The Role of Stakeholders in Bangladesh's TVET and Apprenticeship Systems: A Comprehensive Analysis

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October 2024

Acknowledgement

This study has been jointly commissioned by Friedrich-Ebert-Stiftung (FES) Bangladesh and the Small and Medium Enterprise Foundation (SMEF). We extend our sincere gratitude to the Chairperson of SMEF, Prof. Dr. Md. Masudur Rahman, the former Managing Director, Dr. Md. Mafizur Rahman, and the entire SMEF team for their invaluable insights, support, and cooperation throughout the study.

We also wish to acknowledge the FES Bangladesh team, including Felix Kolbitz, former Resident Representative; Dr. Felix Gerdes, current Resident Representative; and Arifa As Alam, Programme Advisor, for their funding and guidance. Their strategic input in shaping the framework, particularly in outlining stakeholders' roles in developing Technical and Vocational Education and Training (TVET) and apprenticeship programs in Bangladesh, was essential.

The study greatly benefited from the contributions of various stakeholders, including principals, teachers, and students from technical and vocational institutions; representatives of industry associations; members of industry skills councils (ISCs); regulatory bodies; support service organisations; and entrepreneurs. These individuals provided valuable information and participated in focus group discussions, stakeholder consultations, and in-depth interviews, enriching the research with diverse perspectives.

We are deeply grateful to all involved for their active cooperation, unwavering support, and constructive feedback, which significantly enhanced the quality of this report.

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List of Acronyms

ADB	Asian Development Bank
BANBEIS	Bangladesh Bureau of Educational Information and Statistics
BBS	Bangladesh Bureau of Statistics
BGMEA	Bangladesh Garments Manufacturers and Exporters Association
BKMEA	Bangladesh Knitwear Manufacturers and Exporters Association
BMET	Bureau of Manpower, Employment and Training
BNQF	Bangladesh National Qualifications Framework
BTEB	Bangladesh Technical Education Board
DTE	Directorate of Technical Education
FGD	Focus Group Discussion
ILO	International Labour Organization
ISC	Industry Skills Councils
KII	Key Informant Interview
NSDA	National Skills Development Authority
NSDP	National Skills Development Policy
NSS	National Skills Standard
NTVQF	National technical and vocational qualification framework
SEIP	Skills for Employment Investment Program
SDGs	Sustainable Development Goals
SMEs	Small and Medium Enterprises
SMEF	Small and Medium Enterprise Foundation
TMED	Technical and Madrasa Education Division
TSCs	Technical Schools and Colleges
TTC	Technical Training Centre
TTTC	Technical Teachers' Training Colleges
VTTI	Vocational Teachers' Training Institutes
TVET	Technical and Vocational Education and Training

Executive Summary

Technical and vocational education and training (TVET) plays a pivotal role in creating a skilled workforce to support SME growth, a catalyst for the development of SMEs, especially for Bangladesh, where 90% of businesses are SMEs. There are many institutions, such as the National Skills Development Authority (NSDA), The Bangladesh Technical Education Board (BTEB), the Bureau of Manpower Employment and Training (BMET), and the Directorate of Technical Education (DTE), that oversee the expansion, quality control, and regulations of TVET, with a focus on both public and private institutions to develop skilled labour in Bangladesh. Despite the growth of TVET capacity in the country, the absence of apprenticeships is a significant concern. Thus, this paper aims to analyze the TVET and apprenticeship system in Bangladesh and determine stakeholders' roles with specific focus on examining the current status of TVET and apprenticeship, finding out the challenges and barriers to the development of TVET and apprenticeship system; documenting the global experiences of TVET and the apprenticeship system and identifying the strategies of TVET and apprenticeship development plan.

The paper employs a qualitative research approach and adopts multiple data collection techniques from both primary and secondary sources. The primary data were collected through three Key Informant Interviews (KIIs), one Focus Group Discussion (FGD), and stakeholder consultation meetings with NSDA, BTEB, SMEF, TVET institutes, Industry Associations, Entrepreneurs, and SEIP representatives. Secondary sources of this paper are journals, Five-year plans, education policy, skills development policy, NTVQF standards, and reports of multilateral agencies and development partners.

Formal TVET education is categorized as Certificate level training, Secondary School Certificate (Vocational) (SSC-VOC), Higher Secondary Certificate (Vocational) (HSC-VOC), and Diploma courses under the DTE, BMET, and BTEB. Various institutions, including Engineering Colleges, Polytechnic Institutes, and Vocational Teachers Training Institutes, offer programs in 317 specialized areas. Regarding the growth of TVET in Bangladesh, the number of TVET institutions doubled between 2011 and 2021. Despite increased enrollment from 1% in 2009 to 16.1% in 2018. However, female registration in TVET programs constitutes only 27.13% of total students, with a mere 1.31% increase over the past decade. In addressing inclusivity, the DTE collaborates with the International Labour Organization (ILO) to make 118 TVET institutes disability-inclusive, aiming to empower the 3.2 million young people with disabilities who lack necessary employment skills in Bangladesh.

Despite policy initiatives such as NSDP 2022, BNQF, SEIP, 7th and 8th year plans, apprenticeship law, and apprenticeship guideline 2022, the TVET system and apprenticeship in Bangladesh face significant challenges that hinder its effectiveness in producing a skilled workforce. One major issue is providing similar skills training across multiple TVETs, lacking specialization in niche skills required by industries. Moreover, under-equipped institutes, lack of accreditation and global recognition, low social recognition of TVET certificates, shortage of qualified trainers, insufficient collaboration with local industries, the reluctance of employers to hire TVET graduates with premium wages, lack of coordination among the regulators and controlling agencies, and limited female participation are primary challenges.

The success of TVET apprenticeships in Bangladesh relies on the strategic roles of various stakeholders such as TVET institutions, regulatory authorities, trade unions, parents, industry skill councils, donor agencies, and TVET graduates. TVET institutions can enhance apprenticeships

through industry-academia collaboration, awareness campaigns, and partnerships with companies. Meanwhile, accreditation, certification, and active involvement in program development are the roles of regulatory authorities. Regulatory bodies also need to find appropriate strategies for motivating employers to open apprenticeship opportunities, such as easy access to finance, employer recognition programs, and prerequisites for achieving the status of Commercially Important Person (CIP) are some of the alternative strategies. The roles of industry and industry associations are developing trade-specific apprenticeship wings, budget allocations for apprenticeship, and fostering collaboration with other stakeholders. Trade unions can contribute by negotiating fair wages; parents must uphold TVET education and remove the social stigma regarding TVET; TVET graduates must showcase their success stories; donor agencies and development partners contribute through strategy development, capacity building, and policy formulation. Overall, a collaborative effort involving these stakeholders is essential for developing and promoting TVET apprenticeships in Bangladesh.

This paper concluded with recommendations including amending and enforcing apprenticeship acts, revising the TVET curriculum to include practical components, establishing robust certification and accreditation processes, national branding of TVET, job fairs with local and foreign employers, and clustering TVET centers within industrial clusters. This paper also highlights the German dual TVET system and Japan TVET operations. Based on their experiences, this paper recommends adopting a structured registered apprenticeship program with industry/donor-sponsored training and making strategic partnerships between TVET institutions and industries, along with a focus on hands-on, lab-based training, which could enhance the practical skills of apprentices, aligning them more closely with industry niche demands. Overall, these strategies aim to bridge the skills gap, improve TVET infrastructure, and create a more conducive environment for apprenticeship programs in Bangladesh.

1. Introduction

One sub-goal under SDG-4 is ensuring equal access for all women and men to affordable and quality technical, vocational, and tertiary education, including university. Achieving sustainable development goals (SDGs) and creating green and circular economies in the world requires resilient and flourishing industrial sectors. Industrial sectors of most economies are primarily comprised of small and medium enterprises (SMEs), and thus SMEs constitute the bedrock of every society. SMEs directly contribute to economic growth through output and employment creation, backward and forward linkages of industries, and economic resilience and social upgradation of people. Recognizing the critical role of SMEs in the journey of economic progress, the development of SMEs is recognized as a key element in the development plans in Bangladesh. Enhanced micro, small, and medium enterprise activities in the rural and backward regions constitute a key component of the strategy for rural development and reduction of poverty and regional disparity (GOB, 2011). The skilled workforce is critical in developing SMEs created through technical and vocational education and training (TVET). Global experiences suggest that the TVET sector expands with the level of development of a country. Thus, for Bangladesh's transition towards an upper-middle income country, increased investment in TVET will be crucial.

The journey towards technical and vocational education dates back to Bangladesh's independence. The Directorate of Technical Education (DTE) was established as a regulatory body to develop technical and vocational education in 1960 (Rözer & van de Werfhorst, 2020). Over the years, the DTE has initiated rapid development and expansion of degree, diploma, and trade-level technical education in the country. Later, a statutory body, 'The East Pakistan Technical Education Board,' was established through the Act. No. 1 of 1967 by the East Pakistan Assembly became functional in 1969 and is now the Bangladesh Technical Education Board (BTEB). Thus, the Bangladesh Technical Education Board is responsible for organizing, supervising, regulating, controlling, and developing technical and vocational education throughout the country.

In Bangladesh, public and private institutions provide four levels of technical and vocational education: Secondary School Certificate (SSC), Higher Secondary Certificate (HSC), Diploma, and short-term training courses in various trades. Around 87 percent of the institutes are in the private sector. Vocational training institutes, polytechnics, commercial institutes, technical training centers, and specialized institutes offer technical training. The DTE and BTEB oversee the three layers (SSC vocational, HSC vocational, and Diploma) of formal vocational and technical education provided by public and private institutions and part of the training courses.

Apprenticeships have long been viewed as bringing theoretical and practical knowledge together. Apprentices learn in a real work setting and attain occupational skills and other work-related skills, including communication, problem-solving, allocating resources, and dealing with supervisors and a diverse spectrum of co-workers.

The absence of apprenticeships is a profound concern for the TVET sector in Bangladesh. Theoretical coverage in TVET institutions and examination systems is well-developed (ADB, 2015). However, the less developed parts of the existing TVET system in Bangladesh include inadequate exposure to practical applications during the study period and the absence of congruence with the local and global market requirements. This leads to a lack of employers' confidence in the TVET system, eventually leading to skill shortages and unemployment amongst TVET graduates. In this context, SME Foundation and FES Bangladesh have designed this paper on TVET and Apprenticeship: Roles of Key Stakeholders.

2. Objectives of the Paper

The main objective of the paper is to analyze the TVET and apprenticeship system for entrepreneurship development in Bangladesh and find out the roles of stakeholders.

2.1 Specific Objectives:

- examine the current status and prospects of TVET and apprenticeship in Bangladesh
- analyse existing policies, guidelines, and regulatory frameworks governing TVET and apprenticeship
- identify challenges faced by TVET graduates and barriers to the development of the TVET and apprenticeship system in Bangladesh
- explore global best practices in TVET and apprenticeship, and propose model cases for Bangladesh
- recommend strategies and policy options for improving the TVET and apprenticeship system

3. Methodological Approach

The study is based on a qualitative research approach. As per the scope of work, the information is collected from secondary sources like journals, various documents like five-year plans, annual reports of BTEB; government policies like education policy, skills development policy, NTVQF standards; and reports published by multilateral agencies, including ILO, World Bank, IMF, Asian Development Bank to capture the current status of TVET in Bangladesh, figure out global experiences of TVET and apprenticeship system, and review policy frameworks that govern TVET system in Bangladesh.

Table 1: Summary of Data Collection Methods

Modes of data collection	Specific Sources	Type of data
Literature review	Books, Articles, BTEB Reports, websites Five-year plans, education policy, skills development policy, NTVQF standards, and Reports of multilateral agencies and development partners	Secondary
FGD	One FGD with TVET institutions, policymakers, business apex bodies	Primary
KII	Three KIIs with policymakers, business people, business apex bodies, TTC/TVET	
Consultation / Stakeholder meetings	BTEB, SMEF, NSDA, TVET institutes, Industry Associations, Entrepreneurs, and SEIP representatives.	
Validation	Validation workshop at the national level to get feedback on the findings	

Besides, Key Informant Interviews (KIIs), Focus Group Discussions (FGDs), and stakeholder consultation meetings with TVET institutions, BTEB, policymakers, technical universities, and business apex bodies are adopted to collect first-hand data on the challenges faced by TVET graduates, challenges and barriers to the development of TVET and apprenticeship system in Bangladesh; the strategies of TVET and apprenticeship development plan and way forward. Table 1 provides a summary of the data collection approaches.

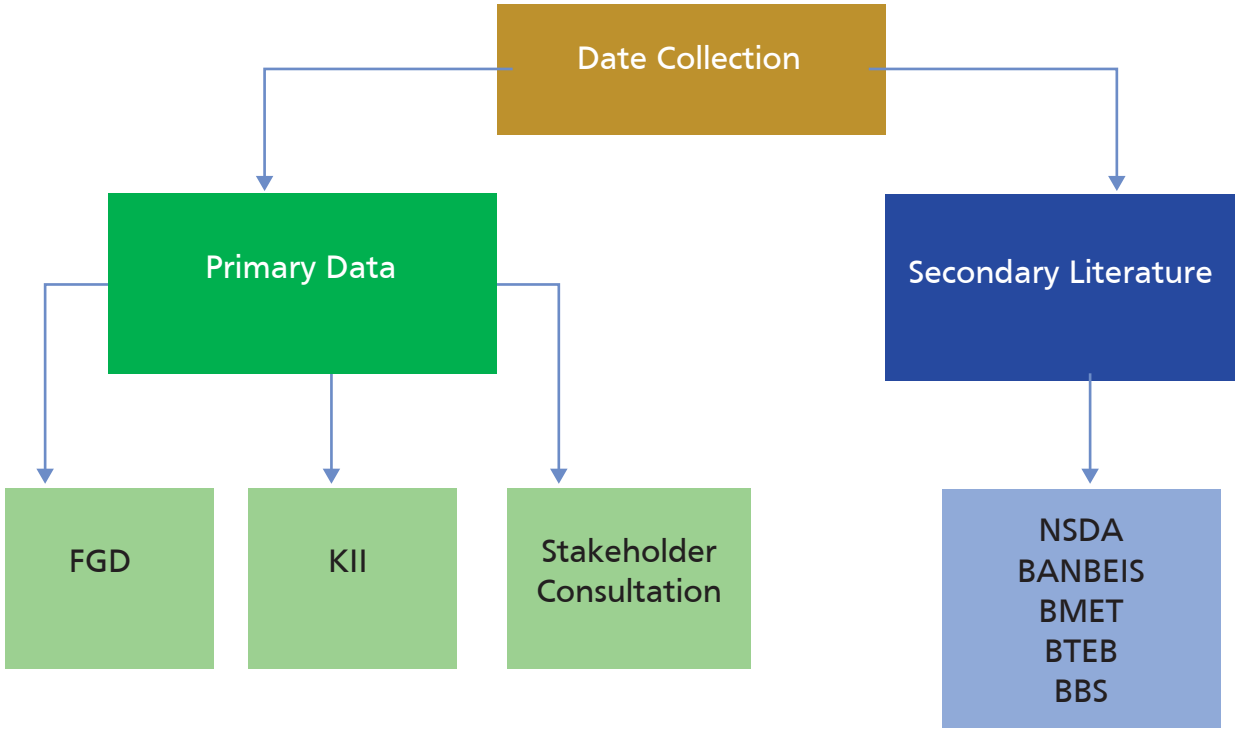

Figure 1: Summary of the Data Collection Approaches

4. Examining the current status of TVET and apprenticeship in Bangladesh

4.1 Levels of TVET in Bangladesh

In Bangladesh, formal TVET consists of Certificate level training, SSC (VOC), HSC (VOC), and Diploma courses (GOB, 2020). The courses are offered by Engineering Colleges, Polytechnic Institutes, Technical Schools and Colleges (TSCs), Technical Teachers' Training Colleges (TTTC), Technical Training Centers (TTC), and Vocational Teachers' Training Institutes (VTTI), Business Management Colleges, and other technical and vocational institutes. The Directorate of Technical Education (DTE), Bureau of Manpower Employment and Training (BMET), and the Bangladesh Technical Education Board (BTEB) oversee the four layers (Certificate level training, SSC vocational, HSC vocational, and Diploma) of formal vocational and technical education.

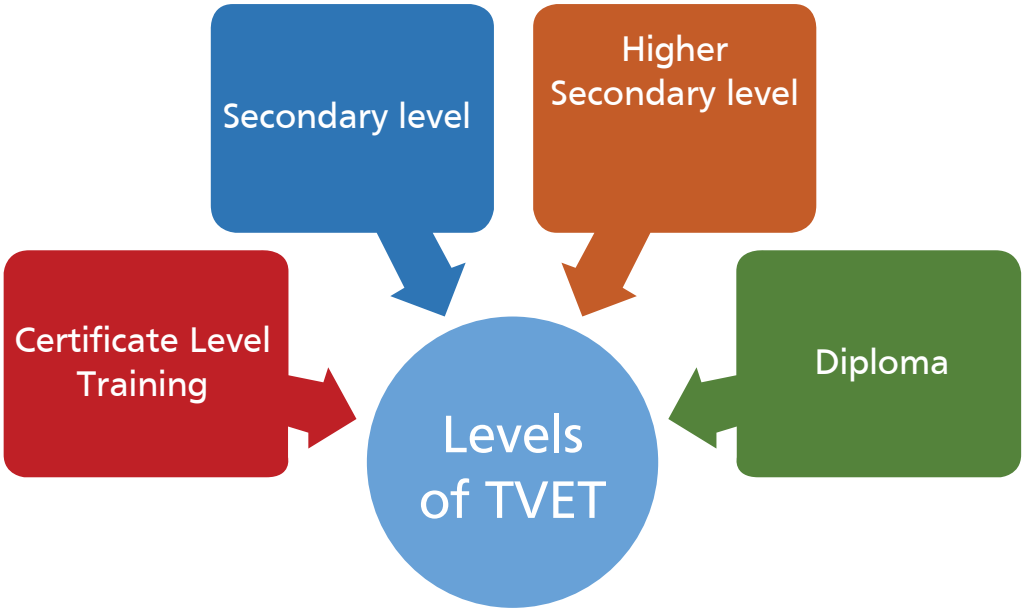

Figure 2: Levels of TVET in Bangladesh

Table 2 presents various areas of study with specialization in the vocational institutes. As found in Table 2, technical and vocational education in Bangladesh is provided for a period ranging from four years of diploma to three months of basic level training on the Bangladesh National Qualifications Framework (BNQF). Figure 4 outlines the various skills education and training levels per the BNQF. Taking all types of institutions that deliver vocational education and training, they provide education and training in 317 specialized areas (BTEB, 2019).

Table 2: Trades of Technical and Vocational Education in Bangladesh

Duration of study	Type/Area of study	Number of Technology/ trades/ Specialization
Four years	Diploma-in-Engineering	59
Three years	Diploma-in-Engineering	1
Two years	Diploma-in-Engineering	2
Two years	HSC and equivalent	21
Two years	SSC and Dakhil	62
Two years	Trade courses/Certificate Programs	4
One-year	Diploma	12
One-year	Certificate	57
Six months	Certificates / Diploma	2
Three/Six months	Certificate in NTVQF Basic	97
Total		**317**

Source: Authors' calculations based on BTEB (2019)

Figure 3: Trades of Technical and Vocational Education in Bangladesh

A two-year diploma is the least available study in the TVET programs. One-year diploma programs focus on technical education, vocational education, and medical ultrasound. Again, there is a 6-month long certificate course in medical ultrasound. Two/one-year certificate programs are specialized in marine trade, skills certificate, certificate in vocational education, health technology, poultry farming, animal health and production, national technical vocational qualification framework level II and level III, and advanced certificate course.

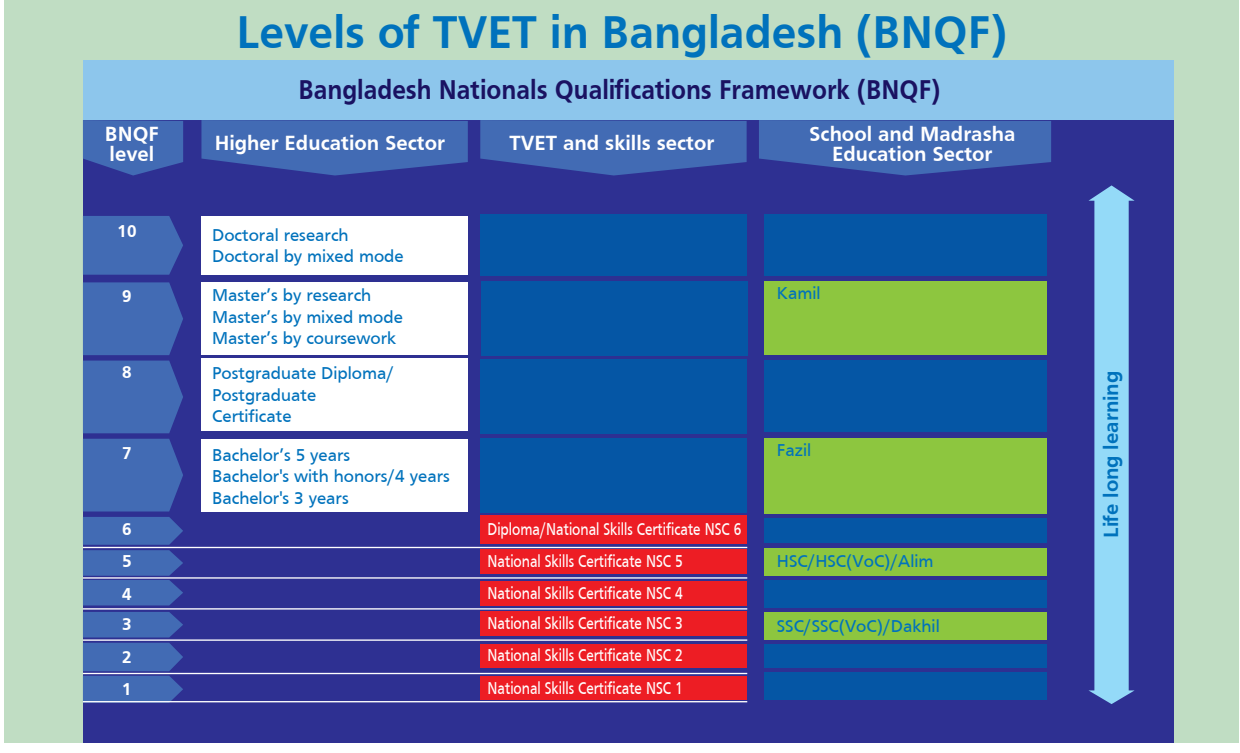

Figure 4: Trades of Technical and Vocational Education in Bangladesh

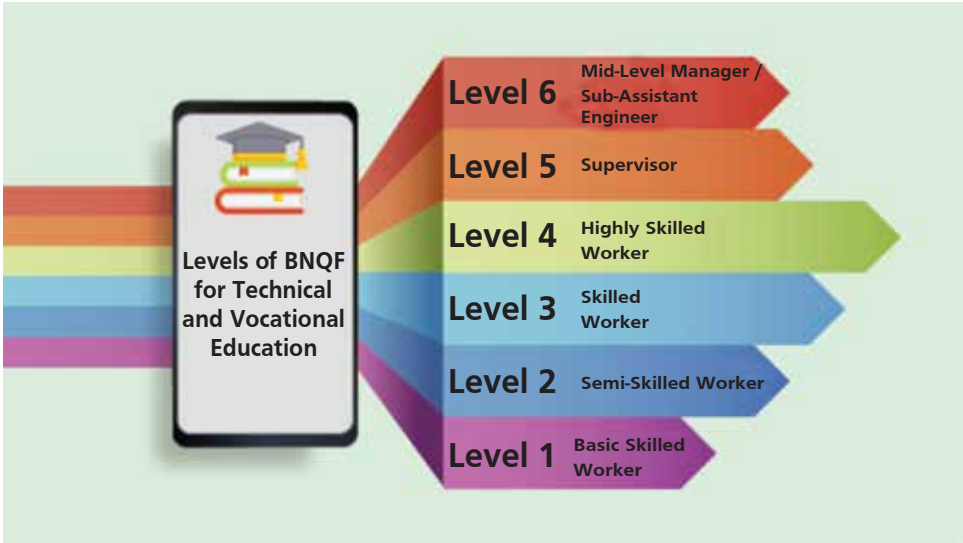

Figure 5: Levels of BNQF for Technical and Vocational Education

Data reveal that over 80 percent of the total registered students were enrolled under three areas, including 3/6 months' training on the basic level of NTVQF, SSC vocational, and HSC vocational in business management. It reveals that the certification process for technical and vocational education in Bangladesh still keeps parity with the general education system.

4.2 Growth of TVET in Bangladesh

The number of TVET institutions in the country doubled between 2011 and 2021 (Figure 6). Including the skills training centers that provide basic training, the number of institutes reached 11160 in 2021 (Table 3). Among them, 6,337 institutes provide SSC and HSC-level certifications parallel to the general education structure. The ratio of Public and Private TVET institutes decreased from 1:11 to 1:10. However, the capacity of Public TVET institutes is higher than that of Private institutes. Hence, the ratio of TVET students in public and private schools was 1:2 in 2021. The enrollment rate in TVET increased from 1% in 2009 to 16.1% in 2018 (GOB, 2021). Student enrollment increased from around 506,556 in 2011 to 1,164,880 in 2021 (Figure 8). For public institutions, this rise was 149,620 to 340,020. The rest were from private institutions. The ratio between students and teachers slightly decreased, from 22:1 to 21:1. However, NEP 2010 suggests that this ratio should be around 12:1.

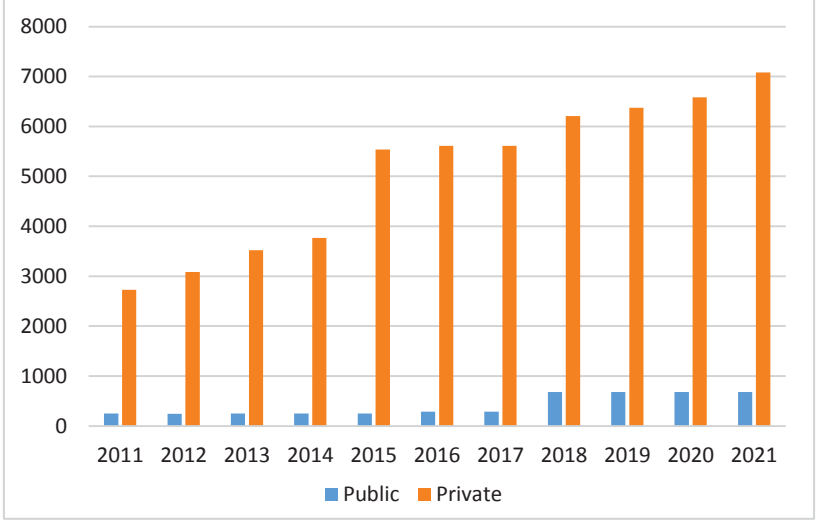

Figure 6: Number of TVET Institutes

Table 3: TVET Capacity by Institution Type

TVET Capacity by Institution Type

Type of Institute	No. of Institutions
Basic Trade (360hrs)	3223
Technical School & College	304
Technical Training Centre	208
Industry Specific VET (Textile, MATS, Medical, Marine, Agriculture, Graphics and arts, Survey)	609
S.S.C Vocational	2975
HSC Voc/B MT	3362
Polytechnic Institute	478
Glass & Ceramic Institute	1
Total (without Skills Training Providers)	7937
Total (with Skills Training Providers)	11160

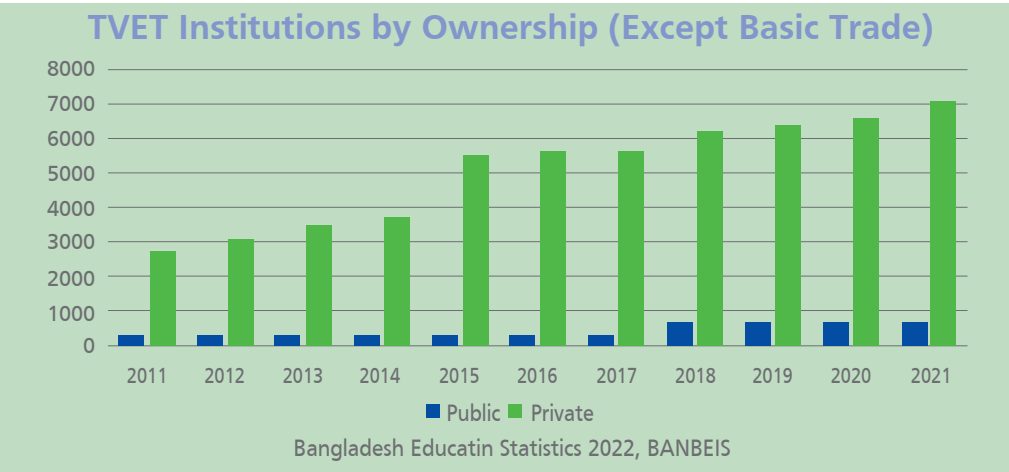

Figure 7: TVET Institutions by Ownership (Except Basic Trade)
Source: DTE, 2020

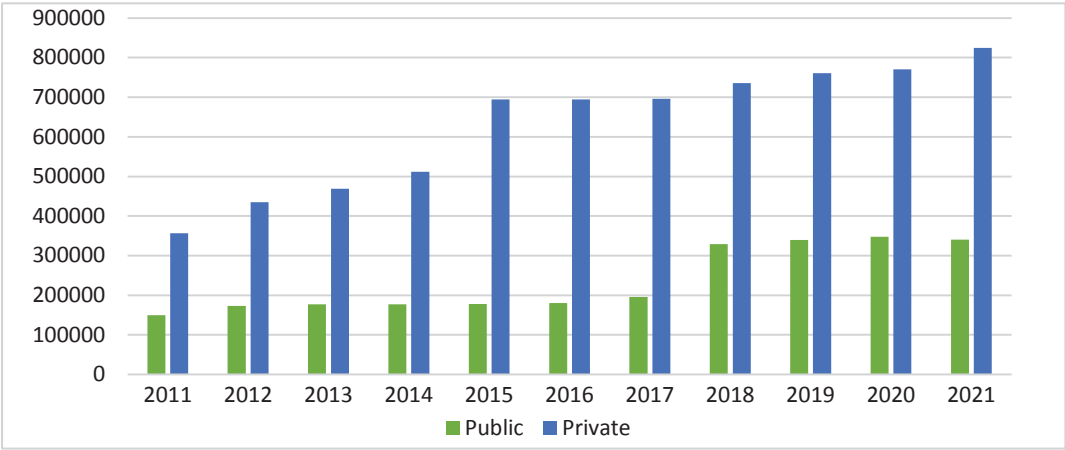

Figure 8: Number of TVET Students
Source: DTE, 2020

Table 4: List of Private and Public Institutes based on Sector, Level, and Area

Public TVET Institutes	Private Training Institutes
Polytechnic Institutions: 52	Polytechnic Institutions: 387
Tech. School & college: 73	Tech. School & college: 152
Glass & ceramic institute: 1	Glass & ceramic institute: 0
Tech. Training Centre: 68	Tech. Training Centre: 98
Graphic Arts Institute: 1	Graphic Arts Institute: 0
Survey Institute: 2	Survey Institute: 2
Textile Institution: 10	Textile Institution: 23
Textile vocational: 41	Textile vocational: 10
Agriculture training Institute: 13	Agriculture training Institute: 170
Marine Technology: 1	Marine Technology: 0
SSC vocational (Independent): 11	SSC vocational (Independent): 211
HSC vocational/BM (Independent): 10	HSC vocational/BM (Independent): 830
Medical Technology: 15	Medical Technology: 97
Medical Assistant Training Centre: 11	Medical Assistant Training Centre: 200
SSC Vocational (Attached): 197	SSC Vocational (Attached): 2556
HSC Vocational (Attached): 172	HSC Vocational (Attached): 234
Total number of institutes = 678	**Total number of institutes = 7083**

Source: BANBEIS, 2021

Figure 9 shows the total number of students enrolled in TVET in different trades. From the chart below, it is found that the largest portion of total enrolled students was in the HSC (BM), which was 4,66,306 (5.50%); the second highest portion was in SSC (Vocational) & the number was 3,96,555 (4.68%); in Diploma-in-Engineering the number was 3,61,086 (4.26%); in Basic Trade (360 Hour) the number of total students enrollment was 2,15,790 (2.58%); two lowest sectors was HSC (Vocational) & Dakhil (Vocational), where the number of total students enrolled was 14,661 (0.17%) & 8,832 (0.1) respectively (DTE, 2020).

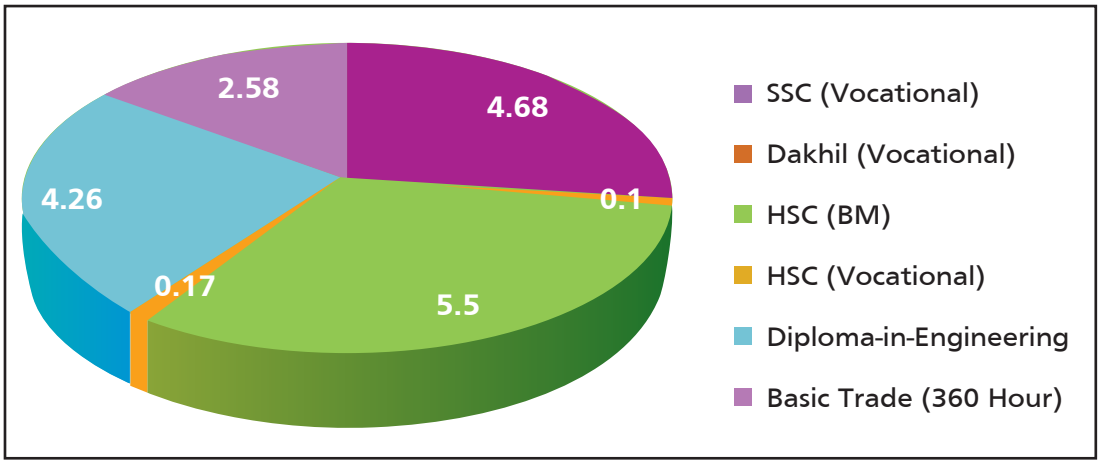

Figure 9: Number of Total Students Enrolled in TVET (2020)
Source: DTE, 2020

4.3 Gender Distribution of TVET Enrollment

Enrollment in TVET programs is still substantially lower than in general education in Bangladesh, where female enrollment is much lower and poorly escalating. However, female participation in skill development training is a time-based, market-responsive demand in Bangladesh. According to Bangladesh Education Statistics 2021, there are 7,761 public & private institutions, and the total enrolled students in 2021 was about 11,64,880. Among them, female enrollment was about 3,16,060, which is 27.13% of the total enrolled students. The total number of teachers was about 54,942, of which 11,269 were female, constituting 20.51% of the total number of teachers (BANBEIS, 2021). In 10 years, female students' enrollment increased by only 1.31% (BANBEIS, 2021). Table 5 clearly shows female student enrollment in TVET institutes. In the table, the enrollment has been categorized by institute type. Table 4 shows that in 2021, female student enrollment in Medical Assistant Training School (MATS) was the highest, about 42.83%, and the lowest enrollment was noticed in Glass & Ceramic Institute, which was only 3.17% (BANBEIS, 2021). Moreover, Figure 10 shows the female enrollment position in public and private institutions based on the enrollment number from 2011 to 2021 (BANBEIS, 2021). The target enrollment under the 7th Five-Year Plan was 40%. However, the actual ratio of enrollment was much lower than the target. Though the number of institutions and registered students has risen during the last decade, the target of female enrollment is yet to be achieved.

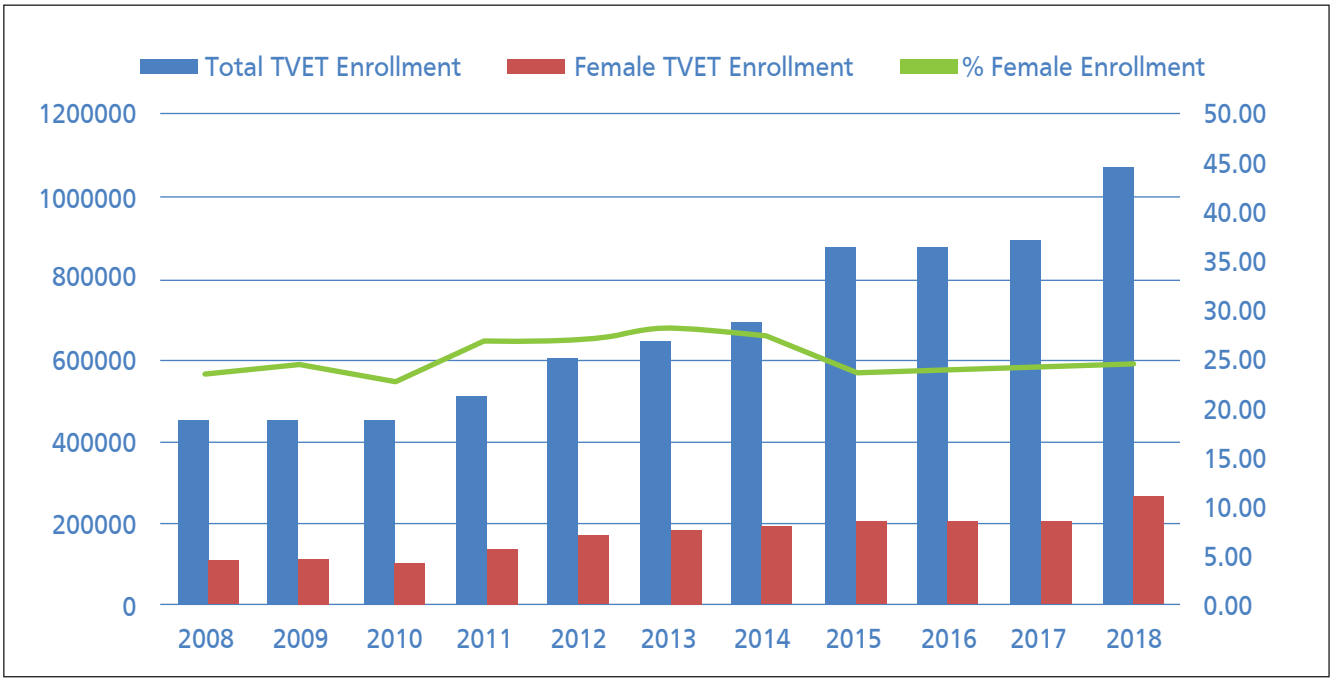

Figure 10: TVET Enrollment by Gender

Figure 11 shows the number of female teachers in TVET compared with the number of male teachers and the total number of teachers in TVET education. The total number of female teachers in TVET in 2021 was 11,269, 20.51%, and male teachers were 43,673, 79.48%, total teacher count in TVET education in 2021 is 54,942. (BANBEIS, 2021).

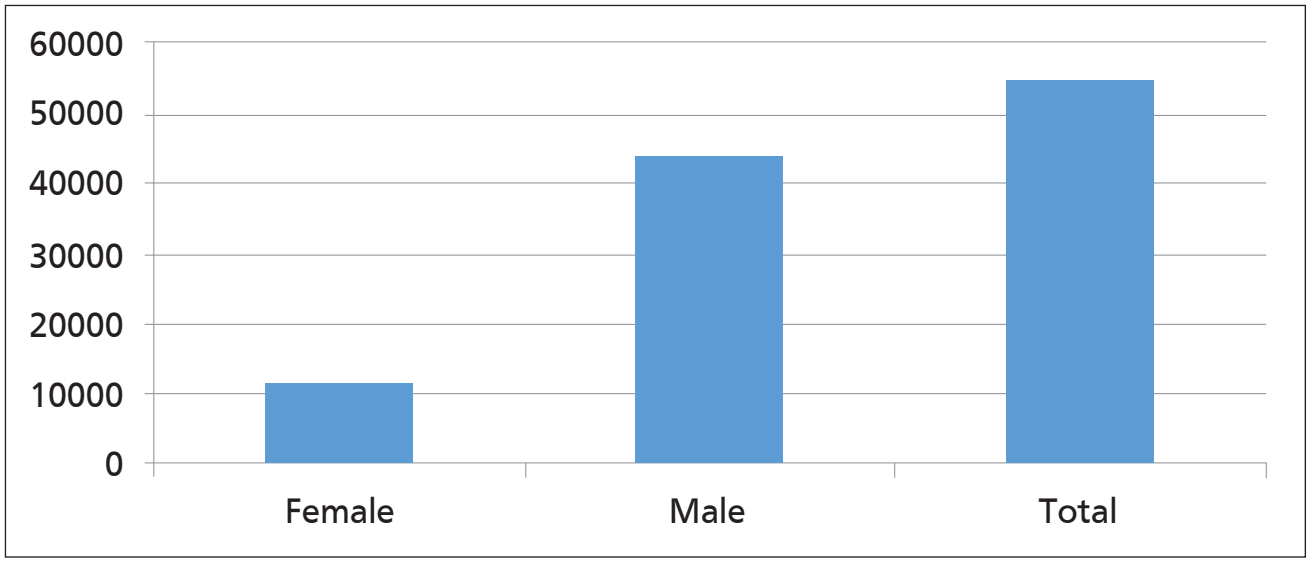

Figure 11: Number of Teachers in TVET
Source: BANBEIS, 2021

Table 5: Institute-Wise TVET Female Enrollment

Type of Institute	No. of Institutes	Students		
		Total	Female	% of Female
Polytechnic Institute	439	257095	43180	16.8
Technical School & College	225	114226	22824	19.98
Glass & Ceramic Institute	1	978	31	3.17
Graphic Arts Institute	1	1397	187	13.39
Survey Institute	4	1306	101	7.73
Technical Training Centre	166	39718	13610	34.27
Textile Institute	33	12134	1058	8.72
Textile Vocational	51	10852	2536	23.37
Agriculture Training Institute	183	30454	8152	26.77
Marine Technology	1	535	55	10.28
S.S.C Vocational (Independent)	222	48517	14024	28.91
HSC Voc/B. Management (Independent)	840	185974	58613	31.52
Medical Technology	112	27880	10444	37.46
Medical Assistant Training School (MATS)	211	31042	13294	42.83
SSC Vocational (attached)	2753	231620	77181	33.32
HSC Voc/B. Management (attached)	2519	171152	50770	29.66
Total	**7761**	**1164880**	**316060**	**27.13**

Source: BANBEIS, 2021

4.4 TVET and Physically Challenged Students in Bangladesh

In Bangladesh, 3.2 million young people with disabilities lack the skills necessary to find employment (ILO, 2017). Under the Technical and Madrasa Education Division (TMED), Ministry of Education, the DTE has carried out several steps in collaboration with the International Labour Organization (ILO) to make its 118 TVET institutes disability inclusive. This guide overviews DTE's approach to disability inclusion and offers practical advice that other departments and ministries can potentially follow and replicate (ILO, 2017).

Table 6: Category-Wise Total Number of Enrollment for Physically Challenged Students

SL	Category	Enrollment in TVET
1	Autism	8
2	Physical	280
3	Mental illness leading to disability	8
4	Visual	39
5	Speech	50
6	Intellectual	10
7	Hearing	28
8	Deaf-Blindness	4
9	Cerebral Palsy	1
10	Down Syndrome	0
11	Multiple	6
12	Other disability	12
	Total	**446**

Source: DTE, 2021

4.5 TVET Authorities in Bangladesh

4.5.1 Bangladesh Technical Education Board (BTEB)

As an autonomous organization, the Bangladesh Technical Education Board (BETB) plays the principal role in developing technical education in Bangladesh. BTEB is the regulatory board for monitoring and developing technical and vocational education at the secondary level (SSC), 2-year higher secondary level (HSC/Vocational), 4-year Diploma in Engineering degree, and 4-year Diploma in Medical Technology degree throughout Bangladesh through setting the curriculum, developing learning material, affiliating grants, governance of admission, conducting examination and awarding diploma certificate. There are 10,452 institutes operated under BTEB; among those, 1 Technical Teachers Training College, 1 Vocational Training Institute, 49 Polytechnic Institutes, and 64 Technical Schools and Colleges are noteworthy (BTEB, 2020). Currently, there are 19,693 teachers and about 13, 87,691 students (BTEB, 2021).

Table 7: TVET Authorities in Bangladesh

TVET Authorities	Formed	Regulating Bodies
BTEB	1969	Ministry of Education
BMET	1976	Ministry of Expatriates' Welfare and Overseas Employment
NSDA	2019	Development & Social Welfare Prime Minister's Office
DTE	1960	Ministry of Education

4.5.2 Ministry of Expatriates' Welfare and Overseas Employment

One of the important functions has been carried out by the Bureau of Manpower Employment and Training (BMET), a government department, to meet the skill requirement of the manpower and to export the manpower of Bangladesh. BMET was established in 1976 under the Ministry of Manpower Development and Social Welfare. There are 37 Technical Training Centers (TTC) positioned in different districts in Bangladesh. The TTC offers many training courses under BMET according to the skill gap of labour. Currently, there are two years, one-year, six months, and three months training courses in TTCs. BMET has 2,692 employees and 2,85,702 trainees trained by 244 trainers and assessors in 2020-2021 (Alam, 2022).

4.5.3 The National Skills Development Authority (NSDA)

National Skills Development Authority (NSDA) is a Bangladesh government agency under the Prime Minister's Office responsible for developing policies to build a skilled labour force. NSDA was formed in 2019, formally known as the National Skills Development Council in 2008, by the National Skill Development Authority Act 2018. The main activities of NSDA are to develop policy, action plan, strategies, and guidelines, forecast the demand for skilled labour in the domestic as well as the overseas job market, analyze the skills gap, produce and promote demand-based training curricula, register skills trainers and institute, monitor the quality of skill development training programs, assess and certify the trainees, developing and strengthening of Industry Skills Council (ISC), create awareness on skill training, etc. From 2019 to 2022, NSDA has registered 13 ISCs, developed 139 competency standards, registered 319 skills training providers, and assessed 1708 trainees as 'competent'(National Skills Portal (NSP), 2022).

4.5.4 Directorate of Technical Education (DTE)

The Directorate of Technical Education (DTE) operates under the Department of Technical Education and Madrasah Education Division of the Ministry of Education, Bangladesh. Since 1960, DTE has been developing skills by widening its operation nationwide. DTE has set for and performed four functions: first, managing human resources; second, developing activities; third, supervising academic programs; and fourth, connecting with domestic and international organizations related to technical education. DTE operates 189 education institutions and offers three teaching programs, i.e., certificate, diploma, and degree levels. 114 Technical Schools and colleges (TSC) and one Vocational Teacher Training Institute (VTTI) operate the certification-level training program. DTE offers diploma-level education from 49 polytechnic institutes and degree-level education from one technical teachers' training college and four engineering colleges (Directorate of Technical Education, 2022).

5. Policy Frameworks Governing TVET in Bangladesh: Analysing existing policies, guidelines, and regulatory frameworks governing TVET and apprenticeship

Bangladesh enjoys a population dividend and has maintained high-economic growth for over a decade. The total labour force in the country stood at 63.5 million in 2017, a rise of 6.8 million from 2010 (BBS, 2018). In 2017, 43.5 million were male and 20 million were female in the country's total labour force. Employment by Industry shows 40.6% in agriculture, 20.4% in industries, and 39% in service sectors. Taking males and females together, the youth labour force aged 15-29 years was 20.1 million. Considering the change in economic structure, industry and service sectors will require a huge number of skilled workers to sustain economic growth (ADB, 2015). At the same, agricultural modernization in the country and technology adoption in the agricultural sector require more skilled workers. But, until now, employers have struggled with an inadequate supply of skilled workers in the country (World Bank, 2007). However, Bangladesh has yet to capitalize on the full potential of its young labour force due to the low level of skills of a large population. Besides, there are 52.3 million people who are 0-14 years old who will gradually enter the labour market (BBS 2018). Despite having abundant human resources, Bangladesh lags behind its Asian neighbours and trade rivals in terms of quality of labour and, therefore, labour productivity (GOB, 2015). The share of the population with formal technical and vocational education and training (TVET) qualifications is very small. Its skilled labour pool is too small and narrow to fulfill its industries' demands (ADB, 2015). The Labour Force Survey 2017 revealed that 30.6% of the population aged 15 or older had no education, 22 % had only primary education, and 35% had only secondary education, indicating a deficient skilled labour force (BBS, 2018). Technical and vocational education has received less attention in Bangladesh (GoB, 2015). Under this backdrop, various strategic documents of the country, including National Education Policy -2010, National Skills Development Policy – 2011, and the 7-8th Five-Year Plan, envisaged the expansion, diversification, extension, and development of technical and vocational education programs.

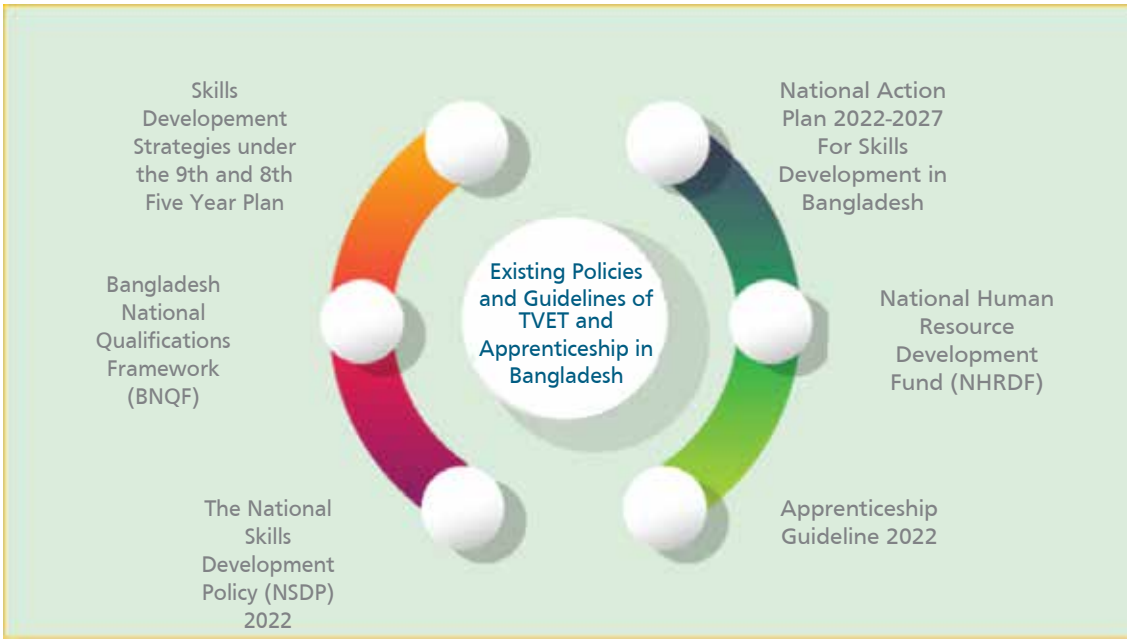

Figure 12: Policies Undertaken for Strengthening the TVET Program & Their Primary Concern

Table 8: Existing policy instruments and its primary concerned for Strengthening the TVET Program & Their Primary Concern

Policy Instruments	Primary Concern
NSDP 2022	The prime activities of the NSDP include developing action plans and strategies, forecasting the demand for skilled labour in domestic and overseas job markets, identifying skills gaps, promote Public-Private Partnerships (PPPs) in TVETand developing demand-based training programs.
BNQF	The aim is to ensure the skill outcomes remain relevant and nationally consistent. It also supports flexible skill linkages and pathways, enabling national and international portability and comparability.
8th Five-Year Plan (2020-2025)	The plan enhances TVET quality through curriculum modernization, competency training, and public-private partnerships, prioritizes digital skills for the Fourth Industrial Revolution (4IR), and promotes equitable access and entrepreneurship for economic diversification.
National Action Plan 2022-2027	The focal point of this plan is to ensure the development of a demand-driven skill ecosystem through research and development, industry attachments, and governance of the skill ecosystem.
NHRDF	NHRDF is a strategic initiative aimed at enhancing the skills and competencies of the workforce in the country.
Apprenticeship Guideline 2022	The main objective of the Apprenticeship Guideline 2022 is to introduce people to the work environment, develop their skills, reduce unemployment, and increase productivity.

5.1 The National Skills Development Policy (NSDP) 2022

National Skills Development Policy (NSDP) 2022 provides a thorough vision for skills development across various sectors in Bangladesh. This policy also provides a framework to improve the coordination and delivery of skills training, involving multiple stakeholders such as the government, industry, workers, civil society, the private sector, non-profit organizations, and NGOs. The NSDP 2022 integrates major government policies such as the Education Policy of 2009, the Non-Formal Education Policy of 2006, the Youth Policy of 2003, the National Training Policy of 2008, and the NSDC Action Plan of 2008. One of the key activities of the NSDP is developing action plans, forecasting the demand for skilled labour in both domestic and overseas job markets, identifying skills gaps, and developing demand-based training programs. For such efforts, it is evident that the NSDP 2022 initiated the TVET reform project, which the ILO and European Union funds support.

5.2 Bangladesh Nationals Qualifications Framework (BNQF)

The Bangladesh National Qualifications Framework (BNQF) is a comprehensive system designed to develop, classify, and recognize skills, knowledge, and competencies in Bangladesh. The main objective of BNQF is to enhance and streamline the education system in Bangladesh by providing a clear, nationally recognized definition for higher education qualifications, ensuring consistency and equivalence across different sectors. This framework facilitates distinguishing qualifications nationally and internationally, clarifying learner-entry and exit points, and defining progression

routes. BNQF is also aligned with the support of national lifelong learning policies, promoting continuous education and skill development. This framework is also regarded as an internationally benchmarked instrument because it covers global standards, aligns with International Qualifications Frameworks, and includes international competencies and skills.

5.3 Skills for Employment Investment Program (SEIP)

Another significant initiative is the Skills for Employment Investment Program (SEIP) under the Ministry of Finance (funded by ADB and the Government), which has partnered with several industry associations such as BASIS, BTMA, BGMEA, AEOSIB, and others to impart vocational training with globally recognized skills certifications where appropriate.

5.4 Skills Development Strategies under the 8th Five Year Plan

The Five-Year Plan is one of the key strategic documents that put the country's development roadmap. The 8th Five-Year Plan (FY 2020- FY 2025) has placed a greater emphasis on expanding technical and vocational education to meet the changing demands of the labour force in the economy. The key strategies relating to TVET programs are the following:

- **Diversifying Technical and Vocational Education Programs** to emphasise meeting the technical manpower needs in emerging technologies (e.g., Fish Production, Leather, Textile, Mechatronics, etc.) reflects the plan's priority of improving program quality through curriculum modernisation. This aligns with the plan's goal of integrating digital skills and competencies to prepare the workforce for evolving industries.
- **Emphasizes Women's Participation in TVET** to promote women's participation in TVET aligns with the plan's objective of ensuring equitable access to education and training. It emphasises empowerment, equality, and gender equity, which are critical for achieving inclusive economic growth.
- D**evelop and Modernize TVET Institutions** using available Indigenous technologies to support the plan’s focus on upgrading infrastructure and enhancing the quality of training to meet the demands of a fast-changing economy, especially in rural areas. This effort is aimed at poverty alleviation and reducing rural-urban migration.
- **Encouraging Private Sector Involvement** in delivering TVET programs aligns with the plan’s strategy of strengthening Public-Private Partnerships (PPPs). This collaboration is essential for improving industry linkages and ensuring that training is relevant to market needs.

Table 9: Government Initiatives for Skills Development During 9-8th

Policy Instrument	Objectives and Strategies
National Skill Development Authority Act 2018 (NSDA)	The NSDA aims to create a cohesive strategy for skills development in Bangladesh, ensuring effective coordination among various institutions and stakeholders involved in skills training. A key focus of the NSDA is to provide targeted support to disadvantaged groups with specialized needs, facilitating their access to education and training opportunities. This initiative underscores the government's commitment to inclusivity and empowerment in the workforce.
Industry Skill Councils (ISC)	ISC provides linkages between industries and TVET institutions. By bringing workers, employers, and the Government together, ISCs improve the skills development system. There are 12 ISCs in Bangladesh. The functions of the ISCs are as follows: a) Introducing skills training institutions to the latest employment and technology trends, b) Improving social dialogues to encourage public-private-donor partnerships, c) Increasing the efficacy of the skills data system to strengthen the industry's role in data collection and ensuring the demand side data is correct.
National Skills Development Authority (NSDA)	Currently, multiple institutions are providing the same skills training while much-needed niche skills are being provided by no or not enough institutions. To deal with these challenges, the National Skills Development Authority (NSDA) has been established. NSDA is one of the major players in improving the coordination of skill development across Bangladesh. NSDA is working on ensuring the efficacy of the public institutions in using resources and implementing arrangements to facilitate private training providers to access public facilities to enhance the scope of skills training.
Competency Based Training and Assessment (CBT&A)	This training material is designed to develop a system to deliver demand-driven training, primarily through encouraging private sector industry partnerships with training institutions. Therefore, the industry is expected to increase its engagement and support of training institutions so that programs and graduates are more likely to meet the needs of employers and their staff.

Source: BOB (2020)

5.5 Targets and Strategies under the 8th Five-Year Plan

Introduction of Pre-VOC and VOC in secondary-level education: Pre-VOC and VOC courses in different trades will be introduced so that students can complete their secondary-level education with some vocational skills. Even now, piloting has been completed in 640 schools, and all secondary-level students will be enrolled in such courses by 2023.

Improve the reputation of the TVET stream: In Bangladesh, the weak reputation of TVET largely prevents students' enrollment in different TVET streams, though those courses are job-centric. The first step would be introducing TVET courses from the primary level at a very early age.

Demonstrating a clear career path to the students and their families from TVET institutes to ensure course employability and improve the social acceptance of TVET education. In many developed countries, for example, Switzerland, more than two-thirds of students at age 16 start vocational education programs instead of pursuing full-time education. Students in Switzerland gain an early and direct understanding of the job market demands and can make better decisions for their future. With a more immersive experience, all students naturally consider both options (technical or higher education) midway through their secondary experience. When the time comes, they make an informed decision based on their relevant and practical experiences. This is an example of secondary-level education and TVET working in tandem in developed countries. A similar set-up will be introduced in Bangladesh, where students are encouraged to undertake internship/apprenticeship programs to learn computer technology and other hard skills. This will create a better and stronger linkage between industries, institutions, and students. Continuous communication will also facilitate the early detection of skills shortages and course revisions. Early exposure to the workspace will also change the mindset of students and their parents that it is not the particular education streams that provide degrees or a certificate but skills that allow one to perform well at a job.

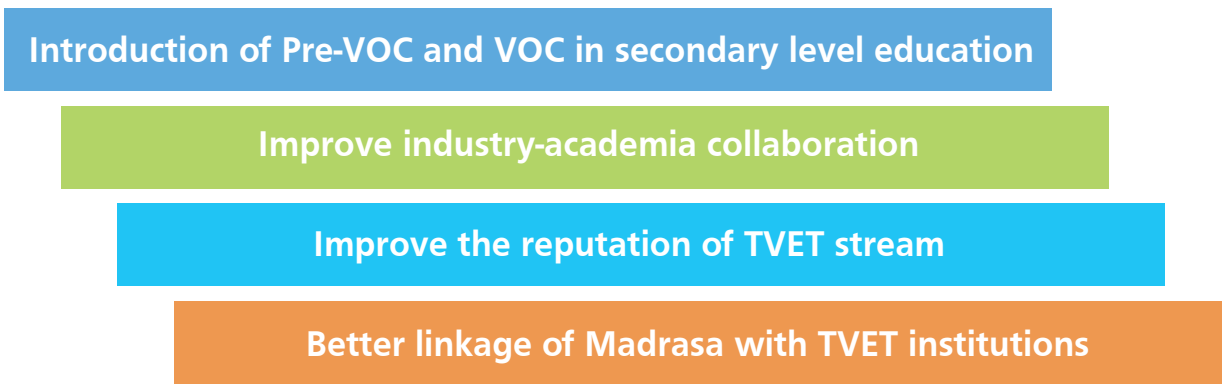

Figure 13: Four Main Strategies Undertaken by the 8 Five Year Plan

Improving industry-academia collaboration: Despite the importance of TVET education, some structural rigidities and lack of incentives limit the formal framework development for industry-academia collaboration. Fiscal incentives for industries, stipends for students, and recognition for TVET institutions for placing their students in enterprises will be adopted to overcome this. Bangladesh Labour Acts 2006 (amended 2013) states that all industries that employ at least 50 workers must have at least 10 percent of apprentices. To make this law effective, the 8FYP will incentivize the industries. Similar support for the TVET institutions will help them expand technical and vocational training to the local level. The Government will also provide subsidized training programs with employment counseling to attract youths to skill training programs.

Better linkage of Madrasa with TVET institutions: Studies have shown that many students from madrasa struggling at secondary-level education will have better earning outcomes if they switch to the TVET stream. TVET education can likely help many madrasa students who are less focused segments in developing economies such as Bangladesh. 8th FYP will introduce technical education at the Dakhil and Alim levels to popularize TVET in madrasa education to propel employability and economic development. Madrasa and TVET and will play catalytic roles in transforming the pedagogical architecture of the madrasa.

Table 10: Targets for TVET Under the 8th FYP

Indicators for TVET	2020	2021	2022	2023	2024	2025	SDGs goal
Teacher-student ratio	1:18	1:16	1:15	1:14	1:13	1:12	4
Student per institutions	171	160	165	161	156	156	4
Teacher per institutions	10	10	11	12	12	13	4

Source: GOB, 2020

5.6 Guideline for Apprenticeship in TVET

The apprenticeship program is a widely recognized tool for skill development where the industry actively participates by placing one or more people in primary and industrial training before joining any profession. The apprenticeship process was first introduced in 1850 in Bangladesh through the British Administration Act. Later, due to inadequate functionality, the new ordinance was introduced in 1962. Holding this thread, apprenticeship process-related instructions were added in the Bangladesh Labour Act 2006 Chapter XVIII. In Bangladesh, the legal framework of the apprenticeship journey is framed in Figure 14.

Figure 14: Four Main Guidelines for Apprenticeship in TVET

5.6.1 Apprenticeship Rules 1967

Though the Bangladesh Labour Act 2006 ("BLA") repeals the Apprenticeship Ordinance, 1962, it keeps in force the Apprenticeship Rules 1967 ("AR") so far as it does not contradict any provision of the BLA. The AR makes provisions for establishing a tripartite advisory committee ("Committee") to ascertain the training needs and recommends to the competent authority such measures as may be deemed necessary for the promotion of apprenticeship training either generally or in respect of a particular trade. In addition, the Committee is to advise the Government in matters relating to apprenticeship standards like minimum educational qualifications at the time of entry, syllabus, and durations of the courses, examinations, grades, and other issues that may be considered necessary.

According to The Bangladesh Labour Act 2006, chapter XVIII, 'apprenticeship' means a system of training in which an employer undertakes to employ a person and to train him or have him trained systematically in an apprentice able trade for a period the duration of which has been fixed in advance and in the course of which the apprentice is bound to work in the employer's service.

5.6.2 Bangladesh Labour Acts 2006:

- An employer is required to operate an apprenticeship program in his establishment and get the program registered with the competent authority if the establishment ordinarily employs more than fifty workers and has existed for more than two years.
- The government can form a tripartite advisory committee to advise the government and the competent authority on matters relating to an apprenticeship.

- At least one-fourth of the total number of persons employed in apprentice-able trades should get apprenticeship opportunities. In that case, disabled workers should get preference in nominating trainees as apprentices.
- Each apprentice should receive the normal working hours related to theoretical instruction of at least twenty percent of the total working hours.
- The government has taken some initiatives to encourage more industries to start apprenticeship opportunities in their organization. According to the Labour Art 2006:
- An employer doesn't have to pay income tax for expenses incurred while operating an apprenticeship program.
- The Government may grant the employers a license to import such goods or articles that the employers may need to operate an apprenticeship program.
- An employer can get all possible technical advice and guidance in all matters relating to the apprenticeship program from the competent authority.

5.6.3 Under the Bangladesh Labour Rule 2015,

- The age limit for each apprentice is from 17 to 30 years.
- Each employer must submit a list of apprentice-able trades in his undertaking, the number of persons employed, and the number of apprentices to be recruited by him within 30 days from the date a particular trade is notified as an apprentice-able trade.
- Moreover, the employer must submit an apprenticeship training program for his undertaking.
- Every employer can take tests of their employee, constructing a board of 5 members.
- If the apprentice cannot become eligible within three months of the apprenticeship program, the employer may provide notice of 7 days, or the employee can also provide notice to the employer of 7 days after doing the three-month apprenticeship program and end their relationship.
- The probationary period is three months.
- The stipend in the first year of apprenticeship has been set at 50% of the wages of a skilled worker of the grade engaged in the trade/occupation concerned, which will rise to 60% in the second year and 75% in the third year.
- If the apprenticeship training exceeds three years, after three years, the stipend is equal to the full wages of the skilled worker of the grade in the trade/occupation concerned.
- Working hours, leave, and holidays are the same as for workers employed in the undertakings and are regulated according to the relevant rules for the time being in force.
- Under the Labour rule 2015, each apprentice is provided with the necessary materials for his training free of cost.
- The employer must ensure proper and efficient supervision, direction, and control of apprentices.
- An apprentice may be transferred with the mutual consent of the employers concerned.
- Every employer is required to maintain a register of apprentices and an apprentice progress card.

5.6.4 Apprenticeship Guideline 2022

The Apprenticeship Guidelines-2022 were issued by the government working with ActionAid Bangladesh and a2i to supply a skilled workforce to domestic and international industries, increase industrial productivity, and enhance global competitiveness in Bangladesh. Numerous sectors are incorporated in this guideline, such as government, private, informal, autonomous, semi-autonomous, and NGOs , which make it comprehensive and inclusive.

Apprenticeship guidelines apply to organizations that have been established and operating for at least two years, with a minimum number of 50 employees. In this type of organization, there must be scope for at least five employees to get the apprenticeship opportunity. According to Apprenticeship guideline 2022, the apprentice must be a Bangladeshi citizen with a minimum age limit of 16 years. The minimum educational requirement is that the apprentice must have passed class eight or equivalent, according to NTCB. Organizations should have a committee of three to five members to select apprentices as suggested in the apprenticeship guidelines. If the age of the apprentice is below 18, then their legal parents should sign on behalf of the apprentice on the apprenticeship contract. For permanent workers, apprenticeship allowance for the first year will be 50% of their minimum wage level; for the second year, it will be 60%. The purpose of the Apprenticeship guidelines is to motivate students to participate in apprenticeship programs and to encourage the owners of any organization, institution, or factory to create and increase apprenticeship opportunities for the eligible work force of our country (Apprenticeship Guideline, 2022).

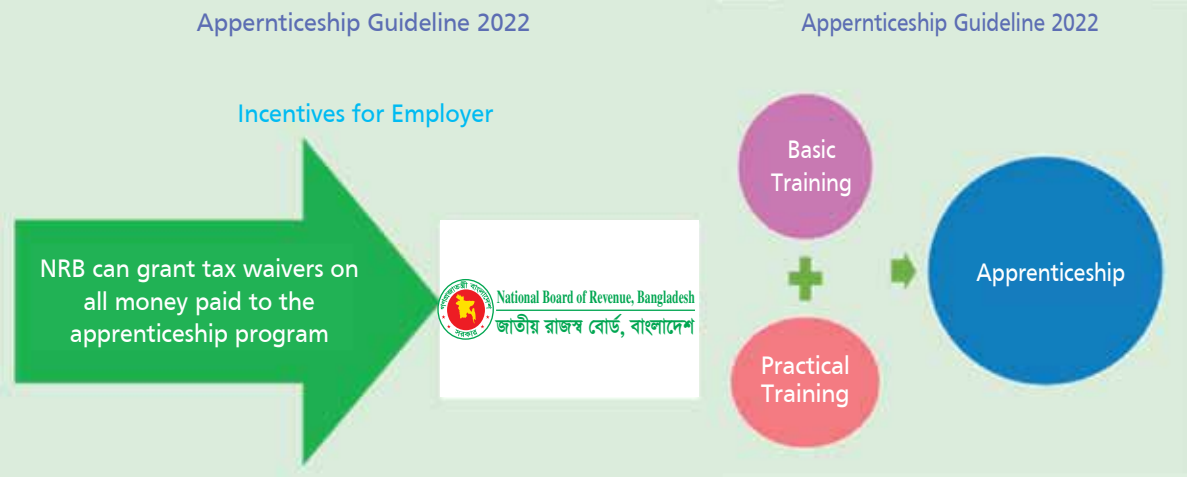

Figure 15: Training under Apprenticeship Guidelines 2022

Figure 16: Focus Areas of Basic and Practical Training of an Apprentice

Figure 17: Salary for Apprentices

Figure 18: Certification of An Apprentice

6. Challenges of TVET and Apprenticeship Program in Bangladesh

The TVET system has prevailed in Bangladesh for a long time, and a series of policy initiatives have been designed to strengthen it. The number of institutions and the enrollment rate have grown over the years. Nonetheless, the TVET system in Bangladesh suffers from some fundamental shortcomings that limit the ultimate success of TVET education. Some key challenges are highlighted below:

- **Multiple Institutions Provide the Same Skills Training while the Absence of Niche Skills Needed by the Industry**

TVET providers are far behind in international standards, certification, and quality assurance. Due to inadequate budgets and coordination, multiple TVETs provide similar training skills that overlap. However, industries need niche skills that are specialized abilities or expertise in a particular area, which remain untouched by the TVET institutes. For instance, in the IT industry, niche skills can be anything from Cyber Security to Big Data analysis (BMET, 2022). There is no curriculum found in the TVET institute to develop such niche skills. Regarding varieties and focusing on niche skills, the TVET institutions in developed countries offer various courses to facilitate skill development; for example, TVET institutions in Germany offer 330 trades for skill development. They target both general abilities and niche skills under the skills development programs.

Agriculture, tourism, information technology, and manufacturing (including garments and textiles) are hindered by Bangladesh's lack of skilled workers. Moreover, environmental issues and climate change are also expected to create new skill demands (ILO, 2022). The mismatch between the curriculum of TVET programs and industry requirements in Bangladesh is mainly due to the provision of similar skills training across TVETs and the absence of training in niche skills. Consequently, the apprenticeship system is unable to function effectively and remains outdated. Moreover, formal and informal apprenticeship programs, which rely on traditional skill development methods, have been unsuccessful in developing niche skills among learners (ILO, 2022).

- **Absence of Close Location of TVET Institutions and Industry**

TVETs are pillars in facilitating the industrial transformation and development of the country. Wide geographical dispersion between TVET institutions and industries led to poor technology transfer and hence deployed inadequate practices of apprenticeship programs, poor skill development, and delays in employee placement. The practical knowledge of novices in particular sectors and a delay in employment at the workplace after training from the TVET are some of the factors for not developing the TVET institutions (Makworo & et al., 2013). This location gap also fosters some common problems, such as limited trade-specific skill awareness, lack of proper support from the trainers of TVET's institutions, poor industry-academia collaboration, demand and supply mismatch in the industries, etc.

- **Low Social Recognition and Appreciation of TVET**

To bridge the demand for jobs with the actual needs of society and industry is one of the critical challenges in TVET. Lack of motivation, no formal structure for appraisal of technical and vocational training in Bangladesh, lack of exciting tasks, etc., possess barriers that lead to a social stigma for TVET recognition and appreciation. Unfortunately, due to low acceptance and appreciation, there is limited growth in the apprenticeship system under the TVET. Industries expect necessary skills, while TVET institutions fail to formulate them in their apprenticeship system (Shrestha & Dangol, 2020).

- **Shortage of Qualified Trainers due to Lack of Apprenticeship Program**

There are insufficient specialized TVET instructors in most developing nations at the secondary and post-secondary levels. Most trainers also do not have regular or short-term endorsements into the workforce, allowing them to stay current with workplace technology and gain insight into the real practical needs of the labour market. The practical and industrial real-time knowledge could be used in lessons or shared with colleagues through peer mentoring (Maurer & Morshed, 2022). Moreover, the trainers took this training profession as a short-term career, mainly during the transition period. They opt out of this profession when they settle for a more reliable and permanent job. The abhorrence of the profession due to the lack of financial and social rewards in Bangladesh is the prominent cause for not selecting TVET training as a permanent profession. Moreover, there is no challenge for the TVET trainers in Bangladesh since the TVET curriculum has not been updated for a long time. Without an apprenticeship program, there is no synergy between the market demand and programs offered by TVET institutions. Therefore, trainers lack training in modern and updated technology and technical requirements (Maurer & Morshed, 2022).

- **Poor Infrastructure for Quality Training and Education**

The TVET institutions lack quality training and education due to poor infrastructure or curriculum. The absence of apprenticeship programs, lack of work-based learning programs with industries, limited or no collaborations with institutions in designing training, the obsolete curriculum in TVET programs, poor and inadequate technical equipment, scarcity of skilled trainers, etc., are the prevailing loopholes for quality TVET training and education in Bangladesh. As a result, such capacities lead to a flawed training system, hence the skill development in Bangladesh. Without the active participation of industries, technical and vocational institutions cannot surge the TVET education and training and upscale the skills for developing smart Bangladesh.

- **Lower Skill Creation Due to the Absence of an Apprenticeship Program**

Every institution needs hands-on learning materials, especially TVET, which requires hands-on learning experience. To get hands-on learning in TVET, a technical workshop of laboratories with newer, updated equipment and tools is mandatory. TVET institutions in Bangladesh have technical workshops and laboratories, but some are not fully updated or updated at all. However, a fully updated and well-functioning TVET workshop and laboratories require financial capabilities, physical properties, and soft skills. Therefore, in some TVETs, it has been found that some of the equipment is outdated enough to use or worn out and not fit for use at all and cannot be updated due to budget constraints. The respondents in FGD opined that the technological gap between industry and TVET is common everywhere and cannot be upgraded as per the industry requirement; therefore, the need for apprenticeship emerged (Arimonu, 2016). Due to the lack of apprenticeship and poor technological coverage, students cannot keep up with the modern tools used in domestic and international workplaces. As a result, Bangladesh failed to supply skilled workers to meet domestic and international skill demands.

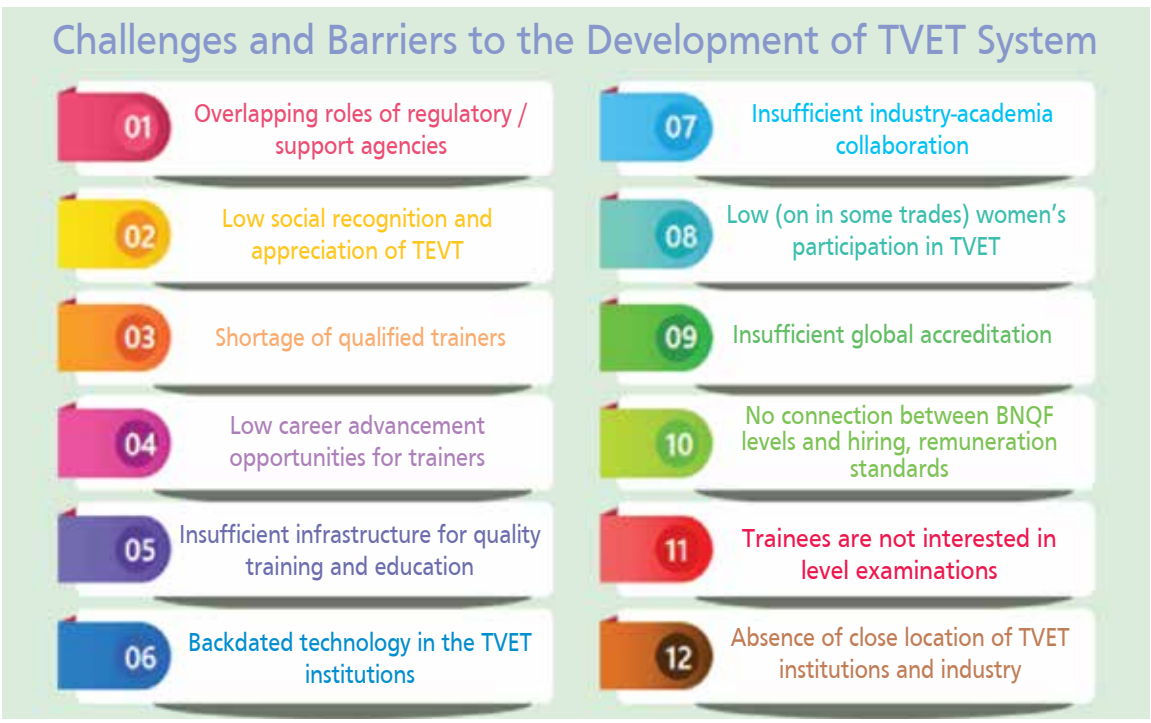

Figure 19: Challenges and Barriers to the Development of TVET System

- **Insufficient Industry-Academia Collaboration**

Cooperation with industries and educational institutions is becoming a significant concern in many developing nations, including Bangladesh. However, a plethora of studies suggest that the development of the technical skills of any country depends on the linkage between TVET institutions and industry in the form of industrial attachment. The biggest obstacles to this collaboration were a lack of initiative by TVET institutions, a slow response from the industries, and no mediator or moderation actively participating in making such linkage. In Bangladesh, the gap is widening between knowledge generated through the training systems of TVET and the skills demanded by employers. It is stated that the industry should provide contemporary skills by training and establishing networks with TVET institutions to minimize the gaps. Collaboration is also considered an important means that can be made on the highway to bridge the gap and enhance the employability skills of TVET people in Bangladesh (New Straits Times, 2012).

The apprenticeship system will not be effective due to the gap between industry-academia collaboration. The TVET curriculum should consider several means and modes of communication, such as Pinterest, Blogger, Facebook, and Skype. If the TVET students can communicate through a web-based mechanism, they can interact with the industries to connect their knowledge with practical things. Finally, the skills can be improved by watching, doing, and using trial and error rather than direct hands-on practice (New Straits Times, 2012).

- **Lack of Willingness of Employers to Hire TVET Graduates with Premium Wages**

TVET certificate holders are supposed to receive a premium salary. If employers strictly enforce their hiring practices for technical and non-managerial positions only to TVET certificate holders, it will raise the level of acceptance to prospective learners. For this, employers need to pay a higher wage/salary than non-TVET candidates.

- **Low (no in some trades) women's participation in TVET and Apprenticeship Program**

In developing countries, especially Bangladesh, the lack of social acceptance is why women can not work with men in technical and vocational jobs. Socio-cultural barriers and constraints, attitudes, gender stereotyping by parents and society, and lack of social safety and security promote the view that technical employment and training programs are exclusively preserved for males (Kitada & Harada, 2019). Moreover, the shortage of female-friendly structures (washrooms, common rooms, etc.) in training institutions and work station lack systematic positive action to counteract the present imbalance. Therefore, no female enrollment has been found in welding and plumbing technical skills training programs in different TTCs in Bangladesh. Moreover, early marriage or child marriage of female students also restricts their participation in TVET. Thus, apprenticeship programs for women in TVET are insufficient in Bangladesh, and these problems are eliminated.

7. Exploring Global Best Practices in TVET and apprenticeship

7.1 TVET System in Germany

The technical and vocational education system is prominently recognized for the role of the social partnership of employment, industrial, and economic policy in Germany (Moodie et al., 2019). TVET in Germany, among the most sophisticated and extensive in the world, plays a vital role in the German education system, for which the completion of upper secondary education in 2017

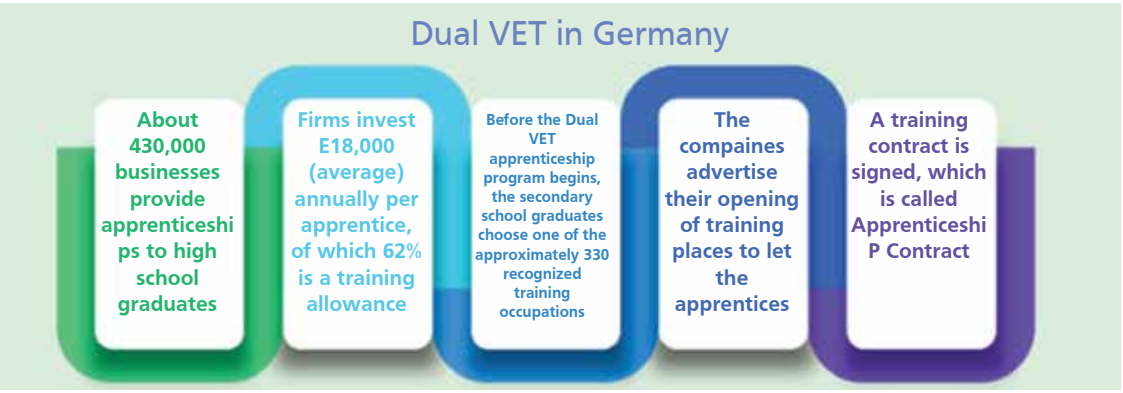

Figure 20: Dual VET in Germany

was 58% higher than the European Union's 47%. In this 4th industrial revolution, the sub-competencies skills also became a part of TVET (Schröder, 2019), applied by the dual system of TVET in Germany (BIBB, 2017). The dual apprenticeship system is based on robust coordination and trust among social partners such as employers, trade unions, and the Government, in which 70% is undertaken at work and 30% at school (Hippach-Schneider and Huismann, 2019). In some dual vocational programs, over half of Germany's high school graduates enroll yearly; German businesses and the government provide over 500,000 apprenticeships annually in all trades. About 52.4% of secondary school graduates in Germany enroll in Dual VET, where almost 1.3 million apprentices are trained in one of more than 330 legally recognized training programs(Hockenos, 2018). These are all recognized occupations regulated by the German states and are facilitated by graduates developed from the TVET dual apprenticeship program (Bundesinstitut für Berufsbildung, 2016). Such outcomes of TVET in Germany have been envisioned early by segmenting German education into academic and vocational (Figure 20) in comparing other countries, where 46% of upper-secondary pupils are enrolled in vocational programs (Rostamian, et al., 2019; UNESCO, 2019).

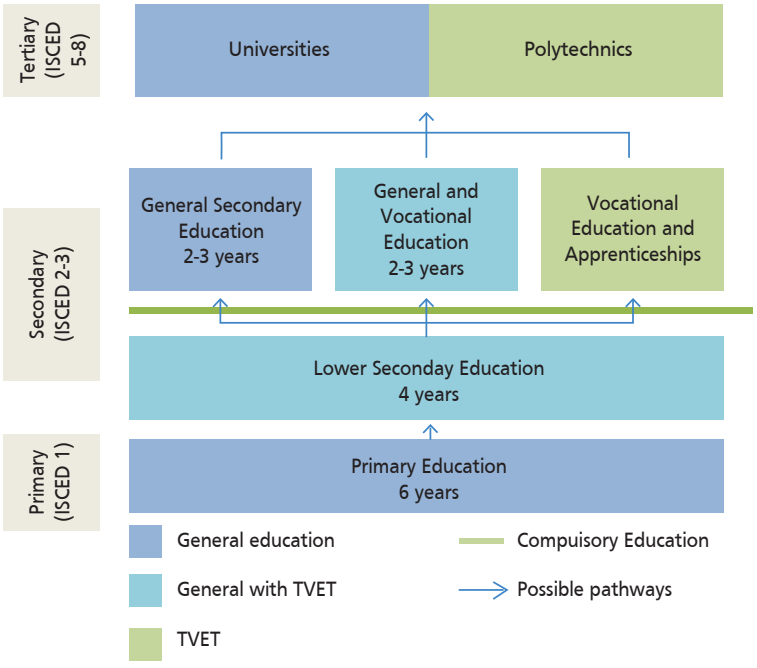

Figure 21: Education Structure of Germany Source: World TVET Database Germany, 2012

The TVET program in Germany is divided into two segments: formal and non-formal and informal TVET system. Formal TVET starts at the upper-secondary level after completing compulsory education. Approximately 33% of students opted for vocational training in the workplace or vocational school. The TVET program lasts 2-3 to 5 years, depending on the occupational choice. However, a 1-year foundation course of basic vocational training is offered either in full-time schooling or a dual system arrangement for preparing students for the higher level of vocational training. In the case of non-formal and informal TEVT offered by municipal institutions, especially by Adult Education centers (Volkshochschulen), private institutions, trade unions, various chambers of industry and commerce, political parties and associations, companies, and public authorities, family education centers, academies, technical colleges (Fachschule), professional academies, institutions of higher education and distance learning institutions.

7.1.1 How Does Germany's Dual VET System Work?

In Germany, approximately 430,000 of 2.1 million businesses provide apprenticeships to high school graduates, investing an average of €18,000 annually per apprentice, of which 62% is training allowance. As an alternative to four-year colleges and universities, dual VET enables a secure transition between secondary school and the job (Govet, 2020). The dual-VET structure is outlined in Figure 22. In the dual VET system, apprentices choose an apprenticeship course from alternatives based on the sector where they want to find work after completing their training (Ogawa, 2021). After announcing their desire to hire apprentices, firms and trainees engage in an apprenticeship agreement. The training period might range from two to three and a half years, depending on the topic of study or occupation. The apprentice receives a double VET certificate upon completion of the program and successful completion of the Independent Final Examination (BIBB, 2017).

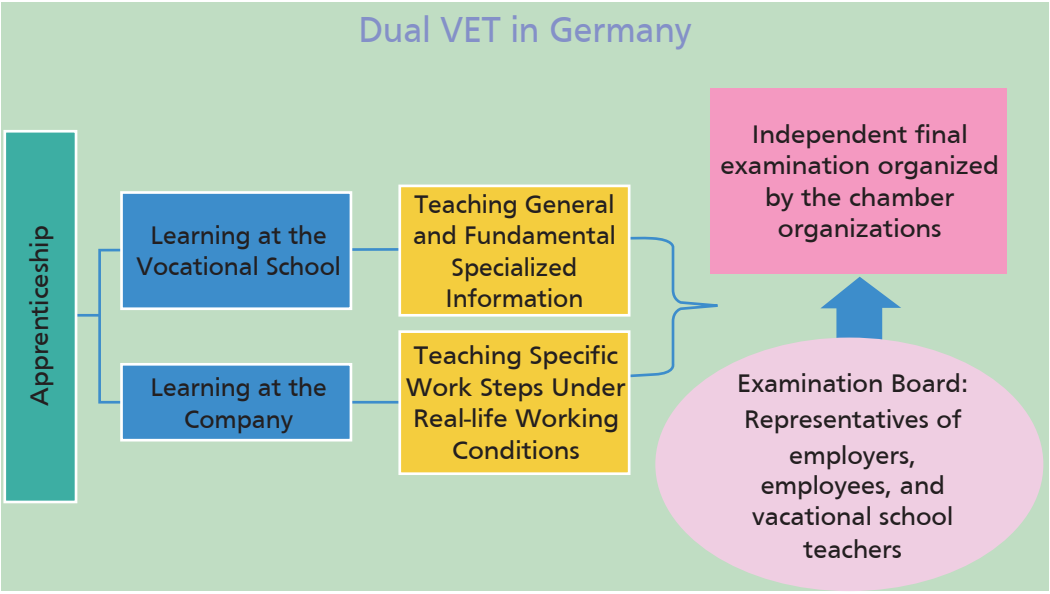

Figure 22: DUAL VET in Germany

7.1.2 Apprentices' Decision

Before the dual-VET apprenticeship program begins, the secondary school graduates get to decide on one of the approximately 330 recognized training occupations. At this stage, the secondary school leavers discover the ideal occupation that suits them perfectly, which they would like to pursue their career in the future.

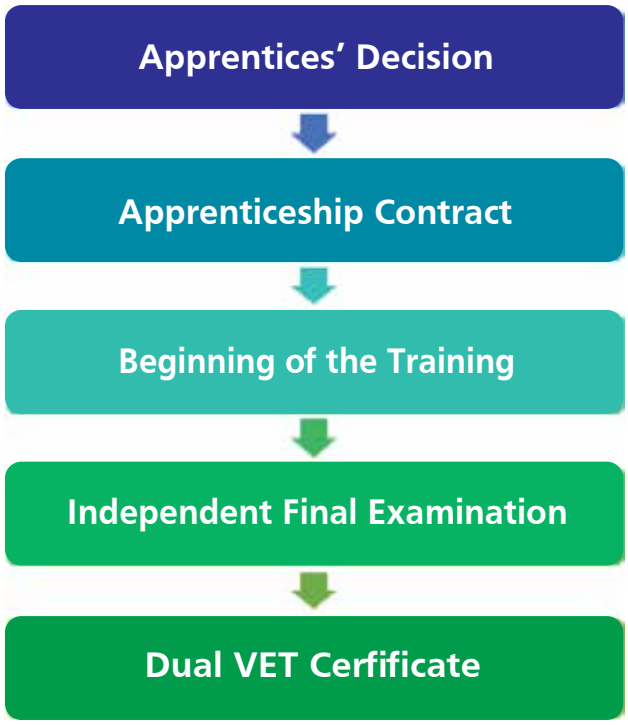

Figure 23: Dual-VET System Process
Source: (BIBB, 2017)

7.1.3 Apprentices Contract

The companies advertise their opening of training places to let the apprentices acquaint themselves with potential companies and the training they provide. After the trainees successfully apply to companies, a training contract is signed, which is called an Apprenticeship Contract (Directorate of Technical Education, 2022). The Apprenticeship Contract contains the most vital contents of the training, such as duration, learning content schedule, training remuneration, and holiday entitlements. While in the apprenticeship program, a trainee receives an average training allowance of about € 854 per month(Robert-Schuman-Platz, 2018), which increases every year of the apprenticeship.

Figure 24: Dual VET in Germany

7.1.4 Beginning of the Training

The trainee will learn on weekdays at two coordinated learning venues, i.e., the vocational school and the company(Charlotte Scobie, 2021). The vocational school focuses primarily on teaching general and fundamental specialized information, and specific work steps are learned in the workplace under real-life working conditions. The in-company training program is built upon the in-company training requirements specified by the internal training regulations. The trainees gradually assume more and more responsibilities and tasks at work, adding to the production in the process. Vocational school education, on the other hand, is based on the standards for vocational education listed in the framework curriculum for vocational subjects, which is generally classroom-based learning(Ogawa, 2021).

7.1.5 Independent Final Examination

The apprenticeship is concluded by a final exam conducted by the chambers. The trainees must demonstrate their skills in an independent final test after the training period required for the particular occupational profile. The independent final examination is organized by the chamber organizations, where the examination board is composed of the representatives of employers, employees, and vocational school teachers(Alaluddin, 2022). The examination board assesses and grades the trainees. After passing the final exam, apprentices who complete their training are awarded a chamber certificate (or a journeyman certificate in the case of a craft trades occupation). This attests to their presence of employability in a profession recognized by the government. The chamber organizations issue the dual VET certificate and are nationally recognized by the government(Gfrerer, 2019).

7.1.6 Some Important Statistics of TVET in Germany

Over 60% of German high school graduates enroll in TVET courses, according to the German Federal Institute for Vocational Education and Training (BIBB). Over 7 million people enrolled in TVET programs in 2019, with over 4 million doing so under the dual system. Additionally, compared to those with just a general education, more than 85% of dual-system graduates find jobs within three months of graduation(Govet, 2020).

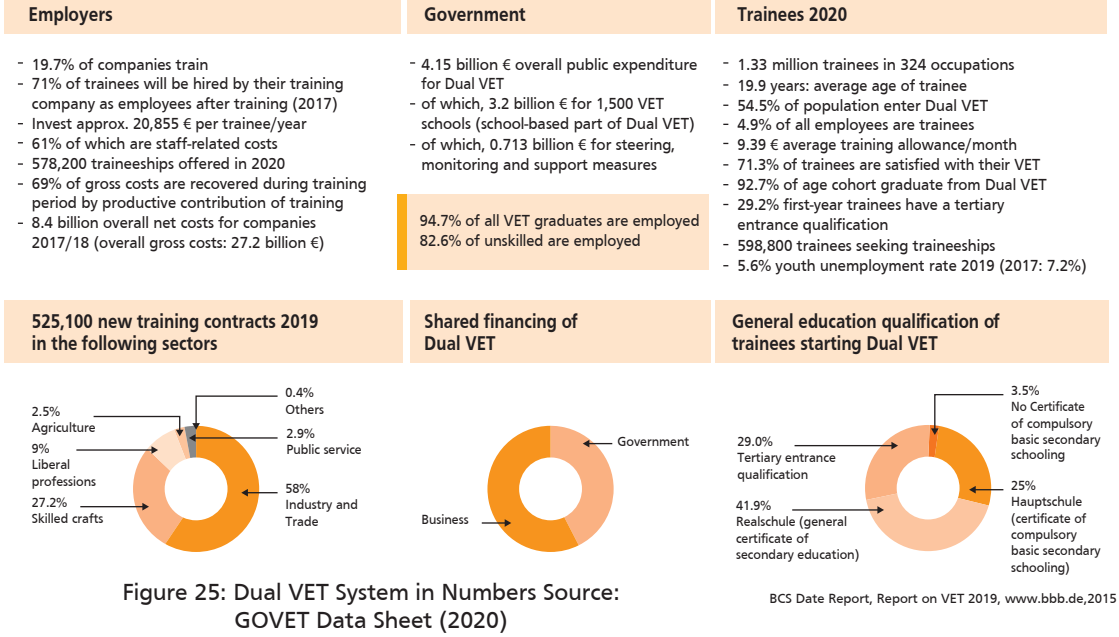

Figure 25: Dual VET System in Numbers Source: GOVET Data Sheet (2020)

BCS Date Report, Report on VET 2019, www.bbb.de,2015

7.2 TVET System in Japan

Japan has a 6-3-3-4 tier structure for education, consisting of compulsory six years of elementary school, three years of junior high school, known as lower secondary, and three years of high school, referred to as upper secondary, and four years of college, followed by optional two years of postgraduate study (Abumiya, 2012). In 2018, about 98.8% of junior high school graduates in Japan continued high school. Among them, 73.1% went to subject high schools registered for general curricula, and 26.9% decided to take vocational education through specialized training colleges and technical colleges (National Skills Portal (NSP), 2022). Here, vocational training courses are offered with agriculture, commerce, fishery, engineering majors, etc. There is an option for students who graduate from high school to choose VET schools, including vocational schools and some VET-focused colleges and universities such as law schools, maritime schools, military schools, etc. However, before World War II, the Japanese education system was based on high school to tertiary education, focusing mainly on general curricula. The need for VET in the Japanese education system arose from the lost war and the aspiring industrialization process. Focusing on VET with various major vocational courses became necessary to fill the skill gap (Abumiya, 2012). Several institutions are playing to fill the skill gap and offering VET; company-led VET is prominent and well-established among them. The company-led VET programs became famous due to the lack of chance for the graduates to be enrolled in the VET program to improve their technical and vocational skills.

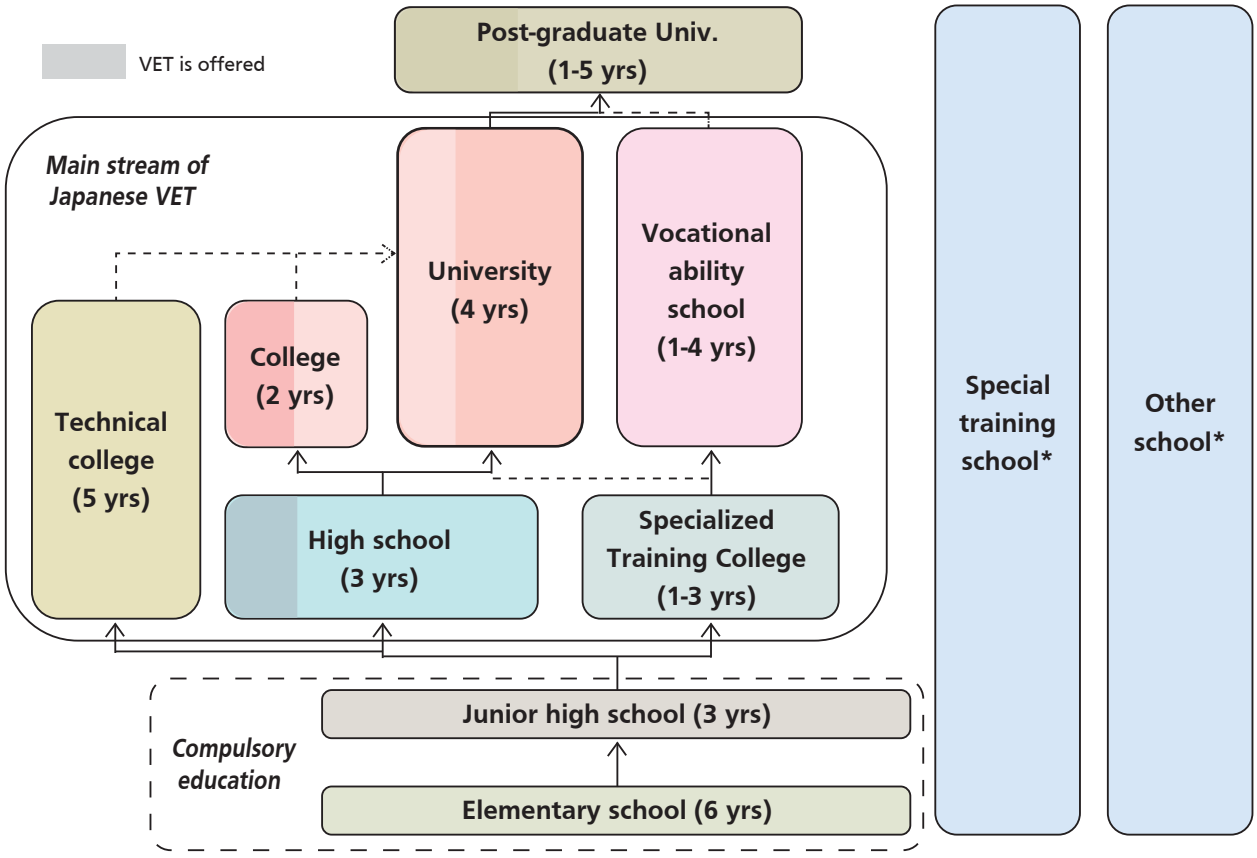

Figure 26: Education Structure of Japan
Source: Kitada, et al. (2019)

7.2.1 Current position of TVET in Japan

TVET programs in Japan provide students with the necessary skills and knowledge for specific trades and industries, prepare students for specific careers, facilitate industry partnerships, and offer lifelong learning (Haristiani, 2022). TVET plays a significant role in Japan's education system and economy by providing students with the skills and knowledge needed to succeed in various industries and trades (Ogawa, 2021). The Japanese government and industry organizations continue to support TVET through funding and other initiatives, and the close links between education and industry remain a hallmark of the Japanese TVET system (Akiyama, 2005). In recent years, there has been a growing emphasis on the importance of lifelong learning and upskilling in Japan, and TVET is seen as a keyway to supporting this goal. There is also a recognition of the need to keep pace with the rapidly changing demands of the labour market, and TVET programs are being adapted to meet the needs of a rapidly changing job market (Gfrerer, 2019). The Japanese government has several plans and initiatives to promote TVET and strengthen its role in the country's economy and society. The government is working to create more flexible and accessible TVET programs that can be pursued at any stage of a person's career in Japan (Haristiani, 2022). TVET institutions in Japan offer a wide range of educational programs that cater to the diverse needs of learners. This flexibility allows learners to continue their education while balancing work and other commitments (Charlotte Scobie, 2021). Moreover, to make TVET popular and remove social stigma, Japan has a national certification system for TVET graduates (BIBB, 2017).

The enrollment in TVET programs has steadily increased from around 1.8 million students in 2013 to approximately 2.3 million in 2019, representing a growth rate of about 28% over six years (Nobuko Kayashima, 2022). The number of students enrolled in technical colleges increased from 567,500 in 2013 to 701,300 in 2019, representing a growth rate of 23.5% (Haristiani, 2022). The number of students enrolled in vocational schools increased from 937,971 in 2013 to 1,161,635 in 2019, representing a growth rate of 23.8% (Gfrerer, 2019). The number of students enrolled in special training schools increased from 321,793 in 2013 to 472,545 in 2019, representing a growth rate of 46.8% (Gfrerer, 2019). In terms of gender, the enrollment of female students in TVET programs has increased faster than male students. In 2013, there were 864,272 female students enrolled in TVET programs, compared to 962,992 male students (Kazuo, 2020). By 2019, the number of female students had increased to 1,172,518, while the number of male students had increased to 1,162,962 (Gfrerer, 2019). The most popular fields of study for TVET students in Japan include engineering, information technology, healthcare, and business (Nobuko Kayashima, 2022).

44.3% of graduates from specialized universities and 40.7% of graduates from specialized high schools in Japan find employment in the industrial sector (Govet, 2020). In Japan, the unemployment rate for vocational high school graduates is 2.3%, but the jobless rate for vocational college graduates is 2.7% (Haristiani, 2022). According to a survey conducted by the Ministry of Health, Labour, and Welfare, the employment rate of TVET graduating students in 2020 was 94.7%, higher than that of university graduates (92.1%) (Kazuo, 2020). The survey also found that the median starting salary of TVET graduates was 204,000 yen per month (approximately USD 1,900), which was slightly lower than the median starting salary of university graduates (216,000 yen per month or approximately USD 2,000) (Gfrerer, 2019). The most popular fields of employment for TVET graduates were manufacturing, healthcare, and information technology. In 2020, 32.3% of TVET graduates found employment in the manufacturing sector, while 13.9% found employment in the healthcare sector, and 10.4% found

employment in the information technology sector(Alaluddin, 2022). The survey also found that the employment rate of female TVET graduates was slightly lower than that of male TVET graduates, at 93.9% and 95.2%, respectively (Charlotte scobie, 2021). However, the median starting salary of female TVET graduates was higher than that of male TVET graduates, at 210,000 yen per month (approximately USD 1,950) and 200,000 yen per month (approximately USD 1,850), respectively (Gfrerer, 2019).

The Japanese government acknowledges the value of TVET and has pushed it via initiatives such as the "New Skills for New Jobs." The Japanese government provides significant support for TVET to promote the development of skilled workers and meet the needs of various industries (Ogawa, 2021). The Japanese government's budget for TVET in 2021 was approximately 2.9 trillion yen (about USD 26.6 billion) (Yoshida, 2010). This includes funding for vocational schools, technical colleges, and other types of TVET institutions and subsidies for companies that provide on-the-job training for their employees (Yoshida, 2010). In 2021, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) allocated approximately 675.4 billion yen (approximately USD 6.2 billion) for vocational schools and about 818.8 billion yen (approximately USD 7.5 billion) for technical colleges (Ogawa, 2021). This funding supports various aspects of TVET, including curriculum development, teacher training, and facilities improvement. The Japanese government also provides financial support to companies that offer on-the-job training for their employees. In 2021, the government allocated approximately 2.4 trillion yen (about USD 22 billion) for subsidies to companies implementing vocational training programs (Nobuko Kayashima, 2022). This funding is intended to encourage companies to invest in developing their workforce and promote acquiring new skills. In addition to financial support, the Japanese government has implemented various policies and initiatives to promote TVET. For example, the government has established a national certification system for TVET graduates designed to recognize and encourage the development of skilled workers (Alaluddin, 2022). The government has also established industry-academia partnerships and other programs to facilitate cooperation between TVET institutions and companies. The Japanese government provides significant support for TVET to promote the development of skilled workers and meet the needs of various industries. This support takes the form of funding for TVET institutions, subsidies for companies that provide on-the-job training, and policies and initiatives designed to promote TVET and facilitate cooperation between TVET institutions and companies (Ogawa, 2021).

Comparing the VET in Japan, Ogawa (2015) asserted that though VET plays a significant role in developing skills, only 22% of Japanese senior secondary students choose VET programs on average. In contrast, the average for OECD countries is 42%. In Japan, engineering, production, and infrastructure build-up are the most prevalent broad fields, accounting for 43% of upper-secondary vocational graduates, compared to 33% on average throughout the OECD nations (Co-operation & Development, 2011). These programs are run at Japan's municipal and provincial levels since the national Government does not acknowledge them. Every student registered in higher secondary vocational education attends school-based programs where at least 75% of the curriculum is taught on campus.

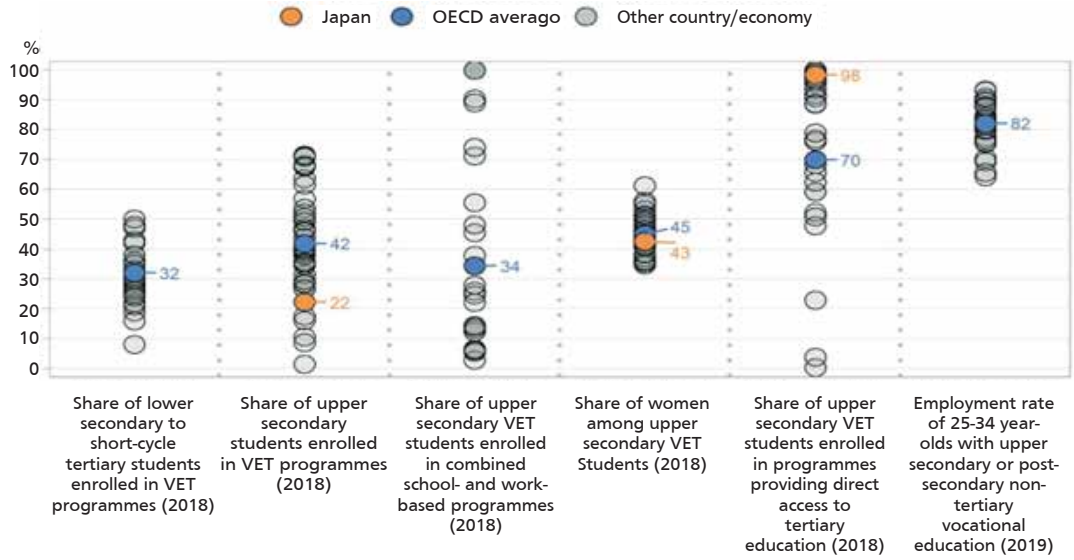

Figure 27: Comparison of TVET of Japan to Other OECD Countries, Source: OECD Indicators, 2020

As portrayed in Figure 27, many nations have established direct paths from vocational programs to higher levels of education to help senior vocational students transfer to graduate school and enhance their employment prospects. 98% of upper secondary vocational students in Japan are engaged in programs that allow them to enter university education directly. In contrast, only 70% of the students are equipped with such an opportunity in the OECD countries.

8. Role Mapping of Stakeholders

8.1 TVET Institutions

TVET institutions can significantly promote TVET apprenticeship in Bangladesh. Here are some ways TVET institutions could contribute to this initiative:

- **Industry-Academia Collaboration:** TVET institutions can collaborate with industries to create apprenticeship programs aligned with current industry needs. This collaboration can ensure that students gain relevant and practical skills that make them immediately employable. Figure 27 identified some approaches TVET institutions can take to initiate industry-academia collaboration.

Figure 28: Approaches for Industry-Academia Collaboration for Apprenticeship Program

- **Awareness and Advocacy:** TVET institutions can raise awareness among students, parents, and employers about the importance and benefits of TVET apprenticeships. This can be done through workshops, seminars, and marketing campaigns. Figure 29 shows the approaches for developing awareness and advocacy for TVET apprenticeship programs in Bangladesh.

Figure 29: Approaches for Awareness Program

- **Partnerships with Companies:** Establishing partnerships with various companies and organizations for apprenticeship opportunities can expose students to real-world working environments. This can also help tailor the training to meet specific industry standards, such as niche skills.
- **International Exposure:** TVET institutions could also consider partnerships with international organizations and educational institutions to bring global best practices in TVET apprenticeships to Bangladesh.
- **Install Modern Lab:** TVET institutes must ensure modern and updated training labs. However, this may be a gigantic financial burden for the TVET institutions; the benefits are substantial. One way to ensure this objective is by collaborating with industry labs or getting funds from industry, alumni associations, or government organizations to restore and maintain the modern and updated lab.
- **Accreditation and certification:** Accreditation and certification are crucial for promoting TVET apprenticeship, as highlighted by TVET experts. Proper accreditation and certification enable TVET graduates to gain trust nationally and internationally. In developed countries like Australia, the Australian Skills Quality Authority (ASQA) is accredited for TVET, ensuring quality and nationally recognized training. The Accrediting Commission of Career Schools and Colleges (ACCSC) accredits vocational training programs, upholding educational standards in the USA. The UK's Office of Qualifications and Examinations Regulation (Ofqual) regulates qualifications, examinations, and assessments to ensure high standards in vocational education. In Bangladesh, BTEB, NSDA, and DTE could issue accreditation through thorough monitoring and evaluation. Additionally, TVET institutions should consider seeking global accreditation options from organizations like the International Vocational Education and Training Association (IVETA), the International Accreditation Organization (IAO), and the Council for the Accreditation of Occupational Learning (CAOL) to establish global trust.

8.2 Regulatory Authorities

Regulatory authorities such as BTEB, NSDA, BMET, and DTE in Bangladesh can be pivotal in promoting TVET apprenticeships. Their involvement is crucial for developing a skilled workforce that aligns with the economic needs. Figure 30 shows the role of Regulatory authorities in promoting TVET apprenticeships.

Figure 30: The Role of Regulatory Authorities in Promoting TVET Apprenticeships

8.3 Industry and Industry Associations

Developing apprenticeships in Bangladesh is vital and can be successful through the active participation of employers. They are the key stakeholder who should be involved in the skill development process to reap the benefits, i.e., building a loyal workforce, shaping future employees, enhancing productivity, etc. Many developed countries such as Germany, Switzerland, and Australia set the utter example of investing in the TVET apprenticeship program, which led them to become successful in business. The roles of employers in promoting TVET apprenticeship are shown in Figure 31.

Figure 31: The Roles of Employers in Promoting TVET Apprenticeship

8.3.1 Developing a Trade-Specific Apprenticeship Development Wing/Center

To develop the apprenticeship program in TVET, industries and industry associations could consider establishing an apprenticeship development wing or center. One challenge is that apprentices might damage production tools due to inadequate training from TVET institutions, which often lack modern machinery. However, establishing an apprenticeship development wing can be beneficial in the long term. Firms within a particular sector could collaborate to form this apprenticeship development wing through associations and other supporting authorities. Additionally, products finished in the apprenticeship development wing or center could be sold at lower prices in the market. This approach could help cover operating costs, making the program sustainable over time. An example of such an initiative is the Center of Excellence for Leather Skill Bangladesh Limited (COEL), which has been operating an apprenticeship development program in Bangladesh since 2012.

8.3.2 Collaboration with TVET Institutions, Regulatory Agencies and ISCs

The industry must collaborate with the TVET institutions, regulatory agencies, and ISCs to get the required skill pool. Industry owners apprehend skill shortages in the industrial sector at many industrial meetings and forums. Multiple initiatives have also been taken to meet the skill requirement in Bangladesh by establishing training centers and institutions. However, the skill gap cannot be minimized without the apprenticeship program and proper industry-academia collaboration. Well-decorated training facilities with a global standard curriculum would likely be able to mitigate the skill gap in the industry. So, the industry needs to collaborate and offer apprenticeships and other programs to meet the skills shortage in the industrial sector.

Figure 32: TVET & Industrial Collaboration
Source: Adapted from (Haolader et al., 2017)

8.4 Trade Union

Trade unions can also play an important role in developing TVET apprenticeships in Bangladesh, drawing from the German experience. In Germany, the dual system combines on-the-job training with theoretical instruction in vocational schools. Vocational schools, in collaboration with trade unions, ensure that training standards are maintained at a high level, supporting the rights and interests of apprentices. Mainly, unions collaborate with employers and legal authorities such as government institutes to develop training policies, regulations, and curricula that meet industry demands. They also actively monitor the quality of training, ensuring that apprentices receive a comprehensive education that equips them with the necessary skills as the industry demands. Furthermore, trade unions also play roles in negotiating fair wages and working conditions for apprentices. These lessons can be learned from the German experience and can be replicated accordingly.

8.5 Parents

Parents play a decisive role in promoting TVET apprenticeships in Bangladesh. Their support towards TVET education can significantly influence the adoption of TVET and remove social stigma in Bangladesh. This study identifies some roles of parents in promoting TVET apprenticeship in Bangladesh (Figure 33).

Figure 33: Roles of Parents to Promote TVET Apprenticeship in Bangladesh

8.6 Industry Skill Council

The Industry Skill Council (ISC) can play a pivotal role in promoting Technical and Vocational Education and Training (TVET) apprenticeships in Bangladesh in several ways:

- Bridging the gap between industry and TVET institutions
- Creating apprenticeship opportunities by applying a quota system
- Ensure quality of training to gain employer trust
- Policy advocacy and collaboration with the government to promote TVET apprenticeship

- Facilitating and setting partnerships and cooperation between industries or between industry and TVET institutions
- Creating awareness programs for TVET apprenticeships.

8.7 Donor Agencies and Development Partners

In many ways, donor agencies and development partners can contribute to developing the TVET apprenticeship program in Bangladesh. Strategy development, capacity building, and policy formulation are such areas where they can contribute. They can also promote inclusive programs to include every skill category from every trade to produce balance in skill mapping in Bangladesh; however, developing countries such as Bangladesh lack in setting strategic priorities and capacity building. Therefore, donor agencies and development partners should work with other stakeholders on advocacy policy frameworks, technology transfer, research and development, and public-private partnerships.

8.8 TVET Graduates

The unique position of TVET graduates as beneficiaries of vocational training enables them to effectively demonstrate the value and impact of such education, thereby helping to mitigate social stigma. To promote TVET education, they should actively share their success stories through social media and online platforms. Additionally, their involvement in alumni associations, serving as role models for current students, providing mentorship, and engaging in advocacy will undoubtedly enhance the TVET apprenticeship environment.

9. Way forward for Strengthening TVET and Apprenticeship in Bangladesh

There has been a substantial growth of TVET institutions in the country during the last decade. Similarly, the TVET enrollment rate has also increased. Thus, various policy initiatives positively impact and upgrade the current TVET system in Balderdash. In particular, there has been an enormous growth of TVET private institutions. Besides, some industry-driven TVET institutes have also emerged to supply skilled manpower in the furniture, textile, plastic, and automobile industries. However, the supply capacity of those institutes is limited to certain geographic locations, and the scale of supply is low. The mainstream TVET institutes, both in the public and private sector, fail to ensure the supply of an adequate skilled workforce due to many reasons, such as the absence of an apprenticeship program, the poor linkage between TVET institutes and industries, the lack of modern laboratories, high teacher-student ratio and mismatch between demand and supply of TVET graduates. In order to overcome the existing shortcomings of the TVET system and to materialize the targets set in the National Skills Development Policy and 8th Five Year Plan, sector-specific strategic plans for skills development, curriculum design and coordination, and increased participation between industry and TVET institutions are required. Connecting the industry skills councils and industry associations with BTEB and TVET institutions is essentially required to popularize apprenticeship in Bangladesh. Instituting international best practices can add further momentum to the growth and development of the TVET system in the country. The following recommendations can help the apprenticeship program to extend skill development in Bangladesh.

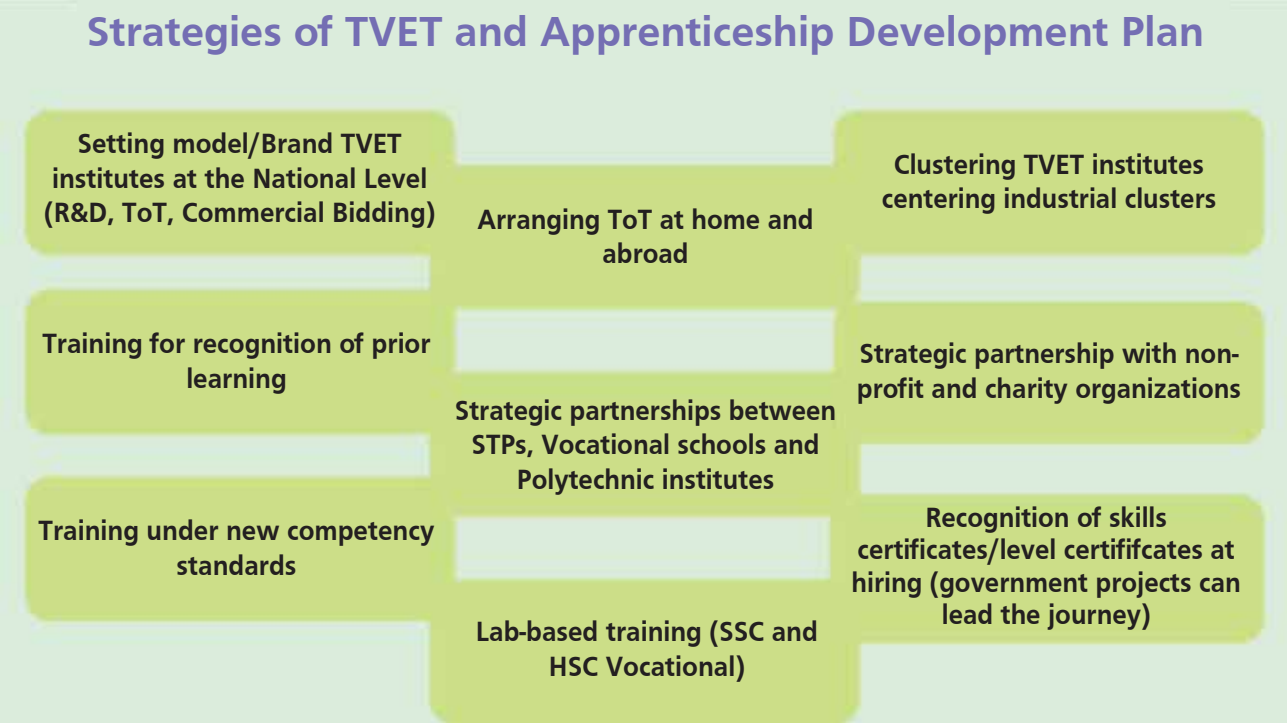

Figure 34: Strategies for Strengthening TVET and Apprenticeship in Bangladesh

- **Adoption of Registered Apprenticeship Programs**

A Registered Apprenticeship (RA) program, commonly found in many developed countries such as the USA, Germany, Australia, Canada, South Africa, and Singapore, is a structured training program designed to teach individuals a specific trade or occupation (Spaulding & Petrov, 2023). Generally, these programs are sponsored by employers, employer associations, or labour unions and are officially registered with government authorities. The main features of the registered apprenticeship programs are structured learning, definite duration (course credit system), industry skill benchmark, proper certification, and legislative framework. However, adopting the registered apprenticeship program has a mounting task for the authority, but the benefits are multifold. All stakeholders must engage to adopt this program, especially in determining the training need assessment and skill assessment according to the industry need. Moreover, they need to identify and set the skills and training standard benchmark, training scopes and establishment, certification, accreditation, and monitoring. In Bangladesh, the Ministry of Education, Ministry of Labour and Employment, BMET, BTEB, DTE, SMEF, a2i, and other important stakeholders may take roles in adopting the registered apprenticeship program.

- **Brand TVET Institutes at the National Level**

To promote TVET education, apprenticeship, and jobs in Bangladesh, there is an immense need to brand the TVET at the national level. The skill force in Bangladesh lacks the proliferation of niche skills, which impedes productivity and product quality. Moreover, social stigma postulates a negative image of the TVET graduates, which grossly affects their financial, social, and standards of living. Therefore, there is a need to revitalize TVET education and brand TVET nationally. Figure 35 lists the actions to be taken for branding TVET at the national level.

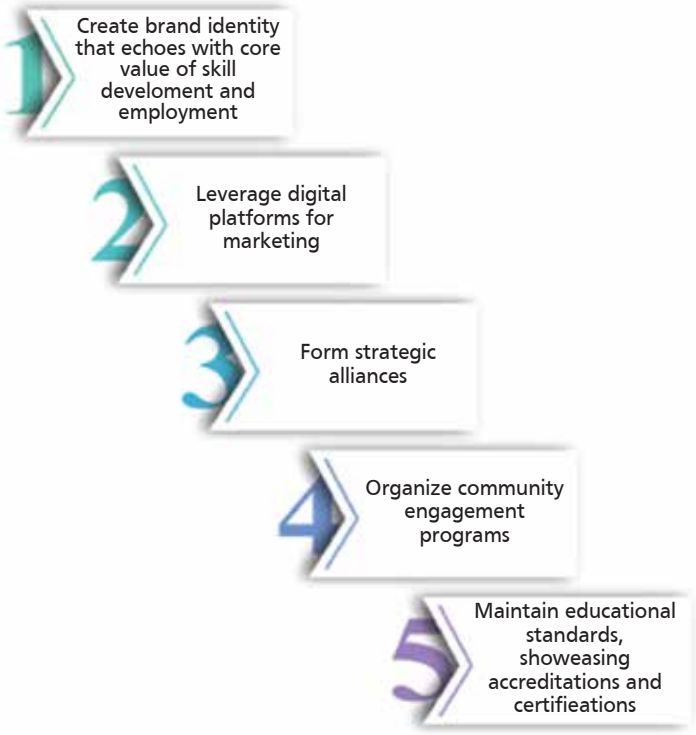

Figure 35: The Actions for Branding TVET at the National Level

- **Amendments and Enforcement of the Apprenticeship Acts**

Amendments in the Apprenticeship Law are the major remedy. For example, currently, each employer is required to submit an apprenticeship training program for their undertaking. The act should be strengthened by including a reward/punishment system if an employer does or doesn't submit the required apprenticeship program. Germany can be an excellent example of having an apprenticeship program for the lowest unemployment rate in the world. Around 60% of school leavers undertake an apprenticeship in the dual education system. However, according to the Labour Act 2006, all government, semi-government, private, autonomous, semi-autonomous, informal sector, and non-governmental organizations that have remained in operation for more than two years with a minimum of 50 employees should provide apprenticeship opportunities. In addition, one-fourth (25%) of the total employees should get an apprenticeship opportunity (Labour Act 2006). But with the increment in the number of employees, the ratio should also be increased to at least 40% to 50% of the total employees. An apprenticeship opportunity enables the worker to gain practical knowledge through on-the-job assignments, which is the best technique to learn a work procedure, as practice makes a man perfect. According to the existing law, it is the employer's responsibility to ensure that an apprentice receives necessary theoretical instructions to the extent of at least twenty percent of the total normal working hours (Labour Act 2006). Enforcing such acts in the industry will boost workers' learning.

However, many benefits have been enlisted under the apprenticeship program of the Labour Act 2006, which have not been acknowledged appropriately by the industries. There are some advantages in tax provisions for the industry with an apprenticeship program, such as a tax waiver in imports for importing materials for the apprenticeship program. It has been found that apprenticeship law in Bangladesh is a less discussed topic for academicians and industry practitioners. More awareness and enforcement must be created to reap the benefit of the existing apprenticeship law.

- **Revise TVET Curriculum**

Most technical institutions, polytechnic institutions, and trades do not provide any apprenticeship program, as their curriculum is mostly theory-based. An apprenticeship program can be tagged with the current curriculum. New courses like auto machines, auto electronics, industrial electronics, etc., which demand practical knowledge, can be introduced. Most assessments of the students should be based on their practical knowledge rather than theoretical knowledge. In Germany, apprentices learn 70% from industrial premises. So, to ensure appropriate learning industries can come forward and extend and set benchmarks for enrolling students in the apprenticeship program. Institutes may create links with industry, BEF (Bangladesh Employees Federation), and business associations such as BGMEA, BKMEA, etc.

- **Robust Certification, Accreditation, and Apprenticeship Lead Job Placement**

Apprenticeship initiatives should be linked with employment opportunities in government projects, government entities, international organizations, global projects, STPs, ISCs, industry associations, NGOs, and other private companies. Employment opportunities can be enhanced by robust certification and appropriate accreditation. The principal of Bangladesh-Korea Technical Training College (BKTTC) emphasizes VET certification because of its global appeal; for example, workers received employment offers to Saudia Arabia only with appropriate certificates. National and international authorities can provide accreditations for skills certification. BTEB, DTE, and ISCs can help strengthen industry linkage, apprenticeship programs, up-skilling and re-skilling, RPL, standard and curriculum development, and assessment of trainees, trainers, and assessors.

- **Recognition of Skills Certificates/level Certificates at Hiring**

Standards of TVET education may be showcased by proper accreditation and certification. Many national and international organizations certify and accredit the TVET, and acknowledging those at the hiring level may encourage more individuals to pursue TVET. This recognition can be extended by collaborating with industry associations to modify the TVET curriculum to meet specific industry needs.

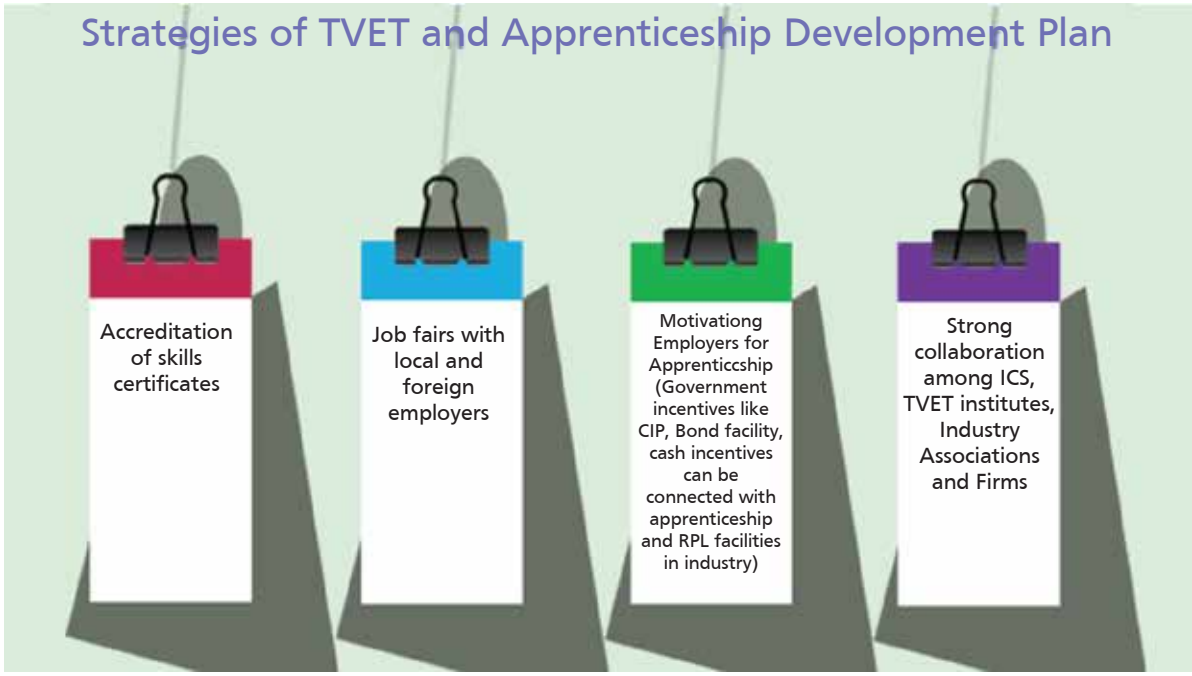

Figure 36: Strategies of TVET and Apprenticeship Development Plan

- **Job Fairs with Local and Foreign Employers**

To forge a better tie with the industry, TVET institutions can organize an employment and apprenticeship fair with the help of BTEB, DTE, SMEF, and ISC. It has been found in the FGD and stakeholder consultation meetings that the industry owners have difficulties finding skilled technical incumbents. Moreover, it is also expensive to select qualified candidates because many applicants usually apply for the post. Industry owners have no idea about any formal bodies or associations that can supply qualified candidates to the industry. However, a few firms have taken private initiatives to liaison with some TVETs to get the necessary technical labour to meet their skills gap; those are insufficient and not even institutionalized to solve the skill shortage in Bangladesh. Therefore, TVET institutes, with the help of the supporting bodies, can arrange employment fairs to inform the industrialists about the present skill conditions and vice-versa.

- **Clustering TVET Centering Industrial Cluster**

Clustering TVET institutes such as TTC and polytechnic institutes within industrial clusters such as SME clusters (identified in 2013 in Bangladesh by the SME foundation) is a strategic approach that nurtures a synergetic relationship between academia and industry. By this approach, students will be able to gain hands-on experience from a specific industrial cluster, advancing their skills according to the demands. Moreover, this will help a seamless transition to learning through doing and encourage occupational socialization. The close proximity of TVET centers to industrial facilities facilitates collaboration between educational institutions and businesses, promoting knowledge exchange, research partnerships, and a tailored curriculum that aligns with the evolving needs of the clustered industries.

- **Provide Lab-based Training**

Integrating lab-based training into TVET programs is demanding nowadays to promote a hands-on learning experience. By offering practical, lab-oriented training, students will gain a deeper understanding of theoretical concepts through direct application in simulated workplace environments. Having a practical orientation, students will enhance their technical skills and instill problem-solving abilities and critical thinking. As students navigate real-world scenarios within the laboratory setting, they become familiar with industry tools, equipment, and processes. Fundamental occupational socialization can be done through the lab-based training system, enhancing employability and improving organizational productivity.

- **Strategic Partnerships between STPs, Vocational Schools, and Polytechnic Institutions**

Individual and private initiatives can be a source of mitigating the skill gap and enhancing the training skills in the TVET sector in Bangladesh. TVET institutes can create a Memorandum of Understanding (MoU) with specific firms and industry associations to deliver the required skills accordingly. This arrangement has multifold benefits, such as, first, there would be continuous communication about the skill requirement and skill gap; second, the industry will oversee the training curriculum and adjust their requirements when necessary; third, TVET institution will utilize their resources appropriately to elevate skill development program; and fourth, help to reverse the social stigma about TVET as the trainees will be readily available for apprenticeship and job.

- **Forming and Strengthening Alumni Association**

The alumni association helps in many ways in the educational sector. TVET institutes may initiate the development of an alumni association. Through the alumni association, TVET students may get the chance to find an apprenticeship program in the industry.

- **Initiate Industry Trainer / Exchange Program**

One of the severe impediments of the TVET institutions is finding a qualified and skilled trainer. There are a few polytechnic colleges that provide trainers, but they lack practical experience. To solve this agenda, TVET can initiate a trainer exchange program through apprenticeship.

- **Incentives for Industry who Engage in Apprenticeship Programs**

More incentives should be designed for employers actively participating in the apprenticeship program. Those who conduct apprenticeship programs on a large scale can be nominated for rewards. In such cases, for example, upon inspection of the number of apprentice and their qualities, NBR can grant tax waivers on all money paid to the apprenticeship program (Spaulding & Petrov, 2023). Besides, this will help acknowledge the contribution made by the company in developing skills in Bangladesh.

- **Communication and Awareness Rising for Employers**

Industries should participate directly and provide apprenticeship opportunities. More Industry attachments should be made. This can be done by creating awareness about the apprenticeship program and using appropriate communication channels on a national scale.

- **Linking with Financial Allocations, Loans Approval**

The apprenticeship programs can be set as a benchmark for industries to avail financial incentives, tax advantages, loan approval, renewing licenses, etc. Linking with the business facilities encourages the industries to comply with the apprenticeship law and initiate apprenticeship to help build skills in Bangladesh.

- **Apprenticeship Audit**

An apprenticeship audit is a systematic evaluation process to assess and ensure apprenticeship programs' effectiveness, compliance, and overall quality. This comprehensive review examines various facets of the apprenticeship framework, including program structure, curriculum relevance, mentorship quality, apprenticeship law, and adherence to industry standards. The audit aims to identify strengths, weaknesses, and areas for improvement, providing valuable insights for optimizing the apprenticeship experience. The government can establish a separate entity or collaborate with BMET and DTE to complete the apprenticeship audit. Moreover, an internal apprenticeship audit report can also be prepared and required to be submitted to the relevant authority.

- **Funding, Financing and Incentives**

Adequate financial support is vital in enhancing infrastructure, modern and updated labs, and technologies and outsourcing the required resources for TVET institutions.

Government initiatives, such as scholarship programs and subsidized training, serve as incentives to encourage enrollment in TVET courses, making education more accessible to a broader segment of the population. Furthermore, partnerships between the government and private sector can lead to innovative financing models, where businesses contribute to the development of TVET programs to meet industry demands (Bank, 2015). International aid and collaborations also contribute to the funding landscape, supporting the expansion and improvement of TVET initiatives. By strategically allocating funds, providing financial incentives, and fostering partnerships, Bangladesh can strengthen its TVET sector, producing a skilled workforce that meets the evolving needs of industries and contributes to sustainable economic growth. In addition, appropriate mechanisms and incentives should be provided by employers to encourage and enhance apprenticeship programs.

10. Conclusion

A collaborative and forward-thinking approach is essential for strengthening TVET apprenticeship programs in Bangladesh. Emphasizing partnerships between the government, educational institutions, industries, and relevant stakeholders will be crucial for successfully integrating TVET apprenticeship initiatives. Investing in modernized infrastructure and labs, cutting-edge technology, up-to-date curricula, and stakeholders' engagement and participation will enhance the apprenticeship program, aligning them with the generic to niche skill needs of industries. Additionally, adopting the registered apprenticeship program is eminent for the gradual dispersion of skill development and social stigma about TVET education. Moreover, continuous dialogue must be set forth between policymakers and industry associations to help tailor apprenticeship programs according to industry requirements. However, raising awareness about the value of TVET education, TVET apprenticeships, learning while earning, learning by doing, and breaking the societal biases toward vocational education will contribute more to skill development in Bangladesh. By prioritizing these strategies, Bangladesh can structure the skill eco-system, fostering skill development according to skill needs and contributing to sustainable development.

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Imprint

Jointly Published by
Friedrich-Ebert-Stiftung (FES) Bangladesh and Small and Medium Enterprise Foundation (SMEF) Dhaka, Bangladesh

Funded by
Friedrich-Ebert-Stiftung (FES) Bangladesh

Responsible
Small and Medium Enterprise Foundation (SMEF)

About the study bangladesh@fes.de

Designed and Printed by
Print Touch, Dhaka, rezaprint.touch@gmail.com

ISBN Number: 978-984-36-0455-2

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The Small & Medium Enterprise Foundation, widely known as the SME Foundation, was established by the government of Bangladesh through the Ministry of Industries as an apex institution for SME development in the country. The primary activities of the SME Foundation are the implementation of SME Policy Strategies adopted by the Bangladesh Government, policy advocacy and research to design the intervention plan for the growth of SMEs in Bangladesh, facilitating financial literature for SMEs, providing skill development and capacity building training, facilitating adaptation with appropriate technologies and access to ICT, providing business support services, etc.

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