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The Importance of TVET and Its Contribution to Sustainable Development

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Abstract. Technical and Vocational Education and Training (TVET) has been gaining its popularity and considered as the driving force for sustainable development. TVET is also considered highly in strategic and operational priorities of the G20, the Organisation for Economic Co-operation and Development (OECD), and of multilateral organizations such as the International Labour Organization (ILO), UNESCO, ASEAN, and SEAMEO. As reflected in Shanghai Consensus, TVET systems need sustained transformation and revitalization if TVET is to realize its enormous potential to impact development. This paper will elaborate relevant policies considered as major drivers for promoting TVET at global, regional, and national levels. The paper also shares TVET initiatives in response the policies, especially in meeting the labour market demands in the 21st century. Lastly, the paper highlights TVET contribution to sustainable development, particularly on the sustainable environmental development, including green jobs. The integration of sustainable development into TVET curriculum, learning contents, and also school policies and practices are important indicators to consider. The paper was based secondary data and documents from the meetings and also reports.

BACKGROUND

Technical and vocational education and training (TVET) is steadily gaining popularity at the global debates and government priorities for education and national development agendas. (Marope et al., 2015). TVET is also considered highly in strategic and operational priorities of the G20, the Organisation for Economic Co-operation and Development (OECD), and of multilateral organizations such as the International Labour Organization (ILO), UNESCO, ASEAN, and SEAMEO. To realise its potential to impact development, however, TVET systems need sustained transformation and revitalization. This was reflected in Shanghai Consensus (UNESCO, 2012).

In the Southeast Asian context, both ASEAN (the Association of Southeast Asian Nations) and SEAMEO (the Southeast Asian Ministers of Education Organisation) have placed TVET as a priority agenda. ASEAN Work Plan on Education 2016-2020 under Strategic Goal 4, states that ASEAN supports the development of TVET and Lifelong Learning by (a) maximizing access to TVET, (b) strengthening Regional Harmonisation and TVET Personnel Development, (c) establishing Regional Quality Assurance and Recognition of TVET, and (d) reducing the gap between supply and demand of skilled labours.

Priority #4 of SEAMEO Seven Priority Areas (2015 -2035) stipulates that SEAMEO is promoting TVET among learners, teachers, and parents with more visible investment and relevant curricula that focuses on creativity and innovation with a clear pathway to Lifelong Learning (LLL), Higher Education (HE), and regional mobility. These two organisations are supported by major multi-national organisations such as UNESCO and ILO, and national development agencies like GIZ, JAICA, KOICA, USAID, AUSAID that have been working together to realize the envisioned agenda.

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TVET MAJOR POLICIES AND INITIATIVES IN ASEAN MEMBER STATES

At the national level, we have witnessed the shift of placing TVET to the mainstream of education. In Brunei Darussalam, with its TVET transformation has established the Institute of Brunei Technical Education (IBTE) and launched of the 'White Paper', the 'Upgrading Plan for Technical Education Brunei Darussalam 2013 – 2018' and issued the "Institute of Brunei Technical Education Order 2014" in May 2014. There are six key changes currently being implemented over the next few years to modernise TVET in Brunei, including (i) course restructuring, (ii) expansion of apprenticeship options, (iii) reviewing progression opportunities, (iv) upgrading the training environment, (v) introducing a new scheme of teaching service, and (vi) renaming of Department of Technical Education (DTE) and the seven vocational and technical institutes (VTIs) under it. Parallel to this transformation, there is also a move from output-based performance measures to outcome-based measures (Ebil et al., 2015).

Cambodia has been working with the Asian Development Bank (ADB) project, "Strengthening Technical Vocational Education and Training (STVET)" which aims at supporting the government's strategies to reduce poverty and achieve socio-economic development for all Cambodians through: (i) promotion of vocational and skills training to ensure continuing improvement in national productivity; (ii) creation of jobs in the formal and non-formal sectors; (iii) an increase in agricultural productivity to create jobs in rural areas; and (iv) the establishment of technical vocational education and training (TVET) networks to assist both men and women, especially the poor, disabled and vulnerable, to respond to labour market needs" (UNESCO, 2013). More specifically, the STVET project is supporting the government's socio-economic development programme through provision of an industry-endorsed TVET system which is aligned with the basic and middle level skills requirements of the formal and informal economies in the three industry sectors, namely: mechanics, construction and business services and ICT. In addition, Industrial Advisory Groups (IAGs) have been constituted for the three priority sectors of construction, mechanics and ICT/business. Industrial Liaison Units (ILU) have been set up in all Provincial Training Centres (PTCs) to interact with the private sector (UNESCO, 2013).

The Directorate of Technical and Vocational Education of Indonesia currently is addressing the issue of increasing access to TVET which at the moment the ratio of enrolment at public upper secondary TVET and general education is still 33:67. In 2020, the Directorate is targeting the ratio to be 60:40. At the same time, Indonesia has been working on revitalisation of secondary vocational and technical schools (SMK) since 2016. Based on Presidential Instruction No. 9 in the year of 2016 on Revitalisation of Upper-Secondary Technical and Vocational Schools for Quality Improvement and Human Resource Competitiveness. This instruction is targeted for 12 Ministers, 34 Governors, and the head of National Professional Certification Bureau (BNSP). Mapping the workforce demands is one of tasks assigned to them (Ministry of Education and Culture, 2016).

There are 6 instructions especially to the Minister of Education and Culture: (1) Creating a roadmap for SMK, (2) improving the curriculum and synchronising it with the employers' expectations (link and match), (3) increasing the quantity and the competence of teachers and other TVET personnel, (4) strengthening the collaboration with other Ministries/Bureaus, local governments, and industries, (5) enhancing the access to certification for SMK graduates and accreditation for SMK, and (6) establishing a taskforce to develop SMK. (Ministry of Education and Culture, 2016).

At tertiary level such as polytechnics and diploma level, revitalisation is aimed at empowering and preparing polytechnic's and diploma's graduates ready for employment according to the needs of industry or society. Thus, they must possess competencies stipulated in the certificate (Dirjen Kembagaan IPTEK & DIKTI, 2017). According to the Indonesian Minister of Research, Technology and Higher Education, revitalisation at higher TVET will be carried out by strengthening collaboration with industry, 50 per cent of the trainers will be from industry. There is a need to adjust the curriculum to meet the needs of industry and it is expected that professional certification and competency assessment will take place in polytechnics (Menristekdikti, 2017).

Revitalisation is also happening at the university level, at the university or higher educational institutions which have roles in preparing for TVET teachers (LPTK]. Based on the Rakernas (Meeting Workshop organised by Menristekdikti) the long-term plans of the revitalisation of LPTK covers the followings: (1) improving the quality of teacher education [PPG], (2) improving SM3T (practice teaching at remote, marginalised, and under-developed

areas) programme, (3) aiming LPTK at the level of world class university, and (4) sustainable quality assurance system.

Those are some governmental initiatives in Indonesia that signify the importance of TVET at different levels. It's clear that much of the initiatives are top-down and public or government-driven which is believed to be most effective approach at the moment.

Lao PDR through its "Strengthening Technical and Vocational Education and Training Project" supported by Asian Development Bank targeted to increase number of workers in the labour force with formal TVET qualifications by 25% (50% for females) from 2011 to 2021. The expected outcome of this project is to provide accessible formal vocational training system that is more responsive to labour market needs which eventually create impact of more highly skilled and diverse workforce in Lao PDR. The intended outputs of this project are (1) improved quality of TVET, (2) increased and more equitable access to TVET, (3) increased private sector involvement in TVET strategy and delivery, (4) strengthened governance and management of the TVET system, and (5) effective project management and implementation (Lateef, no date). Lao PDR has developed Technical and Vocational Education and Training Development Plan 2016-2020 which the aim at promoting the continuous development and systematization of TVET and in a long run to become sustainable and meet the demand of labour market. Some of the plans include an ambitious target of enrolment over 50,000 students in the 23 TVET institutions under DTVE including dropouts, allocate budget of 85 million USD. Lao PDR also has TVET Laws that was approved in 2013 (Ministry of Education and Sports, 2015; Leuang, 2016).

Malaysia had multiple education initiatives and policies which are aimed at strengthening TVET within the country. One of these was the establishment of the Malaysian Board of Technologists (MBOT). The MBOT is tasked with setting up a training and teaching syllabus to enable 30,000 technicians and technologists to be recognised as professionals. This serves to increase the number of highly skilled technologists and technicians in Malaysia. Malaysia has revamped its education system and implemented Vocational Education Transformation (VET) under the Ministry of Education (MoE). VET is a national agenda in Malaysia education system which uphold the standard of vocational education as a prime educational choice. Seventy two existing vocational schools and eight technical schools were upgraded into vocational colleges. Vocational colleges offer diploma programmes in various fields for post-lower secondary students (as early as 16 years old). Having completed the 4 year programme, students are awarded with diploma. Under the National Blue Ocean Strategy (NBOS) the diploma programmes are also offered at private and public colleges as national Public-Private Partnership (PPP) (Ahmad, 2016).

Myanmar has embarked on a dramatic political and social transformation. Myanmar has a new democracy and embraces people-centred development and more open society. Myanmar also undergoing major transformations in its economy from closed to be more open and engaged in regional/global markets, from dependent on natural resource exploitation to balanced development "including industry and service sectors", and from low-skilled to modern and higher skill and value-added. A new Myanmar will require a huge array of soft and hard skills. At this moment, the country is still lacking both quantity and quality of the skilled workforce.

In response, the government's people-centred reforms aim at comprehensive education sector review, drafted 2015 TVET Law, developed 2013 employment and Skills Development. Establishment of new TVET Council, reorienting TVET toward demand-driven, competency-based approach, expanding access to TVET for the disadvantage youths/workers, and increase private sector participation (Sai Kyaw Naing Oo, 2015).

In the Philippines, TESDA (Technical Educational Skills Development Authority) is in charge for the higher TVET at tertiary level, while Department of Education is overseeing the secondary level. Based on the recent policy paper presented during the SEA-TVET High Officials Meeting in Kuala Lumpur Malaysia, TESDA is now continuing the efforts to enhance the image and reputation of TVET in the Philippines. Some of the initiatives include creating slogans and giving award to TVET players, partners, and idols. At the same time, TESDA is also continuously addressing the TVET quality by applying ISO 9001 and securing the place to receive Philippines Quality Award in 2016, widening and strengthening partnerships, and enhancing personnel capacity developments (Urdaneta, 2017).

In Singapore, under the Ministry of Education, the Institute of Technical Education (ITE) and the 5 polytechnics are the major suppliers of skilled labour force. The Ministry of Manpower via the Singapore Workforce Development Agency overseas continuing education and training for adults at the national level (SEAMEO VOCTECH, 2015). The real transformation of TVET in Singapore took place in early 2000s when vocational education became a postsecondary institution with three mega campuses well equipped and high-end facilities. In line with the development plan, a new curriculum was developed with 70 per cent practical and 30 per cent theory. Within the curriculum contents, 15 per cent of them is dedicated for inculcating life skills such as team work, communication, problem-solving, sports and wellness, career development and planning, and customer services. Now ITE is entering the new phase of development called "ITE Trailblazer"(2015-2019) in response to advance economy and society. The expected outcome is a move away from the existing trade-specific preparation model towards a more career-oriented and professional skills preparation model (Varaprasad, 2015). At the polytechnic level, they have adopted several innovation such as smart campus, problem-based learning, teaching factory, etc. (Tan, 2016)

TVET in Thailand is mainly under the Office of Vocational Education Commission (OVEC). Currently there are 426 colleges in Thailand, with the equivalent number of private colleges. To tackle the issue of lacking TVET teachers, OVEC has hired 14,000 teachers, introduced new apprenticeship programmes similar to dual system in Germany, and encouraging more women in TVET. Thailand is now adopting Industry 4.0, called Thailand 4.0, to uplift the economic growth by having more innovation, creativity and new technology. OVEC is anticipating it by offering relevant programmes and new teaching-learning strategies suitable for Industry 4.0. (Workforce Blueprint, 2017).

In Vietnam, TVET is now under the Ministry of Labour, Invalids and Social Affairs (MoLISA). The stakeholders involved among others are General Directorate of Vocational Training (GDVT), including the National Institute for Vocational Training (NIVT), the Vietnamese Vocational Training Accreditation Agency (VVTAA) and other relevant departments, representatives of the business sector, such as the Vietnam Chamber of Commerce and Industry (VCCI), sector associations and enterprises, as well as TVET institutions. TVET strategy 2011-2020, TVET law, and Vietnam Vocational Training Accreditation Agency (VVTAA) have been developed and established as pathways in transforming TVET in Vietnam. (Vietnamese-German Programme Reform of TVET in Vietnam, 2017).

SKILLS IN DEMAND AND JOBS FOR THE FUTURE IN ASEAN MEMBER STATES (AMS)

Skills in Demand in ASEAN Member States

In response to ASEAN Integration TVET graduates must be prepared for entering labour market not only within the country but also abroad, i.e. other SEA countries (see Demographic and Economic Indicators at a glance for a background information).

TABLE 1. Demographic and economic indicators at a glance (2015)

Country	Population	Working-Age Pop.	GDP	Top Sector Contributors to the GDP	Labor force by economic sector
Brunei	423,188	0.31M	US$15.49B	Agriculture: 1.1%, industry: 60.4%, services: 38.5%. Major industries: oil, gas, services, IT, and halal products.	Agriculture: 4.2% industry: 62.8% services: 33%
Cambodia	15,577,899	9.97M	US$18.05B	Agriculture: 26.7%, industry: 29.8%, services: 43.5%. Major industries: garment, construction, services (tourism), gem, cement, and agriculture.	Agriculture: 48.7% industry: 19.9% services: 31.5%
Indonesia	257,563,815	172.57M	US$861.93B	Agriculture: 13.7%, industry: 40.3%, services: 46%. Major industries: oil & gas, textiles, automotive, electrical appliances, apparel, footwear, mining, cement, medical instruments and appliances, handicrafts, chemical fertilizers, plywood, rubber, processed food, jewelry, and tourism. +Maritime and infrastructure (new)	Agriculture: 38.9% industry: 13.2% services: 47.9%
Lao PDR	6,802,023	4.15M	US$12.33B	Agriculture: 21.3%, industry: 32.5%,services: 39.4%. Main industries: Mining, timber, electric power, construction, garment, cement, tourism, and agriculture	Agriculture: 73.1% industry: 6.1% services: 20.6%
Malaysia	30,331,007	21.1 M	US$296.283	Agriculture: 8.2%, industry: 37.8%, services: 54%. Major industries: Oil and gas, rubber and oil palm, manufacturing, pharmaceuticals, medical technology, electronics and semiconductors, timber processing, services, and logging.	Agriculture: 11% industry: 36% services: 53%
Myanmar	53,897,154	26.44 M	62.601B	Agriculture: 36.1%, industry: 22.3%, services: 41.6%. Major industries: agricultural processing; wood and wood products; copper, tin, tungsten, iron; cement, construction materials; pharmaceuticals; fertilizer; oil and natural gas; garments; jade and gems; services.	Agriculture: 70% industry: 7% services: 23%
Philippines	100,699,395	63.44M	291.97B	Agriculture: 9.7%, industry: 30.5%, services: 59.8%. Major industries: electronics assembly, garments, footwear, pharmaceuticals, chemicals, wood products, food processing, petroleum refining, agri., services.	Ag.: 29%, industry:16%, services: 55%
Singapore	5,535,002	4.1 M	292.739B	Agriculture: 0%, industry: 26.6%, services: 73.4%. Major industries: electronics, chemicals, financial services, oil drilling equipment, petroleum refining, rubber processing and rubber products, processed food and beverages, ship repair, offshore platform construction.	Ag.: 1.3% industry: 14.8% services: 83.9%
Thailand	67,959,359	48.8 M	395.168B	Agriculture: 8.9%, industry: 35.9%, services: 55.3%. Major industries: tourism, textiles and garments, agricultural processing, beverages, tobacco, cement, light manufacturing such as jewelry and electric appliances, computers and parts, furniture, plastics, automobiles and parts, agricultural production.	Agriculture: 32.2% industry: 16.7% services: 51.1%
Vietnam	91,713,300	65.6 M	193.599B	Agriculture: 17%, industry: 39%, services: 44%. Major industries: food processing, garments, shoes, machine-building; mining, coal, steel; cement, chemical fertilizer, glass, tires, oil, mobile phones; services.	Agriculture.: 48% industry: 21%, services: 31%

Source: CIA (2017)

From Table 1, we can see that the sectors contributing to the Gross National Products (GDP) are not necessarily those that absorb most employment. Every ASEAN member country has its strengths and sectors that contribute to its GDP and employment. By working together among the member countries, the region can benefit from supplementing skilled labors that are not available in its own country thus minimise skills mismatch.

From the table also shows the regional trend that agriculture sector shows declines in its labor force but still accounts for 43 million people working in the area, in-formal sectors. At the same time, it is evident that service sector in continuously expanding. There is an overall trend of industrial restructuring from manufacturing to service-based economies. This doesn't mean that manufacturing should receive less attention; in fact it should receive special attention considering that this sector has been proven to be more resilient toward economic crisis, as experienced by Germany in recent European economic crisis.

The followings are the highlights of skills in demand in ASEAN member countries:

Brunei is making efforts to sharpen its focus on other areas of the economy (besides oil and gas) including financial services, the halal industry, and tech start-ups. Oil and gas are still the major industries and construction and real estate sector is expected to continue.

Cambodia continues maintaining its major industries in garment, construction, and services sectors, including tourism. The formal sectors of garments and tourism are the main engines of growth, with garment manufacturing accounting for 85% of Cambodia's exports and employing some 350,000 workers, mostly women (OECD, 2009).

Myanmar will experience strong expansion in construction, manufacturing, telecommunication and services. Currently, energy, transportation, tourism, retail, and telecommunications industry has grown by over 40 percent. Agriculture will still play a large part in Myanmar's economy, accounting for 25 percent of exports, and approximately 70 percent of employment. (DCR Trendline, 2017)

Philippines's services sector contributed most to the country's GDP growth, followed by the industrial and agriculture sectors. The Philippines has established a thriving business process outsourcing (BPO) industry, which will continue to require a large pool of skilled resources in the next 10 years, in addition to exporting manufactured and agricultural products.

Singapore's IT industry is growing significantly. Twenty four per cent year-on-year increase in advertised roles in IT and it is expected to remain high, similarly also in digital marketers, regulatory and compliance project professionals, investment professionals and skilled contractors. Slowdown is expected in accounting and finance, and manufacturing (Asia Finance, 2017).

Thailand's service sector will help create new and better jobs, higher incomes and more opportunities. Tourism growth has been strong in 2016, especially from China, increasing by 13.1 percent in the third quarter. Other areas that continue showing progress is auto industry, dual rail track and rail upgrading projects. (The World Bank, 2016)

In Vietnam, about 40 per cent of multinational companies (MNCs) plan to increase staff over the next 12 months. The greatest demand, according to HR2B Recruitment, has been for candidates in Sales, Information technology, Business development, Accounting, Marketing, Engineering, Human resources, Manufacturing, Quality control, Administration/secretarial, and Medical and health (Going Global, 2016).

It applies to all member states that facilitating new entrepreneurs and those working in non-formal to become formal economy is also very important considering their significant contribution to the national economy, alleviating poverty, and minimising the number of unemployment. Migration and mobility (both between and within countries) are driving the need for increased skills portability (transferability and recognition). The recognition of skills acquired from different settings and country should be addressed by referring to ASEAN Qualification Framework (AQRF) and National Qualification Framework (NQF), Mutual Recognition Arrangements (MRA), and Mutual Recognition of Skills (MRS).

Jobs for the Future

Tomorrow's jobs will be very different from those of today. What key sectors that present the greatest opportunity for growth in the region, especially jobs that support sustainable development, i.e. green jobs will be presented briefly as follows.

Construction Sector

Indonesia estimates the construction market will grow annually by 6%, rapidly becoming the world's third largest housing market. Smart construction, digital design and green and sustainable buildings are just a few examples of new ways of doing things thus this will change what we build and how we build. Sustainable and low-carbon construction technologies are also expected to open new opportunities (Department of Business, Innovation and Skills, 2013). Smart homes and automated offices, digital modelling, and green energy are something that must be embraced the architects, building managers, maintenance and installation crews and construction teams of the future (Bernstein et al, 2012).

Technology and Big Data

The main key drivers of productivity and growth nowadays is ICTs worldwide and also in the region. Mobility, broadband, platform development and metadata are shaping the face of business through rapid innovation. Digitisation is one important aspect of the changing technological landscape, including the mass adoption of connected digital services by consumers, enterprises and governments. The developed country in the region like Singapore has been adopting it very well and has created many IT business startups.

Big data will also mean massive opportunities for job creation. According to Bilbao-Osorio (2013) by 2015, big data will directly create 4.4 million IT jobs worldwide. Each additional IT job could generate employment for three more people outside the tech industry. Efficiency and innovation stem from big data, and those economies that can harness its usage will gain advantages. This will further advance the "internet of things" wherein all devices are

connected to assist our daily work and life. This IT can be implemented in various sectors, including agriculture, manufacturing, and services.

Manufacturing

Manufacturing remains important to all nations to be economically competitive, with over 70% of income variations in 128 countries derived from differences in manufactured products' export data (Moavenzadeh et al.,2012). Germany is one of the examples of a strong manufacturing country which survived from the recent economic crisis in Europe. 'Industry 4.0' is in, including in manufacturing industry and it is worthwhile to discuss the current fourth industrial revolution (Deloitte, 2014).

Hospitality and Tourism

Hospitality and tourism industry is one of the world's largest employers. In 2013, this industry along with related investments and supply chain contributed to the employment of 265 million people around the world, representing about 8.9% of the global workforce. (The World Travel & Tourism Council (WTTC) (2014).

Every new job created in this area creates 1.5 jobs down the supply chain, spurring growth in local communities (ILO (2010)). By 2024, trends show that the industry will be responsible for the creation of 74.5 million new jobs, 23.2 million of which will be directly within the sector, representing 10.2% of total employment. This sector is expected to contribute US$ 10.9 trillion—an estimated 10.3% of global GDP (World Travel & Tourism Council, 2014). This sectors also directly affecting three pillars of sustainable development (socio-cultural, economy, and environment). Every country must work strategically so that the adverse impacts can be minimised.

Creative Industry

The definition of creative industry according to UK's Department for Culture, Media and Sports is "industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property". Creative industry is considered one of the most dynamic sectors of the world economy, offering innovative potential and growth opportunities for developing countries (UN's Creative Economy Reports, 2008, 2010, 2013).

The creative industry has been crucial in the development of fast-growing economies like South Korea, Singapore and Malaysia. In Indonesia, the creative industries contributed 4.7% cent of the national GDP in 2006 and grew by 7.3% in 2008, absorbing 3.7 million workers, equal to 4.7% of the total workforce (UNCTAD 2010). In 2013, its contribution to GDP was 7% (Muttaqiena, 2014). In 2014, the contribution to GDP was 7.1%, absorbing up to 12 million workers. (The Conversation, January 12, 2016).

Agriculture

Up until recently, the agricultural sector was the focus for much of the economy in the developing world. The agricultural sector is responsible for the lion's share of jobs across much of the developing world, despite advances in other sectors. (Pompa, 2015)

Rural areas of South and East Asian countries remain home for a huge number of people living in extreme poverty. It is crucial to focus on institutional conditions conducive to the creation of new jobs in agriculture answering the challenges and using opportunities given by globalization. In Indonesia, 35% of employment is in agriculture related area. To address the green growth in agriculture in low-income Southeast Asian countries require assistance from the government. (Szudy, 2015).Using the new technology in agriculture besides creating new ways of doing agriculture will also stimulate interest among young generations to work in agriculture business.

TVET CONTRIBUTION TO SUSTAINABLE DEVELOPMENT

Technical and Vocational and Education and Training (TVET) must play important roles in implementing and promoting sustainable development. TVET institutions are major suppliers of workforce who will be in the forefront in dealing directly with sustainable issues.

Referring to the definition that sustainable development consists of three pillars: economic, socio-cultural, and environmental development, these should be considered as whole and TVET policy and practices should not neglect any of the three. Neglecting the economic development may mean that the initiative is unattractive for funding donors or investors. Ignoring the environmental sustainability can be interpreted that the initiatives may only focus on the short-term benefits and is irresponsible morally and socially. Excluding the socio cultural development cannot attract the local people and may cause of losing the local identity.

To incorporate the three pillars, TVET should embrace the green technology that is economically feasible and environmentally friendly. If TVET cannot create the new green technology, at least it should be able to support and adopt the technology by preparing the future workforces who are aware and capable of handling the technology.

This paper was written on the thesis that TVET can be a leading education and training in achieving sustainable development. Many roles that TVET institutions and stakeholders can play, including creating awareness and be the agent that promotes SD in its daily practices. TVET can also lead by creating workforce that support green technology and implementing regulatory or monitoring tools to assess the "sustainable" practices.

These ideas should be integrated in TVET curriculum, learning contents, teaching-learning processes, and also reflected in school policies and practices. TVET institution can be the source of inspiration for sustainable development. Thus TVET is not only teaching education for sustainable development but practicing through its policies and practices.

There are some potential issues and challenges that TVET institutions may face in executing those ideas. It requires strong commitment from top management and stakeholders, innovative ideas that can be accepted by the stakeholders and feasible economically, socially, and environmentally. The use of ICT for enhancement and proliferation of initiatives is possible in these days that can speed up the process and reach wider community.

An Overview of TVET for Sustainable Development in Southeast Asia

Countries in Southeast Asia differ in their socio, economic, political backgrounds and their preconditions to sustainable development (SD). The salient preconditions for SD suggested by Bagnall (2007) include the level of understanding, ownership, the will or commitment, and capacity of the policymakers and practitioners in the respective countries.

TVET policymakers and practitioners have different views of what TVET for sustainable development is. Referring to the three pillars of sustainable development-- economy, environmental, and social sustainability suggested by UNESCO-UNEVOC, in the case of Southeast Asia, the author suspects that some countries haven't had clear ideas of the scope. Considering that their backgrounds in economic development and socio-political status are also very different, the focus of TVET for SD may also vary; some may focus only on the economic sustainability while others may focus on environment or social sustainability.

Their understanding about ownerships or benefits of integrating sustainable development also varies between countries or even within the countries. Some may still think that integrating the idea of sustainable development in the programmes was more due to external pressures or to make them feel and look "good"; therefore they perceived that the benefits were for others, not for them. This situation is likely to occur when the sense of ownerships is low or unclear.

The level of their commitment may also vary; much of it is influenced by their level of understanding, ownerships, and the capacity to integrate SD in the programmes. In Southeast Asia, the commitment of TVET

policymakers and practitioners in SD could be reflected in their programmes, but could not be easily found in a written policy, reports or documents. During the training programmes conducted at SEAMEO VOCTECH Brunei Darussalam, when we inquired about certain aspects or programmes on SD, the participants from SEAMEO member countries responded that they have the programmes already, but no written policies or reports could be found.

According to World Commission on Environment and Development (WCED), sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Further, UNESCO-UNEVOC noted that "sustainable development is not a fixed concept; rather it is a culturally-directed search for a dynamic balance in the relationships between social, economic and natural systems. A balance seeks to promote equity between present and future, countries, social classes, genders, and races" (UNESCO-UNEVOC, 2005). Adopting the broad definition of SD, this paper will focus on TVET initiatives that directly or indirectly contribute to the improvement of SD in the three pillars all together—socio, economic, and environmental.

Agreeing that TVET should play a pivotal roles in following up and achieving the goals written in the recommendations of the 2nd International Congress on TVE (1999), the goals set out at the World Forum on Education (2000), the Millennium Development Goals adopted by the United Nations General Assembly (2000), the SEAMEO member countries and relevant regional organisations are expected to take some actions to strengthen TVET programmes for sustainable development.

This paper will discuss some examples of what is happening in the SEAMEO region in terms of TVET programmes that address the three pillars of sustainable development: economic, environmental, and social sustainability or any actions that may contribute to knowledge, skills, and values development that leads to economically viable, environmentally sound and sustainable communities. More specifically, the paper will focus on TVET initiatives that enhance awareness of sustainable development, implementation of theory and practices of SD at institutional level, preparation for future workforce that promote green technology, and ideas for creating regulatory or monitoring tools for SD integration in schools.

TVET initiatives in ESD at the School Level

Creating awareness is one of the important initiatives that TVET institutions must do. This can be done effectively after the institution has instilled a strong culture about TVET for sustainable development among the community in the school. This strong culture is built from the understanding about the concept and good practices or implementation of sustainable development in the school.

Many papers have addressed the issue on how to improve students' understanding about SD. For example, how ESD should be integrated in TVET curriculum, such as using Hungerford's Model Model, Infusion and Diffusion approaches. Selecting appropriate learning contents and materials, and enhancing teaching learning process suitable for ESD that promote problem solving skills, creativity and innovative skills have also been highlighted in many papers. This paper will elaborate much on these issues.

Good understanding about ESD among schools administrators, teachers, and students will be more meaningful after the ideas being implemented in good practices. This will both enhance their skills and attitude toward SD.

There are many examples of school level practices in SD, such as the adoption of "3Rs" (Reuse, Reduce, and Recycle) policy, or can be expanded to "6R" (Reduce, Reuse, Renew, Recycle, Repair and Rethink) policy (Majumdar, no date), Eco-Waste Friendly Schools in Manila, Philippines, "Adopt-A-School" or now Corporate and School Partnership programme of Singapore, Brunei, and Vietnam, implementing of ISO 9001:2001 for environment, etc. This can be enhanced by inter-schools initiatives, such as conducting the Wira Alam (environmental hero) Project in Malaysia, sustainable school competition, developing awarding scheme for schools (Green Audit Award in Singapore, Sustainable School Environment Award in Malaysia etc. (Nomura & Abe, 2008).

The followings are three examples of SD practices at the school level to give more detail illustration from TVET school in Southeast Asia; one from SMKN 2 Palembang, Indonesia, one from Maddela Institute of Technology,

Philippines, and VEDC Malang, Indonesia. In SMK2 Palembang, SD is integrated through a policy and practices of green school. Some of the practices include managing school garbage and tree planting programmes. Even though the scale is small, only at the school level, but the participation from all school community in working together to collect and segregate the garbage, to process it into compost is an interesting learning experience (see some pictures at the end of the paper). The collaboration between the school and the local government in tree planting programmes shows the school's care of the environment not only in the school but also in the surrounding areas that receive recognition from the local community. The guideline for this green school project include (a) minimizing garbage by Implementing 3 R, (b) Integrating the environment / cleanliness into student regulation and Job instruction, (c) Forming Team in charge of managing the environment, and (d) Partnering with other institutions.

The second example is from Maddela Institute of Technology, Philippines. This school has managed to meet the three pillars of SD: economic, social, and environmental SD by processing the wastes from local community. This project involve and employ the local community, instil a good practice to the community by promoting/campaigning waste segregation in local market, and produce marketable fertilizers that help both the economics of the school and also the people in the community (Hector, 2010). Some photos are included at the end of the paper.

The other example is from Vocational Education Development Centre (VEDC), Malang, Indonesia that has been producing environmentally friendly products and at the same time implementing the ISO 9001-2001 for making sure that the practices comply with the environmental standards. Examples of the product include solar panels, free-fabricate houses, and laboratory equipments. These practices have not only improved the image of TVET institution as a high-tech producers but also meeting the three pillars of SD.

TVET Policies and Practices in Creating Awareness on Sustainable Development

In the earth summit (UNCED) conference in Rio de Janeiro ,on 3-4, June 1992 produced the Agenda 21 that in Chapter 36 identified four major thrusts to begin the work of E S D : (1) improve basic education, (2) reorient existing education to address sustainable development, (3) develop public understanding, awareness, and (4) training (UNESCO, 2006). Besides strengthening the knowledge of ESD and at the same time practicing it at the school level, TVET practitioners can help promote public understanding and awareness on SD.

There are some practices in the region in enhancing students and public awareness on sustainable development. Examples of good practices Includes environment awareness camp for youths in Singapore, organising 'inter-varsity environmental debates' by ASEAN, providing 'Enviro Library Services' in Malaysia, and sharing of information on environment through Green Forum via online.

These initiatives are powerful in improving public awareness of SD. Not only did the initiative improve the cognitive domain but also more importantly touched the affective, the attitude and behaviour of the participants. TVET should play more active roles in reaching the community outside the institution by using technology and media available in the school and by partnering with other institutions.

TVET Initiatives in Adopting Green Technology

TVET can address the issue of Education Paradox for SD, in which education can be seen as both a tool that brings hope for tackling SD issues and at the same time also a threat due to the over use of resources after having better education, better employment, and improved life styles. It is true that through education and training, people will be more aware of SD issues, can improve their daily practices that minimize the possibility of endangering the environment; but at the same time by having better education people have a better chance for having better job, higher salary that eventually may use more resources thus increasing carbon footprints. Realizing that this is a nature of human being to be better off economically, to live more comfortably that may increase the use of resources, the only hope is by minimizing the impact or the wastes produced by this new "richer" life style. This can be addressed by adopting green technology, such as using solar panel for energy, using environmentally friendly house designs and materials, green cars, and green Information and Communication Technologies. TVET should embrace or even innovate and expand these green technologies.

TVET at secondary level should be introduced by offering courses in these green technologies. Students in automotive, should not only learn how to assemble or fix the older type of cars that is worse polluter, but also the new type, the hybrid models. Students enrol in Building Construction or Design should be trained with greener house designs, environmentally friendly building materials, and utilities. By doing so, those who have the means for modern life style can minimize the use of resources and impact to the environments. Accompanied by better understanding and awareness of SD, we expect that the people will act more wisely and responsibly. This idea is in line with the goal of ESD which is improving quality of life not only for the current generation but also for the future.

TVET Initiatives in Creating Regulatory or Monitoring Tools for Implementing Sustainable Development

To continuously improve people's awareness of and practices in SD, it is important to have a tool to measure how individual and/or institution in compliance with certain standards or measurements. Otherwise, we do not exactly know how far off we are in incorporating SD in our daily life. Carbon footprint calculator, ISO 9001-2001, Human Development Index (HDI), Happy Planet Index (HPI), Environmental Performance Index (EPI), Environment Sustainability Index (ESI) are some of indicators that can be used to benchmark ourselves, our institution, or our nation against certain criteria or compare against each other.

In TVET, there are some efforts to come up with indicators that can measure how TVET institution has performed in terms of ESD. In Thailand, for example, by using the 4 pillars of SD: economic, environmental, social, and cultural, the TVET is in the process of developing the criteria for benchmarking (Jantrakool & Banleng, 2008). In this measure, economic TVET-SD index covers stability and equity, product efficiency, and self reliance. Social TVET-SD index covers equity and participation, quality of life, lifelong learning, learning organization, research for self-employed work, labour demand, and community network strengthening. Environmental VTET-SD index covers environment management in school, and educational resources sharing among schools in a major program or a region. TVET cultural-SD index covers the cultural and traditional diversity, understanding life skills, and sufficiency.

This is one of the excellent initiatives to measure how we are in terms policies and practices at the school level in ESD. This should be encouraged and proliferated in TVET institutions. This is even better if TVET policymakers or practitioners can come up with other measurements that are not only for TVET institutions but also for different organisations, different settings, and different levels of implementations, at individual, family, institution, etc.

CONCLUSIONS AND WAYS FORWARD

Reflecting from what has been happening globally and locally, it is clear that TVET has gained momentum at the global, regional, and national level. This therefore needs proper response from all stakeholders in order to reap the potentials of TVET for contributing to socio, economic, and environmental sustainable development.

In this 21st century, technology is changing very fast that affects the way society works and lives. TVET must be able to anticipate and response accordingly by offering relevant programmes, suitable curriculum, and new ways of teaching-learning and assessing the students.

Working and living in global community, TVET should not only prepare the graduates for the local and national job market but also regional and global. This will also affect the way TVET is planned and run.

We cannot ignore the fact that humans have made significant progress in developments but at the same time is also creating negative effect on its sustainability, especially in regards to environmental sustainability. TVET as the major producer of skilled workforce must play significant roles in addressing sustainable development. TVET players must play at different levels such as creating awareness, be the agent that promotes SD, creating workforce that support green technology, and in developing and implementing regulatory or monitoring tools to assess the sustainable practices.

Achieving sustainable development requires collective and serious efforts and strong commitments. Human tend to be reactive and proactive. As a member of TVET family, I personally believe that our role in ESD is pivotal one. The shifting of TVET in the main stream means that there will be more students and trainees in the systems who are coming from different levels of socio and economic backgrounds. Realising that skills workers are needed and are taking a big portion of whole workforce in a nation, it is necessary for a country to think seriously about TVET and how this type of education can play major roles in ESD.

Realizing the important roles of TVET in preparing for the future labour forces and in tackling various economic, socio, and environmental issues, TVET has to play important role in SD. Otherwise it will be too late to response to the adversities as the consequence of our irresponsible practices.

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