaping the demands of the job market**, emphasizing the need for 21st-century skills. Secondly, there is a substantial demand for skilled workers in the eight priority industries identified by the NTESDP, which are expected to drive economic growth and create millions of jobs. Lastly, addressing the marginalized Filipino workforce, particularly those in rural areas and informal employment sectors, is imperative to ensure inclusive economic growth and opportunities for all. These challenges underscore the importance of adapting TVET programs to meet evolving industry needs and ensuring equitable access to skill development.

The Technical and Vocational Education and Training (TVET) sector in **Timor-Leste** highlighting challenges in ensuring a smooth transition from school to work. One of the main obstacles is the limited funding available for education in agriculture-

based economies, thereby hampering the development of TVET. In addition, high levels of youth unemployment, **skills mismatches**, and lack of access to quality training add to the complexity of the problem.

Infrastructure readiness for technology adoption is still low, thus hampering the transition to Industry 4.0. A lack of qualified instructors, especially in rural areas, contributes to the gap between urban and rural areas. Fragmented government efforts and a lack of policy implementation capacity further exacerbate these challenges, making it important for Timor-Leste to address these issues to align education with industry demands and drive economic growth.

The issues identified in five countries exhibit similar intersections related to the school-to-work transition, characterised by a mismatch or gap between available jobs and the number, qualifications, and skills of TVET graduates in each country.

Skills mismatch in the labour market, as identified by McGuinness et al. (2017), manifests in two primary forms: vertical and horizontal. Vertical mismatch occurs when an individual's qualifications either exceed or fall short of the demands of a particular job. In contrast, horizontal mismatch arises when there is a disparity between an individual's educational background and the specific requirements of a given job role. These two types of mismatches, while distinct, collectively present significant challenges within the labour market.

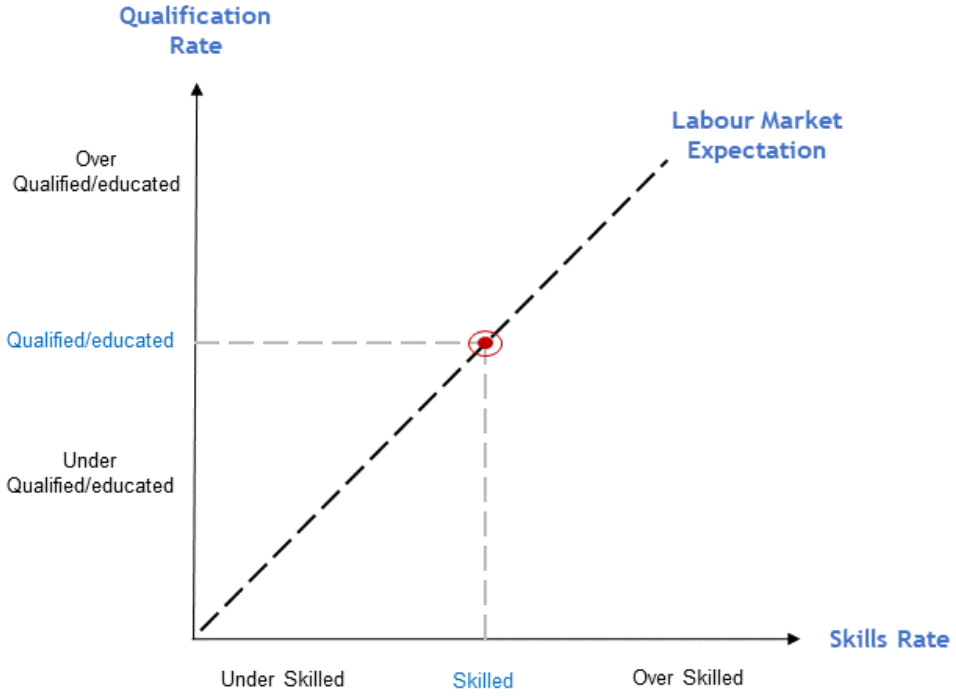

Figure 2: skills mismatch illustrations

Vertical mismatch, characterised by instances of overqualification or underqualification, can result in job dissatisfaction, reduced productivity, and difficulty for employers in finding the right candidates with the necessary skills. When individuals are overqualified for a position, they might feel underutilized and disengaged, potentially seeking better-suited opportunities elsewhere. Conversely, underqualification can lead to reduced job performance and, in some cases, the inability to meet job requirements.

Horizontal mismatch, on the other hand, pertains to the disconnect between the field of study or education an individual has pursued and the actual job they occupy. This misalignment can limit career progression and hinder job satisfaction. For example, an individual with a degree in finance who ends up working in a non-related field may not fully utilize their acquired skills, which can be detrimental both to the employee's professional growth and the employer's overall productivity.

In conclusion, addressing both vertical and horizontal skills mismatch is vital for optimizing the labour market and ensuring that individuals are appropriately matched with their jobs, contributing to higher job satisfaction, increased productivity, and overall economic growth. Recognising and mitigating these types of mismatches should be a priority for policymakers, educators, and employers alike.

3.2. Developing inclusive TVET systems

One of the goals aimed at achieving within the SDGs relates to equal access to all levels of education and vocational training. Equal access here doesn't just encompass gender equality but also extends to ensuring equal access for other vulnerable groups, including persons with disabilities, indigenous peoples, and children in vulnerable situations (Target 4.5). To achieve this, it's necessary for each country to continually embed these objectives in their education-related policies and government strategic agendas, including those related to TVET.

To find out whether the education system, especially TVET, in each country is currently promoting inclusivity, this section aims to capture conditions in three aspects, including the empowerment of persons with disabilities, gender equality, and government readiness during disasters (pandemic situations).

3.2.1 Disability

When discussing the TVET (Technical and Vocational Education and Training) system and its relation to school-to-work transition, one of the common challenges faced by people with disabilities is the stigma attached, which labels them as a weaker group. This situation places people with disabilities who are undergoing vocational training in a separate track from non-disabled people. This separation is accompanied by a reduction in standards because people with disabilities are considered 'less capable.' Ultimately, the training provided to people with disabilities does not consider the requirements and needs of the job

market. Consequently, this leads to an increased likelihood of people with disabilities becoming unemployed and marginalized from the labour market.

The number of people with disabilities worldwide reaches approximately 15% of the global population, or roughly around one billion people. From this number, it is estimated that about 785 million people are of working age. This figure should not be underestimated, as people with disabilities are an integral part of a country's development.

Developing the skills of people with disabilities can enhance their capabilities, making them better prepared and more competitive in a highly dynamic labour market. Thus, efforts to empower people with disabilities not only improve their own well-being but also contribute to the economic growth of the country.

To achieve these goals, the steps taken by policymakers are indeed of utmost importance. Recently, there has been a growing global awareness among countries to ensure equal rights for people with disabilities. With the increasing trend worldwide to promote inclusivity in various aspects, this also presents an opportunity for improving TVET systems to be more disability-friendly.

On the international level, the primary reference for the fulfilment of disability rights is the United Nations Convention on the Rights of Persons with Disabilities (CRPD). One of the rights advocated through this convention is the right of people with disabilities to equal opportunities in education, including access to mainstream higher education, vocational training, adult education, and lifelong learning without discrimination (Article 24). Countries are also obliged to ensure that people with disabilities have access to technical and vocational guidance programs, placement services, and vocational and continuing training (Article 27). Currently, the five countries have ratified the CRPD with the details as follows:

Table 7: Ratification status for CRPD by each country

Country	Year of Signing	Year of Ratification/Accession
Brunei Darussalam	2007	2016
Indonesia	2007	2011
Malaysia	2008	2010
The Philippines	2007	2008
Timor-Leste	N/A	2023

Ratification and/or accession of the convention serves as a good initial step in the effort to fulfil the rights of people with disabilities. However, each country must formulate it in national regulations and policies, followed by implementation through strategic measures. This can serve as a benchmark for the commitment and seriousness of each country in ensuring the rights of people with disabilities and other vulnerable groups.

Currently, Brunei Darussalam has a Special Education Framework issued in 2022. This framework is an enhancement of the Special Education Policy Guidelines from 1997. The purpose of issuing this framework is to provide guidance for the delivery of quality inclusive education for students with special education needs. The special education implemented in Brunei Darussalam provides opportunities for students with disabilities to attend regular schools with the support of Special Education Needs (SEN) Teachers.

In Indonesia, to support access to education for people with disabilities, the Indonesian government provides the Special School (*Sekolah Luar Biasa*, SLB) program. SLB is intended for children with special needs and is available at various educational levels, from elementary school to secondary school, including vocational schools (SMK LB). Furthermore, in 2010, the Indonesian government issued Government Regulation No. 66, amending Government Regulation No. 17

in 2010 on the Governance and Implementation of Education. This regulation introduced inclusive schools, where students with disabilities can receive the same services as regular students.

In Malaysia, the government has an integrated special education program that follows the Guidelines for Inclusive Education Programs for Students with Special Needs from 2013. The Malaysian government also issued the Special Education Integration Program Operational Handbook in 2015 as a guide for implementing this integrated special education.

Meanwhile, the Philippines government has a special program for students with disabilities, outlined in RA 11510, also known as the Alternative Learning System Act (2020). Additionally, to encourage the spirit of people with disabilities, the Philippine government through TESDA (Technical Education and Skills Development Authority) will provide recognition to people with disabilities who excel in TVET (Technical and Vocational Education and Training) and their chosen professions. Just like other countries, Timor-Leste has also designed programs aimed at improving more equitable access to education for people with disabilities. These programs are outlined in the 2011-30 National Education Strategy Plan (NESP).

Nevertheless, good policy formulation and programs will not bring about significant change without consistent and effective implementation. There are several findings of issues at the implementation level. In Indonesia, in the year 2020, there were approximately 70% to 80% of people with disabilities who only completed primary school and did not continue to the next level of education. This condition indicates that there are still barriers for people with disabilities to access education.

Another issue is the high unemployment rate among people with mild and severe disabilities, which is dominated by high school graduates, including those from

vocational schools. This indicates that the transition process from school to the workforce is not running optimally. Several factors could contribute to this condition, one of which is that the skills acquired in school may not align with the needs of the job market or employers.

Similar issues are also experienced by several other countries, for example, in Malaysia, it was reported that in 2019, the participation of people with disabilities in the labour market was still low. Another challenge faced by people with disabilities in Malaysia is the limited availability of post-secondary inclusive TVET institutions for people with disabilities. For a clearer picture, out of 36 polytechnics and 92 community colleges in Malaysia, only 17 institutions, consisting of 5 polytechnics and 12 community colleges, cater to people with disabilities.

Each country encounters diverse issues and challenges. However, when summarized and simplified, the main challenges in promoting educational inclusivity for people with disabilities include three aspects: 1) The availability of schools or TVET institutions that are more accessible to people with disabilities. Accessibility here encompasses not only the number of schools or institutions required but also adequate infrastructure that supports smooth learning and practical processes; 2) Curriculum adaptation in inclusive vocational schools. Adaptation should be understood here as an effort to accommodate the specific needs of people with disabilities, rather than a lowering of teaching quality or standards based on the stigma of disability; and 3) The low employment rate of graduates with disabilities.

Therefore, the commitment of stakeholders, especially the government, is crucial to continuously improve the national TVET system. Governments are also expected to make real efforts to address the challenges and issues that hinder the access of people with disabilities to education and training in their respective countries.

3.2.2 Gender

The condition of the gender gap in Southeast Asian countries in the education sector varies across different countries. While there has been significant progress in closing the gender gap in health and education in Southeast Asia over the past few decades, gender gaps continue to persist in other areas such as employment and political empowerment (Devasahayam, 2012). While there has been progress in closing the gender gap in education in Southeast Asia, there is still work to be done to address gender gaps in other areas and to ensure that women have equal access to education and opportunities.

The government's role in reducing the gender gap of female students towards STEM education is crucial. By providing equal access to education, encouraging girls to pursue STEM education, addressing gender bias, and providing work-integrated learning opportunities, governments can help to ensure that girls have the same opportunities as boys to succeed in STEM-related fields.

Table 8: The government's role in reducing the gender gap of female students

Country	Government's Role
Brunei Darussalam	**Science Technology Environment Partnership (STEP) Centre** The Ministry of Education has established the STEP Centre to develop, organize, and coordinate educational initiatives that enhance knowledge, skills, interest, and awareness of students and teachers on STEM.
Malaysia	• The New Economic Model (NEM), launched in 2010, aims to transform Malaysia into an inclusive and sustainable developed nation by 2020. The NEM focuses on driving economic growth by increasing the productivity of workers in all sectors of society. • The National Policy on Science, Technology & Innovation (NPSTI) 2013-2020, focuses on strategies to make Malaysia a sustainable and inclusive knowledge-oriented nation. Both the NEM and NPSTI highlight the critical role of STEM education in empowering women and men to achieve its vision as a scientifically advanced nation undergoing socio-economic transformation and inclusive growth.

Country	Government's Role
Indonesia	**Girls4Tech Indonesia digital** The Ministry of Communication and Informatics and the Ministry of Education and Culture, together with YCAB Foundation and Mastercard Centre for Inclusive Growth, have developed the Girls4Tech Indonesia digital platform to inspire girls aged 10-15 years old to pursue a career in STEM. **Education Curriculum** Indonesia's latest education curriculum has mechanisms to encourage more women to pursue STEM. This curriculum gives the student freedom to choose what they want to learn. **Supports APEC Women in STEM Principles and Actions** The Indonesian government has endorsed APEC Women in STEM Principles and Actions, which aim to promote gender equality in STEM. **Indonesian government is committed to improving gender equality in the field of STEM** This commitment is also realized through Indonesia's Presidency in the 2022 Ministerial Conference on Women's Empowerment.
The Philippines	**Conscious Effort** The Department of Education (DepEd) continues to exert "conscious effort" to inspire young girls to pursue careers in (STEM). **Supports APEC Women in STEM Principles and Actions** The Philippine government has endorsed APEC Women in STEM Principles and Actions, which aim to promote gender equality in STEM. **The WOMENCANDOIT Scholarship Programme** The WOMENCANDOIT Scholarship Programme is part of the ILO Women in STEM Workforce Readiness and Development Programme in the Philippines. It seeks to provide women with critical soft and technical STEM-related skills, employability and leadership training coupled with targeted mentorship to help women gain quality employment and advancement opportunities in STEM-related jobs.
Timor-Leste	There is no specific information on the initiatives taken by the Timor-Leste government to promote STEM education among female students. However, the government has taken some initiatives to improve the education system in the country: • The government has introduced ICT in education programs to enhance the competitiveness of Timorese students. • The government has also partnered with non-profit organizations to expand education and employment opportunities for young people, including women.

Brunei Darussalam, Malaysia, Indonesia, and the Philippines, are taking significant steps to bridge the gender gap in STEM education. They have established

dedicated centres, revised curricula, endorsed gender equality principles, and implemented scholarship programs to encourage more women to pursue STEM fields. These initiatives are commendable and reflect a commitment to promoting diversity and inclusivity in STEM, which is crucial for fostering innovation and addressing societal challenges. However, it's concerning that there is no specific information available about Timor-Leste's efforts in this regard, highlighting the need for increased transparency and action to ensure equal opportunities for women in STEM across the region. Overall, these initiatives demonstrate the vital role that governments play in promoting gender equality and empowering women in STEM, but there is still work to be done to achieve true parity in these fields.

3.2.3 Disaster – pandemic situations

Undoubtedly, the COVID-19 pandemic has had a widespread impact, including on the education sector. Furthermore, the pandemic is an unprecedented situation, unpredictable, and unavoidable. However, the COVID-19 pandemic also has a positive side, which is a learning experience for all of us, including for the government. At least, if a similar situation occurs in the future, the government will be better prepared to take preventive and control measures.

During the COVID-19 pandemic, nearly the entire world implemented social restrictions to prevent the spread of the virus. The same happened in the education sector. Many countries closed schools and switched to online learning.

In general, these five countries implemented similar policies regarding education during the COVID-19 pandemic, which is conducting online learning, but with different policies or programs. In Brunei Darussalam, the government, through the Ministry of Education, issued policies for the implementation of home-based learning and the closure of schools. This step was taken as part of social restrictions to avoid massive virus transmission in schools.

Moving on to Malaysia, in an effort to reduce the spread of COVID-19, the Malaysian government implemented a series of Movement Control Orders (MCOs). These orders were quite comprehensive and included strict measures to limit gatherings and domestic and international travel. The restrictions on gatherings also applied to the education sector. Additionally, the Ministry of Education Malaysia (KPM) now has a digital learning platform called Digital Educational Learning Initiative Malaysia (DELIMA). KPM collaborates in an integrated manner with Google, Microsoft, and Apple to continuously enhance and improve digital applications and content. DELIMA is not only focused on students but also involves teachers in enhancing their capabilities for the future of education in Malaysia, especially in facing the Fourth Industrial Revolution.

Similar to other countries, the Timor-Leste government also implemented online learning for all levels of education during the COVID-19 pandemic. This program is called 'Eskola Ba Uma,' where students' learning activities are conducted through local TV channels, Facebook, and dedicated YouTube channels created by the Ministry of Education, Youth, and Sports.

The similar approach was taken by the Indonesian government, as outlined in Circular Letter No. 4 of 2020 from the Minister of Education and Culture regarding the Implementation of Education Policies during the COVID-19 Spread Emergency. The circular mandated the cessation of in-school teaching and the shift to online learning from home. Concerning TVET, it is noted that approximately 98% of vocational high schools (SMK) in Indonesia also followed the government's guidance to implement online learning. However, the biggest challenge in implementing vocational schools online is related to practical learning activities. Some vocational programs involve practical learning with equipment only available at the school, making it impossible to carry out these activities during

the COVID-19 pandemic. Therefore, practical learning could only be conducted in specific programs, such as animation and software.

Unlike other countries that implemented general education sector policies, the Philippines has made more progress by issuing a specific policy for TVET. TESDA, which is the authority for technical education and skills development in the Philippines, issued the "TVET Towards the New Normal" plan. Through this plan, TESDA adapted its system to increase the demand for digital skills. The policy priorities are focused on the agriculture, health, ICT, and construction sectors. The plans within this policy are divided into three phases: survival, transition, and structural, with all three phases aimed at addressing the challenges of the pandemic and transitioning to the "new normal”.

The biggest challenge in implementing online learning during the pandemic situation is how to ensure that learning continues to be optimal and effective. This is especially true in the vocational and technical school sectors, which often prioritise practical learning. Currently, the governments of each country still have work to do in finding solutions to this issue. The development of strategic plans, as done by the Philippine government, can serve as a reference for governments to formulate mitigation measures for the future.

Chapter 4:
Innovation and Trends in TVET System

4.1 Responding to rapidly changing labour market

According to the World Economic Forum (WEF), 65 percent of children starting primary school will work in jobs that didn't exist in 2016. This phenomenon is chiefly propelled by macro-level trends and technological advancements, serving as the primary forces behind both job creation and obliteration. Projections from WEF in 2023 indicate that 69 million jobs will be generated while 83 million will be eliminated, resulting in a global labour market reduction of 14 million jobs over the next five years.

These shifts present a formidable challenge to educational and training systems. They must urgently foster skills aligned with future demands and cultivate diverse, intricate competencies required in the evolving labour market. Additionally, these developments resonate with Sustainable Development Goals (SDGs) Target 4.4, aiming to substantially enhance the number of young individuals and adults equipped with pertinent skills, encompassing technical and vocational proficiencies, to access gainful employment, dignified work, and entrepreneurial pursuits by 2030.

In response to these imperatives, Technical, and Vocational Education and Training (TVET) must facilitate seamless job transitions amidst swiftly changing labour markets. The accelerating forces of globalisation, technological advancement, demographic shifts, and climate-related transformations, as identified by The World Bank, UNESCO, and ILO in 2023, necessitate proactive adaptations to ensure the workforce remains well-prepared for the multifaceted challenges that lie ahead.

In light of these shifts, we find ourselves at a critical juncture. To effectively respond to these ever-changing labour markets, we must explore alternative approaches that can support the dynamic nature of current labour market demands while also anticipating future trends. In this discussion, we will delve into four possible building blocks that hold the potential to address this challenge and equip the workforce with the skills and adaptability needed for success in an uncertain future.

Figure 3: Initial Framework Responding to Rapidly Change Labour Market

4.1.1 Leveraging Labour Market Data, Tracer Studies, and Employer's Insight

In today's world, data-driven careers, especially in Technical Education and Skills Development (TVET), are crucial. To create a flexible and responsive TVET system, effectively utilising labour market data, tracer studies, and employer insights is essential.

To enhance TVET systems, it's vital to improve labour force surveys, conducting them regularly and consistently to keep pace with the changing job market. These surveys should include questions about TVET education to understand the demand for skilled workers, evolving skills, and alignment with industry needs. Quarterly surveys offer decision-makers timely data to identify emerging trends and make swift adjustments.

A significant challenge faced by TVET systems globally is the lack of comprehensive information about available skills. Many countries rely on irregular and disorganized surveys from external sources, resulting in fragmented and insufficient data. Regular, internally driven, and systematic data collection is vital for informed decisions about TVET policies, curriculum development, and resource allocation.

Establishing a single agency responsible for collecting and sharing information about skill demand and future job trends is an important step forward. This central authority can ensure consistency and coherence in data collection and analysis across various departments and stakeholders. However, building a robust data infrastructure is necessary to facilitate easy data sharing and access. Such infrastructure empowers policymakers, educators, and students to make informed choices aligned with the ever-changing job market.

Combining administrative data with specific statistics about TVET graduates and conducting tracer studies is essential to understand labour market supply and demand dynamics. These studies offer valuable insights into the career paths of TVET graduates, highlighting areas of success and areas needing improvement. Continuously tracking graduates' progress and gathering feedback from employers allows TVET programs to enhance and better meet industry needs.

Obtaining insights from employers is another vital aspect of data-driven careers in TVET. While surveys are valuable, engaging with industry experts through workshops and consultations provides a deeper understanding of skill requirements. This comprehensive approach ensures that TVET programs cater to the needs of both formal employers and the informal sector, a significant part of the workforce.

In the digital age, real-time labour market data from online job postings and advertisements are potent tools for monitoring labour market trends. Employing big data techniques, institutions and policymakers can collect and analyse extensive datasets, offering valuable insights into job skill requirements, high-demand occupations, and the evolving nature of work. Leveraging this data empowers TVET institutions and policymakers to swiftly adapt to changing market dynamics, align curricula with industry needs, and equip students with skills directly leading to employment opportunities.

Country Examples

In terms of country-specific examples, Malaysia exemplifies the proactive approach to gathering employer feedback. Surveys conducted among 205 employers, spanning both industry and public agencies employing National Dual Training System graduates, revealed important areas of improvement. These findings, including concerns about English language proficiency and entrepreneurship skills, emerged as pivotal inputs for enhancing TVET curricula to better align with real-world requirements.

In the Philippines, strides have been made in establishing a robust labour market information system. Initiatives such as JobsFit, a labour market study highlighting in-demand occupations, have provided critical insights into key industries projected to drive employment growth. The Technical Education and Skills Development Authority (TESDA) further reinforces data-powered careers by regularly conducting surveys on the employability of TVET graduates. These proactive steps underscore how data-driven decision-making facilitates informed enhancements in TVET systems, ultimately ensuring their relevance and effectiveness within the ASEAN region and beyond.

4.1.2 Expanding Work-based Learning to Support School-to-Work Transition

Expanding Work-based Learning (WBL) is vital for enhancing the quality and relevance of Technical and Vocational Education and Training (TVET) programs, aiding students in their transition from school to work. WBL emphasizes hands-on learning, fostering independent thinking and connecting theoretical knowledge to practical application. Evidence from European Union (EU) countries underscores the positive impact of WBL on students' employability, offering various forms such as apprenticeships, internships, traineeships, and on-the-job training to develop practical skills.

However, challenges exist in incorporating WBL into TVET programs, particularly in many Middle and Low-income countries, where weak links between education and industry hinder the placement of learners in host companies, exacerbated by the prevalence of small-scale firms. To promote WBL expansion, clear rules in TVET systems, roles for key stakeholders, and shared funding mechanisms are essential policy recommendations.

Engaging employers and workers' organizations is pivotal for successful WBL implementation, involving collaboration in program design, oversight, and quality assurance. Building strong partnerships, nationally and locally, including with small and medium-sized enterprises (SMEs), is vital to ensure WBL programs align with local industry needs. Recognising the potential in SMEs and non-traditional sectors like agriculture and services is essential for addressing unemployment and providing valuable skills for sustainable employment.

Leveraging technology is a transformative aspect of WBL, offering flexibility and accessibility through online platforms for theory-based lessons. Digital tools for tracking and assessing learning progress provide real-time insights, enabling timely interventions and personalized support, thereby enhancing the overall quality of the WBL experience. Remote work-based learning not only offers

service professionals the convenience of working from their homes but also functions as a valuable instrument for broadening the private sector and small to medium-sized enterprises (SMEs), effectively circumventing the limitations of traditional office-based employment and fostering a more encompassing and flexible workforce. Employing technology in this manner serves as a catalyst for both professional advancement and economic expansion.

Country Examples

In the context of WBL models, Malaysia's Work-based Learning (WBL) model, provides a compelling blueprint for effective skills development within the Technical and Vocational Education and Training (TVET) sector. This model strikes a delicate balance between classroom-based theoretical instruction and immersive hands-on learning. Specifically, it allocates 25% of the learning experience to in-class theory, facilitated by industry-experienced teachers who bring real-world insights to the curriculum. The remaining 75% of the program is dedicated to practical field learning, offering students the opportunity to apply their knowledge in real-world contexts.

The primary goal of Malaysia's WBL model is to maximise the advantages for all key stakeholders involved. For students, this approach ensures that they acquire not only theoretical knowledge but also the practical skills and competencies demanded by the job market. Educational institutions benefit by producing job-ready graduates, enhancing their reputation and relevance. Lastly, the industry benefits from a pipeline of skilled and competent talent, ready to contribute to their workforce. This harmonious collaboration between academia and industry exemplifies the synergy that effective WBL can achieve.

In contrast, Indonesia's journey in enhancing WBL is epitomised by the Teaching Factory (TEFA) program, introduced in 2016 at the secondary level (SMK). TEFA represents a ground-breaking approach to TVET, seamlessly merging production-

based learning with competency development. Under this model, students are not passive observers but active participants in the production process, adhering to industry-standard procedures and protocols.

TEFA equips students with hands-on experience that closely mirrors real-world workplace dynamics. By engaging in actual production processes, students gain practical insights into the industries they are preparing to enter. This approach fosters a deeper understanding of industry-specific practices and demands, ensuring that graduates are not only knowledgeable but also workplace-ready.

4.1.3 Modernising TVET Curricula with New Skills and Competencies

Vocational education has long been advocated as a pivotal means of improving the transition from school to work. However, its significance extends beyond this transitional bridge; it also wields a notable impact on workers' adaptability in the face of technological advancements and structural shifts. This distinguishing feature sets vocational education apart from general education.

The dynamism of today's job market necessitates an education system that not only imparts knowledge but also equips individuals with the versatility to navigate evolving employment landscapes. Vocational education, with its practical orientation and focus on specialized skills, emerges as a formidable ally in this endeavour. As technological innovations and shifts in industry demand become more frequent, TVET institutions must adapt to ensure that graduates remain not only employable but also agile in responding to change.

Recent research underscores a critical distinction within vocational education programs. Specifically, programs that emphasize technical skills over social skills tend to yield more pronounced short-term benefits. However, these relative advantages tend to dissipate over time, emphasizing the need for a comprehensive approach that integrates foundational and evolving skill sets. This

highlights the importance of modernising TVET curricula to encompass a broader spectrum of competencies that resonate with the ever-evolving world of work.

In the effort to modernise TVET curricula, two fundamental approaches emerge. The first approach involves integrating foundation or basic skill sets into TVET education. These skills serve as the building blocks for students' careers, encompassing basic literacy, numeracy, and language proficiency, which are essential for understanding instructions, performing calculations, and effective communication. Moreover, fostering self-efficacy skills like adaptability, resilience, flexibility, and agility empowers individuals to confidently navigate change and uncertainties in the job market. Cognitive skills such as creative and analytical thinking are also vital, enhancing problem-solving abilities and innovative thinking, ultimately making TVET graduates more effective in the workplace.

Secondly, recognising the ever-changing nature of work, modern TVET curricula should encompass a broad spectrum of skills and adaptable competencies. This includes digital skills, which play a critical role in navigating global labour markets and accessing opportunities beyond local boundaries. Additionally, the importance of green skills is highlighted, aligning with UNESCO's Strategy for TVET 2022-2029 and contributing to the development of inclusive and sustainable economies. Lastly, entrepreneurship skills are indispensable, particularly in regions with significant informal labour markets, as they cater to the growing demand for self-employment and enable individuals to actively participate in the workforce.

Country Examples

In the Philippines, the modernisation of TVET curricula is overseen by the Technical Education and Skills Development Authority (TESDA). TESDA collaborates closely with industry experts, employers, and educational institutions to craft Training Regulations (TRs) that establish training and assessment

standards for diverse trades and occupations. These TRs serve as essential guides for TVET institutions, aiding them in the ongoing process of updating curricula to meet current industry requirements, designing new courses, and ensuring that students are well-prepared for the workforce. This collaborations effort entails continuous reviews and adaptations to ensure that TVET programs in the Philippines remain in sync with the ever-evolving demands of the job market.

A prime illustration of this regulatory framework is the development and implementation of TRs, which delineate the specific skills and knowledge needed for various trades and occupations. TVET institutions leverage these TRs to shape and rejuvenate their curricula, guaranteeing that students receive training that aligns with industry standards. Furthermore, TESDA conducts regular competency assessments based on these TRs to assess students' skill levels. This holistic approach involving government, industry, and educational institutions underscores the adaptability and relevance of TVET programs in the Philippines, addressing the dynamic requirements of the job market effectively.

On the other hand, in Brunei Darussalam, the Manpower Industry Steering Committee (MISC) has made significant strides in formulating innovative policies geared towards Industry 4.0. These policies are actively being implemented to enhance existing skills, update training programs, and ensure their future relevance. The Minister of Education has taken strategic measures, such as enhancing the curriculum and providing training for teachers. However, the advent of TVET 4.0 presents fresh challenges, necessitating a more flexible curriculum as traditional methods may not cater to the needs of 21st-century students. To meet this demand, maintaining continuous curriculum updates is imperative, serving as a top priority for both Politeknik Brunei (PB) and the Institute of Brunei Technical Education (IBTE) in their pursuit of delivering high-quality TVET.

At an institutional level, IBTE has initiated programs aimed at raising awareness and enhancing the competencies of teachers and managers. In 2020, a workshop was conducted with the objectives of demystifying key Industry 4.0 concepts and understanding the roles of various stakeholders, reviewing practical roadmaps for implementing Industry 4.0, and comprehending its implications for businesses and technology. The workshop also featured case studies from diverse organizations, shedding light on potential opportunities for growth and development.

4.1.4 Strengthening TVET through Private Sector and Community Engagement

In many low and middle-income countries, a significant gap exists in enterprise involvement in the design of TVET strategies due to various factors. These include a lack of interest among enterprises, limited awareness of partnership opportunities, and scepticism about the value such collaborations can bring. Often, enterprises may not fully grasp the potential benefits of actively participating in the TVET ecosystem, leading to a disconnect between the education system and the evolving demands of the job market.

Figure 4: Private Sector Engagement in TVET

UNESCO-UNEVOC (2021) explain that the private sector is important for improving TVET quality, both as employers and training providers. It is vital to align TVET programs with industry needs. The graph reveals that their significance extends far beyond mere receptivity. These entities serve as pivotal pillars in various capacities. They not only function as recipients but also actively engage as financiers, facilitators of work-based learning, education providers, and a myriad of other essential roles. Their multifaceted contributions enrich the fabric of our society, underlining their vital role in driving progress and innovation. However, globally, there is limited interaction and knowledge sharing among companies and development partners despite working toward the same goal of enhancing TVET quality.

Collaboration between the private sector and the community is essential in strengthening TVET. They contribute to work-based learning, bridging the gap between classroom knowledge and practical skills. Moreover, private sector involvement informs TVET about evolving skills requirements, shaping competency-based curricula. They also ensure TVET adapts to changing workforce needs by aligning with industry demands.

To encourage industry participation in TVET, several incentives can be considered. Collaborating with TVET programs allows companies to access a pool of skilled and job-ready graduates, improving talent acquisition efficiency, reducing recruitment costs, and enhancing workforce productivity. Employing graduates with industry-relevant skills can lead to immediate contributions to business operations and growth. Moreover, government policy carrots can play a pivotal role in incentivising company involvement in TVET through measures such as offering tax breaks or other financial incentives to companies that actively engage in TVET partnerships. These policy incentives serve as tangible benefits for companies, encouraging them to invest in the development of a skilled workforce and contribute to the growth of the national economy.

Country Examples

Indonesia's Kampus Merdeka Program for Higher Education, initiated in 2021, is a shining example of the positive impact that private sector engagement can have in the TVET ecosystem. With a dedicated budget of IDR 180 billion for the Vocation Matching Fund, the government actively encourages private sector participation in TVET, promoting the integration of formal learning with practical work experience. This program serves as an incentive for collaboration between educational institutions and industries, reinforcing the connection between education and the evolving job market.

In Indonesia, the government, through the Vocation Matching Fund, matches industry investments in startup companies that collaborate with educational institutions. Additionally, it facilitates the transformation of research outcomes in the TVET sector into marketable products. This approach not only strengthens hands-on learning at TVET schools but also establishes a closer link between these institutions and industries as real users of the products. This successful collaboration between the private sector, community, and education

demonstrates how TVET can be improved to better align with industry demands, ultimately meeting the evolving needs of a rapidly changing job market.

In response to the challenges posed by the COVID-19 pandemic in Brunei Darussalam, the government implemented a range of measures aimed at safeguarding jobs and supporting individuals. These measures, starting from April 1, 2020, included covering the full Supplementary Contributory Pension (SC) contributions for self-employed individuals for a six-month period. Furthermore, free access to online training via Coursera, which offers more than 300 business-related courses, was provided to individuals. Encouraging lifelong learning, companies were urged to offer training opportunities for their local staff through the Manpower Planning and Employment Council (MPEC).

The government also extended the contracts of i-Ready apprentices in both the public and private sectors, particularly those with contracts expiring before September 2020. The i-Ready Apprenticeship Program was expanded to encompass a level 5 Diploma (HND or Advanced Diploma) and Technical and Vocational Education Training (TVET). Additionally, significant improvements were made to the Job Centre Brunei (JCB) website, enhancing its job-matching capabilities with real-time notifications. This upgrade allowed companies to access talent profiles and compatibility reports based on job criteria. In collaboration with private companies in need of a larger workforce, JCB offered services such as sending SMS notifications to local job seekers, maintaining a talent pool for the reference of these companies, and conducting interviews through a virtual platform.

4.2 TVET as pathway for lifelong learning

Further learning is increasingly essential for TVET graduates as industry is demanding higher qualifications from the workforce. As technological development is getting more advanced, there is also concern on the replacement of human works with automated system.

4.2.1 Higher education pathway

Higher education is formal way to increase qualification. However, the pathway is not always visible to all TVET graduates. Following the more "applied" pathway of learning might have conditioned TVET graduates to focus on technical work after graduation. They might struggle from a steady pay without increasing their share of bargain: increased skills and qualifications. Meanwhile, technological advancement always demanding upgrade in workforce skills.

There are three common streams from which TVET graduates are expected to continue their education, directly from 1) secondary TVET school, directly from 2) post-secondary TVET school, and starting from 3) working adults. Summary of the pathway in below table.

Table 9: Common streams of TVET graduates in continuing education

Latest education	Country	Example of origin school	Example of Tertiary Education available
Upper secondary TVET (ISCED 3)	**Brunei Darussalam**	Certification, NTEC, HNTEC	HNC, Uni. foundation degree, HND/Adv.D, Bachelor's*
	Indonesia	Sekolah Menengah Kejuruan	Diploma 1-3 (D1-D3), Sarjana (Bachelor's d)
	Malaysia	Kolej Vokasional (year 1-3), Latihan Kemahiran	Kolej Vokasional (Year 4), Latihan Kemahiran, Diploma Lanjutan Politeknik
	Philippines	Senior high school	Post-secondary TV programme, Baccalaureate (Bachelor)

Latest education	Country	Example of origin school	Example of Tertiary Education available
	Timor-Leste	Secundario Tecnico Vocacional	Diploma Politecnico, Bachelor's degree
Post-secondary TVET short courses (ISCED 4-5)	**Brunei Darussalam**	HNC, Univ. foundation degree, HND/Advanced Diploma	Post.grad Diploma, Bachelor's*
	Indonesia	Diploma 1-3 (D1-D3)	Sarjana Terapan (Applied Bachelor - D4), Sarjana (Bachelor)
	Malaysia	Kolej Vokasional (Year 4), Latihan Kemahiran, Diploma Lanjutan Politeknik	Bachelor's degree, Professional certificate, Post-grad diploma in public administration
	Philippines	Post-secondary TV programme	Baccalaureate (Bachelor)
	Timor-Leste	Diploma Politecnico	Bachelor, Post-graduate Certificate*
Professional (working adults)	**Professional with secondary/post-secondary certificate**		Generally acceptable by some universities if workers have recognised certificate from upper secondary or post-secondary institutions*. Some universities might have age limit for entry.
	Professional without secondary/post-secondary certificate		May need to obtain certificate from equivalence institutions e.g., Kejar Paket in Indonesia, National Equivalence Program in Timor-Leste, etc.

UNESCO through *Pathways of progression* (2018) recommended several key areas to be improved in order to develop an *effective pathway,* that would allow those with TVET qualifications or practitioner backgrounds to have a full opportunity to benefit from higher education, should they wish to pursue it. The recommendations include promoting transparency of the pathway, improving current TVET design, and removing obstacles for provision.

4.2.1.1. Promoting pathways through transparency

Two ways to promote transparency in learning is through formal standardisation in a National Qualification Framework (NQF) and Recognition of Prior Learning (RPL) or credit transfer. Both NQF and RPL go hand in hand to enable TVET graduates to continue pursuing higher education. NQF helps in promoting lifelong learning, aids in understanding the qualifications from different education systems, and encourages international mobility.

All the countries in the subregion already have their own NQF. The earliest was Malaysian Qualifications Framework (MQF) launched in 2007, followed by Timor-Leste National Qualification Framework (TLNQF) in 2011, both the Indonesia Qualifications Framework (K*erangka Kualifikasi Nasional Indonesia*, KKNI) and the Philippines Qualification Framework (PQF) in 2012, and the Brunei Darussalam Qualifications Framework (BDQF) that guides the education system including TVET since 2013**.** With all the NQF in place, all that is left is their execution which may face challenges from technical and socio-cultural perspectives.

The recognition of prior learning or credit transfer has been part of each country policies. Malaysia's Recognition of Prior Experiential Learning (RPEL) is an established mechanism under the Malaysian Qualifications Agency (MQA). It allows individuals, especially those in the TVET sector, to gain formal recognition for their knowledge, skills, and experience. The RPEL process can provide exemptions and credits towards formal qualifications, facilitating entry or advanced standing in formal education and training programs. The Philippines' Technical Education and Skills Development Authority (TESDA) has policies on RPL, this mechanism allows Filipinos, especially overseas Filipino workers returning to the country, to gain certifications based on their work experiences and skills. The same goes with RPL in Indonesian’s KKNI, Brunei’s BDQF, and Timor’s TLNQF.

Recently, the Malaysia MoHE introduced a **special pathway** that enables students with any technical and vocational education and training (TVET) certification to enrol in a diploma programme at a polytechnic and pursue a degree afterwards. The Ministry emphasised it aims “to ensure that TVET students are interested to continue upskilling” for better salary. The initiative is to prepare the youth for a growth in TVET jobs especially in machine and technology operators, and artificial intelligence technology analysts.

Since 2014, The Philippines has enacted a regulation that allows for a more seamless and borderless system of education. The “Ladderised Education Act of 2014” attempts to institutionalise the ladderised interface between technical-vocational education and training (TVET) and higher education to open the pathways of opportunities for career and educational progression of students and workers. It gives freedom for students and workers to choose when to enter and exit in the educational ladder and provide job platforms at every exit.

In Indonesia, MoE has set out to focus on the secondary vocational to post-secondary fast track (SMK-D2), Applied Bachelor’s Programme (D4), Applied Master's Program, and Applied Doctorate.

4.2.1.2. Design initial TVET to support lifelong learning and augment it with bridges to more advanced programmes.

Entry to higher education can sometimes pose a challenge to TVET graduates. With their focus poured into practical aspects of learning, academic learning skills might be overlooked. There are also cases where entry to higher education, including post-secondary and polytechnics, favours general secondary school graduates. Anticipating this challenge, public polytechnics in Indonesia have taken measures to assess TVET graduates based on their achievement at school instead of entrance exams that focus only on academic knowledge.

Enriching TVET (Technical and Vocational Education and Training) with general education and lifelong learning skills is crucial to ensure that graduates are not only job-ready but also equipped to continue their education and adapt to evolving career demands. Most of countries in the subregion have TVET curriculums that include foundational subjects such as Mathematics, Language (English and respective national language), and Basic Science. Malaysia also added Moral Studies subject to ensure all-rounded graduates.

Providing optional bridging programmes (study skills, basic skills of numeracy and literacy, and targeted preparation for academic pathways) might be a practical solution especially for TVET graduates who are directly continuing their education. The preparation programme can be developed with higher education institutions. One example is the Malaysian MoE initiative of building a TVET foundation centre to provide an affordable one-year foundation programme for Form Five school-leavers to be eligible for TVET programmes in technical universities.

4.2.1.3. Removing the obstacles and filling the gaps in post-secondary provision

Bridging programmes can take a form of 'hybrid' tracks. Hybrid' tracks in upper secondary education allow students to pursue a TVET certificate and a general education diploma simultaneously. 'Dual enrolment' in the USA was proven to increase the likelihood of students enrolling and completing some form of post-secondary qualification. A recent initiative is launched in Indonesia where MoE is striving to improve vocational high school (SMK) education with a fast-track two-year diploma (D2) program. Students will undergo SMK education for three years, followed by advanced education for three semesters with internships in the industry while studying. Students in the fast-track D2-SMK program will be taught by SMK teachers, vocational lecturers, and industry teachers.

While hybrid tracks can increase enrolment in higher education, government may need to provide various options of post-secondary vocational programmes.

Shorter programmes would benefit current TVET graduates with higher qualifications but with less burdening costs.

Moving into working adult perspectives, flexible learning might be the most important consideration for pursuing higher education. Those with family may also need to juggle with responsibility. Open universities, extension programmes, and online courses could become alternatives for adult workers.

4.2.2 Lifelong learning through continuous upskilling

Upskilling workers is vital because it can boost productivity, benefitting from efficiency brought about by increased competencies. It also enhances global competitiveness, attracting investments and creating jobs. Following dynamic labour market, it can fill skill gaps in fast-changing industries, helps workers advance in their careers, and ultimately drives economic growth by fostering innovation and productivity.

Governments are in urgent need for upskilling initiatives to prepare workforces for the digitalisation and green transformation of their economies. Annual survey to CEOs in Asia Pacific by PwC has noted that 71% of them have invested in automation, emphasising the move towards digitalisation. Another study also estimated that up to 37% of the Southeast Asia's GDP could be lost by 2048 due to climate change-related impacts. Currently, there is a strong focus on digital skills upskilling, especially taking lessons learnt during pandemic situation. Meanwhile, sustainability-related upskilling is progressing more slowly due to its complexity.

In terms of potential, PwC analysis shows that wide-scale investment in upskilling has the potential to boost the GDP in Southeast Asia by 4% or US$250 billion. It is equivalent to unlocking up to 676,000 new jobs by 2030. Both companies and governments may need to consider broader social protection policies and invest

in upskilling initiatives tailored to those affected by those two trends. It is a critical time for upskilling workers that face the biggest risks of labour replacement by automation and the net-zero transition.

Taking advantage of the region's strength, upskilling in manufacturing, agriculture, energy and utilities, and financial services sectors could potentially uplift the overall GDP amount to US$136 billion. These sectors account for more than half of the region's overall potential. Those sectors have been the focus of several initiatives such as Philippines' Skills Framework (PSF), Brunei's MISC-WG Energy programmes, and other programmes as detailed in the Table below.

Table 10: Upskilling initiatives from five-clusters countries

Country	Upskilling Initiatives
Brunei Darussalam	• Lifelong learning centre under the Ministry of Education • MISC-WG Energy programmes focusing on energy sector • Upskilling Training Programme for Local Youth Jobseekers and Local Workforce that facilitates the upskilling and reskilling with industry-ready competencies based on industry demand and requirements.
Malaysia	• The government set aside over RM1 billion in the 2022 National Budget for upskilling and reskilling. • They launched Upskill Malaysia, a national platform offering training info and funding opportunities, supported by ministries and agencies. • The Green Technology Master Plan aims to enhance workforce skills, including training partnerships with institutions and upskilling labour in sustainable construction.
Indonesia	• Indonesia introduced 'Kartu Prakerja,' offering job-seekers training subsidies through e-wallets, emphasising support for disabled and female workers. • Indonesia's Ministry of Communication and Information Technology is providing digital skills training, including a Digital Leadership Academy for executives and policymakers to foster digital innovation.

Country	Upskilling Initiatives
The Philippines	• The Philippines introduced the Skills Framework (PSF) to train workers in key sectors like manufacturing and agriculture, as part of their Industry 4.0 strategy. PSF helps workers adapt to digital technology changes, find better jobs, and boost the country's competitiveness by offering accurate info on industries, jobs, skills, and training programs.
Timor-Leste	• The Youth Employment and Entrepreneurship Skills (YEES) programme in collaboration with UNDP, funded by KOICA, focusing on entrepreneurship programmes for youth • Youth Employment Promotion Programme (YEP) programme in partnership with the World Bank and ILO focusing on skills training and employment opportunities for youth • Training and Employment Support Program (TESP) implemented through Secretariat of State for Vocational Training and Employment Policy (SEPFOPE) and the National Labour Force Development Institute (INDMO) • Partnership with UNICEF and World Bank aiming to improve the country's digital infrastructure and skills.

Lifelong learning through continuous upskilling is essential in Southeast Asia to adapt to changing skills needs in the industry or labour market. Several factors such as globalisation, technological developments, demographic changes, migration, climate change, and covid-19 affect people's skills to face a complex world.

To reduce skills imbalances in labour markets, countries must understand where shortages, surpluses, and mismatches exist and use this information to design effective policies. In many organisation for Economic Co-operation and Development (OECD) countries, there are shortages in problem-solving and social skills, while technical skills are mostly balanced. However, the situation differs in Southeast Asian countries. Low-skill occupations face shortages due to their large

size and unattractive working conditions. High-skill occupations may experience shortages in specific areas, and middle-skill occupations often face surplus pressure. The database helps identify these imbalances and guide policy decisions for a more balanced labour market.

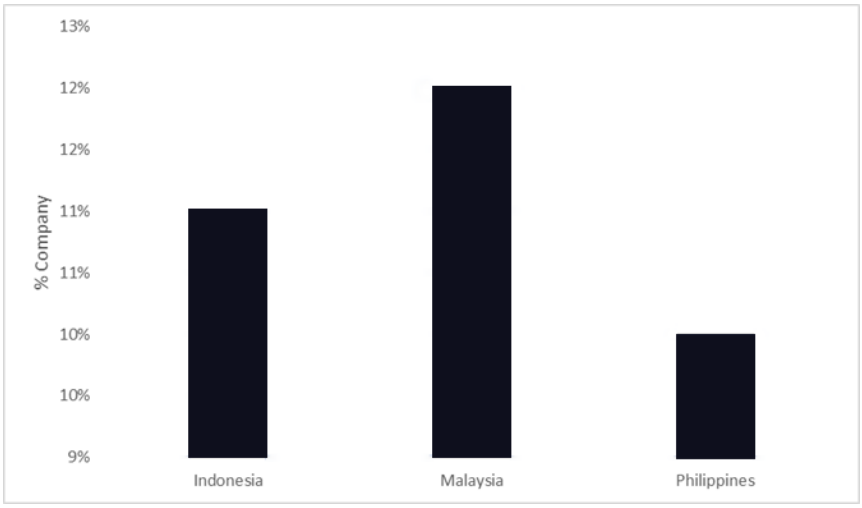

Figure 5: Percent of firms identifying an inadequately educated workforce as a major constraint Referring to 2015 data

Labour markets in Southeast Asian countries exhibit significant levels of qualification mismatches among workers. Under-qualification may indicate employers' difficulty in finding workers with the right qualifications, leading to the hiring of under-qualified individuals. However, it is important to note that under-qualified workers may still possess relevant skills acquired informally. Implementing a system of recognising prior learning can help certify these skills and make them more visible to employers. Additionally, a significant proportion of workers in Southeast Asian countries are mismatched in terms of their field of study, often due to limited job opportunities or more attractive conditions in other fields.

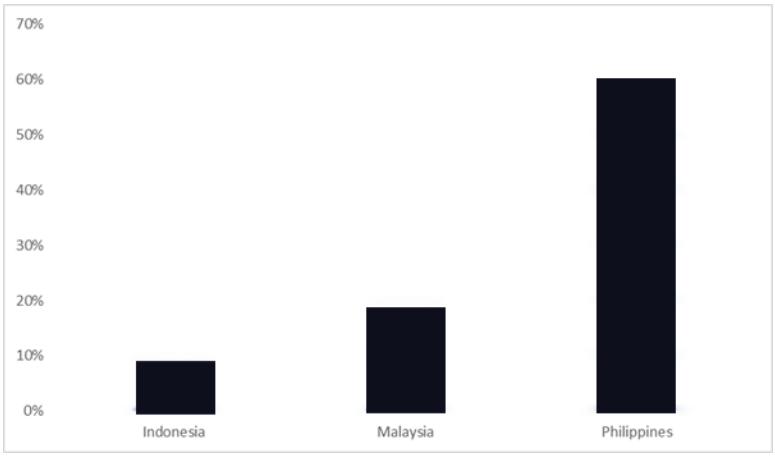

Figure 6: Training provision by employers Data refer to 2015 data

In Southeast Asia, many workers are in jobs that don't match their education and skills. Additionally, there is a risk of structural changes affecting these workers, and people are expected to have longer working lives due to increased life expectancy. Adult learning systems are crucial in providing opportunities for upskilling and reskilling, addressing changing skill needs and preventing skill imbalances. However, adult learning systems in Southeast Asian countries, as well as in many OECD countries, often lack sufficient attention and resources, raising concerns about their ability to tackle future skill challenges.

Career guidance plays a crucial role in addressing the importance of upskilling community skills. By providing individuals with information on relevant learning opportunities and skill development needs, career guidance helps individuals make informed decisions about their career paths. This includes identifying the skills that are in demand in the labour market and aligning them with individuals' interests and abilities. By promoting continuous career guidance for both young and older adults, communities can ensure that individuals are equipped with the necessary skills to meet the changing demands of the job market. This, in turn, contributes to the overall upskilling of the community, as individuals are guided towards acquiring the skills that are needed in their respective fields. By linking

career guidance with the importance of upskilling community skills, individuals can be empowered to make informed decisions about their career development and contribute to the overall growth and competitiveness of their communities.

Chapter 5:
Conclusions and Recommendations

5.1 Conclusion

First, in line with UNESCO's strategic priorities and the Sustainable Development Goal 4 (SDG-4), the school-to-work transition, which places a strong emphasis on lifelong learning, sustainable economies, and inclusive societies through Technical and Vocational Education and Training (TVET), assumes a central role in equipping vocational students with both theoretical knowledge and practical skills necessary to navigate the evolving employment landscape. Sub-regional Study on Transforming TVET underscores the imperative of enhancing the efficiency of vocational education within the sub-region of Southeast Asian countries.

Second, it is shown that while each cluster countries adopts its unique approach to facilitate school-to-work transitions, there is a growing consensus on the necessity for standardised practices to facilitate international employability and mobility. Within this context, highlighted the distinct roles and strategies employed by countries such as Brunei, Indonesia, Malaysia, the Philippines, and Timor-Leste in their concerted efforts to strengthen school-to-work transitions through the prism of their respective TVET systems.

Moreover, our study has illuminated a range of challenges confronting the TVET sector, including issues like labour market mismatches, insufficient infrastructure, and negative public perceptions. Nevertheless, the review also underscores a lot of opportunities available, including forging strategic partnerships with industries, modernising curricula to align with contemporary skills demands, advancing inclusive education for individuals with disabilities, promoting gender equality within the TVET framework, and effectively responding to the ever-evolving labour market. Achieving these goals necessitates leveraging labour market data,

expanding work-based learning opportunities, and seamlessly integrating new competencies into TVET curricula. Active involvement of the private sector and local communities is paramount to the success of these endeavours.

In essence, the study underscores the transformative potential of TVET in fostering not only individual growth but also contributing significantly to the sustainable development within the sub-region. By addressing the challenges and capitalizing on the opportunities within the TVET landscape, collectively work towards creating more prosperous and inclusive societies where people are empowered to thrive in the workforce, regardless of their background or abilities.

5.2 Recommendation

Based on the conclusions, the recommendations of this study focus on key strategies and actions that can be implemented to improve the school-to-work transition and enhance the effectiveness of TVET system, some of the proposed recommendations include:

- Countries adopt universal standards for school-to-work transitions to increased mobility for workers, improved labour market efficiency, and reduced social exclusion.
- Implementing policies related to TVET inclusivity and consistently and sustainably monitoring them to minimize gender-based discrimination, discrimination against people with disabilities and other vulnerable groups, thus enhancing the quality of TVET graduates and providing more equitable access to the labour market.
- Institutional Frameworks: Establish clear TVET frameworks for Work-Based Learning (WBL), addressing program details and funding mechanisms.
- Stakeholder Engagement and Technology: Promote employer and worker involvement, build partnerships, and leverage technology to enhance WBL accessibility and quality.
- Enhance TVET system with study skills and digital skills to prepare TVET graduates for further education and lifelong learning.
- Strengthen efforts in continuous upskilling, both through government-led initiatives and supporting the environment for private sector training market.

Bibliographical References

Admin, A. (2023, September 22). *How is Malaysia faring under its 12th plan? are major revisions required?*. Malaysiakini. https://www.malaysiakini.com/events/679083

Ang Chooi Hwa, M., & Tien Hong, L. (2022). *MAKING TVET INCLUSIVE FOR PERSONS WITH DISABILITIES IN MALAYSIA*, *4*(3). https://myjms.mohe.gov.my/index.php/ijeap/article/view/19919/10597

Barrera-Osorio, F., Kugler, A. D., & Silliman, M. I. (2020). Hard and soft skills in vocational training: Experimental evidence from Colombia. The World Bank Economic Review.

Cedefop (2021). The role of work-based learning in VET and tertiary education: evidence from the 2016 EU labour force survey. Luxembourg: Publications Office of the European Union. Cedefop research paper; No 80.

Comyn, P. J. (2018). Skills, employability and lifelong learning in the Sustainable Development Goals and the 2030 labour market. International Journal of Training Research, 16(3), 200-217.

The Conversation. (2022). Just and successful energy transition requires women's participation, Here's what Indonesia can do. Retrieved from The Conversation: https://theconversation.com/just-and-successful-energy-transition-requires-womens-participation-heres-what-indonesia-can-do-184846

Emel, M. (2021, July 5). *Mesyuarat Jawatankuasa Eksekutif majlis tvet Negara (MTVET) bil. 1/2021*. KPT - Mesyuarat Jawatankuasa Eksekutif Majlis TVET Negara (MTVET) Bil. 1/2021. https://www.mohe.gov.my/hebahan/sorotan-aktiviti/2021-06-29-mesyuarat-jawatankuasa-eksekutif-mtvet-bil-1-2021

Gunawan, T. ; R. (2022, February 8). Mapping workers with disabilities in Indonesia. https://www.ilo.org/jakarta/whatwedo/publications/WCMS_836028/lang--en/index.htm

Hanushek, E. A., Schwerdt, G., Woessmann, L., & Zhang, L. (2017). General education, vocational education, and labour-market outcomes over the lifecycle. Journal of human resources, 52(1), 48-87.

Hernando-Malipot, M. (2020). DepEd encourages girls to pursue 'hard science' STEM courses. Retrieved from Manila Bulletin: https://mb.com.ph/2020/03/05/deped-encourages-girls-to-pursue-hard-science-stem-courses/

ILO, A. (2017, November 27). *Making TVET and Skills Systems Inclusive of persons with disabilities*. Policy brief: Making TVET and skills systems inclusive of persons with disabilities. https://www.ilo.org/global/topics/disability-and-work/WCMS_605087/lang--en/index.htm

Indonesian Government, A. (2020). vocational high schools (SMK) in Indonesia followed the government's guidance to implement online learning. Retrieved 2023,.

Indonesian Ministry of Education, Culture, Research, and Technology (2021) Merdeka Belajar Episode Kesebelas: Kampus Merdeka Vokasi.

International Labour Organization. (2020). #WOMENCANDOIT Scholarship Programme. Retrieved from ILO: https://www.ilo.org/manila/aboutus/WCMS_632711/lang--en/index.html

Kanwar, A., Balasubramanian, K., & Carr, A. (2019). Changing the TVET paradigm: new models for lifelong learning. International Journal of Training Research, 17(sup1), 54-68.

Kenayathulla, H. B. (2021). Are Malaysian TVET graduates ready for the future?. Higher Education Quarterly, 75(3), 453-467.

Khalid, Dato' Seri Mahdzir. (2018). Malaysia: Women in STEM. Retrieved from Ibe-Unesco 2023: https://ibe-infocus.org/articles/malaysia-women-stem/

Malaysian Government, A. (2021). *Digital Educational Learning Initiative Malaysia (DELIMa)*. Mygov - the government of Malaysia's Official Portal. https://www.malaysia.gov.my/portal/content/31221

Malaysian Government, A. (2023, September 29). *Kemampanan, Kesejahteraan, Daya Cipta, Hormat, Keyakinan, Ihsan*. Malaysia MADANI. https://malaysiamadani.gov.my/

McGuinness, S., Pouliakas, K., & Redmond, P. (2017). *How useful is the concept of skills mismatch?*. International Labour Organisation. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_552798.pdf

Meodia, A. (2020). Kementerian komunikasi dan informatika (kominfo) mendukung perempuan di industri teknologi informasi dan komunikasi (tik) dengan mendorong keterampilan stem (sains, teknologi, engineering/teknik, matematika) bagi siswi lewat program pendidikan girls4tech. *Kementerian Komunikasi Dan Informatika*. Retrieved 2023, from https://www.kominfo.go.id/content/detail/29567/kominfo-dukung-perempuan-di-industri-teknologi-lewat-girls4tech/0/sorotan_media.

Ministry of Education Brunei Darussalam. (2019). STEP Centre. Retrieved from Ministry of Educatio Brunei Darussalam: https://www.moe.gov.bn/bdta/SitePages/Step%20Centre.aspx

Natrah. (2023, July 27). *Madani economy to boost Malaysian economy, improve quality of life – pm Anwar*. Kementerian Kewangan Malaysia. https://www.mof.gov.my/portal/en/news/press-citations/madani-economy-to-boost-malaysian-economy-improve-quality-of-life-pm-anwar

Nurmalasari, N. (2023). A closer look at gender inequality in Indonesia's tech industry. Retrieved from Indonesia Business Post: https://indonesiabusinesspost.com/insider/a-closer-look-at-gender-inequality-in-indonesias-tech-industry/

OECD. 2021, Adapting to changing skill needs in Southeast Asia

OHCHR, A. (2016). Ratification Status for CRPD - Convention on the Rights of Persons with Disabilities. Retrieved 2023,.

Parra, C.A., Dikmelik A. I., Pela, K., & Froy, C.A. (2023) What we're reading about real time labour market data. The World Bank Blog

Republic of the Philippines. (2014). *Republic act no. 10647: THE LADDERIZED INTERFACE BETWEEN TECHNICAL-VOCATIONAL EDUCATION AND TRAINING AND HIGHER EDUCATION*. Official Gazette of the Republic of the Philippines. https://www.officialgazette.gov.ph/2014/11/21/republic-act-no-10647/

UNESCO-UNEVOC, A. (2019). Brunei Darussalam TVET Report of 2019 . ASEAN; UNESCO.

UNESCO. (2020). TVET Country Profile: Timor-Leste. Bonn: UNESCO

UNEVOC-UNESCO, A. (2020). *Research material 2020-42 - best practices in tvet policies coping with covid-19 crisis*. unevoc.unesco.org. https://unevoc.unesco.org/pub/best_practices_in_tvet_policies_coping_with_covid-19_crisis.pdf

UNICEF Timor-Leste, A. (2020, June 1). *"Eskola Ba Uma" initiative helps children continue learning in Timor-Leste*. UNICEF Timor-Leste. https://www.unicef.org/timorleste/stories/eskola-ba-uma-initiative-helps-children-continue-learning-timor-leste

UNICEF. (2020). Reimagine Education: ICT & Innovation in Timor-Leste.

UNICEF. (2020). Towards an Equal Future: Reimagining Girls' Education through STEM. New York: UNICEF

Woessmann, L. (2019). Facing the life-cycle trade-off between vocational and general education in apprenticeship systems. An economics-of-education perspective. Journal for educational research online, 11(1), 31-46.

World Bank, UNESCO, & ILO. (2023). Building Better Formal TVET Systems: Principles and Practice in Low-and Middle-Income Countries.

World Economic Forum (2023) The Future of Jobs Report

YCAB Foundation. (2020). Mastercard, Ministry of Communication and Informatics, and Ministry of Education and Culture. Retrieved from YCAB Foundation: https://www.ycabfoundation.org/news-highlights/news-updates/stem-for-girls-in-indonesia-developing-the-next-generation-of-girls-in-tech-with-ycab-foundation-mastercard-ministry-of-communication-and-informatics-and-ministry-of-education-and-culture/

CONTACT US

UNESCO JAKARTA OFFICE

Sentral Senayan I, 7th Fl -
Jl. Asia Afrika No. 8, Senayan, Jakarta 10270,
Indonesia

+62-21-2519-6647

jakarta@unesco.org

www.unesco.org/jakarta