

The Development of TVET System in Malaysia and Its Challenges Ahead

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Abstract

This paper discusses the development and current landscape of TVET system in Malaysia since 1870 and highlights some challenges it faces. The history of Malaysian TVET can be divided into three phrases, namely the British colonial stage from 1870 to 1952, the Post-Independent stage from 1952 to 1978, and the Industrialization stage from 1979 to 2010. Each stage of TVET development has its own different characteristics, purposes and targeted participants. Currently, the TVET institutions are administrated by seven ministries with three different certification systems from the Ministry of Human Resources, Ministry of Education, and MARA under the Ministry of Rural Development. However, the public TVET institutions are not in favoured by the non-Malays due to various reasons. Besides the TVET classes in Chinese Independent High Schools, the Chinese community has also sought for the TVET opportunities from Taiwan and China. Since 2010, the government launched a few transformation plans and allocated huge budgets to enhance the TVET systems in Malaysia. Nevertheless, issues such as uncoordinated TVET systems, racial segmentation and polarization, and mismatched of skills-jobs remain the critical challenges for the Malaysian government.

Keywords: Malaysia, TVET system, Technical Education, Vocational Training.

1. Introduction

It has been agreed that Technical and Vocational Education and Training (TVET) system plays an important role in the socio-economy development of a nation (Maclean et al., 2013). Many countries, such as German and South Korea provide a successful model in promoting economic and technological development via the expansion of skilled labours. Nevertheless, Malaysia has faced the problems of shortage of skilled workers to fulfil the needs for its economic growth in the past few decades (Manpower Group, 2012; ACCCIM, 2012). Malaysia's achievement in TVET is still far behind if compared with developed countries or the neighbouring countries in ASEAN.

Since Malaysia obtained its independence in 1957, it has had a high un-skilled labour rate (JPK, 2011). The situation remains unchanged even though successive governments have invested a great deal in the TVET system. Based on statistics published by the Performance Management and Delivery Unit (PEMANDU, 2012), a government agency for national economic planning, there are about 28% or 130,000 high school graduates and school drop-

outs every year entering into the workplace without any skills. Similar research also reports that about 72% of workers in Malaysia are semi-skilled and unskilled workers (Nambiar, 2011).

As such, the Malaysian government, in its Tenth Malaysia Plan (RMK10) for five-year period from 2011 to 2015, has initiated some strategies and incentives to enhance the Technical and Vocational Education and Training (TVET) system in the country. Based on the Malaysia Economic Transformation Program (ETP) which was launched by the Prime Minister on 25 October 2010, the government has taken a comprehensive approach to achieve the goal of Malaysia becoming a high income country by 2020. One of the main strategies toward economic transformation is to develop our human capital to have high technical skills. Therefore, 23% of the education budget is allocated to upgrading the quality of TVET and a new TVET certification system will be introduced under the RMK10. An additional RM 27.3 million was allocated for TVET in Malaysia Budget 2013 (Ministry of Finance, 2012).

The objective of this paper is to provide a systematic and comprehensive review of TVET development in Malaysia. The next section emphasizes on the historical background which consists of three development stages from 1870 until 2010. Section 3 summarizes the current TVET landscape and initiatives from various perspectives. Last but not least, this paper highlights two major challenges faced by TVET in Malaysia.

2. Historical stages of Malaysia's TVET

The formal origins of vocational education in Malaysia can be traced to 1870. The British Colonial Government in Malaya trained Malay youths in the skills of building and maintaining railway lines to support its tin mining industry (Zakaria, 1988). The development of formal TVET in Malaysia can be divided into three stages based on its purposes and training scale. The three stages are the British Colonial stage, the Post-Independence stage and the Industrialization stage.

2.1 The British Colonial Stage

The British Colonial stage ran from 1870 to 1952. The TVET system during this period was carried out on a small scale and was not systematic. Its main purpose was to train Malay youths to become skilled labour in railway building and maintenance. Before 1870, the Malay schools administered by the colonial government were mainly to teach Islamic religious. Mr. Winsatt, an education officer at that time, has promoted the vocational subjects to the colonial government. In 1870, A.M. Skinner introduced Malay language subject and Skills and Occupational subject into Malay schools (Tay, 1998). Since 1897, the British Colonial Government sent some Malay farmers and artists to Kuala Lumpur to train Malay youths in agriculture and home science in order to improve the living skills of Malay community (Sharin & Zulkipli, 2009). In 1904, the first government technical school, which was Treacher Technical School (named after Sir William Treacher) located in Weld Road (now known as Jalan Raja Chulan), Kuala Lumpur was set up to train technical assistants for the public service sectors such as the Railway Bureau, Department of Works and Quantity Survey Department (Md. Yunus et. al., 1972; Sharin &

Zulkipli, 2009, Universiti Teknologi Malaysia official web portal). It was upgraded to the Malaysia Technology University (UTM) in 1975.

Thereafter, the Winsted Committee on Industrial and Technical Education which was renamed as the Lemon Committee was set up in 1918 to study the needs of technical education in Peninsular Malaya. As a result from the committee, a technical school was set up in 1923 which was later upgraded into a College in 1941 and University of Technology Malaysia in 1972. Four trades schools were established in 1926 and an agriculture school in 1931 (Sharin & Zulkipli, 2009). The agriculture school was later upgraded to the University of Agriculture Malaysia in 1972. At this stage, the number of students in public TVET institutions were small and most of them were Malay students. On the other hand, Chinese parents preferred to send their children to learn technical skills in various industries through informal apprenticeships.

2.2 The Post-Independence stage

The second stage from 1952 to 1978 started before the Independence of Malaya in 1957. The Malaysian education system had experienced a drastic change in this period as a result of several important education reports such as the Razak Report (MOE, 1956) and the Talib Report (MOE, 1960) and the social re-engineering and affirmative action programme under the Malaysian New Economic Policy (NEP, 1971-1990). The main objective of education under the NEP focused on the elimination of identification of race according to economic function.

The Barnes Report in 1951, which was led by L. J. Barnes from Harvard University, aimed to introduce subjects such as Home Science and Crafts into the school curriculum. Unfortunately, its proposal was rejected as the implementation of the Barnes Report required a thorough reform of the education system. One year later, the Education Ordinance 1952 was drafted based on the suggestions from the Hogan Report in 1952. As a result, both Vocational Schools and Technical Schools were introduced to offer a two-year vocational and technical education to upper-secondary students with different abilities and needs.

In 1956, the Rural and Industrial Development Authority Training Centre was set up at Petaling Jaya as proposed in the Razak Report 1956 and the Education Ordinance 1957. This training centre was later renamed as the MARA Institute in year 1965 and Institute of Technology MARA in year 1967.

The first polytechnic in Malaysia, which is Ungku Omar Polytechnic was completed in year 1969, sponsored by Canada government under the Colombo Program. This polytechnic is located at Ipoh, Perak and it aims to produce semi-skilled technicians at Certificate and Diploma levels. The courses offered include mining technology, accounting, land surveying and stenography (Jabatan Pengajian Politeknik, 2009).

Thereafter, the Talib Report 1960, the Education Act 1961, the National Language Act 1967 and the Majid Ismail Report 1971 were gazetted with the main objective to consolidate the Malay language as the medium of instruction in national schools (Wong, 2013). As such, the

Malay language has been made an entry requirement to most of the TVET programs with at least Grade C (60 marks and above) in the Lower Secondary Examination.

Compared to the first stage, the development of TVET in the second stage has the following characteristics:

- (i) the purpose of the TVET system shifted from protecting the economic interests of the British Colonial Government to the purpose of producing skilled labour for government agencies of a new nation and;
- (ii) the targeted TVET trainees changed from rural Malay youths to secondary school students.

However, the Malaysian Government has through its unilateral education policies and the formation of the MARA education system ensured that Malay students would continue to benefit from and dominate the intake of public-funded TVET institutions.

In order to facilitate and coordinate among TVET providers and government agencies, the National Industrial Training and Trade Certification Board (NITTTCB) was established in 1971. Other functions of NITTTCB were to provide common trade standards, improve syllabi and course structure for TVET and provide TVET providers and courses with accreditation services. It was then renamed to the National Vocational Training Council (NVTC) in 1989 (Rasul et al., 2015). The NVTC was then restructured to become the Department of Skills Development (DSD) in 2006 under the Ministry of Human Resources.

2.3 Industrialization Stage

The third stage of TVET development in Malaysia was influenced by the economic development and industrialization process from 1979 to 2010. Among the economic policies that were introduced during this period include the Industrial Master Plan (1985 – 1995), the National Development Policy (1991 – 2000) and Vision 2020 (Nordin Tahir, 2010).

The Malaysian Government provided various incentives to encourage private and foreign direct investment during the 1977-1980 period. Export-oriented industries such as electronics and textiles were specifically targeted (Kuruvilla, 1995). On the other hand, the state involvement in the development of heavy import-substituting industries had substantially increased, in order to increase Malay share ownership (Kuruvilla, 1995).

In 1979, the Report of the Cabinet Review Committee on Education had highlighted the importance of training provided by polytechnics to the development of various industries around the country. In response to the report, Dr. Mahathir Mohammed, then Minister of Industry, announced the National Heavy-Industries Policy (HIP) in 1980. Through the formation of the Heavy Industries Corporation, a government investment arm, it invested in a series of large-scale, capital-intensive and import-substituting joint ventures such as PROTON, the national car company, the National Trading Corporation and PERWAJA, an iron and steel works at Terengganu.

In the second half of the 1980s, the focus of industrialization shifted back to labour-intensive industries due to the failure of HIP (Kuruville, 1995). Thereafter, the Industry Development Blueprint 1985-1995, the National Development Policy 1991-2000 and Vision 2020 were launched one after another and it had changed the features of TVET system (Nordin Tahir, 2010). The Government had taken three efforts to ensure there is a sufficient supply of skilled and semi-skilled labours to fulfil the high demands from industries. These efforts include:

- (i) the amendment of education legislation such as the University and College University Act 1996 and the National Accreditation Board Act 1996 to allow the involvement of the private sector in providing education and training;
- (ii) setting up new institutions or upgrading the existing public TVET institutions to technical college or university and;
- (iii) Measures to encourage private learning institutions to provide TVET programmes and industry engagement through the National Dual Training System.

Among others, the MARA Institute of Technology (Amendment) Act 2000 enabled the MARA Institute of Technology to be upgraded to become the MARA University of Technology (UiTM). The PTTC was upgraded into the Institute of Technology Tun Hussein Onn (ITTHO) in 1996 and then the Tun Hussein Onn University College (KUiTTHO) in 2000 before it obtained the full university status as the Tun Hussein Onn University of Malaysia (UTHM) in 2007. A new technical university called the Technical University of Malaysia Malacca (UTeM) was also established in 2000. The first Community College was established in 2005 while the Secondary Vocational Schools were converted to colleges in 2012.

Furthermore, the increase of foreign investment in Malaysia resulted in an increased demand for highly trained workers with advanced skills in new technologies. Consequently, two advanced skill training institutions were established in cooperation with Germany and France called German-Malaysian Institute in 1991 and Malaysia France Institute in 1995 (Rasul et al., 2015). Subsequently, the Japan Malaysia Technical Institute was established in 1998. In 1993, the Ministry of Education, Malaysia was awarded a grant by the World Bank to build a Polytechnic Teacher Training Centre (PTTC) at Batu Pahat, Johor. Its purpose was to train and provide sufficient qualified technical teachers for the nation.

Due to the increasing number of TVET institutions, the National Skills Development Act 2006 was gazetted to provide related guidelines, standards within the National Occupational Skills Standards (NOSS) and management of TVET institutions and curriculum.

The development of the TVET system in the third stage has two important features, namely:

- (i) the target of TVET has been shifted from producing technical personnel to meet the needs of government agencies into fulfilling the demands of skilled labour for industries more generally and;
- (ii) in addition to public funding there is an increasing role of private sector and industry in providing TVET.

Table 1 provides the summary of key features of TVET system at each stage.

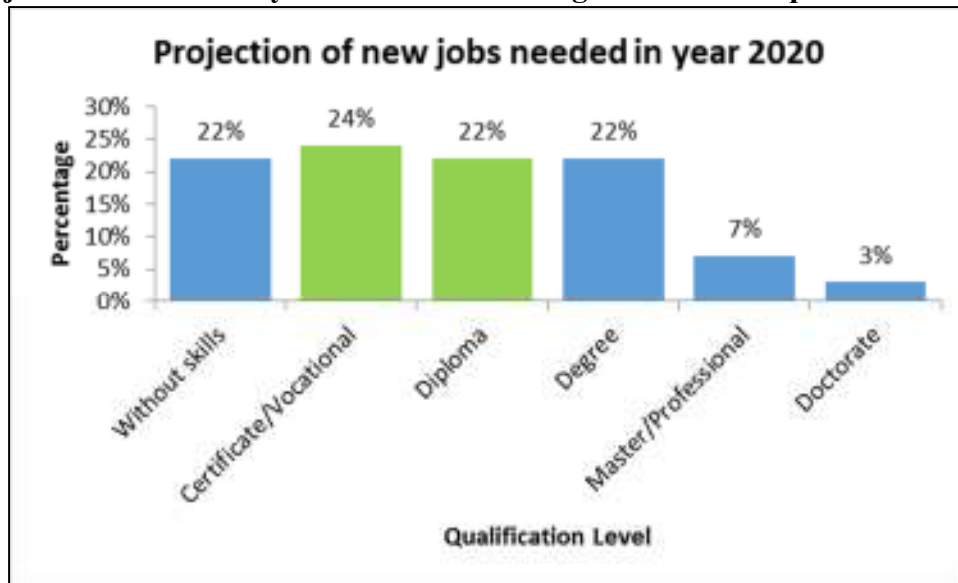
**Table 1:
Key features of Malaysian TVET system at each stage**

Year	Stage	TVET Key Features
1870-1952	British Colony	<ul style="list-style-type: none"> • Carried out on a small scale, not systematic • With the purpose to enhance the Malay's skills level to work for the Colonial Government or on their own • Targeted participants were adults • Focus on building railway, agriculture and home science • Provided by the Government
1952 – 1978	Post-Independent	<ul style="list-style-type: none"> • Carried out systematically and on a big scale • With the purpose to produce skilled workers for Government agencies • Targeted participants were secondary students • Covered different kinds of main industries • Provided by the Government
1979 – 2010	Industrialization	<ul style="list-style-type: none"> • Carried out systematically and on a big scale • With the purpose to train skilled workers for industries and Government agencies. • Targeted participants were secondary students and unskilled workers • Covered different kinds of main industries, ranging from hospitality to high technology. • Provided by the Government and private sector

3. The current landscape and TVET transformation in Malaysia

Starting from 2011, the Government initiated a number of new systems to transform TVET in Malaysia. Through the 10th Malaysia Plan (2011-2015) and the Economic Transformation Programme (ETP) 2010, TVET had become the main driving force for the country to achieve its goal as a high-income country with a targeted income per capital of US\$ 15,000 (RM 48,000) to US\$20,000 (RM 64,000) by 2020. As a result, 46%, roughly 1.5 million, of the 3.3 million new jobs needed by 2020 would have to possess a TVET certificate or diploma qualification, as shown in Figure 1. Under the National Key Economic Areas (NKEAs) in Education, the Government aims to reduce the percentage of unskilled and semi-skilled workers from 76% in 2009 to 50% in 2020 (Performance Management & Delivery Unit, 2012). Measures taken to achieve this target include an increase in private sector involvement, tightening the relationship of training providers with industry players, realigning the skills needed through discussion with the private sector, a more active role for the Skills Development Fund Corporation, nationwide road shows and career counselling under the Skills Malaysia campaign and audits and rating of accredited skills training programmes by the Department of Skills Development (JPK).

Figure 1:
New jobs under Economy Transformation Program based on qualification levels.



Source: Economy Transformation Program 2010.

3.1 TVET Transformation Plans

Since the existing TVET system has many limitations and has failed to attract students, Government has introduced several transformation plans to revitalize TVET system and strengthening the governance of TVET (Pang, 2011). One of the initiatives taken in 2009 is the launched of the Polytechnics Transformation Plan 2010-2015. This plan aimed to change public perception of polytechnics by intensifying their programmes via collaboration with local or foreign higher learning institutions. Polytechnics no longer offer certificate course from the July 2010 intake and now focus on diploma and advanced diploma programmes. In conjunction with this, three polytechnics were upgraded to premier polytechnic status, these are the Ungku Omar Polytechnic in Ipoh (Perak), the Salahuddin Abdul Aziz Shah Polytechnic in Shah Alam (Selangor) and the Ibrahim Sultan Polytechnic in Pasir Gudang (Johor).

As the main education provider in the country, the Ministry of Education introduced a pilot project under its Vocational Education Transformation (VET) initiatives in 2011, called Basic Vocational Education (PAV) in 2012. There were 15 national secondary schools, shown in Table 2, selected to participate in this PAV pilot project where lower secondary students, from Form 1 to Form 3, who are not academically-oriented students are exposed to basic vocational subjects and choose major skills as early as the age of 13 years old before they are awarded the Malaysia Skills Certificate Level 1 and Level 2 (Mohd Dom, 2011; Nur Iwani & Mohamad Hisyam, 2012). It was expected that 5% of the primary school leavers will enrol into PAV at 150 national secondary schools in 2013 and achieve a total of 82,800 PAV students from 920 schools by 2020 (Johari et al., 2014). Table 3 shows the projected number of schools offering PAV until year 2020. Johari et al. (2014) highlighted some implementation issues and challenges of PAV.

Quality of the existing vocational courses at upper secondary level will be improved with the upgrading of Vocational Secondary School into Vocational College. The curriculum and course structure of Vocational College had been revised. The Diploma of Vocational Malaysia which is accredited and recognized by the Ministry of Higher Education was introduced to Vocational College and this enable vocational graduates to pursue tertiary education. It is estimated that 20% from the Form 4 students will take up the courses at Vocational College in year 2016.

**Table 2:
List of schools selected for Basic Vocational Education pilot project**

No	School Name/Location	Course
1	SMK Arau, Arau, Perlis	Clothing and Tailoring
2	SMK Simpang Kuala, Alor Setar, Kedah	Furniture
3	SMK Datuk Haji Mohd, Gelugor, Penang	Motorcycle servicing
4	SMK Trolak Selatan, Sungkai, Perak	Automotive
5	SMK Sungai Rawang, Sepang, Selangor	Plantation
6	SMK Dato' Sedia Raja, Rembau, Negeri Sembilan	Air-conditioning and Refrigeration
7	SMK Seri Pengkalan, Alor Gajah, Melaka	clothing and Tailoring
8	SMK Datok Menteri, Batu Pahat, Johor	Furniture
9	SMK Bukit Goh, Kuantan, Pahang	Air-conditioning and Refrigeration
10	SMK Saujana, Setiu, Terengganu	Aquaculture
11	SMK Kubang Kerian 2, Kota Bharu, Kelantan	Air-conditioning and Refrigeration
12	SMK Beaufort, Beaufort, Sabah	Air-conditioning and Refrigeration
13	SMK Belaga, Belaga, Sarawak	Electric Wiring
14	SMK Setiawangsa, Kuala Lumpur	Interior Design
15	SMK Taman Perumahan Bedaun, Labuan	Visual and Animation

Source: Ministry of Education circular, (reference number: KP.BPTV.600-6/2/9(26)), 24 Oct 2011.

**Table 3:
Projected schools offering Basic Vocational Education until 2020**

Year/ school	2012	2013	2014	2015	2016	2017	2018	2019	2020
New School	15	135	110	110	110	110	110	110	110
Existing	0	15	150	260	370	480	590	700	810
No. of Schools	15	150	260	370	480	590	700	810	920

Source: Johari et al., (2014)

The Malaysia Education Blueprint (MEB, 2013-2025) launched in 2012 placed great emphasis on the future of Malaysia's vocational education and has provided substantial measures. Most of the related content is included in the seventh chapter of the Blueprint (System Structure). One of its main proposals is to revisit the 60:40 student ratio of Science and Arts streams to

40:36:24 ratio of Vocational, Science and Arts streams. Vocational and technical subjects will also be included as elective papers in the Malaysia Education Certificate (SPM) examination while compulsory practicum in Vocational College will be enforced. In addition, the Blueprint suggests that public TVET institutions should focus on courses related to high-technology industries, whereas private institutions will offer vocational courses related to non-technological industries. In response to the MEB proposals, sixteen Chinese-based NGOs formed a research team to provide feedback and recommendations on the MEB, including vocational education issues (Kong and Chang, 2013). Among others, Kong and Chang (2013) suggests the ministry to provide bilingual instruction to TVET students and to enhance teacher's training in vocational education.

TVET continues to be considered as a critical aspect to support the nation building programmes under the Tenth Malaysia Plan 2011-2015. According to Pang (2011), four policies have been put forward to mainstream and elevate access to quality TVET in Malaysia, namely:

- (i) improving the perception of TVET and promoting TVET through various intensive national media campaigns;
- (ii) upgrading and harmonising the TVET curriculum quality in line with industry requirements such as standardizing TVET curriculum;
- (iii) producing competent instructors and trainers with a proposal to establish a new Centre for Instructor and Advanced Skills Training and;
- (iv) streamlining the delivery of TVET by undertaking performance ratings of TVET institutions and revision of the funding approach of TVET.

3.2 TVET Regulatory and Certification

In addition to national education reforms, the Government also intended to improve service quality and uphold the professionalism of technical and vocational sectors. In the past, only operators or technicians from electrical, medical and industrial safety sectors would have to obtain skill certification before their operations in Malaysia. Starting from 2013, this skill certification requirement will be extended to 29 technical sectors gradually (Further Studies Intelligence, 2013). For example, the Motor Vehicle Maintenance and Repair Act was tabled in parliament in 2012, while the Traditional and Complementary Medicine Act 2013 and the Construction Industry Development Board (Amendment) Act 2016 have been gazetted.

As in many other countries, TVET is often viewed negatively by society and it becomes the last choice of parents for their children's education with those who are less academically inclined (Law, 2007). In order to promote the image of technicians, the Technologist and Technician Act 2015 was gazetted. A professional body named the Malaysia Board of Technologists (MBOT) will be formed under this act to register the technicians and technologist of the country and enhance TVET. Upon the registration with MBOT, the technicians and technologists are recognized as professional personnel who can carry the title of, 'TC.,' and, 'TS.,' just like, 'Ir.,' for engineer or, 'Ar.,' for architect. With this change, it is estimated that 800,000 graduates of technical universities and polytechnics will be registered under MBOT by 2020 while the holders of Malaysia Skills Certificate Level 3, Diploma and Advanced Diploma of Skills Malaysia will also benefit.

Based on the Malaysian Qualification Framework (MQF), accreditation and quality assurance of TVET courses are under the purview of two agencies, namely, DSD under MOHR and MQA under MOE. DSD undertakes the accreditation process for the skills sector based on NOSS. There are five levels of certification which are Malaysia Skills Certificate 1 to 3, Diploma and Advanced Diploma levels. Until 2016, DSD has accredited 1,457 TVET centres (574 public and 883 private), 2,745 NOSS (1654 active and 1091 inactive) and 4,672 certificates (SKM level 1 to level 5) were awarded in 2015 (JPK, 2016). The MOE provides vocational and technical certifications from certificate to doctorate degree (bachelor, master's and doctorate degrees in TVET are provided by 3 premier polytechnics, 4 technical universities, and some private universities) and these are accredited by MQA based on the Malaysian Qualification Agency process. Table 4 compares the different TVET certifications and their levels between skills, vocational and technical and higher education in Malaysia. TVET graduates accredited by MQA have more accessibility to pursue higher education in an institute of higher learning compared to DSD accredited graduates as their curricula are more inclined toward the academic track.

Table 4:
Malaysia Qualification Framework, Qualification and Level

MQF Level	DSD-accredited based on NOSS	MQA-accredited based on internal quality assurance process	
	Skill level	Vocational & Technical	Academic
8		Doctoral degree	Doctoral degree
7		Master's degree	Master's degree
			Postgraduate Diploma
6		Bachelor degree	Bachelor degree
			Graduate Certificate
5	Skills Advanced Diploma (DLKM)	Advanced Diploma	Advanced Diploma
4	Skills Diploma (DKM)	Diploma	Diploma
3	Skills Certificate 3 (SKM3)	Certificate in Vocational & Technical	Certificate
2	Skills Certificate 2 (SKM2)		
1	Skills Certificate 1 (SKM1)		

Source: Department of Skills Development, MOHR Malaysia, Eleventh Malaysia Plan 2016-2020.

It should be noted that not all the Government agencies use the same TVET certification as in Table 2. For example, GiatMARA, skills training centres owned by Council of Trust for the People (Majlis Amanah Rakyat, MARA) under the Ministry of Rural and Regional Development has their own certification system. Certificates awarded by GiatMARA are Professional Certificate, Skills Certificate, Modular Certificate, Technology Certificate, Attendance Certificate, Heritage Skills Certificate and Apprenticeship Certificate. This means that TVET in Malaysia is accredited by three types of certification systems, namely Malaysia Skills Certification offered by MOHR, Malaysia Vocational Certification by MQA (under

MOE and MOHE), and MARA Skills Certification. On the other hand, some private TVET institutions provide certifications from overseas such as City & Guilds.

3.3 TVET Systems and Pathways

Currently, there are four ways a person can learn technical and vocational skills in Malaysia these are:

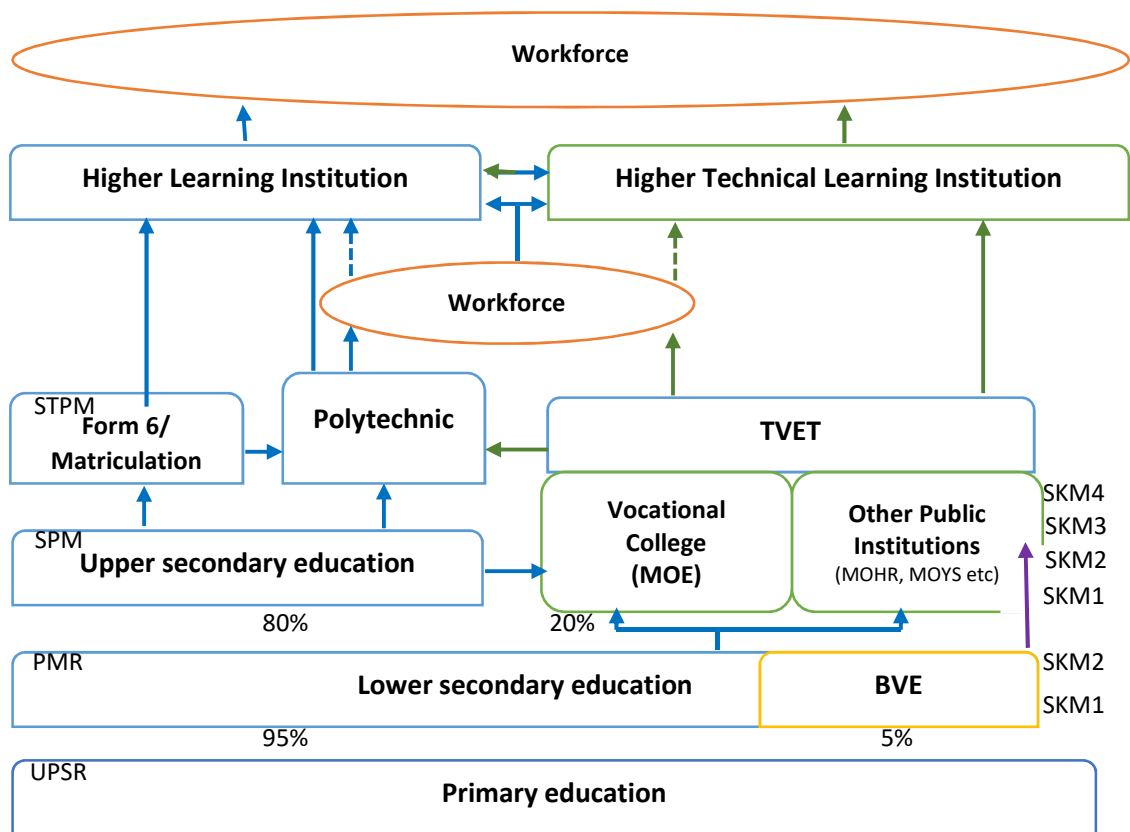
- (i) **Informal Apprenticeship:** the apprentice works under a skilled person or workshop owner to learn hands-on experience. There is no curriculum and course syllabus and hence no certification at the end of apprenticeship. The apprentices usually have to work very long hours with low wages. This way was very popular among the Chinese community in the past and it is still practising by some Chinese and Indians today.
- (ii) **On the Job Training:** the employer provides on the job training either internally or sends employees for external training to acquire certain skills. Usually the training provided is based on the company's needs. DSD has also introduced the National Dual Training Scheme where industry will provide on the job training to trainees registered with DSD and certificates will be awarded upon completion of the training.
- (iii) **Private TVET Institutions:** parents send their children to a private TVET institution to take a structured technical or vocational course. Some private TVET institutions are accredited and recognized by DSD but many are not recognized by local authorities such as City and Guilds programmes. Chinese students may also choose the vocational courses offered by the Chinese Independent High Schools or Overseas Youths Technical Training Programme sponsored by Taiwanese Government.
- (iv) **Public TVET Institutions:** this is funded and accredited by Government agencies. It has a systematic structure and accredited curriculum.

Figure 2 shows the revised pathway for Malaysian TVET graduates proposed in the Vocational Transformation Plan 2012. According to the pathway, 5% of the primary school students will enrol to BVE at lower secondary education and obtain the Malaysian Skills Certificate Level 1 and 2 by age of 15. At the upper secondary level, 20% of the students join TVET programmes offered by MOE and other ministries. These students can obtain the Malaysian Skills Certificate Level 4 or equivalently Malaysian Skills Diploma by completion of their high school education. By then, the TVET graduates can enter the workforce or pursue their study at polytechnic or technical university. The new pathway also allows academic-oriented students to access to TVET at different stages such as the Primary School Achievement Test (UPSR), the Lower Secondary Assessment (PMR), the Malaysian Certificate of Education (SPM) and the Malaysia Higher School Certificate (STPM)

As at July 2018, there are 656 public TVET institutions and 641 private TVET institutions registered under DSD in Malaysia (JPK, 2018). The number of private TVET institutions is lesser than the number accredited in 2016 because some of the private institutions have been closed. These public institutions are governed by seven ministries or their agencies and state government. Among others, the Ministry of Agriculture and Agro-based Industry (MOA), the Ministry of Works (MOW), the Ministry of Health (MOH), the Ministry and Defence (MINDEF) and the Ministry of Home Affairs (MOHA) offer programmes related to their niche

areas. Other ministries such as the Ministry of Human Resources (MOHR), the Ministry of Education (MOE), the Ministry of Higher Education (MOHE), the Ministry of Youth and Sports (MOYS), the Ministry of Rural and Regional Development (MRRD) and the Ministry of Women, Family and Community Development (MWFCD) offer cross-disciplinary programmes. The largest public TVET provider in Malaysia is neither MOE nor MOHR but MARA (under MRRD) with 231 GiatMARA training centres, 32 technical colleges or institutes and 13 institutions under the big umbrella of University of Kuala Lumpur. Table 5 lists the public TVET institutions offered by various agencies and its certification level (Economic Planning Unit, 2015). Although the Budget 2018 has suggested to merge all TVET institutions under 7 ministries under the purview of MoHR, its result remains to be observed.

Figure 2:
The revised pathway for Malaysian TVET graduates



Source: Ministry of Education Malaysia (2012).

**Table 5:
Programmes Offered by TVET Institutions and Their Accreditation System**

Qualifications	MOHR	MOYS	MRRD	MINDEF	MOE/ MOHE	MOA	MOW (CIDB)	State
Degree in Engineering Technology (Level 6)			Universiti KL (UniKL) ⁽¹³⁾ German Malaysia Institute (GMI) ⁽¹⁾	National Defence University of Malaysia (UPNM) ⁽¹⁾	Malaysian Technical Universities Network (MTUN) ⁽⁴⁾ Private Universities/ Universities Colleges ⁽⁶⁰⁾			
Advanced Diploma/ Diploma in Technology (Level 4 & 5)	CIAST ⁽¹⁾		Japan Malaysia Technical Institute (JMTi) ⁽¹⁾					
Advanced Skills Diploma/ Advanced Diploma in Technology (Level 5)	Japan Malaysia Technology Institute (JMTI) ⁽¹⁾ Advanced Training Institute Centre (ADTEC) ⁽⁶⁾	National Youth Advance Skills Institute (IKTBN) ⁽¹⁾	MARA Advanced Skills College (KKTm) ⁽¹¹⁾ Poly-Tech College & MARA Professional College ⁽⁶⁾		Polytechnics ⁽³²⁾	National Agriculture Training Council Institutes ⁽¹³⁾	CIDB (Malaysia Architecture Academy) ⁽⁶⁾	Federation of Malaysian Skills Development Centre (FMSDC) ⁽¹²⁾ INSPEN International College ⁽¹⁾ Negeri Sembilan Skills Development Centre ⁽¹⁾ Penang Skills Development Centre ⁽¹⁾
Skills Diploma/ Diploma in Technology (Level 4)	Federation of Private Accredited Centre (FEMAC) ⁽⁶⁴¹⁾		MARA Skills Institute (IKM) ⁽¹⁴⁾ Giat MARA ⁽²³¹⁾	Perhebat Institute ⁽¹⁾				
Skills Certificate (Level 1 – 3)/ Certificate of Technology (Level 3)	Industrial Training Institute (ILP) ⁽²³⁾	National Youth Skills Institute (IKBN) ⁽²⁰⁾						

Note 1: the number in bracket represent number of institutions. Source: Eleventh Malaysia Plan 2016-2020. There are some public TVET institutions are not listed here.

Note 2: CIAST is the only TVET teacher training institution for SKM system.

Note 3: Green colour uses MOHR certification, yellow colour uses MOE/MOHE certification, and blue colour uses MARA certification.

The Malaysian Technical University Network consists of 4 public universities that offer TVET programmes. These are the University of Malaysia Pahang (UMP), Tun Hussein Onn University of Malaysia (UTHM), the Technical University of Malaysia Malacca (UTeM) and the University of Malaysia Perlis (UniMAP). Other public universities offering degree qualification for TVET are the National Defence University of Malaysia (UPNM) and MARA University of Technology (UiTM). There are also some private universities conducting TVET programmes such as DRB-Hicom University of Automotive Malaysia, BERJAYA University College of Hospitality, International University College of Technology Twintech (IUCTT), MAHSA University, INTI International University, Tunku Abdul Rahman University College and City University College of Science and Technology. These private higher institutions were upgraded to university status after year 2000 and tend to offer TVET programmes that require less investment covering non-high-technological such as culinary arts, hotel management and tourism management.

For many reasons, non-Malay enrolment into the public TVET institutions is very unsatisfactory. Based on an unofficial observation, there are not more than 5% of the non-Malay students in all public TVET institutions. The Chinese and Indian students often prefer to take up courses at private TVET institutions even if they would have to pay higher study fees. Particularly, the MySkills Foundation, an Indian based NGO with its established Primus Institute of Technology in 2011 was formed to transform underprivileged youths and provide skills training to Indian school dropouts. On the other hand, the Overseas Youths Technical Training Programme (OYTT) offered by the Overseas Community Affairs Council (OCAC), Taiwan since 1963 has recently received overwhelming response from Chinese students. Until 2010, there were about 9,000 students completed OYTT programmes and more than 1,600 students enrolled in 2016 (FAATUM, 2018). Selected students will attend a two-years training course in specific technical fields at one of the Taiwanese universities and the study fees are waived. The Federation of Alumni Association of Taiwan Universities, Malaysia (FAATUM) is the only authorized organization to nominate Chinese students from Malaysia to OCAC annually. Since 2017, another Chinese-based education association, Merdeka University Berhad (MUB) has formed an Education Centre to help the Malaysian high school leavers to study TVET courses in China. The MUB Education Centre has successfully granted more than 300 full scholarships awarded by 13 Technical Colleges and Polytechnics in China every year (MUB, 2018). The first batch of the 68 scholarship recipients had started their 3-year TVET diploma courses in September/October 2017.

The first TVET courses in Chinese Independent High School was started in 1987 when Pay Fong High School, Melacca set up the electrical and electronic course. Over the years, 32 Chinese Independent High Schools have offered various TVET courses, but some of them were closed down due to small number of enrolment. Currently, there are 19 out of 61 Chinese Independent High Schools offering TVET courses such as fine arts and design, culinary and food management, automobile repair and maintenance, electrical and electronic, and fashion design. Table 6 shows the list of Chinese Independent High Schools and its offered TVET courses.

**Table 6:
List of Chinese Independent High Schools and TVET Courses**

No	State	School Name	Courses	Started Year
1+	Kelantan	Chung Hwa Independent High School	Fine Arts and Design	1997--
			Electrical and Electronic	1998-2011
			Culinary and Food Management*	2016--
2+		Jit Sin Independent High School, Bukit Mertajam	Fine Arts and Design	1993--
			Electrical and Electronic	1991-2010
3+	Penang	Han Chiang High School	Fine Arts and Design	2010--
			Automobile Repair and Maintenance	2002-2015
4+		Chung Ling Private High School	Fine Arts and Design	2011--
5+		Phor Tay Private High School	Culinary and Food Management	2017--
6		Poi Lam High School, Ipoh	Electrical and Electronic	1989-2011
			Skin and Health Care**	1992-??
			Plastic Technology**	1997-??
7+		Perak Yuk Choy High School	Fine Arts and Design	1991--
			Automobile Repair and Maintenance	1991--
8+	Perak	ST Nan Hwa (Suwa) High School	Fine Arts and Design	2000-2011 2018--
9		Shen Jai High School, Ipoh	Building drawing	1993-1996
10		Tsung Wah Private High School, Kuala Kangsar	Industrial Electronic	1991-1997
11		Hua Lian High School, Taiping	Textile	1993-2006
12		Yik Ching High School, Pantai Remis	Electrical and Electronic	1998-2003
13	Selangor	Hin Hua High School, Klang	Electrical and Electronic	1993-2015
			Accounting and Business Administrative***	1989-??
14		Sek Men Chung Hua (Persendirian), Klang	Mechanical	1991-2002
15		Pin Hwa High School, Klang	Advertisement Design	1991-2004
16+	Kuala Lumpur	Confucian Private Secondary School	Fine Arts and Design	2006--
			Culinary and Food Management	2007--
17+	Negeri Sembilan	Chung Hua High School, Port Dickson	Fine Arts and Design	1992--
			Electrical and Electronic	1993-2009
18+	Melaka	Pay Fong High School	Electrical and Electronic	1987--
19		Chung Hwa High School, Muar	Fine Arts and Design	1992-2007
20+	Johor	Chong Hwa High School, Kluang	Electrical and Electronic	1991--
			Fine Arts and Design	1991--
21+		Foon Yew High School, Kulai	Electrical and Electronic	2006--
			Culinary and Food Management	2007--

22		Foon Yew High School, Johor Bahru	Electrical and Electronic	1990-2006
23+		Chinese High School, Batu Pahat	Fine Arts and Design	2006--
			Fashion Design	2006--
24+		Pei Hwa High School, Ledang	Fine Arts and Design	2014--
			Furniture	1988-2002
25+		Pei Chun High School, Pontian	Fine Arts and Design	2005--
26+	Sarawak	Chung Hua Middle School No. 3, Kuching	Electrical and Electronic	2016--
			Automobile Repair and Maintenance	1995--
27+		Catholic High School, Sibu	Electrical and Electronic	1991--
28		Chung Hua Middle School No. 1, Kuching	Electrical and Electronic	1993-2012
29		Riam Road Middle School, Miri	Furniture	1995-1997
30+	Kedah	Keat Hwa High School	Fine Arts and Design	2011--
31+		SM Sin Min Alor Setar	Culinary and Food Management	2017--
32	Sabah	Kian Kok Middle School, Kota Kinabalu	Electrical and Electronic	1990-2006

Source: Dr. Lim Mei Yan from Dongzong.

Source *: Nanyang Siang Pau (Nanyang Business Daily), 11/1/2016 .

Source **: <http://www.poilam.edu.my/>

Source ***: http://www.hinhua.edu.my/cn/about/history1_3.html

Note: Serial number with + sign indicates that the school is still offering TVET courses.

Based on statistics by the United Chinese School Committees' Association of Malaysia, there were 1,896 upper secondary students enrolled into various TVET courses in these Chinese Independent High Schools in year 2015 (Dongzong, 2015). Table 7 shows an increasing trend in the number of TVET students. There are a total of 1,680 TVET students at Upper Secondary Level 1 to Level 3 in year 2012 and increased to 1,717 students in year 2013, 1,819 students in year 2014, 1,896 students in year 2015, slightly dropped to 1825 students in 2016 and increased to 2000 students in 2017 (Dongzong, 2012-2017). Based on the information from Dongzong, the number of TVET students in Chinese Independent High Schools achieved an historical high of 2045 in 2018.

3.4 TVET Budget

Human resource development is among the key factors contributing to the prosperity of a nation. The government targets 60% of 1.5 million new jobs by 2020 to be for workers with TVET skills. Hence, the TVET sector will need to strengthen its functions in line with the Malaysia Education Blueprint 2013 – 2025 and transformation plans. For this purpose, the government has increased its Budget allocations in TVET to further enhance it in years 2014 to 2016 which are shown in Table 8.

**Table 7:
TVET Enrolment in Chinese Independent High Schools**

Level/Course	2012	2013	2014	2015	2016	2017	2018
Upper TVET Secondary Level 1	618	682	681	679	692	737	745
Fine Arts and Design	263	263	320	295	296	265	288
Textile and Fashion Design	32	35	32	32	36	15	18
Electrical and Electronic	133	151	152	152	118	174	201
Automobile Repair	63	108	56	69	80	79	68
Culinary and Food Management	127	125	121	123	149	204	170
Furniture	-	-	-	8	13	-	-
Upper TVET Secondary Level 2	542	563	617	574	632	594	711
Fine Arts and Design	175	261	296	266	303	253	274
Textile and Fashion Design	24	23	25	28	24	28	11
Electrical and Electronic	167	135	123	122	119	125	220
Automobile Repair	54	29	54	46	55	50	26
Culinary and Food Management	122	115	119	112	116	138	180
Furniture	-	-	-	-	15	-	-
Upper TVET Secondary Level 3	453	472	521	643	501	669	589
Fine Arts and Design	159	175	249	249	232	248	255
Textile and Fashion Design	21	18	18	16	21	18	20
Electrical and Electronic	118	119	119	108	106	113	159
Automobile Repair	43	43	36	55	42	37	27
Culinary and Food Management	112	117	99	110	100	104	128
Others	-	-	-	105	0	149	-
Total	1608	1717	1819	1896	1825	2000	2045

Source: Administration and Information Department and Archive Department, Dongzong, Dongzong (2012 – 2018).

In 2014, a sum of RM1.18 billion was allocated to the Government agencies and private sector players that provide vocational and skills training. Among this, RM178 million was allocated to upgrade and replace equipment at training institutions under the Department of Manpower (JTM) and RM330 million was allocated for the Skills Development Fund managed by MOHR as loans for SPM leavers to enrol in TVET courses. The Government also implemented a two-shift approach at IKBN in automotive, marine maintenance, welding and electrical wiring with an allocation of RM200 million. It is expected that 15,000 IKBN trainees nationwide benefit from the initiative. In order to strengthen the development of the Malaysian Indian workforce, RM72 million had been allocated to enhance education performance and skills training for Indian community. The Human Resources Development Fund (HRDF) provides RM400 million for registered companies to give training programmes for employees to upskill and reskill themselves or to train apprentices and future workers.

Budget for TVET in year 2015 had increased 90% to RM2.25 billion as compared to the previous year. The allocation of the budget comprising RM1.2 billion was for TVET promotion activities, aimed to increase the intake through Vocation and Technical Transformation programmes. In addition RM100 million was allocated for MOE to create 10,000 placements in private TVET institutions; RM50 million was allocated to enhance MARA's TVET

programmes; RM30 million was allocated to establish Industry-Academia Collaboration programmes where Government agencies, universities and industry will collaborate to develop the curricula for internship programmes and industrial training; RM300 million was used to train 30,000 workers under a new programme called 1MalaysiaGRIP by HRDF and RM570 million was allocated to increase skills training programmes under JTM for students with SKM certificates, university or college graduates and industrial semi-skilled workers.

**Table 8:
TVET Initiatives under Budget 2014 to 2018.**

Initiatives	2014 ('000 millions)
Upgrade and replace equipment at Manpower Department (JTM) training institutions	0.178
Allocate to Skills Development Fund under MOHR as loans for SPM leavers to enrol in TVET courses	0.330
Implement 2-shift approach at IKBN in automotive, marine maintenance, welding and electrical wiring; benefited 15,000 trainees.	0.200
Enhance Indians education performance and skills training	0.072
HRDF provides for registered companies to provide training for employees in up-skilling and reskilling programmes, or apprenticeship.	0.400
Non-monetary initiatives: <ul style="list-style-type: none"> • Implement single tier for SKM1 to SKM3 for 6 months in all ILP under the purview of JTM. • Levy of 1% of the monthly wages of workers to HRDF will be used to train and upgrade the skills of workers. • Implement intensifying skills training for youth and Professional Leaders Programme and increase student intake in UiTM to 250,000 students by year 2020. 	
Total	1.180
Initiatives	2015 ('000 millions)
Increase TVET intake through Vocational and Technical Transformation programme	1.200
MOE to create 10000 placements in private TVET colleges	0.100
MARA TVET programmes	0.050
Review public TVET curriculum and establish Industry Academic Collaboration programme to develop curriculum for internship programmes and industrial training	0.030
Government and HRDF to train 30,000 workers under a new programme called Globally Recognised Industry and Professional Certification Programme or 1MalaysiaGRIP	0.300
Train 48,000 students with SKM certificate, university/college graduates and semi-skilled workers in 5 year period through 32 TVET institutions under Department of Manpower (JTM), it comprises 176 courses.	0.570
Non-monetary initiatives:	

<ul style="list-style-type: none"> • Increase capacity and skills of youth via IKBN Transformation and Coding Bootcamp programmes and Projek Angkat Dan Upaya ((PADU) programme 	
Tax incentives:	
<ul style="list-style-type: none"> • Double deduction for providing scholarships to certificate level TVET • Double deduction for company that implement internship programmes for students at diploma and vocational level. • Further deduction on training expenses by employer for employees to obtain qualification from accredited TVET bodies. 	
Total	2.250
Initiatives	2016
	('000 millions)
Enhance 545 public TVET institutions	4.800
TVET training equipment at polytechnics, community colleges, MARA skills institutes, IKBN, ILP, GiatMARA and Vocational Colleges	0.585
Financing various TVET training programmes under Skills Development Fund Corporation (PSMB)	0.350
Establish a Tourism Academy at Community College in Kota Kinabalu, Vocations College in Sandakan and ILP in Serian Sarawak	0.080
Enhance IKBN and IKTBN	0.280
Improve National Service Training with new curriculum include technical skills	0.360
Train an additional 15,000 participants under the 1Malaysia Training Scheme (SL1M) fully financed by GLCs	0.250
PSMB provides the fund to implement programmes e.g. Train and Replace in hospitality, shipping and transport to improve the management of foreign workers	0.077
MRRD for the Career and Skills Training Programmes	0.050
Support private skills training institutions and NGOs to enhance skills of the B40 group.	0.100
Non-monetary initiatives:	
<ul style="list-style-type: none"> • Target 60% of 1.5 million new jobs by 2020 are for workers with skills. • Ministry of International Trade and Industry (MITI) will establish an Industrial Skills Committee to coordinate with TVET programmes and collaborate with industries. • Allocate 30% of HRDF to implement training programmes to meet the needs of local industries in Sabah and Sarawak 	
Total	6.932
Initiatives	2017
	('000 millions)
Enhance public TVET institutions capacity	4.600
Upgrade TVET educational equipment.	0.270
Financing various TVET training programmes under Skills Development Fund Corporation (PSMB)	0.360

Allocation through Yayasan Peneraju Pendidikan Bumiputera for Peneraju Skil dan Iltizam, Peneraju Professional and Peneraju Tunas programmes	0.100
9 unused Teachers' Training Institutes will be transformed into 4 Polytechnics, 4 Vocational Colleges and 1 training institute for TVET trainers.	0.400
Scholarships through MoHR	0.028
Non-monetary initiatives: <ul style="list-style-type: none"> • Double tax deduction for private companies to provide structured internship programme for students pursuing TVET program • Training matching grants and curriculum development to public TVET which obtained assistance in the form of equipment from industries. 	
Total	5.758
Initiatives	2018 ('000 millions)
Implement TVET Malaysia Masterplan	4.900
Allocation for programmes Peneraju Professional, Peneraju Skil and Peneraju Tunas, benefitting almost 8000 individuals.	0.090
Provide 100 TVET Outstanding Student Scholarships	0.0045
Non-monetary initiatives: <ul style="list-style-type: none"> • Create one-stop centre incorporating agencies such as JobsMalaysia, SLIM, SOCSO, HRDF, TERAJU in Urban Transformation Centre to provide professional advisory services in seeking employment and training. • RM654 million of RM61.6 billion is allocated for construction of 4 pre-schools, 9 PERMATA centres, 48 primary, secondary schools, vocational colleges and 1 matriculation centre. • RM2.5 billion allocated for higher education scholarship and training programmes under MARA. • Establish the National Rail Centre of Excellence (NRCOE) to oversee and coordinate quality assurance as well as accreditation of national rail education and training. • Malaysia Rail Link Sdn. Bhd. in collaboration with IPTAs will train 3000 professionals in the railway industry. • All TVET institutions under 7 ministries will be merged and known as "TVET Malaysia" under the purview of MoHR. 	
Total	>4.9945

Source: Ministry of Finance Malaysia (2013 – 2017).

The budget for TVET development has increased dramatically to RM6.932 billion in 2016. The biggest allocations are RM4.8 billion to enhance and upgrade 545 public TVET institutions nationwide and RM585 million to purchase or renew of training equipment at polytechnics, Community Colleges, MARA skills institutes, IKBNS, ILPs, GiatMARA centres and Vocational Colleges. Unexpectedly, the three-month National Service Training Programme (PLKN) that promotes patriotism and national unity among the multiracial communities was also allocated with RM360 million to introduce a new curriculum including technical skills

training. Other than these, PSMB and MRRD will be allocated RM427 million and RM50 million, respectively for various TVET programmes. IKBN and IKBTN under MOYR will received other development funds of RM280 million. A new Tourism Academy under Community College in Kota Kinabalu, a new Vocational College in Sandakan and a new ILP in Serian will be established with an allocation of RM80 million. The Government has also identified the bottom 40% income (B40) group and encouraged the private TVET institutions and NGOs to enhance their skills with allocation of RM100 million. Last but not least, Government Linked Companies (GLCs) will provide RM250 million to fully finance the 1Malaysia Training Scheme to train an additional 15,000 participants.

However, the overall budget for TVET was declined after 2016 although the main allocations remained at RM4.6 billion to RM4.9 billion in 2017 and 2018, respectively. As a compensation, non-monetary initiatives have been taken to improve delivery system of TVET such as creating one-stop centre for employment and training advises, and merging of the TVET institutions under the purview of MoHR. Besides, MARA continues to be one of the main beneficiary of the TVET allocations.

4. Challenges for TVET in Malaysia

Although the Government had put in a lot of effort and resources in TVET, the achievement seems not to meet the expectation (Chang, 2015). The enrolment rate to TVET is still far below more-developed countries or even its neighbour ASEAN countries (UNESCO, 2015). Besides the negative perception of skills training among students and parents, there are many challenges that require immediate attention from the authority. This section highlights only three main challenges.

4.1 Uncoordinated TVET systems and vague entry requirements

There are 577 public or government-funded TVET institutions offering various TVET programmes in Malaysia. According to Dr. Pang C.L., the director-general of DSD, MOHR, Malaysia, there is no single authority over TVET management in Malaysia and there are more than 20 government agencies reporting to different ministries (Pang, 2011). To make matters worse, there is a lack of coordination between each ministry and government agencies resulting in lack of overall understanding of the national TVET landscape. This is not only a waste of resources but more importantly means that the quality and accreditation of the programmes are not aligned and recognized. For example, GiatMARA has its own certification system which is different from MOHR and MOE, while graduates from TVET teacher education and training programme from University of Tun Hussein Onn, Malaysia (under MOHE) is not recognized by MOHR. This means that graduates with a TVET teacher training degree need to obtain another teaching certification from CIAST (under MOHR) in order to be able to teach Malaysian Skills Certificate programmes.

Another issue is the unrealistic TVET entry requirement and levelling system. In many developed countries, TVET is treated as the main choice for their students, where it is on par

with the academic education. Their students are allowed to choose vocational track after primary education, often starting from age 12 years old and later pursue degree courses at university or technical university. In Malaysia, all students are required to enrol into general studies at Lower Secondary Assessment. The PAV (Basic Vocational Education) at lower secondary level introduced in 2012 seems to have been abandoned due to its poor planning and preparation. Upon completion of the lower secondary level, students are automatically entered into the upper secondary level regardless of their academic achievement in the Penilaian Menengah Rendah (PMR) examinations. Students interested in vocational training must apply to Vocational College themselves. The problem is how many students will apply for the Vocational College if they are already automatically enrolled into high school? JPK statistics revealed the fact that only 25,000 upper secondary students enrolled into the technical and vocational track in 2010 as compared to 453,000 upper secondary students in normal national and private schools (JPK, 2011).

A similar issue happened in TVET diploma programmes. Most of the programmes offered by the public TVET institutions had set high and unrealistic entry requirements to non-academic oriented students. Table 9 shows a few examples on the entry requirements for some TVET programmes offered by IKBN, ILP and Polytechnics. For example, the Diploma in Automotive Engineering Technology (Maintenance) in IKBN required a student to obtain at least SPM qualification with Malay Language and English Language passed and obtained credit in Mathematics, General Science and other science subjects.

Since most excellent students would prefer to study in college and university, only those academically weak students and school dropouts will choose vocational and training programmes. Many of these students failed to obtain certificates in their SPM examinations and are weak in Bahasa Malaysia (national language), English Language and Mathematics subjects. For the weak students who dropout before SPM, which is estimated at about 20% to 25% of the students, or failed to obtain a full SPM certificate, these criteria are too high to achieve and they will be disqualified from applying for the TVET programme. Whereas, for students who meet the criteria, they usually have a better option to apply to foundation programme offered by private universities. As a result, there were only 17,814 students enrolled in 86 Community College certificate programmes and only 386 students obtained the diploma qualification in year 2010 (Ministry of Higher Education, 2011).

**Table 9:
Entry requirements for various TVET Institutions**

<p>National Youth Skills Institute (IKBN)</p> <ol style="list-style-type: none"> 1. Diploma in Automotive Engineering Technology (Maintenance) <ul style="list-style-type: none"> • Age 18 – 30, single and healthy. • Passed SPM or equivalent, passed Malay Language and 3 credit which include Mathematics, Science or Physics and any other subject. • Passed English paper. 2. Diploma in Civil Technology (Interior Design – Drywall & Ceiling) <ul style="list-style-type: none"> • Age 18 – 30, single and healthy • Passed SPM or equivalent, passed Malay Language
--

- Credit in Mathematics/Science/Physic
3. Certificate of Automotive Engineering Technology (Maintenance)
 - Complete Form 5
 - Age 18 – 30, single and healthy
 - Passed SPM or equivalent, passed Malay Language and Mathematics and one credit in any other subjects
 4. Advanced Certificate in Automotive Technology (Spray Paint) (SKM1,2&3)
 - Complete Form 5
 - Age 18 – 30, single, healthy

Industrial Training Institute

1. Certificate of Construction Technology (Wood-Based) – (SKM1,2,3)
 - Age 17- 35
 - With SPM/SPMV qualification. Must passed in Malay Language
2. Certificate of Automotive Technology (SKM1,2,3)
 - Age 17- 35
 - With SPM/SPMV qualification, must passed the following subjects:
 - i) Malay Language
 - ii) Mathematics/Additional Mathematics; and
 - iii) Science/Physic/Chemistry/Automotive related subjects.
3. Certificate of Electronic Technology Industry (SKM1,2,3)
 - Age 17 -35
 - With SPM/SPMV qualification. Passed in the following subjects:
 - i) Malay Language
 - ii) Mathematics/Additional Mathematics; and
 - iii) Science/Additional Science/Application Science/Physic/Chemistry/Electrical and Electronic related subjects
4. Diploma in Construction Technology
 - Age 17 -35
 - With SPM/SPMV qualification and distinction in the following subjects:
 - i) Malay Language
 - ii) Mathematics/Additional Mathematics; and
 - iii) Science/Additional Science/Application Science/Physic/Chemistry

Polytechnics

1. Most of the Diploma courses
Passed SPM with the following minimum grade:
 - Passed Malay Language
 - Passed English
 - Credit in 5 subjects, include Mathematics/Additional Mathematics
2. Diploma in Secretarial Science
 - Passed SPM with 3 credit in the following subjects: (i) Malay Language, (ii) English Language, and (iii) Any other subject
3. Diploma in Event Management
 - Passed SPM and fulfil the following minimum criteria:
 - i) Passed Malay Language
 - ii) Passed Mathematics/Additional Mathematics
 - iii) Credit the following 3 subjects: (i) English, and (ii) Other 2 subjects (Malay Language and Mathematics is considered if obtained a distinction)

Source: webpages of ILPs, IKBNs and Polytechnics

4.2 Racial Segmentation and Polarization in TVET

The most worrying outcome of the Malaysian TVET system is the phenomenon of racial segmentation. According to Pang (2011), there were 270,000 students enrolled in the TVET system in 2010, comprising 79% of students in public TVET institutions and the remainder in private TVET institutions. Although the total number of TVET students dropped to 179,438 in 2017 (see Table 10), it is believed that the proportion of TVET students in public and private institutions is about the same. In 2017, there are 2,413,855 students in various secondary school systems, and only about 7.43% are TVET students from Technical Schools, Vocational Colleges, Affiliated Centres, National Dual Training System (SLDN), Recognition of Prior Achievement (PPT), Private Chinese Secondary Schools, and scholarship for training programmes offered by Taiwan's government.

Table 10:
Enrolment of Secondary Students into TVET and Non-TVET Programmes in 2017

MOE*	Number of Students	%
Secondary Schools (Form 1 to Form 6)	1,884,012	
Technical Schools	3,371	0.1%
Vocational Colleges	52,033	2.2%
Others (boarding schools, religious schools etc.)	159,617	
MOHR**		
Affiliated Centres (PB)	93,089	3.9%
National Dual Training System (SLDN)	9,563	0.4%
Recognition of Prior Achievement (PPT)	17,167	0.7%
Private Schools & Others		
International and Private Schools*	71,589	
Chinese Independent Schools (normal students)***	83,199	
Chinese Independent Schools (TVET students)***	2,000	0.1%
Religious/Boarding Schools*	36,000	
Taiwan Overseas Youth Program****	2,215	0.1%
Grand Total	2,413,855	

Sources: *MAMPU official portal. ** JPK (2018). *** Dongzong (2018). **** China Press (24 Sept 2018)

Note: The statistics excluded TVET students from MARA system.

Despite of small number of TVET enrolment, the Government has implemented some unfriendly policies and practices to non-Malays, which ensure Bumiputra (refers to indigenous population in Malaysia, including mainly Malays and other indigenous people from Peninsular, Sabah and Sarawak) remain dominant and continue to benefit from public TVET such as:

- (i) creating a more Malay-Islamic study environment in the public TVET institutions through various national education acts and language policies introduced in 1950s and 1960s;

- (ii) introducing the largest MARA education system that is only opened for Bumiputra students and;
- (iii) tightening the entry requirements for TVET especially on Malay Language where many non-Bumiputra students are unable to master the language.

The implication of the above implementation caused marginalization of non-Malays in public TVET institutions. For example, the enrolment of non-Malay students in both Vocational Schools (converted into Vocational College) and Technical Schools in 2010 only consist of 1.66% from a total of 60,590 students, about 3% in Polytechnics and Community Colleges and about 1% at IKBNs. However, Abdul Wahab et al. (2014) showed that the participation of non-Malays indigenous students in TVET is also low. Only 443 and 175 non-Malay indigenous students from Peninsular Malaya joined the special skills training programme and indigenous skills training centres in 2011, respectively.

On the other hand, the liberalization of higher education in the country to meet the increasing demand for tertiary education in the mid-1990s had enabled the establishment of many private universities and colleges, including private TVET institutions. This development has opened up more tertiary education opportunities to non-Malay students in which their access to public universities is limited. However, it could cause racial polarization if fewer non-Malay students choose to join public TVET institutions. Based on the number of students in a few private TVET institutions, it is observed that there are more non-Malay students than Malay. Malay students will usually not choose private institutions as they can enjoy free or very inexpensive education in public TVET institutions. Table 11 provides an estimation of the number of Malay and non-Malay students in both public and private TVET institutions. It is estimated to have less than 3% (3,000 students) of non-Malay in all public TVET institutions but about 50%-70% (18,841 – 26,377) of non-Malay students in private TVET institutions, whereas 98% or 138,779 and 30%-50% or 11,305 – 18,841 Malay students enrolled into public and private TVET institutions, respectively.

**Table 11:
Estimated number of Malay and non-Malay students in TVET.**

TVET institution	Number of students	Number of Malay students (estimated)	Number of Non-Malay students (estimated)
Public	141,756 (79%#)	138,779 (97.9%)	2,977 (2.1%**)
Private	37,682 (21%#)	11,305– 18,841 (30% - 50%)	18,841 – 26,377 (50% - 70%***)
Total	179,438*	150,084	29,354

* From Table 10. #Pang (2011).

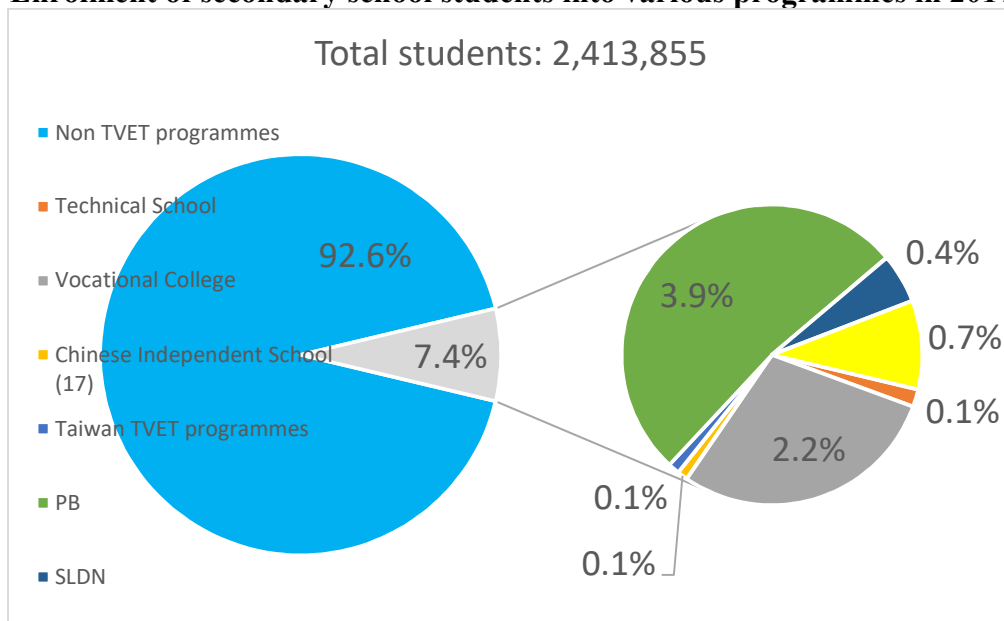
** China Press (24 Sept 2018). E.g. there are only 148 Chinese and Indian students studied in 21 IKBNs in 2018.

*** In 2018, there are 2215 Chinese students undergo Taiwan TVET programmes, 2000 students TVET courses in Chinese Independent Schools, 500 Indian students in Primus (MySkills Foundation), etc.

4.3 Skills-Jobs Mismatched and the Needs for Industrial Revolution 4.0

Malaysia has been facing the shortage of skilled workers since its Independent in 1957. There are only 28% of the 12 million workforce in 2015 are skilled workers (Tenth Malaysia Plan 2011 – 2015) and the number of skilled workers increase to 31.5% in 2018. The remaining 60.5% and 8% are semi-skilled workers and workers without any skill, respectively (Department of Statistics Malaysia, 2018). It is noted that Malaysia needs to produce 1.5 million skilled workers to fulfill the new jobs created by year 2020. Unfortunately, there are only 7.3% of a total of 2,411,640 secondary school students enrolled into TVET programmes in 2017 as shown in Figure 3. Statistics from JPK (2017) further indicates that there are only 12,255 TVET students who obtained SKM level 4 and level 5 certifications in 2017, which is insufficient to support the demand for the skilled-workers.

Figure 3:
Enrolment of secondary school students into various programmes in 2017



Sources: (i) School Management Division, MoE, (ii) Dongzong, (iii) JPK, and (iv) FAATUM.

A survey carried out by the Associated Chinese Chambers of Commerce and Industry of Malaysia (ACCCIM) in 2012 revealed that 65% of the companies are facing the problems of unable to recruit suitably skilled workers to fill up the workforce requirement. This problem has been raised for many years and yet to be resolved, and it caused negative impacts to the productivity and competitiveness of the country. One of the main reasons for this problem is that there is a mismatched of the TVET courses offered or the TVET graduates produced do not meet with the industries' needs. The ACCCIM survey was supported by Ismail & Hassan (2013) and Ismail & Zainal Abidin (2014). These studies reveal that there are lacking of product quality and skills possessed by the TVET students. The current TVET programs in Malaysia are largely supply-driven and still lack giving emphasis to match training to available jobs.

On the other hand, it is believed that to close the gap between the supply and the demand of skilled-workers cannot rely on the current needs of the industries. In fact, we stand on the brink

of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. The government must ensure that TVET programmes are designed in such a way that it is in line with the trend of 4th Industrial Revolution. Nevertheless, most of the programs offered by TVET institutions are still very traditional and low-tech courses. Courses linked to the cashless e-commerce, artificial intelligence, data science and internet of things have not yet offered in any of the TVET institutions.

Hence, one of the main challenges for TVET institutions is to produce not only the enough skilled-workers, but also to produce TVET graduates that meet the industries' needs and the future trend. It is essential to introduce new TVET programs that foster skilled-workers in the era of 4th Industrial Revolution.

5. Conclusion

Each TVET system is unique in its history and development. In the case of Malaysia, TVET has evolved in response to the various phases of economic development since 1870. As the economy restructured and moved from being labour-intensive to capital-intensive and then knowledge-intensive, the TVET system responded accordingly to ensure that the workforce has the relevant knowledge, skills and values. The educational and training systems were reviewed, upgraded and remodelled to stay relevant and responsive to the needs of school leavers, industry and community groups of all ethnicities.

However, the achievement of TVET education in Malaysia is still far behind other developed countries. The Government has identified various issues faced by the main TVET stakeholders and some new demands on TVET in Malaysia toward its 2020 vision. Revitalising TVET has also been taking place where major initiatives including re-branding of the TVET sector to the education mainstream, efforts to improve perceptions of TVET, rationalising TVET provisioning to meet economic and employment needs and scaling up private TVET training provision (Pang, 2011).

Despite the Government's efforts, shortcomings and unmatched skilled workers issues remain unsolved and many industries must rely on foreign workers and professionals. This shows that Malaysia still has a long way to go to reach its goal of becoming a high-income and developed nation.

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