

Quality TVET: Opportunities, Challenges and Policy Options for Bangladesh

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সারাংশ (Abstract)

কারিগরি শিক্ষা অধিদপ্তর কর্তৃক বাস্তবায়নকৃত এই গবেষণাকর্মে প্রধানত দুটি বিষয়কে প্রাধান্য দেয়া হয়েছে; এক নির্ধারিত পাঁচটি মাননির্দেশক (Quality Indicator) এর সাহায্যে বাংলাদেশের কারিগরি ও বৃত্তিমূলক শিক্ষা ও প্রশিক্ষণ ব্যবস্থার (টিভিইটি) গুণগত মান যাচাই তথা কার্যকারিতা পরীক্ষা (Effectiveness Test) করা হয়েছে এবং গুণগত মানের প্রাপ্ত ফলাফলের ভিত্তিতে কারিগরি ও বৃত্তিমূলক শিক্ষা ও প্রশিক্ষণ ব্যবস্থার মানোন্নয়নের জন্য নীতি প্রণয়ন/নীতি সংস্থার সুপারিশ এবং সুপারিশ বাস্তবায়নের জন্য অধিভুক্ত ক্ষেত্র (Intervention Area) চিহ্নিত করা হয়েছে। সুনির্দিষ্টভাবে এই গবেষণার মাধ্যমে বাংলাদেশের কারিগরি শিক্ষা ও প্রশিক্ষণ ব্যবস্থার গুণগত মানের একটি সংক্ষিপ্ত-প্রকৃত তথ্যচিত্র উদঘাটন, কারিগরি ও বৃত্তিমূলক শিক্ষা ও প্রশিক্ষণ ব্যবস্থার মাধ্যমে মানব সম্পদ উন্নয়নের সম্ভাবনা ও চ্যালেঞ্জের ধরণ নির্ধারণ এবং বিদ্যমান চ্যালেঞ্জ মোকাবেলা তথা সম্ভাবনাকে কাজে লাগিয়ে কীভাবে মানসম্পন্ন টিভিইটি নিশ্চিত করা যায় তার লক্ষ্যে প্রয়োজনীয় নীতি প্রণয়ন/নীতি সংস্কার এবং তা বাস্তবায়নের জন্য নির্ধারিত অধিক্ষেত্র (Intervention Area) চিহ্নিত করা হয়েছে।

এই গবেষণা কার্য বাস্তবায়নের জন্য প্রধানত মিশ্র পদ্ধতিতে উপাত্ত সংগ্রহ, উপাত্ত বিশ্লেষণ করা হয়েছে, প্রাপ্ত ফলাফলকে যাচাই বাছাই করার ক্ষেত্রে টিভিইটি বিশেষজ্ঞগণের সাথে ফোকাস গ্রুপ ডিসকাশন (এফজিডি) এবং প্রধান তথ্য প্রদানকারীগণের (KII) সাথে সাক্ষাতকার গ্রহণ করা হয়েছে। প্রাথমিক উৎস হতে উপাত্ত সংগ্রহ করার জন্য নির্ধারিত টুল হিসেবে প্রশ্নমালা প্রণয়ন এবং তা যাচাই (Pre-test) করে কাঙ্খিত উপাত্ত পাওয়া যায় কিনা তা নিশ্চিত করা হয়েছে। উপাত্ত সংগ্রহের উৎস হিসেবে টিভিইটি শিক্ষক-প্রশিক্ষক, ব্যবস্থাপক-অধ্যক্ষ গণের জন্য পৃথক পৃথক প্রশ্নমালা সেট প্রণয়ন করা হয়েছে। নমুনা নির্ধারণে টিভিইটি গবেষণায় স্বীকৃত স্লুভেন এর তত্ত্ব (sluven's formula) ব্যবহার করা হয়েছে। প্রাথমিক উপাত্ত সংগ্রহের জন্য অনলাইনের গুগল ফরম তৈরি ও ইমেইলে তা নির্ধারিত রেসপন্ডেন্টগণকে প্রেরণ করা হয়েছে। জবাব দানকারী শিক্ষকগণকে ক্ষেত্র বিশেষে প্রদত্ত উপাত্তের নির্ভুলতা সম্পর্কে অনলাইনে এবং সরাসরি সাক্ষাতকার নেয়া হয়েছে। কয়েকটি নমুনা প্রতিষ্ঠান সরেজমিনে পরিদর্শন করা হয়েছে, অধ্যক্ষগণের সাক্ষাতকারের মাধ্যমে উপাত্ত সংগ্রহ ও যাচাই করা হয়েছে। টিভিইটি এর মান যাচাই ও চ্যালেঞ্জ নির্ধারণে সরাসরি শ্রেণিকক্ষে গিয়ে শিক্ষক ও শিক্ষার্থীগণের সাক্ষাত গ্রহণ করা হয়েছে। সেকেন্ডারি উপাত্ত সংগ্রহের জন্য বাংলাদেশ ও উন্নত এবং দ্রুত উন্নয়নশীল কিছু রাষ্ট্রের টিভিইটি এর মান নির্দেশক ভিত্তিক তথ্য সংগ্রহ ও তথ্য বিশ্লেষণ করা হয়েছে, এছাড়াও টিভিইটি সংশ্লিষ্ট আন্তর্জাতিক সংস্থা সমূহের গবেষণা জার্নাল এবং তাদের সুপারিশ সমূহ হতে তথ্য সংগ্রহ ও বিশ্লেষণ করা হয়েছে। সর্বোপরি উপাত্ত সংগ্রহে ডকুমেন্ট রিভিউকে প্রাধান্য দেয়া হয়েছে যার মাধ্যমে বাংলাদেশের টিভিইটি ব্যবস্থার একটি তুলনামূলক চিত্র ও মান বিশ্লেষণ ও সুপারিশমালা প্রণয়ন তথা সুপারিশ বাস্তবায়নের অধিক্ষেত্রসমূহ সুনির্দিষ্ট করা সম্ভব হয়েছে।

এই গবেষণায় প্রাপ্ত ফলাফলে বাংলাদেশের টিভিইটি ব্যবস্থাটি নিম্নমানসম্পন্ন প্রশিক্ষক, উচ্চ শিক্ষক-শিক্ষার্থী অনুপাত, ক্রমবর্ধনশীল শিক্ষক সংকট, নতুন প্রতিষ্ঠানসমূহের পরিচালনায় শিক্ষক ও সহায়ক কর্মচারি নিয়োগে দীর্ঘসূত্রিতা, অপরিপূর্ণ অবকাঠামো সুবিধা, শিক্ষক-প্রশিক্ষকগণের অপরিপূর্ণ পেশাগত ও সামাজিক মর্যাদা, শিল্পকারখানা ও অন্যান্য অংশীজনের সাথে দুর্বল প্রাতিষ্ঠানিক সংযোগ প্রভূত ক্রমবর্ধমান ও ভীতিকর চ্যালেঞ্জ (Daunting Challenge) প্রতীয়মান হয়েছে। সামগ্রিকভাবে কারিগরি ও বৃত্তিমূলক শিক্ষা ও প্রশিক্ষণ ব্যবস্থার ধারাটি বিগত এক দশকে ক্রমবিকাশমান হলেও টিভিইটি গ্রাজুয়েটগণের নিয়োগলাভের অনিশ্চয়তা, সামাজিক মর্যাদায় অবনমন, কারিকুলামের সাথে শ্রমবাজারের দক্ষতা চাহিদার পার্থক্য ও ক্রমাগত অবনতি এই গবেষণায় প্রতীয়মান হয়েছে, যার দ্রুত নিরসন করার মাধ্যমে বিদ্যমান সম্ভাবনাকে অধিকতর কার্যকর করার সুপারিশসম্বলিত অধিক্ষেত্রসমূহ চিহ্নিত করা হয়েছে।

একটি মানসম্পন্ন টিভিইটি ব্যবস্থা দেশের মানব সম্পদ উন্নয়নে প্রধান নিয়ামক হিসেবে গণ্য একবিংশ শতকের এই তত্ত্বটিকে এই গবেষণায় কার্যকর রূপে বিবেচনা করা হয়েছে। এ জন্য পৃথিবীর বিভিন্ন উন্নত ও দ্রুত উন্নয়নশীল রাষ্ট্রের নীতি সমূহ পর্যালোচনা করে বাংলাদেশের প্রেক্ষাপটে প্রয়োজনীয় নীতি প্রণয়ন, বিদ্যমান নীতির সংস্কার প্রস্তাব যৌক্তিকভাবে উপস্থাপন করা হয়েছে। সুপারিশকৃত নীতির আওতায় একটি বাস্তব সম্মত শিক্ষক-শিক্ষার্থী অনুপাত কার্যকর করার ক্ষেত্রে যৌথভাবে কারিগরি শিক্ষা বোর্ড, কারিগরি শিক্ষা অধিদপ্তর কর্তৃক সিদ্ধান্ত গ্রহণ, উন্নত ও দ্রুত উন্নয়নশীল রাষ্ট্রের ন্যায় টিচার্স কোয়ালিফিকেশন ফ্রেমওয়ার্ক এর প্রবর্তন, শিক্ষক নিয়োগে মানদণ্ড নির্ধারণ, সরকারের মাধ্যমে শিল্প সংযুক্তি ও অংশিদারিত্ব কার্যক্রমকে আইনী কাঠামোতে আনয়ন এর সুপারিশ করা হয়েছে।

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ACCRONYMS

ASEAN:	Asia and South East Asian Nations
BTEB:	Bangladesh Technical Education Board
CBT&A:	Competency Based Training and Assessment
DTE:	Directorate of Technical Education
FGD:	Focus Group Discussion
ICT:	Information Communication Technology
ILO:	International Labor Organization
IT:	Information Technology
HSC (BM):	Higher Secondary School Certificate (Business Management)
HSC (VOC):	Higher Secondary School Certificate (Vocational)
MOE:	Ministry of Education
NSDP:	National Skill Development Policy
NEP:	National Education Policy
NTRCA:	National Teachers Recruitment and Certification Authority
NTVQF:	National Technical Vocational Qualification Framework
OECD:	Organization for Economic Cooperation and Development
PSC:	Public Service Commission
Seven 5YP:	Seventh Fifth Year Plan
SSC (VOC):	Secondary School Certificate (Vocational)
TMED:	Technical and Madrasah Education Division
TQF:	Teachers Qualification Framework
TVET:	Technical Vocational Education and Training
TTTC:	Technical Teachers Training Institute
TSC:	Technical School and College
UCEP:	Underprivileged Children Education Program
UNESCO:	United Nations Educational Scientific and Cultural Organization
USAID:	United States Agency for International Development
VTTI:	Vocational Teachers Training Institute

CHAPTER- ONE: RATIONALE OF THE STUDY

1.0 INTRODUCTION

Quality Technical Vocational Education and Training (TVET) system is always an important component for ensuring country's economic growth and sustainable development. Government of Bangladesh is giving priority to TVET for producing skilled human resources to address national and global employment market. Global market is highly competitive due to rapid technological change and skills demand in the labour market. A quality and market responsive TVET system can adopt those technological changes and meet the changing needs of the employment market and expedite employment generation and economic growth of the country. Considering this contemporary trend of global economy TVET is viewed as a tool for productivity enhancement and poverty reduction and there is a strong correlation between the proportion of TVET graduate and per capita income many countries have taken steps to strengthen policy guidance and regulatory frameworks for TVET. (Margarita Pavlova, 2014)

The research title, “**Quality TVET: Opportunities, Challenges and Policy Options for Bangladesh**” is selected by the Technical and Madrasa Education Division (TMED), under the ministry of education and supported by the Directorate of Technical Education (DTE)¹. This research will be a part of celebrating the Muzib Barsho¹. The research title clearly reflects four key words; meaning concept and scope of quality TVET, opportunities that are prevailing in Bangladesh context, challenges that are facing Bangladesh TVET system and policy options that will be required to transform Bangladesh TVET system as an effective tool for economic growth of the country. TVET is often seen as 'last choice education' because lack of quality, on the other hand, High-quality TVET leads to a higher status and improved attractiveness of TVET² (UNESCO, Quality Assurance of TVET).

Quality is a crucial issue for Bangladesh TVET system in the context of rapid enrollment of TVET from 1% in 2008 from 17% in 2018 and to meet the national target 20% by 2020 and 30% by 2030 (BTEB, enrollment analysis, 2016). This study will identify some quality indicators of TVET that will be used to measure the effectiveness and quality of TVET in Bangladesh. It is mentionable that the quality of any education is contextual, i.e; it depends upon the norms and standard of the institution as well as of the country and other indicators prevailing in the system. Through using these quality indicators Bangladesh TVET system will be studied to find out its measurable outcome in terms of employability, responsiveness of the market demand, quality training system for ensuring intended skills and competencies, success rate of the students, capacity of the trainers etc.

As per the oxford dictionary, the term **Opportunity** means a favourable juncture of circumstances for advancement and progress. Through this study, sufficient information has been tried to gather about the potentials of Bangladesh in terms of its human potentials and youth supply in the labour market (treasure), government plan, policies, and strategies regarding addressing the demographic devedend that promote Bangladesh TVET system for its further improvement.

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¹ TMED circular no-57.00.0000.053.99.003.18.104 dated-06/10/2021 and DTE Circular no-57.03.0000.023.99.009.121-63 dated-04/08/2021

‘Challenges’ is the plural form of the word Challenge that means something needing effort in order to be done successfully or a situation of facing with kind of efforts (Cambridge Dictionary). In this study challenge of Bangladesh TVET system has been identified concerning the main mandate of TVET. Grossly Bangladesh TVET system is confronting many challenges in terms of student teacher ratio (STR), sufficiency of teachers and staff, capacity of teacher in delivery quality training, recruitment process for ensuring quality supply of teachers, infrastructural capacity and employability of the TVET graduates etc.

The term **Policy Option for TVET** is representing a wide range and it's a national responsibility to frameout after completing the performance analysis of the whole TVET system of Bangladesh. But considering this limited range of research work and in order to assist the development of policy formulation some specific findings based policy recommendations has been proposed with its intervention areas as per the operational agencies/organization concern. The researchers tried to attempt a sketch of result/findings which will indicate some policy reform initiative is compulsory for quality TVET in Bangladesh. But it is rememberable that in the context of 21st century every country are concern to reframe and some extend considering the radical restructuring of TVET policy and programme as per the needs of the society and job market requirements. The researchers has the limitation to address all issues that are prevailing in the whole TVET system in which some are prevails in political, social or bureaucratic structure and tradition of the country. Considering these limitations researchers are raised some points, facts and issues that national policy makers, policy formulators can address within their own capacity.

Considering the specific quality indicators researchers has identified the policy options either introducing new policy or needs a policy review to execute. Further outcome of this research has been frameout in terms of identifying specific intervention areas and organization that can promote or implement the recommendations. As a whole policy maker, policy formulator, TVET administrator, experts will get a clear picture of policy reform proposal that can promote and improve the existing quality of TVET in Bangladesh.

1.1 TVET SYSTEM IN BANGLADESH

As per the BTEB report 2018-19, there are 34 types of different TVET programme operating in which 18 types are diploma level programme, 12 types Certificate level programme, 2 types national skills standard level and 1 type National Skills Standard Basic (360 Hr) courses. In this study we have taken only diploma in engineering and SSC Vocational programme. Details Information of TVET Programme and institute are shown in the table.

Table-01: TVET Programme and Institutes Information (As on BTEB Report 2018-19)

SI	Curriculum/Programme	No of Technology/ Trade	Duration	Institutes No		Total Institute No
				Public	Private	
01	Diploma in Engineering	34	4 yrs	122	495	617
02	Diploma in Textile Engineering	03	4 yrs	07	153	160
03	Diploma in Agriculture	-	4 yrs	18	162	180
04	Diploma in Fisheries	-	4 yrs	04	54	58
05	Diploma in Forestry	-	4 yrs	01	0	01
06	Diploma in Livestock	-	4 yrs	02	0	02
07	Diploma in Medical Technology	08	4 yrs	0	231	231
08	Diploma in Tourism & Hospitality	-	4 yrs	06	0	06
09	Diploma in Engineering (Naval)	04	4 yrs	01	0	1
10	Diploma in (Army)	05	4 yrs	03	-	03
11	Diploma in Fisheries (In Service)	-	4 yrs	03	0	03
12	Diploma in Forestry (In Service)	-	2 yrs	02	0	02
13	Diploma in Animal health and Production (In Service)	-	2 yrs	03	0	03
14	HSC (Vocational)	14	2 yrs	64	0	64
15	HSC (Business Management)	05	2 yrs	03	1907	1910

16	Diploma in Commerce	02	2 yrs	0	07	07
17	SSC (Vocational)	31	2 yrs	151	3082	3233
18	Dakhil (Vocational)	31	2 yrs	0	301	301
19	Diploma in Medical Ultrasound	-	1 yrs	0	28	28

1.1.1 DIRECTORATE OF TECHNICAL EDUCATION AND TVET SYSTEM

Directorate of Technical Education (DTE) was established in 1960 in Bangladesh. It is the main implementing agency of Technical and Vocational education and is a directorate under the Technical and Madrasa Education Division, Ministry of Education. The main activities of DTE are human resource management, operating development work, supervising and monitoring academic activities and creating connectivity with national and international agencies. The total number of TVET institutes under DTE is 119 and covers three level of learning activities; certificate level, diploma level and degree level. In certificate level there are 64 TSCs and 1 Vocational Teachers Training Institutes (VTTI). In Diploma level there are 49 Polytechnic Institutes. In degree level there are 1 Technical Teachers Training College (TTTC) and 4 Engineering Colleges. Details of the Institutes information is shown in the table-02

Table-02: Institutes Information under DTE (Data Source: DTE report 2017-18)

Sl	Institute Category and Types	Number	Upcoming Number of Institutes by 2021-2025
1	Technical Teachers Training College (TTTC)	01	1+8=9
2	Engineering College	04	4+1+4=9
3	Vocational Teachers Training Institute (VTTI)	01	01
4	Polytechnic/Monotechnic Institute	49	49+4+23=76
5	Technical School and College (TSC)	64	64+100+8+389=561

1.2 SIGNIFICANCE OF THE STUDY

TVET is often seen as "last choice education" because lack of quality. High-quality TVET, on the other hand, leads to a higher status and improved attractiveness of TVET (UNESCO, Quality Assurance of TVET). Therefore the standard and **Quality Assurance** should be applied to TVET. Bangladesh is highly prosperous country considering its human potentials. In recent enrollment in TVET has been expanding significantly in the last two decades. Interest to TVET from policy maker to academicians is also an encouraging feature; Bangladesh government has given more emphasis on TVET and declared it as the priority sector for skills development of the country. The government of Bangladesh has given more emphasizes on the the expansion and quality of TVET system in the country and has set a target of increasing student enrollment 20% by 2020, 30% by 2030 and 50% by 2041 from existing 14% in 2016 (BTEB, 2016) This enrollment has a direct correlation with quality. TVET system needs quality training to meet the local and global job market requirements as it is considering as one of the major tools for employment generation and enhancing productivity of the youth. But, quality is till a big challenge to harness the human potential into human resources. To get a comprehensive picture about the quality and strength of TVET sub sector it is better to know about the quality of the TVET sub-sector with its opportunity and challenges are facing. Considering these issues the research will bring a scenario with good knowledge on TVET with the following feature:

1. A comprehensive informative and knowledge about the potential of Bangladesh and significance of TVET for human capital development;
2. A complete picture of challenges prevailing in TVET sector that need to face and meet to utilize the opportunities and boost human resource development programme in Bangladesh;
3. Knowledge of quality measuring indicators and how these indicators can be used to measure the effectiveness of TVET in Bangladesh context. To measure the quality of the system is vital and must measure with the measuring tools which is suitable for country's context. This research will be organized to identify the suitable quality indicators considering education aspects as well as the whole education system of the country.
4. Policy reform proposal through which Bangladesh TVET system can be reformed and transform the system as much effective and quality.

As a whole this research will be usefull to policy maker, TVET administrators, quality assurance agencies, TVET accreditors, TVET recruiters, practitioners and all stakeholders for future planning and project preparation in TVET sector.

1.3 PURPOSE OF THE RESEARCH

To identify quality indicators that will be used to assess the effectiveness of TVET system, unvail the opportunities and identify the challenges that are prevails in the TVET system and formulate policy reform to face the challenges and best utilization of the opportunities and improve quality of TVET in Bangladesh

1.4 RESEARCH QUESTIONS

This study has been organized with the following questions-

1. **What are the Quality Indicators** that can be used to assess the effectiveness of TVET system in Bangladesh?
2. **What are the opportunities** that are available in Bangladesh TVET System?
3. What are challenges do exist in Bangladesh TVET system?
4. **How Policy options** can be formulated to overcome the identified challenges and improve the quality of TVET in Bangladesh?

1.5 SCOPE AND LIMITATIONS

The study will cover formal TVET system and has been organized and conducted within the following boundaries:

1. Only BTEB affiliated SSC Vocational, HSC Vocational and Diploma in engineering level formal TVET courses has been studied.
2. Among the quality indicators only student teachers ration (STR), Teachers quality, selection criteria, and employability of the graduates will be assessed.
3. Though the samples size covered almost all certificate and diploma programme but special attention and analysis will be done on DTE and its TVET institutes.

1.6 THEORY AND FORMULA USED IN THIS STUDY

Education System Performance Analysis: Theory and Practices

This study has been organized with the following theory and formula used by the UNESCO Institute of Statistics (UIS), Education Indicators Technical Guidelines, November 2009

Education System Analysis (ESA) Tools:

Selected aspects are demography, Access, Internal Efficiency, Quality, External Effectiveness, Management and Financing. Under each aspect there are some measurable indicators and under each indicator some sub-indicators are used to measure the effectiveness of education system.

Demography: indicators and sub-indicators are:

- Distribution of Polpulation. Sub indicators are
 - Age (Gender Sagregated)
 - Rural and urban
 - Hilly/Char areas
- Ratio between working and non-working population
- Least dependency ratio
- Population education level by employment

Access: Indicator and Sub-indicators are:

- Net Intake Ratio (NIR)
 - Grade 9 and 11
 - Boys and Girls (Gender sagrigated)
 - Private and Public

Internal Efficiency: Indicator and Sub-indicators are:

- Dropout rate
- Repetation Rate
- Failure Rate
- Coefficient of efficiency
- Progression rate (Programme wise, public private, gender sagrigated)

Quality: Indicator and Sub-indicators are:

- Students-teacher ratio
- Curriculum content
- Assessment and testing mechanism
- % of trained teacher with teachers training an dindustrial experience
- Instructional facilities
- Learning outcome (Result)

External effectiveness: Indicator and Sub-indicators are:

- Time needed for getting first salaried employment
- Self employment
- Employers view about the graduates
- Entry to further education
- Graduates view about own institute

Management: Indicator and Sub-indicators are:

- Organization structure (DTE, BTEB, BMET etc)
- Role Range and Volume of function
- Institutional strengthens (Acts, Policies, Regulations)
- Organizational Strengths (Staff background and capacity in planning programme action planning for operationalization including curricula preparation monitoring and evaluation and MIS for implementation)

Financing: Indicator and Sub-indicators are:

- TVET financing policy
- Govt expenditure in TVET (% against whole education budget)
- Per capita expenditure for TVET
- Share of GDP for TVET

Definition of Some of the Key Term/Indicator:

Enrollment Rate: The enrolment rate is the ratio of pupils (students) of a given age, enrolled in an educational institution or system, to the total population of the same age

Net Enrollment Ratio (NER): Net Enrollment Ratio is defined as actual age group of students enrolled in the grade divided by age group population for that grade and multiplied by 100

Student Teacher Ratio (STR): is one of the main quality indicator (Proxy Indicators) that focuses the quality situation of any teaching learning process. For calculating the STR total number of student and total no of teachers is the result of STR.

Coefficient of Efficiency (COE): Devide the ideal number of student year for a cohort by the actual number of student year required to produce the same number of graduates and multiply the result by 100. The higher the COE the better the performance and the resulting effect is lower dropout, failure and repetition rates. With COE 100% there is no dropout, failure and repetition. As per the BANBEIS report 2009, BTEB updated information 2010 calculation of COE for SSC (Voc) is: Dropout rate =23.38%, Failure rate=14.38%, repetition rate=12% Planned time 2 years, time taken for graduation for a cohort is 2.75 years in average, COE= $2/2.75=73\%$

CHAPTER-TWO: LITERATURE REVIEW

This study considers principle concept of Quality TVET , specially considering the key features which includes education system analysis with access of TVET in the main education system, a standard ratio of students and teacher (STR) for quality delivery and operating project based learning, selection recruitment of quality teachers, teachers training for continuous professional development, quality tools and equipments, infrastructural facilities, engagement of industry with the TVET institutes for meet the challenge of globalization, ICT revolution, 4th industrial revolution (IR 4.0), Climate Change & Sustainable Development. The area is wide and need to cover nation wide but considering the limitation of time and resources, there are relatively few studies will be considered in the area of quality TVET in global and Bangladeshi perspective. So, this study considers the literatures, policy papers, Government Plans, projects and journals which reflect the knowledge regarding assessment of education system in the present technological changes in the industry and in the job market have been considered in this review. There are four interrelated area that is reviewed in this study; these are quality measuring indicators to assess and measure the effectiveness of TVET in Bnagladesh, the opportunities that are prepailling in Bangladesh TVET system, the challenges are facing and finally the policy and legislative framework in which the TVET is operating.

The Technical and Madrasha Education Division (TMED) prepared an ‘**Integrated TVET Development Action Plan**’ to achieve Vision-2021 and SDG -2030 (TMED, Ministry of Education, Bangladesh, 2018). 50 (fifty) activities have been described in chapter one. TVET teachers’ recruitment criteria were mentioned comprising with industrial experience, teaching experiences and training. Formation of a separate teachers’ recruitment commission was emphasized in the plan. ‘National Education Policy-2010’ MOE, Bangladesh also provided a guideline for selection of quality teachers with establishment of a separate recruitment commission for the teachers (Sorce?). National Skills Development Policy-2011, by NSDC, GoB has introduced a separate chapter titled “Certified Instructors and Trainers,” where detailed recruitment criteria has been mentioned including the industrial experience and training for TVET teachers and instructors.

TVET enrollment is rapidly increasing and government has given more emphasis and declared it as the priority and set a target of increasing student enrollment rate to be achieved 20% by 2020 and 30% by 2030 (Bangladesh Technical Education Board (BTEB), 2016). This increasing trend of enrollment has a direct correlation with teachers’ recruitment. As per the Bangladesh Education Policy-2010 standard student teacher ratio (STR), is 12:1 (MOU, GOB, 2010). and considering this ratio with 15:1, it means By 2020 thereare further 142867 ore TVET teachers will be needed even to keep this ratio 15:1. The present TVET teachers’ size is calculated as 58404 as per the data of BANBEIS (BANBEIS, 2013). It appears that minimum 84465 or more number of TVET teachers (due to vacancies for training and retirement) will be newly selected/recruited to maintain teaching learning function by 2021. Addressing the issues of teaching learning quality a book title ‘TVET Governance Reframmed, Ensuring Quality Teaching Learning’(Rafique A. , 2014), Rafique, Abdur (2014) mentioned, “In Bangladesh almost all the TVET institutions and the TVET system are facing the challenges of low qualification of teachers, very high students’ teachers’ ratio (STR), inadequate facilities and infrastructure, low payment and low ability of teachers, low financing of students, academically uncoordinated with other stakeholders etc. The reasons for the serious crisis concerning the STR are not simple either to explain. This partly may be attributed to the unusually lengthy and faulty teachers’ selection and recruitment process, absence of mandatory standards, inadequate flow of resources and lack of attention.

Teachers, managers and other staff selection, recruitment, promotion and promotional development should be done by the GOB both for public and private institutions as per the approved teachers' qualification framework". Bangladesh TVET teachers' selection and recruitment process are performing by different government and state owned organizations; like PSC, TMED, BTEB, NTRCA etc. these organizations have specific criteria and recruitment process along with the government non government TVET providers. 'Bangladesh Civil Service (Age qualification for direct recruitment) Regulation 2014(Ministry of Public Administration, Bangladesh, 2014)' mentioned post of BCS technical education cadre and its criteria for direct recruitment. TMED, MOE introduced a recruitment regulation title, 'The directorate of Technical education and institutes under the DTE and its non cadre teachers and staff recruitment regulation-2020(Technical and Madrasha Education Division, Ministry of Education Bangladesh, 2020)' in this regulation 12607 number of posts has been newly created under the DTE institutions and its selection criteria has been developed and categories recruitment into four types; direct recruitment, promotion, posting and Deputation or Transfer and set the criteria for direct recruitment. Non-Government Teachers Registration and Certification Authority(NTRCA, 2021) has introduced for certifying candidates for being teachers of non-government educational institutes and they have been set criteria for for each of the teaching post and conducting a written test yearly. The certified candidates are eligible candidate of Private TVET teachers. Bangladesh Technical Education Board (BTEB) has introduced its recruitment regulations title, "Recruitment regulations for the private TVET institutes teachers' recruitment-1996". In this regulation all government and non-government institutes post has been mentioned with its selection criteria has been set comprehensively. It has been set criteria for the teachers of Private polytechnic and vocational (MPO supported). Some special NGO like UCEP (UCEP, Bangladesh, 2020) has their own criteria of trainer/instructor including maintain minimum qualification criteria set by BTEB. The Bangladesh Technical Education Act-2018(BTEB, 2018) mentioned its organization mandate to introduce recruitment regulation of all its accreditate institutes and its teachers.

Most of the developed and OECD countries are following selection and recruitment process with introducing a national/regional teachers qualification framework. Innovation Strategies in South Asia Teachers Professional Development, Special Focus on Bangladesh ADB-2017, noted with the national teacher development framework. Teachers' qualification framework for ASEAN, title "Regional TVET Teacher Standard for ASEAN" has been identified Essential competencies required for a TVET Teacher. It has been clearly demonstrating all the required criteria to being qualify for a TVET teachers at the time of recruitment and after te recruitment what will be the other competencies for his/her professional competencies. As per the ESA (Education System Analysis) quality represent with basic two indicators along with the fulfillment of the curriculum requirements. These two indicators are Students Teacher Ratio (STR) and % of trained teachers.

Quality Assurance in European Union: Europe has developed the Common Quality Assurance Framework (CQAF) in VET in an effort to increasing transparency and consistency between Member States. It provides a common framework and tools to Member States to improve, monitor and evaluate their quality assurance policies and practices. The CQAF consists of four main components: a model; a method for assessment and review; a monitoring system; and a measurement tool. A set of coherent quality indicators was also developed, which includes input, process, output and outcome measures in VET. The European has developed a list of indicators to assess the quality of TVET systems, especially in Europe. The indicators are: relevance of quality assurance systems for VET (Vocational

Education and Training) providers, Investment in training of teachers and trainers, Participation rate in VET programmes, Completion rate in VET programmes, Placement rate in VET programme, Proportion of VET programme completers who are placed either in the labour market, further education or training (including university) or either destination within 12-36 months after the end of programme. A large period of transition to the world is required to measure the external effectiveness of education, especially in high level training, Percentage of VET programme completers who are employed after the end of training, utilisation of acquired skills at the workplace, unemployment rate, prevalence of vulnerable group, mechanisms to identify training needs in the labour market. The indicator shows information on Mechanisms set up to identify changing demands at different levels and how the Mechanisms are effective and schemes used to promote better access to VET.

Australian National Training authority revealed that six more frequently used quality indicators in the countries studied were education attainment; teachers; learner support; articulation; learning environment; and demographic and inclusiveness. **UNESCO-UNEVOC Quality Indicator of TVET** are fitness to purpose of TVET, cost effectiveness, curriculum and programmes, infrastructure and training equipments, training Plan, assessment Process, quality/ competence of instructor/trainees. The Directorate of Technical Education (DTE) has conducted a tracer study with the support of European Union and found a poor employment outcome of TVET in Bangladesh (DTE, TVET Graduate Tracer Study, 2021). The report suggested furthering improving the quality of TVET through emphasizing the practical of training on modern equipments, communication skills, improvement in syllabus and curriculum and relevant career guidance service. The report also addresses DTE and BTEB to set a reasonable student teacher ratio.

Effectiveness of TVET in achieving Sustainable Development Goals (SDG) is also remarkable. In a recent review “Four Years of SDGs in Bangladesh” published in February 2020 reviewed that targets no 4.3 and 4.4 are relevant to TVET and good work practices. Participation in TVET and tertiary education is not satisfactory and below the MDG target of attaining full equality. Gender-based discrimination still remains one of the most difficult hurdles to realising the right to education. Inclusive, gender-responsive framework, second chance and non-formal education have to be recognised and implemented dynamically to end all forms of disparity and inequity in education. The challenge is to turn education into a rights-based tool for building a just and equitable society for breaking the cycle of trans-generational disadvantages. Aligning science and technology education with the development plan of Bangladesh and the objective of meeting the SDGs must be seen as a challenge, as well as an opportunity for Bangladesh. UNESCO, in one of its 2015 report, has stressed the role of science and technology leading to innovation (UNESCO, 2015). Significant investment is needed for this in order to build a solid knowledge base in science, technology and innovation. To address the needs of SDGs, Bangladesh will have to increase the capacity in higher education significantly. In this connection, it must be noted that, Bangladesh’s

budgetary allocation for higher education is less than 0.5 per cent of the gross domestic product (GDP); this is way lower than some of the other least developed countries (LDCs). Education policy implementation. Slow and fragmented approach to implementing the Education Policy 2010. Needs urgent attention

The government does recognise that human capital is a key determinant of economic growth and poverty reduction in Bangladesh. It is committed to Education for All and to the SDGs, and has integrated them in its development plans and actions. The 7FYP identifies improving education quality as the most important challenge facing the education sector. The Plan aims to improve the teaching–learning process in school, ensure participation, reduce disparity, promote decentralisation, and step up planning and management in the sector. The National Education Policy, 2010 considers primary education as a fundamental anchor of the country’s education system and aims to achieve universal, compulsory, free and uniform quality primary education. Development partners have also been extending support to the education sector in Bangladesh on a sustained basis. The rapid socio-economic transformation of Bangladesh and its growing young population is generating a strong demand for high-quality education. Progress in ICT is making education more accessible and bringing in innovation in teaching and learning methods. This gives countries such as Bangladesh opportunities to leapfrog barriers to upgrade the education system and build up the needed human capital at a faster pace. Finally, the fact that SDG 4 is a catalytic force, connected to all the other Global Goals, needs to be appreciated and emphasised. Government, NSAs (actors), development partners and other stakeholders who share responsibility for implementing SDG 4 and the Education 2030 Agenda must strengthen their efforts further. They must work together to address the challenges identified in the paper by taking an active part in the entire value chain in the education sector covering policy-making, resource allocation, implementation and monitoring. It is reckoned, if appropriate steps are taken in view of this, with the urgency it deserves, Bangladesh will be able to attain the aspirations of Goal 4 by leaving no one behind. (Four Years of SDGs in Bangladesh: Non-State Actors in Delivery Partners, Citizens Platform for SDGs in Bangladesh, February 2020)

National Skills Development Policy: The National Skills Development Policy is a comprehensive policy for guiding the skill development strategies of both public and private sectors and facilitate improved coordination of all parties involved in education and training in Bangladesh. This Policy provides the vision and direction for skills development, setting out the major commitments and key reforms that government is implementing in partnership with industry, workers and civil society. The policy extends and builds on other major government policies such as the Education Policy of 2009, Non-Formal Education Policy of 2006, Youth Policy of 2003, National Training Policy of 2008 and the NSDC Action Plan of 2008. The policy is the result of the collective efforts of government agencies involved in TVET and skills training, employer and worker organizations and private training providers and NGOs, all with the common goal of reforming Bangladesh’s skills development system. The policy was approved by the Cabinet in January 2012. TVET sector of Bangladesh is now undergoing major reform in terms of skills development, TVET policies, credentialing,

industry linkages under Competency Based Training and Assessment (CBT&A) system. TVET reform agenda included some multiple inter-related outputs as:

- Modified TVET legislation
- National skills development policy
- National Technical and Vocational Qualifications Framework
- Bangladesh TVET QA System
- TVET data system
- Recognition of Prior Learning (RPL)
- Model for competency standards development and new demand driven courses
- New training programs for TVET teachers and principals
- Enhanced work based learning including apprenticeships

Main features of the National Skills Development Policy: National Technical & Vocational Qualification Framework (NTVQF) o Competency Based Training & Assessment (CBT&A) o Quality Assurance System (QAS) o Strengthened role of Industry Sectors in Skills Development o Competent & Certified Instructors and Trainers o Effective & Flexible Institutional Management o Strengthened Apprenticeships o Recognition of Prior Learning (RPL) o Access for Under-privileged groups o Accurate Labour Market Informatio

Industry Skills Councils (ISCs): The TVET reform project has helped establish ISCs in different sectors like agro-food processing, transport equipment (e.g. shipbuilding), leather and leather products, information technology and tourism & hospitality. Meanwhile, the SDP has established similar councils (which they call sector working groups) for construction, light engineering, readymade garments& textile and the informal economy. Beside these sectors since 2019, other established sectors are furniture, pharmaceuticals, ceramic. Two other sectors are under formation as jute and creative media The responsibility of ISCs are to conduct survey of skills demand for their sectors and identify the priority occupations where training is needed. They have also recommended technical experts as members on the Technical Sub Committee and Standards and Curriculum Development Committees (SCDCs) for developing competency standard and Competency based curriculum. According to the policy recommendation BTEB is tuning and aligning the traditional TVET courses to the National Technical and Vocational Qualifications Framework (NTVQF)

Apprenticeship Act: Apprenticeship is a training strategy with requirements that should be clearly stated in national laws and regulations. The national legal framework should provide the guidance from the policy level. These laws and regulations establish minimum requirements for protecting the welfare of the apprentice, such as: a. The length of training, b. Type and amount of related instruction c. Supervision of the apprentice d. Appropriate ratios of apprentices to regular workers e. Apprentice selection and recruitment procedures, etc Apprenticeship process was introduced in Bangladesh in the 1850 through an act designed by the British Administration. Given the nature of the 1850's act, it was found to be inadequate to function properly these days. This resulted in a new ordinance in 1962. Through this ordinance, candidates received apprenticeship under the umbrella of BMET. Now Apprenticeship act is the part of Bangladesh Labour Act, 2006 where Chapter eighteen indicates the application, special definition related to apprenticeship, form of tripartite

advisory committee, obligations of employers, the prevalence to relief from income –tax, advice and guidance to employers, obligations of apprentices, powers of entry, inspection and delegation of powers

Bangladesh Technical Education Board act: Bangladesh Technical Education Board established by the then “The Technical Education Act 1967 and was the first legal power as well as binding for BTEB. After long interval in 2018 Bangladesh Technical Education Board act, 2018, passed in November 14, at the Bangladesh National parliament with following legal activities a. Manage, Accreditation and Control Technical and Vocational Education and Training b. Determining the TVET courses, developing curriculum and preparing syllabus c. Prepare books and learning materials according to the board curriculum d. Conduct Examination, assessment, determining fees, result publication and certification of TVET e. Student admission in BTEB accredited TVET institute/ organization and developing rules and regulation for inter organizations students and trainee transfer. Inspection, Supervision and Monitoring BTEB accredited TVET providing institute/ organization g. Recognition of the Prior Learning Regardless this act h. Establishment of Information Management System and it’s Maintenance for BTEB accredited TVET providing institute/ organization i. Collection of the TVET related information regarding need of the labour market through Industry Skill Council j. Develop competency based training and assessment standard and curriculum in cooperation with Industry Skill Council k. Determining eligibility criteria for National Technical Vocational Qualification Framework l. Providing Scholarship, Medals and Awards in TVET field m. Contract with other organization to fulfill the purpose of this act and n. Performing other duties as instructed by the government

National Skills Development Authority act: National Skill Development Act, 2018, passed in October 01, at the Bangladesh National parliament with empowering and getting the mandate of following legal activities a) Prepare National Skill Development Policy, Strategy and Action Plan b) Coordination, monitoring and evaluation of activities for preparing Key Performance Indicator(KPI), unique training curriculum and their implementation to develop skill human resource according to the need of domestic and international labour market in government and private training institutes. c) Publish the information related to the need of the national and international labour market forecasting report. d) Recognition of the Prior Learning Regardless this act, where applicable e) Supervising and monitoring the skill related project and program f) Perform necessary arrangement for developing quality of training, certification and mutual recognition g) Constitute Industry Skill Council and provide necessary support. h) Strengthen the industry linkages i) Initiate any other skill development activities in own consideration and j) Perform Any other responsibilities as per instruction of government or governing board. Further review will be on these documents to relate this study: Situation Analysis of Bangladesh TVET Sector: A background work for a TVET SWAp, Khan A, 2019.

Blue Ocean Strategy for TVET System is a new interpretation of policy formulation in TVET with the four main components of the framework, these are CREATE new customers, opportunities and employment options, REDUCE overlapping of policies, rules and regulations, RAISE professional competence and status of TVET and ELIMINATE

obsolescence system. In Bangladesh there are many policy formulation or initiate to formulation is concern with the blue ocean strategy like National Skills Development Policy 2011 and National Skills Developemnt Policy 2020 (Proposed). Through these two policies it can be assume that the impenmenting agencies will face an unwanted competition (Red Ocean environment) and may create conflicting situation. (Blue Oean Stategy, W.Chan Kim and Rence Mauborgne, Harnard Business School Press2005.). (Mauborgne, 2005)

Note: Total literature review will be organized further as per the title and variables in the study

CHAPTER-THREE: METHODOLOGY OF STUDY

3.0 INTRODUCTION:

The methodological structure of the whole study comprises with relevant methods, strategies and approaches applied to meet the objective of the study. These methods, strategies and approaches were time to time adjusted in time of application to ensure best outcome of the study and are described with the following sub-chapters.

3.1 Strategy of the study is determined as mixed methods following the matrix

3.1 STRATEGY OF STUDY

Research Question	Strategy of Inquiry	Overall Strategy of Inquiry
1. What are the Quality Indicators that can be used to assess the effectiveness of TVET system in Bangladesh?	Qualitative	Mixed Method will be mostly applied
2. What are the opportunities that are available in Bangladesh TVET System?	Qualitative	
3. What are challenges do exist in Bangladesh TVET system?	Qualitative & Quantitative (Mixed)	
4. How Policy options can be formulated to overcome the identified challenges and improve the quality of TVET in Bangladesh?	Qualitative & Quantitative (Mixed)	

3.2 DATA SOURCE

Research Questions (RQ)	Data Source
1. What are the Quality Indicators that can be used to assess the effectiveness of TVET system in Bangladesh?	Secondary : TVET QA documents, Recent research and study, GOB Policy
2. What are the opportunities that are available in Bangladesh TVET System?	Secondary: Research papers, journals, reports etc.
3. What are challenges do exist in Bangladesh TVET system?	Primary: TVET Teachers'/ Principal/Managers, Teachers, TVET Experts and Administrator
4. How Policy options can be formulated to overcome the identified challenges and improve the quality of TVET in Bangladesh?	Mixed: Primary- TVET policy formulator, policy makers Policy review from contemporary documents

Identified Primary Sources are: TVET Teachers, Principals/managers, TET experts, TVET administrators and policy formulators.

Secondary Sources of the study are identified as: Review documents of TVET Quality Assurance System, Quality Indicators of TVET, policies, rules and process of TVET teachers in Bangladesh specially used for the teachers of SSC, HSC and Diploma in Engineering Programme by public and Private TVET Institutes, Related documents of Teachers qualification framework, standards, Recruitment rules of selected countries for the same level of TVET programmes.

Specific Review documents are : Action plan of TMED, Tracer study reports, NEP-2010, NSDP-2011, NSP-2020, NSDA Act-2018, BTEB Act-2018.

3.3 SAMPLE AND SAMPLING

Sample Size and Sampling has been decided as per the following matrix

Data Source	Sample Size	Sampling
Teacher	100. As per Sluven's formula: $n=N/(1+Ne^2)$ with considering 10% margin of error= $49696/(1+496.96)$ =99.79	Purposive Sampling: Diploma: Polytechnic (Public, Private)-30 HSC+SSC (VOC): TSC-15, HSC (BMT): Private-15 SSC: (Public, Private, Special):20, SSC+ Short Tr: TTC:10. Occupational Course (CBT&A):10 Short Course: Basic: 10, Total 110
Principal/Manager	20	Polytechnic (Public, Private, special):5 Dhaka/Central/UCEP (Dhaka), HSC/SSC(VOC): TSC-5 (Manikgang/Gazipur/Narayangan HSC (BMT): Private-3 (Jashore/Kustia SSC: (Public, Private, Specl):3, SSC+ Short Trng: TTC:2 Occupational Course (CBT&A):2 Short Course: Basic: 0, Total-20
Quality Control Body (BTEB)	1	Purposive selection: From BTEB: Director (Curriculum)

3.4 DATA COLLECTION TOOLS

Data Source	Data Collection Tools	Expected Findings
Teacher	Questionnaire (Semi structured)	Identification of Challenges
Principal/Manager/Experts	Questionnaire and Interview note	Identification of Opportunities and Challenges
BTEB (Quality Control Body)	FGD	Findings existing Quality Indicators and policy formulation
Policy formulator (TMED/DTE)	KII Note	Validation of findings and formulation of recommendations

3.5 RESEARCH MATRIX

Research Question	Respondent	Population	Sample size	Tools	Pre-test Number	Expected Outcome
What are the Quality Indicators that can be used to assess the effectiveness of TVET system in Bangladesh?	Review doc	-	-	Chart/ Review Note	N/A	Identified indicators
What are the opportunities that are available in Bangladesh TVET System?	Review doc	-	-	Question naire 2 Sets	N/A	Identified Opportunities:
What are challenges do exist in Bangladesh TVET system?	Teacher/Principal Review Tracer Study	50931	100+16	Tracer Study and review	N/A	STR, Quality of Teachers & Training PPP, Employment rate, Drop Out,
How Policy options can be formulated to overcome the identified challenges and improve the quality of TVET in Bangladesh?	Policymaker TVET Expert Administrators	Purposive selection	5	KII note	N/A	Identified New idea on TVET Quality Improvement

Data Collection Area

- 100 TVET teachers from the selected Institute around whole Bangladesh
- 4 Sample TVET Institution located at Jashore, Kustia, Bogura and Dhaka
- DTE, BTEB for KII

Data Analysis: For Quantitative Data analysis excels was used. Moreover using cloud forms makes automated reports for pre assessment of the result for further analysis and than it was converted and customize with using excel data sheet. For qualitative data charts, notes and description were used.

3.6 ETHICAL CONSIDERATION

Maintain ethics in sampling size determination based on size of the population and using formula (Sluvin's formula) not set it arbitrarily and don't on convenience (like choosing close colleagues, friends those who are easily accessible). Trying best to avoid in the following common errors made any research work. Ethics and practices followed in the study are shown in the following table.

Common error	Our practice to avoid it
Selective observation that confirms pre-existing beliefs	Tried to make all statement based on literature study/review, find other study and relationship, decide research approach before takes notes on supervisor/advisors notes etc
Inaccurate observation	Careful literature review helps us for misremembering the essential data and information during data collection.
Made-up information	Asking opinion of others makes its more reliable. Rely on prior research, study, theory makes our interpretation more reliable.
Illogical reasoning	Extensive use of peer review among the team members.
Ego involvement	Trying to remain neutral, using team approach, sharing research task with others.
Pre-mature Closure of enquiry	Keep looking for answer, using frequently different approach of data collection.
Mistifications happens	Keep looking for answer when we face tempted to rely on enchanted explanation specially from advisor.

Other ethical practices are:

- In every stages of findings it is further checked and verified with the relevant secondary data
- Comparative assessment were made with other countries as background of the study were set to see a quality comparison of TVET with other countries

CHAPTER FOUR: DATA ANALYSIS AND FINDINGS

4.0 INTRODUCTION

In this chapter data analysis and findings were prepared as per the result of received data and information from both primary and secondary sources. The findings and result of the study are describing now with the following sub-titles.

Chapter	Sub-Title	Intended Findings
4.1	Identification of Quality Indicators	List of common and selected indicators
4.2	Identification of Opportunities	List of Oportunities in BD TVET system
4.3	Identification of Challenges	Findings based on selected indicators:
4.3.1	Students Teachers Ratio (STR)	Trend/situation of Students Teachers Ratio
4.3.2	Teachers and Staff position	Trend and situation of sufficient teachers and staff in TVET institute
4.3.3	Teachers and Staff projection	Demand of TVET teachers from 2020- 2030
4.3.4	Teachers Selection criteria	Basic selection criteria that are commonly recognized for recruitment of TVET teacher
4.3.5	Teacher Recruitment Process	A situational findings on BD TVET teachers recruitment process and a comparative case study report
4.4	Employment Rate and Socio Economic Status of TVET Graduates	Direct employment, self employment, throughput ratio, Higher education mobility of TVET graduate in Bangladesh
4.5	TVET Policy Reiew and Other findings	Outcome from TVET related different Acts & Policies (NEP, NSDP, NSDA, BNQF, BTEB etc) Overlapping and implementation status, Organizational Capacity, and performance etc

4.1 IDENTIFICATION OF QUALITY INDICATORS

This study firstly defined the quality indicators which are applicable for measuring quality of an education system and secondly identify different quality indicators that are using in different countries and introducing by UNESCO incorporating different quality assurance system.

Definition of Indicator: Firstly the definition of the indicator as per the OECD is “A quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, to reflect changes connected to an intervention, or to assess the performance of a development actor”. As per the USAID an indicator is a variable which purpose is to measure change in a phenomena or process. The simplest operational definition of indicator is a tool designed to measure or assess to what extent the planned objective or activity is required to be achievedbeing achieved or to be achieved. Practitioner agreed to set common characteristics of

an indicator is represent by SMART where S-Specific, M-Measurable, A-Acheivable, R-Realistic and T- time bound.

For finding out a clear picture of the TVET quality it is necessary to analyse as many indicators as possible for which data and information are available. For analysis of total TVET programme a refined and representative list of 10 indicators covering 6 aspects has been considered to analysis in recent study of programme and performannce analysis of TVET Sub-Sector within the frame of education sector analysis (Rafique 2014). These selected aspects and indicators for TVET quality measurement are shown in the following table:

Table- Education System Analysis (ESA) reviewed Aspects and Indicators for Education System Performance Analysis

Aspects	Indicators
1. Demography	1. Least dependency ratio
2 Access	2. Net enrollment ratio
3. Internal efficiency	3. Coefficient of efficiency/Employment rate
4. Quality	4. Student Teacher Ratio (STR)
	5. Percentage of Trained Teachers
5. Management	6. Teachers Selection Entry criteria 7. Recruitment Process 8. Promotion Procedure
6. Financing	9. Share of GDP to education and TVET 10. Private financing of Education unaccounted to GDP

Data Source: Review of Education Indicators Technical Guidelines 2009 of UNESCO Institute of Statistics (UIS)

Through conducting this study we found different indicators are practices by the different country and UNESCO introduced a common quality indicators for measuring quality of the countrys own context. Among these, selected quality indicators shown left most columns) in the following table:

Selected Indicators	Basis of selection
Student Teacher Ratio (STR)	These indicators are selected as per data available in Bangladesh TVET system.
Success/Completion Rate	
Teachers Selection Criteria	
Availability of Teachers & staff	
Employment Rate	

4.2 IDENTIFICATION OF OPPORTUNITIES IN BD TVET SYSTEM

Bangladesh is one of the fastest growing economy in the world, supported by a demographic dividend, huge potential of youth and entering about 2.2 million working age population in the labour market every year, strong export track of the ready-made garment (RMG), steady remittances from 10 million migrant workers, and stable macroeconomic conditions. Moreover, human development outcomes improved along many dimensions (World Bank Report). Bangladesh is coming with its highest number of working age population of 128 million by 2030 in the 100 yrs from 2000 to 2100. It will open the highest opportunity for harnessing the human resources in to human capital. Review of the relevant document study finding the fact that TVET is viewed as a tool for productivity enhancement and poverty reduction in many countries in the world. (Pavlova Springer Plus 2014, Volume-3). As there is a strong correlation between the proportions of TVET and per capita income, many countries have taken steps to strengthen policy guidance and regulatory frameworks for TVET to improve partnerships with private sector and employers. Considering the fact that skilled human resources are the primary asset of many countries and TVET is considered as the tool for producing skilled manpower the opportunities are identified in Bangladesh TVET system by the review study under this research work in two context of the country

1. Macro Context
2. Micro context

In macro context Bangladesh with population of 0.157 billion was the 8th populous country in 2013 and will remain 8th position with 0.202 billion in 2050 and will slip down to 14th with 0.182 billion in 2100. Bangladesh will have highest number of 128 million working age population by 2030 and this may be the unique opportunities for Bangladesh through transforming this huge working age population into productive workforce. Quality TVET can play key role for transforming process of skills manpower.

Considering the micro context of the country Bangladesh has the following opportunities as per the government policy documents:

1. Government attention on TVET and set specific target to achieve 20% enrollment by 2020 and 30% enrollment by 2030 (TMED, Intregrated Action Plan 2018)

2. Mainstreaming of TVET with the general education from 2022 (NCTB Curriculum for secondary education 2022)
3. Introducing separate division under Ministry of Education for responsive governance of TVET
4. Government introduce many projects and engage development partners to promote TVET (DTE, progress report 2018)

4.3 IDENTIFICATION OF CHALLENGES IN BD TVET SYSTEM

Following challenges are prevails and identified through data analysis from primary source and documents review of secondary sources. There are many challenges found during data collection when interview with the teachers and managers, but concerning the research questions and limitation of the study following identified challenges are mainly addressed for policy initiatives:

- Student Teacher Ratio (STR) identified based on primary data analysis and compared with existing secondary documents,
- Success Rate (Pass Out, Drop Out, COE) based on result analysis of BTEB and review of Tracer study report 2020 and 1997
- Teachers and Staff position identified based on existing and vacant post analysis
- Teachers projection from 2020 to 2030 based on analysis of national TVET Target
- Teachers selection criteria based on existing recruitment rules and Teachers Recruitment Process
- Graduate employment rate analysis made on TVET Tracer study report 2020 & 1997 and Review of Industry and Labour law

4.3.1 STUDENT TEACHER RATIO (STR)

Student Teacher Ratio (STR) is one of the main quality indicator (Proxy Indicators) that focuses the quality situation of any teaching learning process. For calculating the STR total number of student and total no of teachers is the result of STR. In National Education Policy 2010, Chapter 5.3 STR for TVET is set as 12:1. As per the BANBEIS report STR for 52 polytechnic institutes was found 50:1 in 2018 and for TSC STR is found 36:1 which seems a better picture than the primary data of 33 TSC. Moreover the BANBEIS report identified a significant difference of STR among different regional polytechnic institutes as highest STR found in Mymensingh region is 92:1 to the minimum STR found in Barishal as 36:1

In this study both institute based STR and country wide STR will be found through collecting data analysis and data review by the relevant documents. Through data analysis 104 no of TVET teachers are the respondents from both public and private polytech institute, technical school and colleges, private vocational institutes. Among the respondents

34% respondents have STR with 31-40

21 % respondents have STR with 41-50

27% respondents have STR with +50

Few teachers were found those class size is below 30 no of student mostly from private TVET institute. During the investigation data collected from one of the best polytechnic institute and found they have a total students no 5120 against 63 no of teachers in which contractual (Master role) teachers no is almost same to regular (Permanent) teacher. However the institute STR is $5120/63 = 81:1$.

Causes for High STR:

- BTEB increases the seat capacity of Polytechnic and TSCs from a group size of 30 to 40 and 40 to 50 without ensuring the class room size and other class room facilities
- Due to shortage of teachers Polytechnic and TSCs are combining the group for one teachers
- In some department not a single teachers are available make the STR is not countable

In this study a trend analysis has been prepared on STR and teachers' crisis and will be critically discussed with the next chapter.

4.3.2 TEACHERS AND STAFF POSITION

Teachers and staff are considered as the living inputs in any educational system and playing manipulative and multi dimensional role in controlling the quality of teaching learning process. Directorate of Technical Education (DTE) was established in 1960 in Bangladesh. It is the main implementing agency of Technical and Vocational education and is a directorate under the Technical and Madrasha Education Division, Ministry of Education. The main activities of DTE are human resource management, operating development work, supervising and monitoring academic activities and creating connectivity with national and international agencies. The total number of TVET institutes under DTE is 183 (As on June 2022) and will be 649 by 2025 after completion the ongoing projects. In this study teachers and staff crisis is increasing day by day and found an alarming situation for the upcoming days. In the following table statistical analysis on teachers are shown

Table-3: Teachers Situation under DTE Institutions

Sl	Institute Category	Institute No		Teaching Post		Filled post	Vacant Position
		2022	2025	2022	2025		
1	TTTC	1	8	68	-	18	55
2	VTTTI	1	1	36	-	1	35
3	Polytechnic (old)	49	49	9912	-	1294 ²	
4	Polytechnic (New)	-	27	-		-	
5	TSC (Old)	64	64	2965		1218	
6	TSC (New)	-	497	4600 ¹		135	
	Total	185	646	17581		2666	14915

Data Source: Review of DTE report 2017-18

1. As per the teaching post under 100 TSC project. 2. HCDP21, Bulletin

Analysis-01: Out of total 17581 existing teaching post 2666 no of post means 15% are filled up and 14915 posts is vacant means 85% post are vacant.

4.3.3 QUANTITATIVE CHALLENGES OF TEACHERS REQUIREMENTS 2020-2030:

Table-04: Projected no of Teachers (Base of calculation: 20% enrollment by 2020 and 30% by 2030)

National Target	Analysis findings	Comments	Projected Teachers
20% enrollment by 2020 NER-3.78 million GER-2 million	In 2018 all general Board 78,67,829 no and in BTEB no was- 1,262,761=16.05%	As per GER. 20% enrollment size should be enhanced to 2000159 from existing 1262761 (2018)	
30% enrollment by 2030	Enrollment size will be 8.1 million as per NER	Huge national task for capacity strengthening of both organizational and institutional.	
In 7th FYP increase female participation rate 40% and 20% TVET enrollment-2020	Female enrollment 29.7% in 2019 from 13% in 2014		

Data Source: 1. Enrollment Analysis in TVET, BTEB'2016 2. BTEB Annual Report 2018-19 3. Situation analysis of BD TVET Sector, MAK 2019

Analysis-02: By 2020 (Already we are now at 2022) if TVET enrollment needs to reach 20% then and consider national standard of STR 12:1 then total teachers will be required 166680 against total enrollment is calculated as 2000169. It Means $166680 - 49,696 = 116984$ no of newly recruited teachers will be required.

Analysis-03: If we meet the enrollemnt target-30% by 2030 then students' enrollemnt will be 8.1 m by 2030 based on calculation under the age group enrollment. Then total Teachers' sizes will be $8.1m/12 = 0.675$ million. Means further $0.675 - 0.166680 = 0.50832$ no of teachers will need to be recruited further after 2020 to 2030.

4.3.4 TEACHERS' SELECTION CRITERIA

Introduction: In all developed countries TVET teachers are not selected only based on educational qualification, rather they formulate a competent teacher with required academic qualification along with teacher training (Pedagogy), teaching experience, industrial experience and industrial training. Major criteria for selection of TVET teachers following quality are addressed in all developed and fast developing countries.

- Suitable Academic Qualification (At least one level Higher)
- Teaching experience (At least 1 yr)
- Pedagogy training and professional certification
- Industrial experience and training on the same field

Data Source: ASEAN, TVET teachers Qualification Framework

Findings: “Recruitment regulation-2020 for Cadre and Non-Cadre officer and staff under DTE”, categorises recruitment into four types; direct recruitment, promotion, posting and deputation or transfer using the set criteria for direct recruitment. “SRO- 54, 1996 of BTEB, Service Regulation for Private TVET Institute Teachers and Staff” sets criteria for the teachers of private polytechnic and vocational (MPO supported). Some special NGO like UCEP has their own criteria of trainer/instructor including maintain minimum qualification criteria set by BTEB. In the following Table-9, TVET teachers’ recruitment criteria and process for cadre, non cadre post and other category of teachers are as follows:

Table-5: Selection Criteria of TVET teachers

Sl	Post Name	Criteria for selection	Recruitment Process
1	Principal (Polytechnic)	For Promotion: 3 yrs experience as a vice principal or deputy director and minimum 12 years service experience in grade nine or above post. For Posting: Experience as associate professors of TTTC for three years is needed.	Through promotion, if not available through posting
2	Principal (TSC)	Five years experienced Chief Instructor (Tech) or Assistant Director or Central Store Cum Service Workshop Equipment Officer.	Through promotion
3	Vice Principal (polytechnic)	Five years experience as a chief instructor tech/non tech and minimum 10 yrs service experience in grade ix or above.	Through Posting
4	Chief Instructor Tech/Non-Tech	5 yrs experience as instructor tech on relevant technology or relevant subject or project officer or equipment officer of DTE.	10% direct recruitment 90% through promotion. If not available by promotion than direct recruitment.
5	Instructor/Workshop Super	For Promotion: Minimum 5 yrs experience as a junior instructor in the same technology.	50% direct recruitment and 50% through promotion. If not available by promotion

		For direct recruitment: Second class in B.SC Engineering/B.SC TE. Not more than one 3 rd division/CGPA	than direct recruitment.
6	Junior Instructor	First division/CGPA in 4 yr duration Diploma in Engineering from BTEB	100% direct recruitment
7	Trade Instructor (For Private Vocational Institute)	2 nd division or equivalent CGPA in respective technology in Diploma in Engineering or Diploma in TE or DVE or Agriculture diploma (3 or 4 yrs). 3 rd division is allowed in only one exam.	100% direct recruitment
8	Training Instructor (UCEP), a typical NGO operated TVET provider)	B. Sc/M. Sc in related Technology with at least 5 yrs teaching experience in a reputed similar training institute and specified training certification on specific occupation under the technology cluster, and experience in similar industry mentioned and industry skills. Specific skill required, professional certification, industry experience is included with the mentioned quality criteria	100% Direct recruitment <i>Training instructor is the entry teaching position of UCEP</i>

Source: SRO- 54, 1996 of BTEB, Service Regulation for Private TVET Institute Teachers and Staff”

4.3.4.1 SELECTION CRITERIA FOLLOWED BY DIFFERENT COUNTRIES

“OECD countries” are following a standard¹ for recruiting TVET teachers. As per their standard a good (competent) teacher must possess: required academic qualification along with integrated training and experience components of:

1. Teacher Training,
2. Teaching Experience,
3. Industrial experience,
4. Industrial Training and
5. Management training.

Registered Training Organizations (public and private, universities) that have Certificate in Training and Assessment in their scope of delivery can offer pre-service TVET teacher and TVET trainer training. The duration of Initial Pre-service training in terms of years:

Australia 4, France 5, Finland 5, Germany 5, Japan 4, Korea 4, UK 4, USA 4” (Source...).

According to the standards set out by the Australian Industry and Skills Committee Authority², all VET trainers and assessors must hold a Certificate IV in Training and Assessment and/or a qualification in adult education at a diploma or higher level as well as the appropriate current skills/qualifications/knowledge/abilities for their industry. For those who provide assessment, a

certification in the Assessor Skill Set is sufficient qualification instead of the above, including the same industry skills requirements.

ASEAN introduced TVET Teachers Recruitment Criteria and Standard as at least one year of teaching experience, relevant work experience in industry, hold bachelor degree (**AQRF level 6**), higher skills level than to be conducted, one level approach, train students until post sec level & focus on occupational competence.

4.3.4.2 CASE STUDY: TAMIL NADU, INDIA SELECTION CRITERIA:

India practices different standard in different provinces. For understanding their standard in selection and recruitment of lecturer (Entry post) of polytechnic college as Selection and Recruitment of Lecturer, Polytechnic College, Tamil Nadu, India. The Teachers Recruitment Board (**TN TRB⁴**) under the Govt. of Tamil Nadu inviting eligible candidates for direct recruitment for the post of lecturers in Govt. Polytechnic colleges and special institutions (Engg and Non-Engg). The post of lecturer in Govt. Polytechnic Colleges is considered as a reputed job in the govt sector. Many aspirants aim to become a lecturer and salary provided are the best in the field of teaching jobs. Age Limit: Should not completed 57 yrs Education Qualifications: The candidate should have passed in Tamil Language as part I or part II up to SSLC or PUC/ Higher secondary course levels. If not, he/she should pass the Tamil language test conducted by the Tamil Nadu Public Service Commission within two years from the date of his/her appointment. The candidates possessing equivalent qualifications can also apply for which the Govt. order has been issued. Application link is open; candidate can visit and fill the form. The application is entirely online. After comply all requirement admit card will be provided.

Selection pattern includes the following steps-

1. Computer Based Examination
2. Online examination. Single page 150 MCQ 3 hrs
3. Subject covers: Main subjects, general knowledge
4. Candidates shortlisted (CBE) will move to the next round of recruitment.
5. The selection from CBE will be in the ratio of 1:2 for the next steps.
6. Awarding weightage marks during certificate verification
7. Weightage marks awarded after certificate verification for the short-listed candidates.
8. The candidate securing higher merit in the above rounds will be selected for the post.
9. The final list of selected candidates will be published on the official portal. Candidates can download the result.

Subject covers for selection test: Main subjects plus general knowledge include basic question from the topics: History, Geography, Polity, General awareness (6 months from the month of examination) & general Sc. The selected candidates will receive Rs 56100-177500 (Level 22)

4.3.4.3 DIFFERENCES OF SELECTION CRITERIA AMONG DIFFERENT TYPES OF TEACHERS

ASIAN Teachers qualification and standard defined a good TVET teacher having the required academic qualification (Higher level that to be taught) along with teaching experience, competency certification in teaching methodology (Pedagogy), Industrial experiences & training¹. In this study comparing those criteria respondents' teachers' qualification and gaps are shown in the Table-10

Table6: Selection Criteria differences of TVET teachers at entry post

Teachers Type	Post	Education Qulification	Teaching Experience	TeachingCo mpetency	Industry Experienc e	Industry Training
ASIAN TVET Teachers (Qualification Standard)	TVET Teacher	Bachelor Degree	At least 1 Year	Higher skill level than	Work exp in industry	Occupational Competence
TVET Teachers of Public Institute	Junior Instructor	Dip in Engg First Division or GPA 3.00	X	X	x	x
Teachers of Private Polytechnic Institute	Junior Instructor	Dip in Engg 1 st Div or GPA 3.00	X	X	x	x
Teachers of MPO granted Private TVET Institute	Trade Instructor	Dip in Engg 2 nd Division equ. CGPA	X	X	x	x
Teachers of NGO operated TVET Institutes (UCEP)	Training Instructor	B. Sc/M. Sc in related Tech	√ At least 5 yrs	√	√	√

Analysis:

- For public TVET teachers' educational qualification is the only criterion for selection and recruitment under DTE.
- For public and private polytechnic teachers' educational qualification is same, but for the public and private vocational teachers' qualification has a difference.
- For the teachers of NGO (UCEP) teachers' criteria included higher educational qualification than public TVET teachers with added at least 5 yrs teaching experience, teaching methodological (Pedagogy) certification, industry experience and training.

Analysis: In Bangladesh TVET Teachers selection for public, MPOs and Private Polytechnic Institutes is mostly based on educational qualification. Job description and job specification was not written clearly. Only written and viva voce are taken for selection of teachers. There is no provision for skills test and other criteria to qualify the competency. Few NGOs like UCEP have clear description of job responsibility of each post. They set the criteria combining with educational higher qualification, teaching experience, industry experience and other professional skills certifications.

4.3.5 TEACHERS RECRUITMENT PROCESS

Following are the major findings from the data analysis and result come out both in qualitative and quantitative form and can be summarized with the following points

1. For entry position of TVET teaching post (Junior instructor/Trade instructor) academic qualification is the only selection criteria for recruitment.
2. For public TVET institute junior instructor is the entry post of teaching and first division in diploma or equivalent CGPA in respective technology is the minimum education qualification, but for Private TVET institutions (MPO supported) 3rd division in SSC and 2nd division in Diploma holder can be recruited for a post of trade instructor, i.e. there is a difference in qualification between public and private TVET teacher for the same TVET programme.
3. Teachers' educational qualification is same level (Diploma teachers taught at diploma level), but for vocational programme, teachers' educational qualification is one level higher (Diploma teachers taught at SSC/HSC vocational level)
4. For some NGOs like UCEP, B. Sc/M. Sc in Engineering is needed in the respective engineering field. Along with this qualification, teaching experience, teaching methodology and certifications, industrial experience and training is the compulsory components for selection criteria to qualify to become a training instructor.
5. There is a significant qualification difference in selection criteria between public/private TVET teachers and some NGOs (UCEP, MAWTS, Ahsania Mission etc) teachers. Public-private TVET teachers are selected based on only educational qualification, but NGOs are incorporating with teaching experience, teaching methodology, industrial experience, industrial training along with educational higher degree than to be taught.
6. PSC (detail meaning) is the main recruitment agency for selection of TVET teachers needs to meet at least 16 main steps and more sub steps to complete the recruitment cycle.
7. Selection and recruitment criteria is not same among the following group of TVET teachers
 - Teachers of public and private TVET institutes (MPO supported and UCEP)
 - Teachers of MPO supported private institutes and some special institutes (UCEP)
 - Teachers of public and private polytechnic institutes

4.4 EMPLOYMENT AND SOCIO ECONOMIC STATUS OF TVET GRADUATE

Introduction: Employment rate is one of the main quality indicators of TVET system. It represents the responsiveness and effectiveness of the whole system and a comprehensive picture can be found in tracer study report. Bangladesh TVET system has two tracer study reports: one conducted in 1997 jointly conducted by the DTE, BTEB and IDEB in 1997 and the second one is conducted by the DTE in support of EU funded technical assistance to support the HCDP for BD in 2021. Both reports have been studied and its main findings are pointed out in the next chapter.

4.4.1 TRACER STUDY REPORT-1997

The tracer study was conducted to trace the graduates of 17 polytechnic institutes in the process of getting employment and their performance in the job market and identify the problem of both graduates and the employers for further improvement of the quality of technical education system. The following results were found in the report:

- Among the sample graduates 85% find their employment within 18 months after their graduation including 15% self employment.
- Among the sample graduates 51% got first employment as SAE, 9% as supervisor, 6% as technician and 27% with other designation, 7% were out of any designation.
- In the first entry job 38% got Government and 62% got private jobs. Among the sample graduates in private jobs 23% got more pay than government jobs, 17% similar and 60% got less pay.
- Graduates are ranked fewer advertisements as the highest barrier in finding jobs.
- Graduates rated lack of capital/finance as the highest barrier in creating self employment.
- 55% of the sample graduates indicated that they entered into the Diploma engineering course to study higher engineering courses.
- Graduates are rated availability of facilities are 40% of their requirements and utilization of facilities are second lowest 62%.
- Employment pattern of the surveyed industries were 1:1.65:14 among professional, midlevel technical manpower and craftsman.
- Ability of diploma engineers were rated as lowest among 9 criteria and suggested that proportion of curricula among technical and general subjects should be 70:30.

- Retention rate of students was 82% in 1996 and it is 5% lower than in 1995, The average throughput rate from 16 polytechnic for 10 yrs was 30%. The average pass of irregular and throughput together of 10 yrs was 49%.
- Socio Economic Status (SES) mobility was found as: 41% students' father, 34% graduates fathers average income was seen 30000 BDT/year. More than 60% of the graduates get pay and other benefits was seen 50000 BDT/Year. More than 78% of the graduates' acquire SES higher than 100% of their parents shows a positive SES mobility.

4.4.2 TRACER STUDY REPORT-2020

Recent DTE has conducted another (2nd) Tracer study and has identified the following results:

- 5 TVET institutes under DTE is studied
- Covering Diploma, HSC and SSC Vocprogramme
- Graduation period was 2018 to 2019 and study period was 2019-2020
- 1983 no of TVET graduates were studied and 1792 no was responses (92%)
- Male female proportion was 87% and 13%
- 25% graduates were SSC level, 9% HSC level and 66% were diploma level
- Employment rate of SSC Voc were found only 10%, for HSC Voc graduates, it is 23% and for Diploma graduates, the employment rate was found GAI 55%, RPI was 30% and CBPI was 29%. Average employment rate for diploma graduates is 39%
- 39 number of employer were participated in the study and they were satisfied to recruit TVET graduate and suggested on the following points for more employability of TVET graduates
 1. Improve quality of TVET through emphasizing practical training with modern technology and equipments
 2. Enhance communication skills
 3. Improvement of curricula and syllabus
 4. Career guidance
 5. Teachers' quality and minimize the crisis of teacher

4.4.3 COMPARISON OF TVET STATUS FROM 1997-2020

Based on the main outputs from the tracer study reports in 1997 and in 2020 following comparative result trends can be identified

Table-07: Comparative Findings of Tracer Study Report 1997-2020

Issues	Tracer Study 1997	Tracer Study 2020
Overall Employment	85%	39%
Self Employment rate	15%	11%
Period range of first employment	18 month	24 month
Pattern of first employment	51% as SAE, 9% as supervisor, 6% as technician and 27% with other designation, 7% were out of any designation	-
Proportion of employment: public and private job in the first entry	38% get Government and 62% got private jobs.	8% in public, 69% in private, 12% in multi national, 6% in NGO, 3% self employment
Salary comparison among Public and private job	23% got more pay than government jobs, 17% similar and 60% got less pay.	
Higher Education mobility	55% of the graduates entered in Diploma engg course to study engineering courses	29% pursuing HE, 40% are not in education employment and training (NEET)
Employment Pattern	1:1.65:14 among professional midlevel technical manpower and craftsman	
Socio Economic Status	41% students' father, 34% graduates fathers average income was seen 30000 BDT/year. More than 78% of the graduates' acquire SES higher than 100% of their parents shows a positive SES mobility	

4.5 ANALYSIS AND FINDINGS ON ACTS AND POLICIES

Introduction: Quality TVET is considered as a tool for productivity enhancement of the workforce, employment generation, poverty reduction and achieving sustainable development goals and other national development goals set by the Government of Bangladesh. Like other developed and fast developing countries in the world Bangladesh needs to steps to strengthen policy guidance and regulatory frameworks for quality enhancement of TVET. In this sub chapter the existing policy documents have been analysed in the three levels of considerations;

- What policy guidance are available relevant to the **selected five quality indicators?**
- What policy and legal environment is required to build a quality TVET system?
- How policy intervention will be formulated to overcome the existing challenges and harness the opportunities prevailing in the TVET system in Bangladesh?

To formulate the intended policy options for quality TVET in Bangladesh following acts, policies, action plans and other relevant regulatory/research documents have been analysed.

4.5.1 NATIONAL EDUCATION POLICY 2010

To address the Bangladesh constitutional mandate mentioned in article 17 governments constituted 8 different commissions/committees, the last one is national education policy 2010. NEP-2010 introduced a separate chapter (Chapter5) for TVET, introduced Students and teachers ration (STR) 1:12 (5.7), Industrial training will be compulsory for all teachers; Seat capacity of TTTC and VTTI will be increase and if required new training institute will be established and training capacity will be strengthened (Chapter 5.11). Measures will be taken to fill up the teachers' vacant post (Chapter 5.17). Transparent recruitment process will be followed to ensure quality teachers (chapter 24). Quality teachers recruitment will be ensure for quality education. For private teachers recruitment a teachers recruitment commission will be established (Chapter 27). One of the common characteristic is seen in last 8 education commissions/committees that every government initiated a new move and left the new policy unimplemented. Since introducing the new education policy in 2010 last 12 years none of the policy guideline is addressed for proper implementation though it was mentioned in chapter 27.1 that an integrated Education Act will be introduced to implementation of the NEP-2010.

4.5.2 NATIONAL SKILLS DEVELOPEMNT POLICY 2011

National Skills development policy 2011 has been introduced with addressing multi dimensional quality issues; introducing certified trainer and assessors (Chapter 10), Governemnt teachers recruitment will be done through eachers recruitment commission as mentioned in NEP-2010, two phases approach will be taken to minimize teachers' crisis. In the mean time new skills policy-2020 is being introduced in which TVET teachers and quality issues are not addressed as NSDA Act-2018 and the status of NSDP-2011 is not clear.

4.5.3 NATIONAL SKILLS DEVELOPMENT POLICY 2020 (DRAFT)

The National Skills Development Policy 2020 will be aligned with the provisions of the other important national policy documents and skill requirements of 4ir. pursuant to the NSDA Act 2018 and NSDA Rules, 2020; this policy is developed to establish a sustainable skills development ecosystem in Bangladesh. There has been a paradigm shift in the skills development domain with the enactment of the NSDA Act, 2018 and the subsequent national skills development authority rules, 2020 which placed national skills development authority (nsda) as the linchpin of the skills ecosystem of the country. NSDA notified this draft in their website on 6 December 2020 for public opinion. Through this draft policy a separate “National Skills Qualification Framework (NSQF)” has been proposed with 10 levels. Somehow this proposed NSQF creates different ambiguities among the different implementing agencies.

4.5.4 NATIONAL SKILLS DEVELOPMENT AUTHORITY ACT-2018

National Skills Development Authority Act 2018 has been approved and notified on 1 October 2018. The main quality concern for skills development is mentioned in this act in chapter six. However, this act does not include TVET and quality of TVET but skills is the integrated feature of TVET and the measures can be considered for quality improvement of TVET.

4.5.5 BANGLADESH TECHNICAL EDUCATION BOARD (BTEB) ACT 2018

Technical Education Act 1967 has been modified and updated and enacted as “Bangladesh Technical Education Board Act 2018” on 14 November 2018. In this act, Chapter 8 under the duties and responsibilities of BTEB has mentioned the quality measures by board specifically for course and institution accreditation, syllabi and curricula development, monitoring and evaluation, industrial engagement, data management etc. In chapter 21 mentioned teachers and staff service rule and condition will be introduced with proper regulation. In chapter 25 mentioned standard for TVET courses, duration of courses, certification etc, In chapter 28 any regulation regarding TVET can be introduced by BTEB after approval by government.

4.4.6 INTEGRATED ACTION PLAN BY TMED

Technical and madrasah Education Division (TMED), Ministry of Education has been developed an integrated action plan in November 2018. There are five key areas considered in this action plan; Policy and Project formulation, industry institute linkage, TVET enrollment, curricula development and job market assessment and employment area identification. Under key area of policy/project formulation there are 50 activities, under industry institute linkage there are 9, under TVET Enrollment there are 18, under curricula development there are 12 and under Job market assessment there are 10 activities are mentioned with three phases of implementation.

periodically for short term upto 2020 and for mid term upto 2025 and for long term upto 2030. All selected indicators were taken in to consideration in this integrated action plan of TMED.

4.4.7 INDIAN EDUCATION POLICY 2020

Indian Government approved there national education policy 2020 and focusing vocational education is a prior agenda for human resource development programme. In this policy there are many issues covering quality of TVET were nmentioned but few are related to teachers' quality improvement measures. These are teaching profession will be one of the best, attractive and social recognized profession in India, Strategy for most Talent hunting and preservation of local intellectual in teachers recruitment, In Teacher recruitment eligibility criteria, trade skill test and minimum bachelor degree (Integrated 2 yrs) will be condition, Automated update of vacant post, Vocational Qualification Framework. Posting and promotion of qualified teachers in higher education administrative position and attractive salary

4.6 MAIN FINDINGS

Based on the analysis and result from chapter 4.1 to 4.5 following findings are considering for policy options/interventions for improvement of Bangladesh TVET quality

Main Finding of the Study

RQ	Objective	Result form the study	Main Findings
1	Identification of quality Indicator	Common Quality Indicators are: <ul style="list-style-type: none"> • Relevance of TVET • Access Rate • Success/Completion Rate • Student Teacher Ratio (STR) • % of Trained Teacher • Employment Rate • Finance (Investment Rate) • Curricula and Programme • Response to Labour Market • Collaboration with industry 	Following five Quality Indicators have been selected to assess the quality of Bangladesh TVET system through this study: <ul style="list-style-type: none"> • Student Teacher Ratio (STR) • Availability of Teachers & staff • Teachers Selection Criteria • Success/Completion Rate • Graduate employment rate
2	Identification of Opportunities	<ol style="list-style-type: none"> 1. GOB set national target of TVET 2. Alignment of TVET curricula with mainstream general education 3. Reframe governance system of TVET through introducing TMED 4. More development projects and initiatives for capacity strengthening of TVET 	<ol style="list-style-type: none"> 1. National target of TVET: 20% by 2020 and 30% by 2030 2. Introduced Vocational Education from class vi in national curricula by NCTB 3. Prepared an integrated Action Plan taken by TMED for achieving national target of TVET 4. Many ongoing Development projects are working for capacity enhancement and quality improvement.
3	Identification of Challenges	Following Colleges were found- <ul style="list-style-type: none"> • High STR range from 36:1 to 92:1 • Teachers' crisis: 15% filled up 85% vacant. • 116984 no of teachers will be required by 2020 and 583200 lacs by 2030. • Anappropriate Teachers selection criteria • Lengthy and faulty Teachers Recruitment Process • Poor success & high dropout 	Following Challenges are taken for policy intervention <ul style="list-style-type: none"> • High STR • Teachers' crisis • Inappropriate Teachers' Selection criteria • Lengthy Teachers' Recruitment process • High drop out & poor success rate • Poor Graduate employment

		<ul style="list-style-type: none"> • Poor Graduate employment rate • Declining SES of graduates 	
4	Policy Options for Quality TVET	<p>Main Policy documents are:</p> <ol style="list-style-type: none"> 1. National Education Policy-2010 2. National Skills Development Policy 2011 3. National Skills Development Policy 2020 (Draft) 4. National Skills Development Authority Act-2018 5. Bangladesh Technical Education Board Act-2018 6. Integrated Action Plan developed by TMED, MOE. 7. Indian Education Policy 2020 	<p>Considering the selected indicators main findings are:</p> <p>1. Student Teacher Ratio (STR): 1.1 As per chapter 5.7 of NEP-2010 STR Should be 1:12</p> <p>2. Success/Completion rate:</p> <p>3. Teachers Recruitment: 3.1 As per chapter 5.11 of NEP Industrial training will be compulsory criteria for teachers recruitment 3.2 Measures will be taken to fill up the teachers' vacant post (Chapter 5.17 of NEP). For private teachers recruitment a teachers recruitment commission will be established (Chapter 27).</p> <p>4. Teachers Selection Criteria 4.1 Transparent recruitment process will be followed to ensure quality teachers (chapter 24). Quality teachers recruitment will be ensure for quality education.</p> <p>5. Employment of TVET Graduate In TMED action plan there are 10 different activities are proposed for employment Chapter 5.1 to 5.10</p>

Detailed of the above findings and results are describing in the following part of this chapter.

CHAPTER-FIVE: RECOMMENDATIONS/INTERVENTION OF THE STUDY

Introduction: Recommendations/Implication of this study has been prepared based on the findings shown in the previous chapter and the main findings has been logically transformed to the intervention areas with applying the following Matrix.

Main Findings	Why	Who	How	Intervention Area
High Student Teacher Ration (STR): Range from 36:1 to 92:1	1. Students Group size is not proportionately decided for polytechnic institutes and TSCs 2. Student size per group increased time to time without ensuring teachers availability 2. Teachers Vacancy is increasing due to lengthy process of recruitment	BTEB and DTE (Considering the organizational mandate, BTEB will set standard for STR and DTE will execute with administrative order)	Standard group size should be reset as per the NEP/UNESCO standard with considering the existing teachers crisis and class room size. Periodically STR may planned to reach its standard with fulfillment of requirements	<p>1. Reset STR: In National Education Policy (NEP)-2010 STR is set for TVET is 12:1. Considering the present teachers crisis and existing class room size nominal/interim STR may formulate as</p> <p>For Polytechnic: Theory Class-40:1 and Practical Class-20:1</p> <p>For TSC: Theory Class-30:1 and Practical Class-15:1</p> <p>2. Needs to Implementation of the regulation prescribing STR for all public private TVET providers jointly by the TMED-BTEB-DTE</p> <p>Note: Prescribed Internationally set standard for SCH: 200 working days & 900 instrc. Hrs for grade 1-8 220 working days & 1100 hrs for secondary grade 9-12 schools/college teachers.</p> <p>Student Teacher Ratio (STR): For the primary grade (1-8) STR is 20-25, for secondary grade (9-12) STR is 20-30.</p> <p>For the subject with practical competencies/skills both primary/secondary the STR should not exceeding 20. In case of disable student STR should be 20 or less.</p>

<p>Acute Shortage of Teachers (Out of total 17581 existing teaching post 15% are filled up and 85% post are vacant)</p>	<ol style="list-style-type: none"> 1. Students enrollment size has been increased without changing teachers no 2. Lengthy recruitment process and long time stalemate in recruitment 3. New institutes are in operation without new teachers, running by deputation from nearby institute. 	<p>PSC, TMED, BTEB and DTE</p>	<p>As per the action plan taken by TMED needs to implement activities mentioned in chapter 1.7-1.9, 1.11 and 1.19.</p>	<ol style="list-style-type: none"> 1. Needs to reorganize and implementation of the new organogram of DTE (As per the TMED action plan chapter 1.10) and public private TVET providers following STR to find the real number of teachers needs to operate smoothly covering training, administrative and urgent requirements of the system. 2. Automatic vacancy post will be displayed and online application and scrutiny provision will need to be introduced with proper regulatory provision 3. Urgently need to execute the action plan approved by the TMED to establishment of a separate Teachers Recruitment commission (TRC) as per Chapter 1.7. 4. To avoid discrimination among the teachers after establishment of TRC there is a need to declare ineffective/N&V of the BCS RR-1981, BCS Technical Education Cadre-1992, and BCS Non-cadre recruitment rule-2011 respectively. 5. There is a need to issue a regulatory order to stop any new TVET institute without teachers recruitment (As per SRO no 182 of BTEB-1996)
<p>Inappropriate Teachers Selection Criteria</p>	<ol style="list-style-type: none"> 1. Only academic qualification is the selection criteria 2. Qualification difference among the public & private vocation teachers' 3. No skills test in selection. 4. No qualification framework 5. Same program but different selection criteria. 	<p>TMED and BTEB (as the accreditation Body BTEB needs to develop TQF with approval by the TMED)</p>	<ol style="list-style-type: none"> 1. Through implementation of the TMED approved action plan chapter 1.8 and 1.10 	<ol style="list-style-type: none"> 1. There is a need to set a universal selection criterion for all public private TVET teachers through development and implementation of the Teachers Qualification Framework (TQF) by the BTEB. Further needs to amend/desolve/ineffective N&V order for “Recruitment regulation-2020 for Cadre and Non-Cadre officer and staff under DTE”, and “SRO- 54, 1996 of BTEB, Service Regulation for Private TVET Institute Teachers and Staff”.

Lengthy Teachers Recruitment Process	<ol style="list-style-type: none"> 1. PSC needs to overcome a 16 steps to complete recruitment process 2. Min 2 yrs time needs to fill up a vacant post 3. Project post transfer in to revenue is lengthy and inhumanitarian process 	TMED	Through implementation of the TMED approved action plan chapter 1.7	Revision and implementation of the regulation by the BTEB with the provision for selection recruitment promotion and professional development by the GOB of both public private TTVET teachers under affiliation with the BTEB.
Poor Success and High Drop Out Rate	<ol style="list-style-type: none"> 1. Low SES of student 2. poor health cond. 3. Teachers role is limited in class. 4. Poor institutional management 5. Inappropriate curricula 6. Poor participation of parents in schools 7. Poor internal and external monitoring 	DTE and TVET providers Institute	BTEB and DTE	<ol style="list-style-type: none"> 1. Strengthening financial support and other benefits for poor and meritorious students 2. Providing periodic medical checkup 3. Training for teachers and managers 4. Ensuring easy accessibility 5. Providing good infrastructure 6. Enhancing service capacity of Institute 7. Implementing learners friendly delivery of learning 8. Providing career counseling and guidance
Poor Graduate Employment Rate	<ol style="list-style-type: none"> 1. Poor Quality of learning due to high STR, Teachers crisis, teachers quality etc 2. Poor engagement of Industry Institute linkage 	TMED, DTE	<ol style="list-style-type: none"> 1. Industry Institute formal collaboration under legislative framework 2. Effective implementation of Apprenticeship 3. Curricula updating as per the industrial needs 	<ol style="list-style-type: none"> 1. There is a need to introduce Workforce employment Act clearly specifying the responsibility and accountability of the employers including upskilling the employed workforce and upcoming workforce replacement of Bangladesh Labour Law 2006 2. There is a need to promulgate for operationalization of BNQF with the level of national skills standard classification of the workforce. 3. There is a need to amend the apprenticeship act clearly specifying the role of the education providers, employers, and trainees

Overall recommendations for ensuring Quality TVET in Bangladesh:

1. There is a need to review all recent research conducted in TVET system in Bangladesh with addressing their recommendations specially addressing the quality issues and continuous improvement of quality.
2. Bangladesh TVET system should be assessed as per the norms standards with respective indicators set by the internationally recognized tools. Education System Analysis (ESA) tools and guideline introduced by UNESCO can be seen with this report as annex.
3. There is a need to conduct a thoroughly tracer study for all programme of TVET which is not covered by the TSR 2020 by DTE. It should be covered and focused on all indicators including demand analysis of all running programme and what further needs to improvement.
4. There is a need to conduct a Demand supply Gap analysis from the employment market and incorporate the result for producing graduates at each level of BNQF: There is a need to operationalize the BNQF through preparing action plan jointly by the UGC, TMED and NSDA for its respective level.
5. There is a need to update TVET curricula as per the job market needs and adopting 21st century competence with addressing following areas:
 - i. Common and workplace competencies: Global awareness, financial. Economic, business, entrepreneurial literacy, civic literacy, health and wellness awareness.
 - ii. Learning and Thinking skills: Critical thinking, problem solving, communication, creativity, innovation, collaboration, contextual learning information and media literacy skills
 - iii. ICT Literacy: ICT literacy is the ability to use technology to develop 21st century content knowledge and skills in the context of learning core subject so that they know how to learn , think critically, solve problem, use information, communicate, innvate and collaborate.
 - iv. Life Skills: Leadership, personal responsibility, ethics, people skills, accountability, self direction, adoptability, social responsibility and personal productivity.
 - v. Adopting STEAM and AI taking competitive plan to produce STEAM graduates as per the global market forecasting.

CONCLUSION AND FURTHER ACTION

Without ensuring quality of TVET government investment will be misuse and national target of economic growth can not be achieved without a quality TVET system of the country. Following three major documents are proposed to ensure better outputs from this research work:

1. **Quality Manual of DTE:** There is a need to introduce/updated Quality Manual/Quality Assurance System jointly by DTE-BTEB and TMED. Through conducting a series of workshops or through appointing a consultant the draft Quality Manual/Quality Assurance Manual can be developed.
2. **Teachers Qualification Framework for TVET:** There is a Need to review the different selection-recruitment quality criteria processes of TVET teachers and needs to develop a Teachers Qualification Framework with an operating manual of the TQF.
3. **Continious Professional Development of TVET Teachers:** There is a need to develop a Continious professional development (CPD) plan for TVET teachers as per the guideline of NEP-2010, NSDP-2011 and Integrated action plan by TMED. DTE within his own mandate can prepare a CPD plan integrated with Foundation training, Professional Certification training, Competency Based Training, Subject based short course training and other training.

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Note: It will be write and completed following APA format

ANNEXURE

1. TMED Approval memo on this research
2. TMED Budget allocation
3. Evedenace Picture of Data Collection
4. Questionnaire Set-01: TVET teacher
5. Questionnaire Set-02: TVET Manager
6. Questionnare Set-03: KII
7. Questionnaire Set-04:FGD
8. Data Analysis Sheet
9. Pre-Test Questionnaire and Result

(Mauborgne, 2005)