



Technical Assistance Consultant's Report

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People's Republic of China: Sharing ADB's Operational Knowledge in Technical and Vocational Education and Training in the PRC with CAREC Member Countries

Prepared by Consultant Team

For Asian Development Bank

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¹ The consultant team include Team Leader, Dr. Min Tang, Counsellor of the State Council and Vice Chairman of Youcheng Foundation; Team Member, Dr. Liu Yufeng, Director, Central Institute for Vocational and Technical Education of Ministry of Education; Ms. Hu Chaoyi and Ms. Zhong Yajunzhi, the TA Project Coordinator.

LIST OF ABBREVIATIONS

ADB	-	Asian Development Bank
AR	-	Augmented Reality
CAREC	-	Central Asia Regional Economic Cooperation
ICT	-	Information and Communication Technology
MLT	-	Multi-level TVET
MOE	-	Ministry of Education, the People's Republic of China
MOF	-	Ministry of Finance, the People's Republic of China
MHRSS	-	Ministry of Human Resources and Social Security, the People's Republic of China
MOOC	-	Massive Open Online Courses
NDRC	-	National Development and Reform Commission, the People's Republic of China
NQF	-	National Qualification Framework
O2O	-	Online to Offline
RBL	-	Results-Based Lending
PRC	-	People's Republic of China
TA	-	Technical Assistance
TVET	-	Technical and Vocational Education and Training
VR	-	Virtual simulation

EXECUTIVE SUMMARY

In the past decade, CAREC (Central Asia Regional Economic Cooperation) 6 countries have made great efforts in vigorously developing TVET (technical and vocational education and training) and have achieved remarkable progress². However, restricted by the slow economic growth and insufficient financial resources, the TVET sector is underdeveloped in CAREC 6 countries. There are three noteworthy challenges:³ mismatches between curricula in TVET programs and the skills required by employers; lack or absence of a national qualification framework; and inadequate human and financial resources.

Based on World Bank's classification, CAREC 6 countries can be divided as two groups, Kazakhstan and Turkmenistan belong to upper middle-income economies (Group 1 CAREC countries), while Kyrgyz Republic, Mongolia, Tajikistan and Uzbekistan belong to lower middle-income economies (Group 2 CAREC countries). In terms of TVET development, by and large, the CAREC 6 countries could also be divided as two groups. While there are lot of similarities between those two groups of countries, different groups do have different stages of development and different priorities in terms of TVET development.

As upper middle-income economies, Kazakhstan and Turkmenistan have a relatively better TVET system. The Group 1 CAREC countries is facing TVET problems and challenges, such as supply of TVET does not match the demand of labor market, high unemployment rates of TVET graduates, insufficient digital skills and inadequate teachers' ability, etc. As lower middle-income economies, Kyrgyz Republic, Mongolia, Tajikistan and Uzbekistan are facing more problems and challenges compared with the Group 1 CAREC countries. TVET problems in the Group 2 CAREC countries are more basic, including inadequate number of TVET schools, lack of TVET teachers, and insufficient job opportunities for TVET graduates, etc.

International donors have made great efforts in promoting the reform and development of TVET in CAREC 6 countries through related programs or projects. Some international organizations, such as European Union (EU), Asian Development Bank (ADB) and World Bank, are important TVET donors for CAREC 6 countries. The efforts of international donors have a great influence on TVET system design and implementation in Central Asian countries.

As a transitional economy, the PRC has encountered similar problems in the development of TVET for many years. Since the reform and opening-up, Chinese economy has generated strong demands for professional and skilled labor. The PRC has made great progress in many fields of TVET in recent years with the long-term unremitting efforts from governments and vocational schools. The assistance from ADB, the World Bank and several bilateral aid agencies has also contributed greatly to the development of the PRC's TVET sector.

² This study focuses on 6 countries in the CAREC region including Kazakhstan, Kyrgyz Republic, Mongolia, Tajikistan, Turkmenistan, Uzbekistan (CAREC 6). The PRC is also a CAREC country, but in this study, we will distinguish the PRC with CAREC 6 countries.

³ ADB has done a few TVET lending projects in the Kyrgyz Republic, Mongolia, and Tajikistan. Challenges such as low standards and a generally low quality of facilities and staff, weak links with industry, and mismatches between TVET programs and changing labor market needs have been identified.

This report is trying to find out the problems and challenges in the development of TVET and to analyze some key factors that lead to the problems in CAREC 6 countries. The focus of this report is on drawing lessons from the success and failure of the PRC's TVET development. Based on those findings, the report provides some practical recommendations for TVET development of CAREC 6 countries. If it is possible, we try to distinguish our recommendations for short term and longer term. The report also provides some suggestions to international organizations in assisting CAREC 6 countries to improve their TVET performance.

Suggestion 1: Match TVET with the Market Demand. Among all things, achieving high employment rate for the graduates of TVET schools is on the top priority in CAREC 6 countries. Employment quantity and quality should be the primary indicators to evaluate any TVET school's performance. Employment quantity and quality should be the primary indicators to evaluate any TVET school's performance in CAREC6 countries.

It is suggested to have annual skills-demand survey among enterprise and vocational schools as soon as possible. A systematic mechanism needs to be developed to regularly revise the vocational course curriculum and major's directory. Schools should be also allowed to adjust their own majors flexibly according to the changes of market demand. The curriculum reform, training program design and career analysis need to involve industries and enterprises. Training program design and career analysis need to involve industries and enterprises.

The Group 1 CAREC countries can learn from the experience of “academic certificate + vocational skill level certificates” system applied in the PRC. The government can request enterprises to recognize the skill certificates. Students' practice before graduation should be strengthened to improve their employability. In longer term, the CAREC 6 countries can try to establish a modern apprenticeship system which is developed in Europe and US and well applied in the PRC.

Suggestion 2: Deep Integration of Industry and Education. Based on the achievements of the PRC's TVET reform, it is suggested that the school-enterprise cooperation is the key policy measure to TVET development in CAREC 6 countries. Only enterprises' in-depth participation in TVET can solve the problems such as disconnection between TVET and market demand and outdated curricula. Enterprises can integrate these activities into their corporate social responsibility practices.

However, this may be more applied to Group 1 CAREC countries where industries are more developed locally. In Group 2 CAREC countries where going abroad and being a migration worker is the major job opportunities, efforts may need to make to attract foreign enterprises to participate TVET development.

The core of the integration of industry and TVET schools is to involve industries and enterprises into vocational school operations. However, enterprises are generally lack enthusiasm to participate it. CAREC 6 Governments need to promote from the policy level the integration of industry and education together, and gradually attract enterprises in school operations. It needs to provide a series of adequate policy incentives including tax reductions for enterprises cooperated with vocational schools.

Chinese experience showed that it would help if some combined incentives are given including finance + budgetary allowance + land + relevant tax exemptions. School is responsible for providing training venues and resources. Cooperative enterprises provide new training equipment and invest part of the funds to jointly build a training base in the school. Private-Public Partnership could be applied to support enterprises to participate in vocational education.

Suggestion 3: TVET Groups: An Effective Way to Improve Quality of TVET. Chinese experience showed that sometimes, a TVET group is another type of TVET operating system in promoting the organic integration of education chain. But this could be applied mainly in Group 1 CAREC countries at the current stage of development. The PRC's experience shows that as long as the enterprise has a right to run TVET schools, incentives to provide systematic and sustained inputs to TVET schools are established.⁴ In this regard, it should select enterprise very carefully to run TVET school group.

In most cases, only large scale enterprises have incentive and capacity to lead the TVET school group. A clear policy guild line needs to be established in this area to protect public and student's interests, including the education rights and labor protection rights for students, the rights and obligations of the enterprise, incentives for enterprise set up TVET school group, and governance structure of TVET groups, etc.

Governments of CAREC 6 can also try to support some local specialized or bring in some international TVET serving companies. Those TVET serving companies provided practical courses which may yet be offered in schools, solving the problems such as schools do not acquire the latest technology, in shortage of "dual qualification" teachers etc. If there is a need, concerned officials could visit some of those companies in the PRC and see how they served TVET schools.

Suggestions 4: Promoting Dual Qualification Teachers. The quality of the teachers has always been regarded as the key to the quality of vocational education. It should be recognized that TVET teachers have their own unique professional characteristics. Concerned government departments in CAREC 6 country could establish a national qualification standards and certification system for TVET normal education.

It is suggested to develop a comprehensive trainings program for dual-qualification teachers and provide opportunities for vocational teachers to work part-time in enterprises to gain industrial experience and increase the proportion of teachers who have academic training background and certain years work experience in industry. Special funding needs to be allocated in this area.

It is also suggested to encourage enterprises staff to work at TVET schools as part time teachers. Government should encourage large public and private enterprises to provide practical opportunities for TVET teachers. Vocational schools are to give preference policies to dual-qualification teachers in terms of promotion and salary increase. As many of them may not have high academic degrees, a special policy needs to be applied to those teachers in terms of promotion and salary determination.

If it is possible, in longer term, some CAREC countries could consider to establish TVET normal university in order to promote in large scale of high quality TVET teachers. Ordinary universities can also offer some diploma training of vocational teachers.

Suggestion 5: ICT + TVET. Chinese experience showed that ICT (Information and Communication Technology) could provide some new hopes for fast development of TVET. The high-quality courses particularly those lecture based courses among schools can be shared through internet and Massive Open Online Courses (MOOCs). CAREC 6 countries can enhance ICT policy, mobilize more investment in this area to promote the development of digital campus. Multimedia classrooms, interconnections' channels and public service platforms are the basic for ICT facilities in campus.

⁴ Xiaoyan Liang and Shuang Chen, Developing Skills for Economic Transformation and Social Harmony in China, A Study of Yunnan Province, Chapter 4, p68, World Bank.

The Ministry of Education and the Finance Ministry in CAREC 6 countries should give priority to improving the hardware facilities as soon as possible. The infrastructure depends largely on the government input with preferential resources from TVET schools and colleges. The integrate software purchase can be realized among the alliance of schools and colleges. A large number of courses can be shared between schools and colleges at least inside of one country. The types of teaching mode require a higher standard to the internet resources and teaching staff in vocational institutions. Meanwhile, the training of teachers in vocational institutions must be enhanced first.

In longer term, the technology of virtual process, craft and production line must be put into good use to improve the efficiency and effect of teaching and training for a cost-saving. Adopting a student centered, competency-based teaching mode with mixed channels of interactions, enhancing the students' online learning capability and self-management, creating an active learning community with innovative approaches.

While it may be too early to apply the credit transfer system right now, some pilot projects can be considered in Group 1 CAREC countries in near future. "Credit bank system" can also be taken into consideration to carry out when condition permits. The accumulation of learning achievements and the credit transfer among schools and colleges in the credit bank system will promote the interconnection and combination between academic education and vocational skills. It is a good opportunity for CAREC 6 to catch up with the development by taking advantage of the most advanced methods in the first place.

Suggestion 6: Enhance the Investment in TVET. Government funding is the most important funding source for TVET. On average, running TVET schools need more money than normal high school and academic universities as TVET schools need to purchase a lot of expensive equipment and to provide practice facilities to students. For those CAREC countries where TVET funding is divided by central and local government, equalize public funding per student is important. The PRC experience showed that sometimes, a "reward for subsidy" mechanism could give some incentives for local government to put more money in their TVET schools.

Other sources of finance should be explored including provide short term training service to general public, community support service, and mobilizing donations. Expansion of private owned or enterprises owned TVET schools can save some public resources.

Given limited resource of the government, CAREC countries could try a model TVET school system of the PRC. Additional human and finance resources should be put into such model schools to support their new reforms and innovative activities. Many new policies can be tested in those model school first and gradually expanded to other schools.

Suggestion 7: Seeking More Helps from International Organizations. We strongly recommend to use ADB, World Bank and bilateral donor's technical assistance in TVET development as much as possible, and as soon as possible. Projects from International organizations are not only providing much needed financial resources to CAREC 6 countries, but also bringing in international experience and reform measures to improve development environment of the TVET. The project areas should include further improvement of NQF System, long term development policy and national program on TVET and trainings, reforming the curriculum, developing course materials, enhancing teachers' capability and skills, and formulating lending program, supporting institutional capacity building in education department of the government and TEVT schools, etc.

Using loan project to promoting school-enterprise collaboration is essential, including involving enterprises to define the standards of training materials and curriculum, piloting modern apprenticeship,

and promoting the establishment of TVET groups, providing industrial visits opportunities for vocational teachers.

The loan project can also be used to enhance the capacity of the school management, providing managers and teachers trainings to implement institutional TVET reforms, establishing TVET management and monitoring system and integrated management information system platform, providing financial assistance to students from impoverished families

If it is possible, it is recommended to use ADB and World Bank's results-oriented loan and technical assistance to support reform and development of TVET system in CAREC 6 countries. This kind of loan is funded through tracking the completion of evaluation outcome indicators to improve the project management efficiency and address the inconsistency between the domestic bidding procedure for procurement and the international common procedures as well as the inefficient withdrawal and reimbursement process.

Using loan project to provide more ICT service and online courses at TVET schools, support vocational institutions to share quality courses with excellent vocational institutions at home and abroad through the Internet and MOOCs; support the construction campus network to ensure the sound condition of hardware and infrastructure; support the collective purchase of software via the alliance of vocational institutions, enhance the information and communication technology training of teaching forces.

Suggestion 8: TVET Cooperation with the PRC. The experience of the PRC in helping TVET development of the Southeast Asia can be used in cooperation between the PRC and CAREC 6 countries. Some models, such as Luban workshop can also be used to cooperate between the PRC and CAREC 6 countries.

Cooperation between the PRC and CAREC 6 countries can also learn from the PRC's cooperative model in Africa countries in where TVET program in the PRC became some components of international institutional projects. Similarly, Chinese companies invested in CAREC 6 countries can be involved in helping TVET development by not only providing funds, but also giving lectures by the engineers of those companies.

Cross-border e-commerce can be a pilot cooperation field of TVET between the PRC and CAREC 6 countries. This field is growing rapidly. Central Asian countries are lack of talents in this area. Recently, CAREC Institute and China Services Trade Association is planning to organize a series of cross-border e-commerce training courses for TVET colleges in Central Asian countries. This cooperation model can be used to explore a broader TVET cooperation between the PRC and CAREC 6 countries.

Main Report

CHAPTER I. INTRODUCTION

Technical and vocational education and training (TVET) is of important to the industrial development and youth employment in developing countries. In the past decade, CAREC (Central Asia Regional Economic Cooperation) 6 countries have made great efforts in vigorously developing TVET and have achieved remarkable progress⁵. Many CAREC 6 countries set their tentative plans for the medium and long-term development of TVET system in their own policy framework. International organizations, including Asian Development Bank (ADB), the World Bank and the European Union (EU), as well as several developed countries have implemented a number of TVET projects in CAREC countries, boosting the development of TVET.

However, restricted by the slow economic growth and insufficient financial resources, CAREC 6 countries have encountered many difficulties in the development of TVET. According to analysis from ADB, the TVET sector is less developed in CAREC 6 member countries because of three noteworthy challenges:⁶ mismatches between curricula in TVET programs and the skills required by employers; lack or absence of a national qualification framework; and inadequate human and financial resources.

As a transitional economy, The PRC has encountered similar problems in the development of TVET for many years. With the rapid development since the reform and opening-up, Chinese economy has generated strong demands for professional and skilled labor. The PRC has made great progress in many fields of TVET in recent years with the long-term unremitting efforts from governments and vocational schools. The assistance from ADB, the World Bank and several bilateral aid agencies has also contributed greatly to the development of the PRC's TVET sector.

This report focuses on the following aspects: 1) finding out the problems and challenges in the development of TVET in CAREC 6 countries and analyzing some key factors that lead to the problems; 2) drawing lessons from the success and failure of the PRC's TVET development and providing some practical recommendations for CAREC 6 countries; 3) providing some suggestions for international institutions in assisting CAREC 6 countries to improve their TVET.

⁵ This study focuses on 6 countries in the CAREC region including Kazakhstan, Kyrgyz Republic, Mongolia, Tajikistan, Turkmenistan, Uzbekistan (CAREC 6). The PRC is also a CAREC country, but in this study, we will distinguish the PRC with CAREC 6 countries.

⁶ ADB has done a few TVET lending projects in the Kyrgyz Republic, Mongolia, and Tajikistan. Challenges such as low standards and a generally low quality of facilities and staff, weak links with industry, and mismatches between TVET programs and changing labor market needs have been identified.

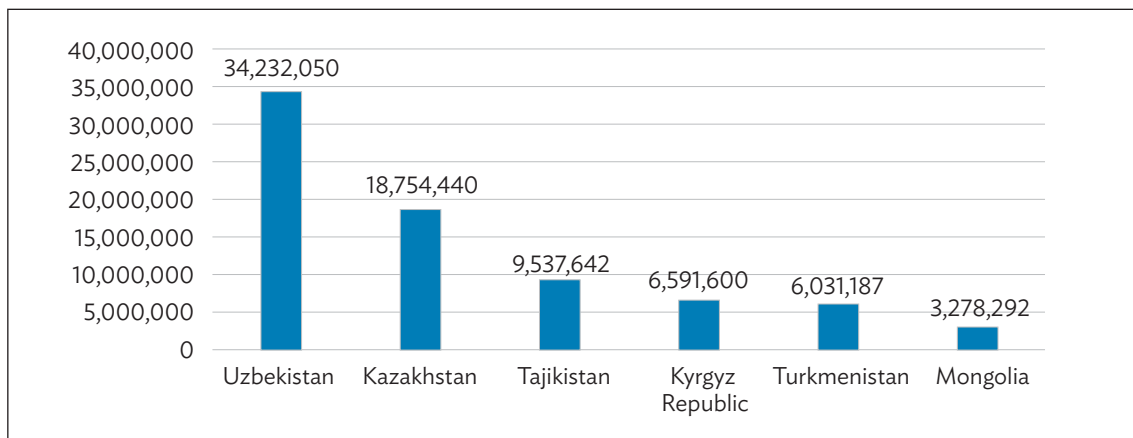
CHAPTER II. OVERVIEW OF THE TVET IN CAREC 6 COUNTRIES

To improve productivity and adjust economic structure, CAREC 6 countries need to cultivate more high-level technical and skilled talents. Recognizing the functions of TVET in promoting employment, economic development and poverty alleviation, these countries have formulated and implemented development strategies including TVET. International organizations, including ADB, the World Bank and the European Union, have implemented a number of TVET projects in CAREC 6 countries, boosting the development of TVET. However, TVET in CAREC 6 countries are still facing many problems and challenges.

2.1. Some General Information in CAREC 6 Countries

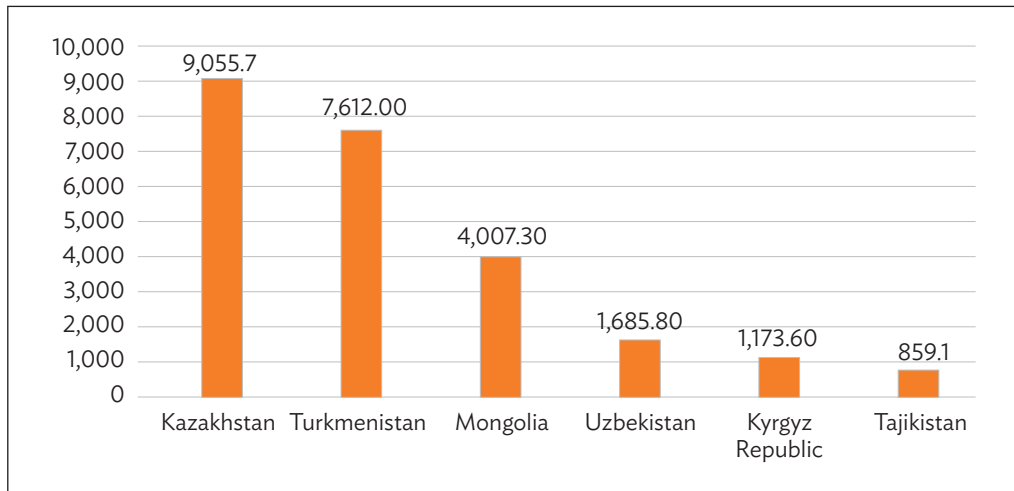
The population scale, economic development level and industrial structure of CAREC 6 countries are different. According to the data in 2019, Uzbekistan had the largest population, Kazakhstan had the highest per capita GDP, and Tajikistan had the highest annual GDP growth rate. The industrial structures of CAREC 6 countries were also different. See figure 2.1-2.2 for details.

Figure 2.1. Population, total - Kazakhstan, Kyrgyz Republic, Mongolia, Tajikistan, Turkmenistan, Uzbekistan, 2020 ⁷



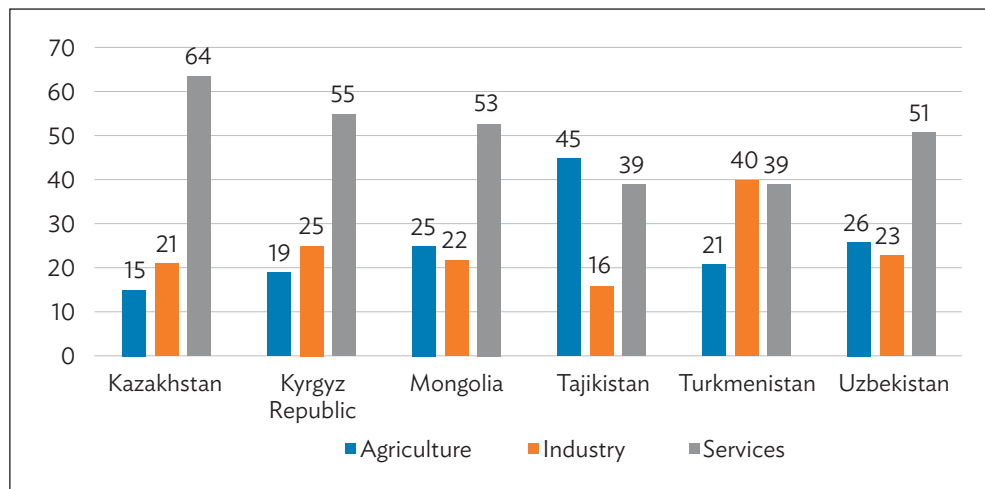
⁷ The author develops the chart according to the data of the world bank. Data source: <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=KZ-KG-TJ-UZ-MN-TM>.

Figure 2.2. GDP per capita (current US\$) - Kazakhstan, Kyrgyz Republic, Mongolia, Tajikistan, Uzbekistan, 2020, Turkmenistan, (2019)⁸



The proportion of GDP and the proportion of employed population in the three major industries in CAREC 6 are not consistent. For example, in year 2019, the proportion of employment in agriculture in Tajikistan was 45%, but GDP of agriculture, forestry and fishing only accounted for 16.2% of the total GDP. In Kazakhstan, the proportion of employment in agriculture was 15%, but agricultural GDP only accounted for 21%. This phenomenon also existed in Kyrgyzstan. The details are shown in figure 2.3.

Figure 2.3. Employment in agriculture, industry, and services (% of total employment), 2019⁹



⁸ The author develops the chart according to the data of the world bank. Data source: <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=KZ-KG-TJ-UZ-MN-TM>.

⁹ The author develops the chart according to the data of the world bank. Data source: <https://data.worldbank.org/indicator>.

The unemployment rate of CAREC 6 countries is also different. According to the data in 2020, Mongolia had the lowest unemployment rate, with 4.3%, while Kyrgyz Republic had the highest unemployment rate of 7.9%. See Table 2.1. for details.

Table 2.1. Unemployment rate % of some CAREC 6 countries (2020)¹⁰

Countries	Unemployment rate %
Kazakhstan	6.0
Kyrgyz Republic	7.9
Mongolia	4.3
Tajikistan	7.5
Turkmenistan	4.4
Uzbekistan	6.0

2.2. The Current Situation of TVET in CAREC 6

After compulsory education, students could choose general education and TVET. Formal TVET starts at ISCED 3. Some countries just have one level TVET, such as Uzbekistan. Other countries, such as Turkmenistan, Tajikistan, Mongolia, Kyrgyz Republic, and Kazakhstan have two levels of TVET.

Uzbekistan just has one level of TVET. The secondary specialized vocational education is provided at ISCED3, which lasts 3 years.¹¹ Turkmenistan provides basic vocational education at ISCED4, which lasts for 1 year; the secondary vocational education duration at ISCED5-8, its duration varies from 2 to 4 years, depending on the field of education.¹² There are two levels TVET in Tajikistan, primary and secondary TVET. Primary vocational education is provided for lower secondary education graduates is at ISCED3, duration is 3 years. After graduation, students can get professional qualification diploma and certificate of general secondary education. Upper secondary graduate can choose primary vocational education at ISCED 4, which lasts for one year, these students can get professional qualification diploma. Secondary vocational education is provided at higher education stage, which lasts for 3 years, graduates can get Secondary vocational education diploma.¹³ Mongolia provides one year training and 2-3 years Vocational Upper Secondary Education at ISCED 3, 1-2 years' Technical Education Diploma and 3 years Technical Education Diploma at ISCED4.¹⁴ Kazakhstan has two levels of TVET, at the level of ISCED3, there are two kinds of TVET, one is basic vocational education lasting for 2 years, another is Vocational education (Grades 1-2) lasting for 2 years too. At higher education level, there are two kinds of TVET, Sec. vocational education lasting for 3 years, and Vocational education (Grades 3-4) lasting for 2 years.¹⁵ TVET system also the same with Kyrgyz Republic¹⁶.

¹⁰ <https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS?locations=KZ-KG-TJ-UZ-MN-TM>.

¹¹ <https://unevoc.unesco.org/home/Dynamic+TVET+Country+Profiles/country=UZB>.

¹² <https://unevoc.unesco.org/home/Dynamic+TVET+Country+Profiles/country=TKM>.

¹³ <https://unevoc.unesco.org/home/Dynamic+TVET+Country+Profiles/country=TJK>.

¹⁴ <https://unevoc.unesco.org/home/Dynamic+TVET+Country+Profiles/country=MNG>.

¹⁵ <https://unevoc.unesco.org/home/Dynamic+TVET+Country+Profiles/country=KAZ>.

¹⁶ <https://unevoc.unesco.org/home/Dynamic+TVET+Country+Profiles/country=KGZ>.

There is a big difference in the proportion of TVET students in the total number of upper secondary school students in CAREC 6 countries. In 2015, Uzbekistan had the highest proportion, with 93%, while Kazakhstan had only 40.5% in the same year. In 2014, the proportion of Kyrgyz was lower, at 37.2%, compared with 6.4% in Tajikistan in 2013.¹⁷ The proportion of TVET students in the total number of high school students in CAREC 6 countries is shown in the figure 2.4. below.

Figure 2.4. The proportion between the number of vocational students at senior secondary school and the total number of students in senior secondary school in CAREC 6 countries¹⁸

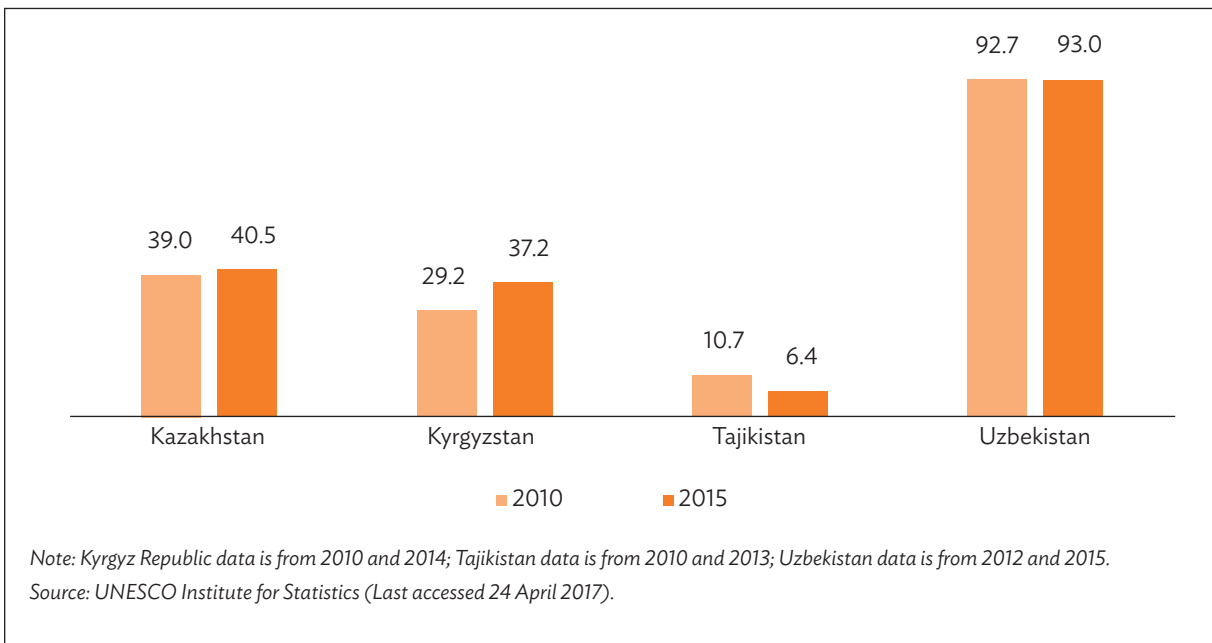
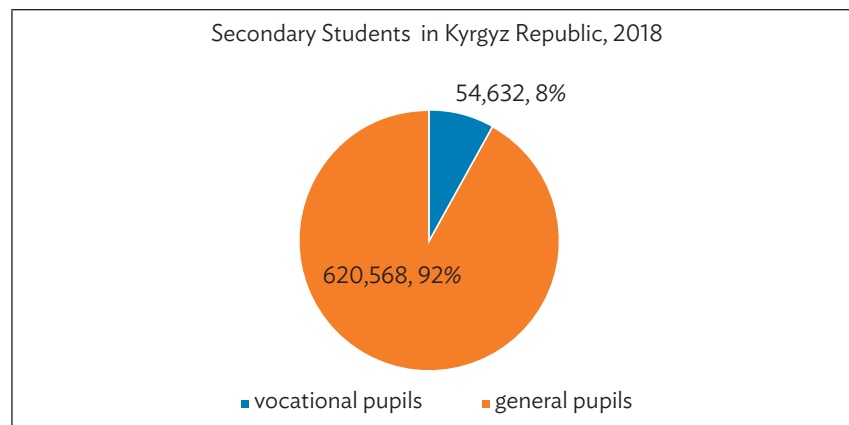


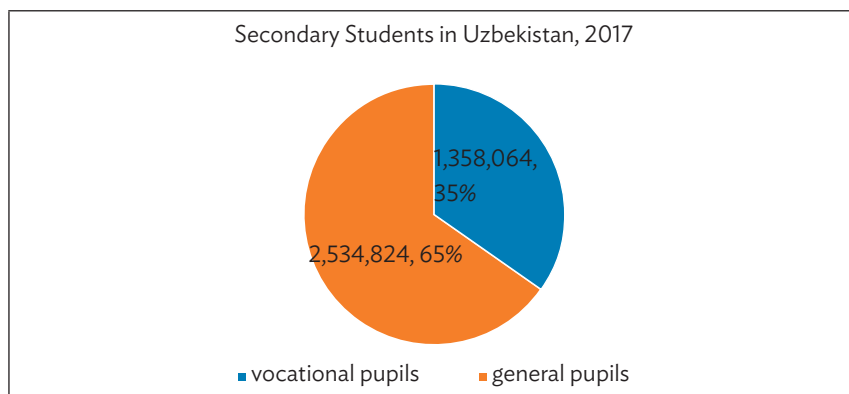
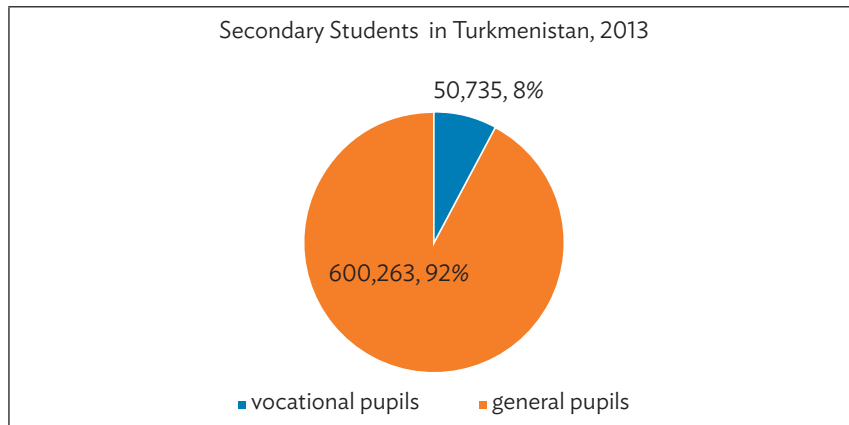
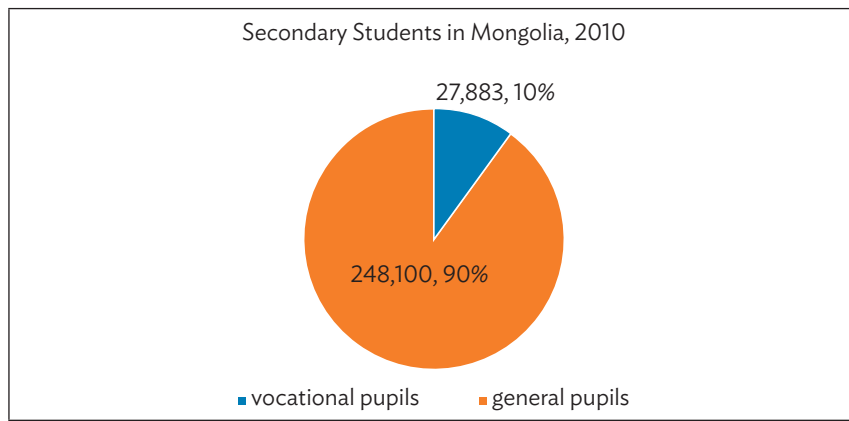
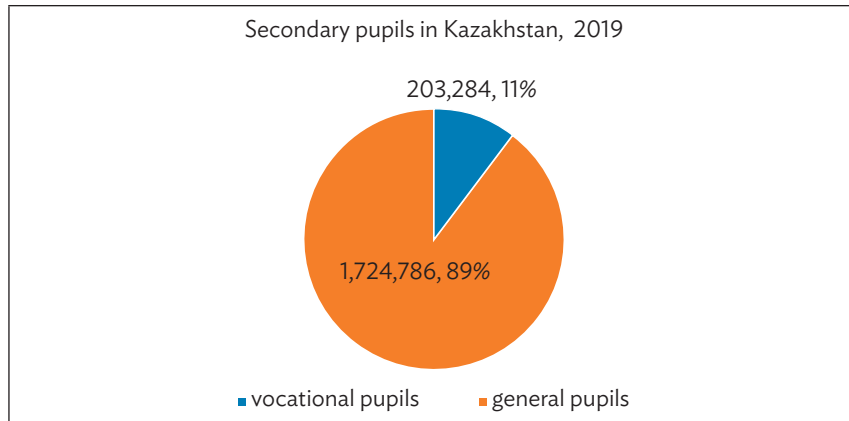
Figure 2.5.¹⁹



¹⁷ ETF, Torino Process 2016–17 Central Asia, P9, ISBN 978-92-9157-682-1.

¹⁸ ETF, Torino Process 2016–17 Central Asia, ,10, ISBN 978-92-9157-682-1.

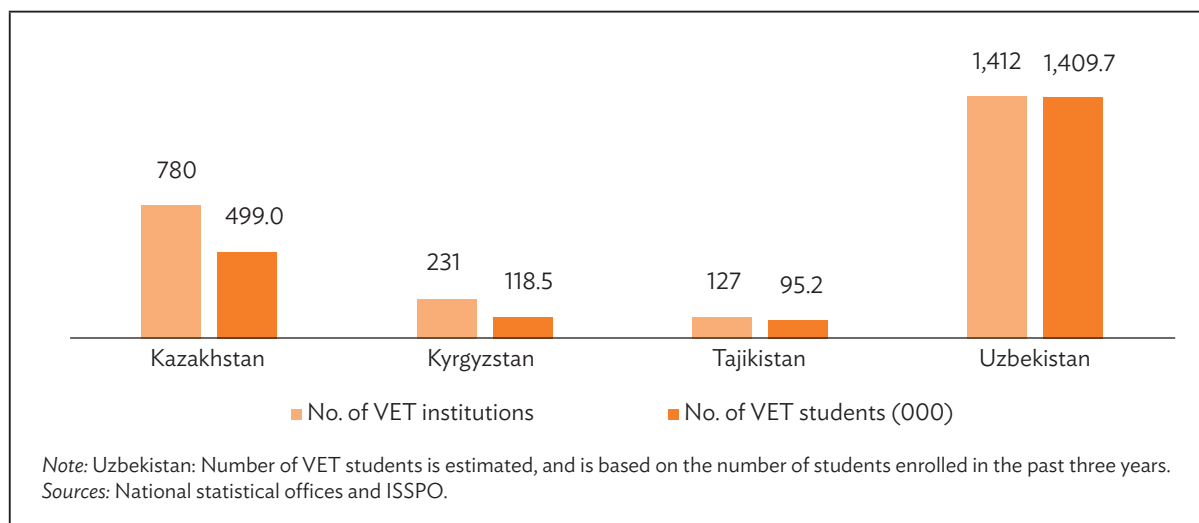
¹⁹ The author draws on the basis of World Bank data. <https://data.worldbank.org/indicator/SE.SEC.ENRL.VO?locations=KZ-KG-TJ-UZ-MN-TM>, <https://data.worldbank.org/indicator/SE.SEC.ENRL?locations=KZ-KG-TJ-UZ-MN-TM>.



The figures have a little change related to TVET students in 6 CAREC countries after 2015, but general situation has no big change. For specific information, please see figure 2.5.

The number of TVET students and TVET institutions in the above four countries are also very different. In 2015, Uzbekistan had the largest number of TVET providers and students, with 1,412 and 1,409,700, respectively. The lowest was Tajikistan, with only 127 institutions providing TVET and only 95,200 students. See Figure 2.6. for details.

Figure 2.6. The number of TVET providers and registered students in Four CAREC countries in 2015²⁰



2.3. Policies of TVET Sector in CAREC 6

CAREC 6 countries regard the development of TVET as the strategic content of national development and an important means to promote industrial innovation and employment. In recognition of the importance of TVET, most CAREC 6 countries set forth their tentative plans for the medium and long-term development of TVET system in their own policy documents. National Torino Process reports show that all the countries have adopted policy documents that spell out their vision for the medium- to long-term development of their TVET systems.²¹ See Table 2.2. for details.

²⁰ ETF, Torino Process 2016–17 Central Asia, P10, ISBN 978-92-9157-682-1.

²¹ ETF, Torino Process 2016–17 Central Asia, P12, ISBN 978-92-9157-682-1.

Table 2.2. Examples of key policy documents relating to the development of the vision for TVET in the national systems of the five CAREC 6 countries²²

Country	Policy document
Kazakhstan	<ul style="list-style-type: none"> • Kazakhstan 2050 Strategy (2012) • State Program for the Industrial-Innovative Development of the Republic of Kazakhstan (2014) • Plan for the Nation – 100 Concrete Steps (2015) • Roadmap for Employment 2020 (2015) • State Program for the Development of Education in the Republic of Kazakhstan 2011–20 (2010) and corresponding action plans • Roadmap for the Implementation of a Dual Education System (2014) • Law of the RK «On Education» (with amendments and additions as of April 19, 2019) • State Program for Development of Education and Science of the RK for 2016-2019, approved by the Decree of the Government of the RK from July 24, 2018 № 460 • Labor Code of the RK, with amendments and additions as of 01.01.2019 • State Program of Industrial and Innovative Development of the RK for 2015-2019, approved by the Decree of the President of the RK of August 1, 2014 № 874 • Strategic Development Plan of the RK until 2025, approved by the Decree of the President of the RK of February 15, 2018 № 636 • Road map for holding the Year of Youth was approved by the Decree of the Government of the RK for January 30, 2019 № 27 • State program «Digital Kazakhstan» was approved by the decree of the Government of the RK № 827 dated from 12.12.2017 • Digital Kazakhstan, 2018
Kyrgyz Republic	<ul style="list-style-type: none"> • Concept for the Development of Education in the Kyrgyz Republic (2012) • Education Development Strategy 2012–20 (2012) and corresponding medium-term action plans (2012–15, 2016–17) • National Sustainable Development Strategy for the Kyrgyz Republic 2013–17 (2013)
Tajikistan	<ul style="list-style-type: none"> • National Strategy for the Development of Education of the Republic of Tajikistan to 2020 (2012) • National Development Strategy of the Republic of Tajikistan for the period up to 2030 (2016 draft)
Uzbekistan	<ul style="list-style-type: none"> • National Program for Personnel Training (1997) • Uzbekistan Education Sector Plan 2013–17 (2013) and corresponding action plans • Welfare Improvement Strategy 2013–15 (2013) • Development Strategy 2017–20 (2017)
Mongolia	<ul style="list-style-type: none"> • “VISION-2050” LONG-TERM DEVELOPMENT POLICY OF MONGOLIA • Sustainable Development Vision of Mongolia-2030 • Government Action Plan (2016-2020) • National Program on TVET and Training (2016-2021)

Sources: Torino Process national reports, TVET Country Profile, Mongolia, June 2020.

2.4. Changes in TVET system of six Central Asian countries

During the Soviet Union period, with few exceptions, the education system—and thus TVET—was homogenous across member states including CAREC 6 countries. All education institutions, including in TVET, were subordinated under the Ministry of Education. For a few years, the Ministry of Education was called the Ministry of Higher, Secondary and Special Vocational Education.

²² ETF, Torino Process 2016–17 Central Asia, P13, ISBN 978-92-9157-682-1.

Technical and vocational education in the Soviet Union was offered at two levels: lower and higher. Lower vocational programs were offered by professional technical schools (PTUs) and secondary professional technical schools (SPTUs). Institutions of higher vocational education in the Soviet Union were known as specialized secondary education institutions, which included three main categories depending on their field of study: technicum (4-year technical school), uchilische (higher technical college), and college (since 1989). The technicum offered programs in technical and business fields, The uchilische offered programs for a range of skilled, nontechnical occupations, and Colleges were created to educate highly trained specialists for the type of work previously entrusted to university-level graduates.²³

After the collapse of the Soviet Union, CAREC 6 countries started to build their own education and TVET systems in a new format. Some universities and TVET institutions were linked to specific economic ministries and enterprises. A wide range of reforms that relate to governance, quality, access, and relevance of TVET were carried out to achieve more flexible and more demand responsive systems.

Reforms are classified into two major phases: (i) Reforms initiated in the 1990s, focusing primarily on the governance and structure of education. Countries largely restructured the different sectors of education, including TVET. Donor organizations provided technical support in the process. Reforms focused on decentralization of regional and local service delivery. (ii) The second phase, which is widely ongoing, focuses on modernizing TVET and higher education. Many countries have prepared policies specifically to adapt the structure of TVET delivery to the needs of the market economy. The reforms include the design of new curricula, design of national qualification frameworks, and development of systems for lifelong learning. Reforms are often accompanied by donor funded investment in modern equipment and training materials.

2.5. International Donors Activities in TVET in CAREC 6

International donors have made great efforts in promoting the reform and development of TVET in CAREC 6 countries through related programs or projects. Some international organizations, such as EU, ADB and World Bank, are important TVET donors for CAREC 6 countries.

In Turkmenistan, EU national assistance program for 2011–13 included a series of projects, one of them was Further Improvement of Quality and Relevance of Professional Education, which represented an important step towards the modernization of TVET.²⁴

ADB is an important donor of TVET for CAREC countries. For Example, in 2016, ADB implemented a Policy and Advisory Technical Assistance project for Uzbekistan and issued a report “Republic of Uzbekistan: Skills Strategies for Industrial Modernization and Inclusive Growth”.²⁵

²³ ADB, Technical and Vocational Education and Training in Tajikistan and other Countries in Central Asia Key Findings and Policy Options, March 2021, p35-37.

²⁴ ETF, Turkmenistan Overview of Vocational Education And Training and The Labor Market Update 2015, p25.

²⁵ ADB, Republic of Uzbekistan: Skills Strategies for Industrial Modernization and Inclusive Growth (Financed by the Japan Fund for Poverty Reduction).

Table 2.3. ADB TVET Loan/Grant Projects in CAREC 6 Countries

Project name	Approve date	Loan Amount (million \$)	Location
Kyrgyz Republic: Vocational Education and Skills Development	29 Jan 2007	10.00	Kyrgyz Republic
Kyrgyz Republic: Second Vocational Education and Skills Development Project	28 Sep 2012	20.00	Kyrgyz Republic
Mongolia: Skills for Employment Project	16 Dec 2014	25.00	Mongolia
Tajikistan: Strengthening Technical and Vocational Education and Training	09 Nov 2015	49.00	Tajikistan
Kyrgyz Republic: Skills for Inclusive Growth Sector Development Program	20 Nov 2017	30.00	Kyrgyz Republic
Tajikistan: Skills and Employability Enhancement Project	30 Jun 2020	60.00	Tajikistan
Uzbekistan: Skills Development for a Modern Economy Project	11 Dec 2020	93.00	Uzbekistan

With assistance and financing from the World Bank. The government of Kazakhstan has cooperated with employer organizations, trade unions and professional organizations on revising the List of Occupations and Disciplines for Technical and Vocational Post-Secondary Education and is gradually updating all TVET standards ²⁶.

GIZ, a federal company in Germany, has made a lot of efforts in the international cooperation of TVET in Central Asia. Project-based learning program involved participants from Kyrgyzstan, Tajikistan, Kazakhstan and Germany.²⁷ GIZ carried out a project “Support for the VET Reform in Tajikistan”, which attempted to introduce a component for training the personnel of the National Adult Training Centre to follow up the employment routes of vocational training courses graduates ²⁸.

The efforts of international donors have a great influence on TVET system design and micro method implementation in Central Asian countries. For example, Kazakhstan introduced dual system, and CAREC 6 countries introduced curriculum development and project teaching methods.

²⁶ ILO, Jobs and Skills For Youth: Review Of Policies For Youth Employment Of Kazakhstan, P65.

²⁷ Jens_Drummer, etc, Vocational Teacher Education in Central Asia: Developing Skills and Facilitating Success, UNEVOC, Asia-pacific educational research association, Springer Open, vii, <https://doi.org/10.1007/978-3-319-73093-6>.

²⁸ ETF, Torino Process 2016-17 Tajikistan Executive Summary, P5.

Table 2.4. World Bank TVET Loan/Grant Projects in CAREC 6 Countries

Project name	Approve date	Loan Amount (million \$)	Location
Technology and Commercialization Project for Kazakhstan	15 Jan 2008	75.00	Kazakhstan
The Kazakhstan Health Sector Technology Transfer and Institutional Reform (consists of TVET components in health sector)	15 Jan 2008	296.7	Kazakhstan
Technical and Vocational Education Modernization Project for Kazakhstan	8 Jul 2010	30.00	Kazakhstan
Youth Corps Project for Kazakhstan	26 Mar 2014	21.76	Kazakhstan
SME Competitiveness Project Kazakhstan	2 Mar 2015	46.00	Kazakhstan
Kazakhstan Skills and Jobs Project	30 Mar 2015	45.00	Kazakhstan
Mongolia Employment Support Project	27 Apr 2017	25.00	Mongolia

Table 2.5. GIZ TVET Projects in CAREC 6 Countries

Project name	Project period	Amount (Million Euro)	Location
Professional Education in Central Asia - promoting systemic approaches in the food processing sector	2010-2024	40.00	Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan
Vocational training for economic growth sectors in Central Asia	2010-2024	40.00	Afghanistan, Kyrgyzstan, Kazakhstan, Tajikistan, Uzbekistan
Promotion of employment and vocational qualification	2013-2023	19.25	Kyrgyz Republic
Build4Skills Global Project	2018-2021	4.00	Mongolia, Pakistan
Vocational Education and Employment Promotion	2014-2018	3.00	Kyrgyz Republic
Cooperative Technical and Vocational Education and Training	2019-2022	34.00	Mongolia
Improving employment and income for Tajik migrant workers	2020-2022	4.00	Tajikistan
Support of the reform and modernization process in the vocational education system of Uzbekistan	2020-2023	7.00	Uzbekistan

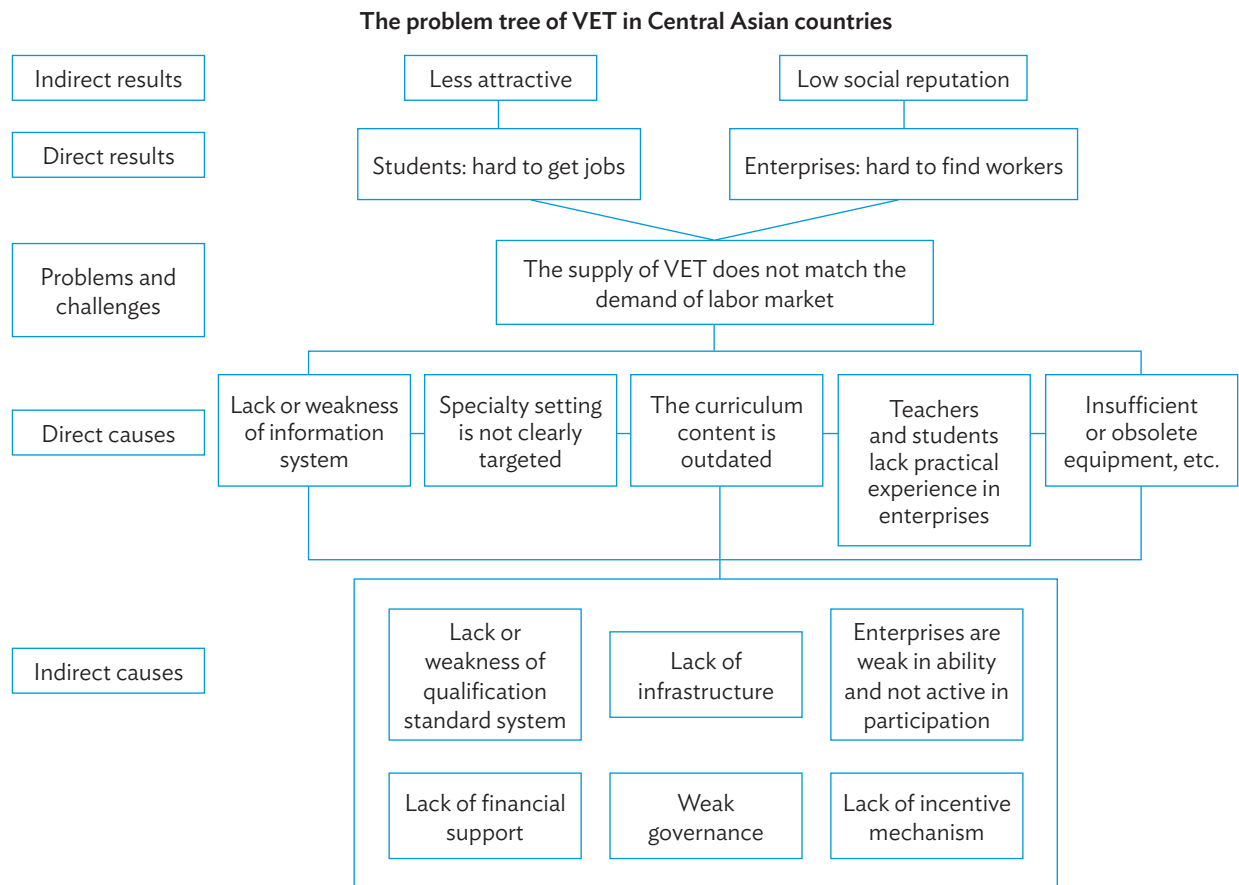
CHAPTER III. CHALLENGES AND DIAGNOSIS OF TVET SECTOR IN CAREC 6 COUNTRIES

There is no difference with many developing countries, TVET development in CAREC 6 are facing many challenges. Some of the challenges are common to all countries, others are country specific.

3.1. Problem Tree of the TVET of CAREC 6

On the basis of the contents of various research reports, the problems of TVET in CAREC 6 countries mainly include: the supply of TVET does not match the demand of labor market, the curriculum content is outdated, the equipment is insufficient and obsolete, the teachers lack enterprise experience, the funds are insufficient, and enterprises are not actively involved in TVET. Some of these problems are causes and some are results, and their relations are reflected in the problem tree.

Figure 3.1. Problem tree of TVET in CAREC 6 countries²⁹



²⁹ Drawn by author.

The mismatch between TVET supply and labor market demand is the most common problem faced by TVET in CAREC 6 countries. On the one hand, it is difficult for vocational education students to find jobs. On the other hand, it is difficult for enterprises to find qualified talents. There are various reasons for this mismatch. Lack of effective labor market information system, lack of sufficient qualified vocational teachers, lack of enterprise participation and lack of funds are the main reasons. The research shows that there is no graduate tracking system and skill prediction system in the CAREC 6 countries, or these systems are imperfect, and the participation of industry enterprises in skill demand analysis is insufficient. Due to the low salary, it is difficult for the vocational education system to recruit a sufficient number of qualified vocational teachers with professional ability and teaching level. The CAREC 6 countries have insufficient investment in vocational education funds, and enterprises lack the dynamic mechanism to participate in TVET, which leads to the difficulty for TVET students to get practical training. For the above reasons, it is difficult for TVET to meet the development needs of enterprises in CAREC 6 countries.

3.2. Different in Development of National Qualification Framework System

Countries are at different stages of implementation of National Qualification Framework (NQF). Kazakhstan has begun to implement NQF; the Kyrgyz Republic has carried out legislation and testing for various aspects of NQF; Tajikistan is in the process of developing its NQF and legislating for some aspects; Uzbekistan is revising its NQF to integrate some features of the tariff qualification system.³⁰

Kazakhstan adopted NQF in 2012. Since then, with the participation of employers, 450 occupational standards have been systematically developed and transformed into educational programs. In 2016, significant changes were made in the definition and description of qualification levels (for example, the introduction of the “applied bachelor’s degree” level) and the methodology used to develop the sectoral framework. However, there are still some problems in Kazakhstan’s qualification framework system, such as the weak link between the elements of NQF, the lack of clear stipulation on the learning outcomes of non-formal education, and the need to revise the legislation on the development of TVET and training courses to better meet the needs of the labor market.³¹

The national qualification framework was adopted in the Kyrgyz Republic on March 17, 2016 and implemented in the quadraga (CAREC Qualification Framework: Bologna principles and regional coordination) project of the Tempus project. According to the document, the national qualification system of the Kyrgyz Republic also includes: Professional standards; Sector qualification frameworks; and Certification system for acknowledgement of qualifications on the national and international levels. In the Kyrgyz Republic, NQF system is one of the focuses of education system reform, which is oriented to the cultivation of key professional and social abilities rather than knowledge and skills.³²

Tajikistan developed a concept for NQF in 2015 and provided methodological support. By the end of 2016, the documents were in the stage of consultation. International projects provide initial experience in the development of professional standards with the participation of employers.³³

³⁰ ETF, Torino Process 2016–17 Central Asia, P21, ISBN 978-92-9157-682-1.

³¹ Claudio Dondi, Senior STE, on behalf of the EC and GOPA, National Qualifications Frameworks (NQF) IN Central Asia Stock-taking Report, September 2016, P28-34.

³² Claudio Dondi, Senior STE, on behalf of the EC and GOPA, National Qualifications Frameworks (NQF) In Central Asia Stock-taking Report, September 2016, P47.

³³ ETF, Torino Process 2016–17 Central Asia, P22, ISBN 978-92-9157-682-1.

Uzbekistan initiated a work on the national quality framework with the participation of various stakeholders (chamber of Commerce, Ministry of education and Ministry of labor). Key issues under consideration are employer involvement in the development of professional standards and student assessment and / or certification. The draft NQF concept of Uzbekistan still draws on many features of the tariff qualification system.³⁴

Mongolia is developing a national qualification framework system. In 2012, the National TVET Commission approved a departmental vocational qualification framework (VQF) in the form of qualification grade structure. The VQF defines six career levels, and its descriptive indicators cover all vocational training flows, including long-term, short-term and non-formal education.³⁵

3.3. The Supply of TVET does not Match the Demand of Labor Market

The mismatch between TVET supply and labor market demand is the most common problem faced by TVET in CAREC 6 countries.

A report of the International Labor Organization (ILO) shows that the TVET in Kazakhstan does not match the demand of the labor market. This problem mainly displays in the following aspects: First, the professional settings do not match the demand of industries. A large part of secondary TVET is oriented to social and economic disciplines, while enterprises hope to obtain skilled manual workers with technical skills; Second, the ability of TVET graduates does not match the demand of enterprises. Employers often complain that young people have theoretical knowledge but lack practical skills. Third, because of the above mismatch, secondary vocational graduates have difficult to find a job. In 2012, 41.4% of Kazakhstan's secondary vocational school graduates had difficulties in finding their first job, which was even higher than that of ordinary middle school graduates (33.3%). One of the reasons is that enterprises believe that secondary vocational school graduates lack practical experience.³⁶ According to the results of the employers focus groups conducted in the study «TRP in Kazakhstan», in 2017-2018, employers were not fully satisfied with the training of the personnel of the TVET system.³⁷

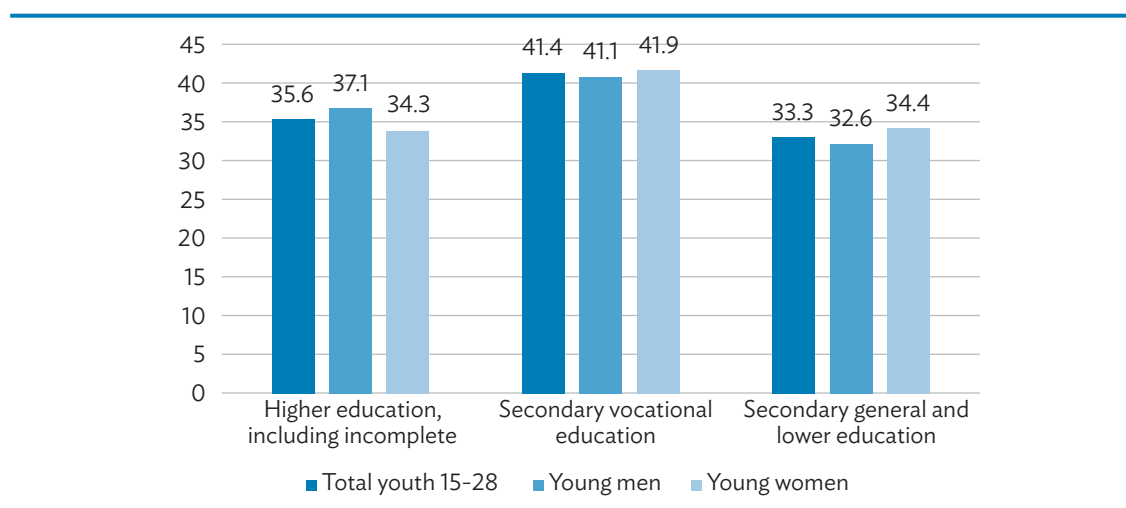
³⁴ ETF, Torino Process 2016–17 Central Asia, P22, ISBN 978-92-9157-682-1. Tariff qualification system regulated the labor market and education provision through classifiers of occupations and qualification characteristics, state educational standards, labour registration and remuneration.

³⁵ TVET Country Profiles | Mongolia June 2020, P13-14, https://unevoc.unesco.org/pub/tvet_country_profile_-_mongolia1.pdf.

³⁶ ILO, Jobs and Skills for Youth: Review of Policies for Youth Employment of Kazakhstan, First published (2015), P42, P93-94.

³⁷ ETF, Torino process 2018–2020 Kazakhstan National Report, P25.

Figure 3.2. The share of employed youth aged 15-28 having had problem to find their first job, by level of education, per cent, Kazakhstan³⁸



Source: Own calculations on the basis of data from special youth employment module in the LFS, 3rd quarter of 2012.

Similar to Kazakhstan’s TVET problems, Mongolia TVET graduates also face the employment difficulties. According to the World Bank, only about 50 percent among graduates of TVET and tertiary education in Mongolia could get employment after the graduation.³⁹ Another survey finds that 62.3 per cent of TVET graduates were employed, and among those employed, only 53.0 per cent work by using their trained skills.⁴⁰

Skills mismatch also exists in Uzbekistan. Thirty-five percent firms reported that employee skills posed a “major” or “very severe” obstacle. On the other hand, very low percentage of TVET graduates got the job in their trained specialties. For example, the employed fresh TVET graduates was reported at 40.7% in their trained specialization in academic year 2017/18. Among those employed, 60% were hired below their level of qualifications. Another survey indicates only 30 percent of Uzbek SSVE graduates found a job in their field of specialization, with the largest shares in construction, agriculture, production technology, economics, and pedagogy.⁴¹ A survey of more than 200 enterprises in Uzbekistan indicates that, less than 60% enterprises express satisfaction with the skills of TVET graduates.⁴² The underdeveloped labor market information system and employment service exacerbate the skills mismatch.⁴³

According to “National Development Strategy of the Republic of Tajikistan for the Period up to 2030”, inadequate connections between the education system and labor market was one of major challenges

³⁸ ILO, Jobs and Skills for Youth: Review of Policies for Youth Employment of Kazakhstan, First published (2015), P42.

³⁹ World Bank, MONGOLIA: Systematic Country Diagnostic, 2018, P38.

⁴⁰ The Ministry of Education, Culture, Science and Sports, Asian development bank, Study report of the Technical, Vocational Education and training Sector, P20.

⁴¹ World bank group, Uzbekistan Education Sector Analysis Final Report, December 27, 2018, P93.

⁴² ADB, Technical and Vocational Education and Training in Tajikistan and Other Countries in Central Asia, March 2021, p59.

⁴³ Sector Assessment (Summary): Education (Technical and Ethnical and vocational education and training), P1-2.

faced by the country. A training assessment conducted by ADB showed that the existing training programs did not match the actual needs of the local labor market in Tajikistan.⁴⁴

Teaching in colleges in Kyrgyz Republic remains highly theoretical and does not adequately equip youth with the practical skills needed in the labor market.⁴⁵ Because of inadequate knowledge and skills among TVET graduates and high training costs, 61 per cent of companies in the construction sector and 85 per cent in the service sector do not communicate with educational institutions.⁴⁶

The six CAREC countries have a large number of labor exporters and importers, which put forward specific requirements for TVET. Kazakhstan is a net importer of labor while the Kyrgyz Republic, Tajikistan, and Uzbekistan rely significantly on labor exports for foreign exchange revenue and employment. Workers from Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan migrate mainly to the Russian Federation. About 33% of GDP of Kyrgyz Republic and Tajikistan comes from migrant remittances.⁴⁷

Working in other countries, migrant workers should have strong interpersonal skills, but the TVET considered little of it. For instance, in Turkmenistan, the content of the initial TVET curriculum does not pay attention to interpersonal skills and other key capability training.⁴⁸

3.4. Weak Labor Market Information Service System

The reports of ILO and ETF show that CAREC 6 countries have different development levels in labor market information system, many of them need to be improved.

In Tajikistan, lack of effective labor market information system is one of the important reasons that caused the mismatch between TVET supply and labor market demand. For instance, linkages between the TVET and the local business community are essentially nonexistent. No tracer studies of secondary TVET graduates are available⁴⁹. As a result, planning in the vocational education system at all levels is carried out without considering the real needs of the labor market.

Labor market information systems in CAREC 6 countries could not provide forward-looking information. According to the ETF 2016–2017 Turin process report, although Uzbekistan, Kazakhstan, Tajikistan and the Kyrgyz Republic did conduct annual reviews of labor market demand, employers are rarely able to accurately and prospectively determine their skills needs. The demand survey method focuses on the existing majors, so it only involves the quantity and did not pay attention to the specific skills required by employers or new skill requirements arising from the development of the economic sector. Due to its extremely limited resources, Tajikistan only conducts a labor force survey every four to five years. To date, only Kazakhstan and the Kyrgyz Republic have reported medium-term (five- to ten-year) forecasts of labor market demand.⁵⁰ In fact, in Kazakhstan, forecasting of professional skills required in the labor

⁴⁴ ADB, Concept Paper, Project Number: 51011-001-November 2018, Proposed Grant, Tajikistan: Skills and Competitiveness Sector, Development Program.

⁴⁵ ADB, Technical and Vocational Education and Training in Tajikistan and Other Countries in Central Asia, March 21, P52.

⁴⁶ ILO, State of Skills, Kyrgyzstan, P12.

⁴⁷ CAREC, ADB, Education and Skills Development Under the CAREC Program Scoping Study, September 2019, P4-5.

⁴⁸ ETF, Turkmenistan Overview of TVET And Training and the Labor Market, P20.

⁴⁹ ADB, Technical and Vocational Education and Training in Tajikistan and Other Countries in Central Asia Key Findings and Policy Options, March 2021, p41.

⁵⁰ ETF, Torino Process 2016–17 Central Asia, P14, ISBN 978-92-9157-682-1, 2017.

market is practically not conducted.⁵¹ According to “TVET Country Profiles Mongolia”, Mongolia does not have information system on labor supply and demand forecast.⁵²

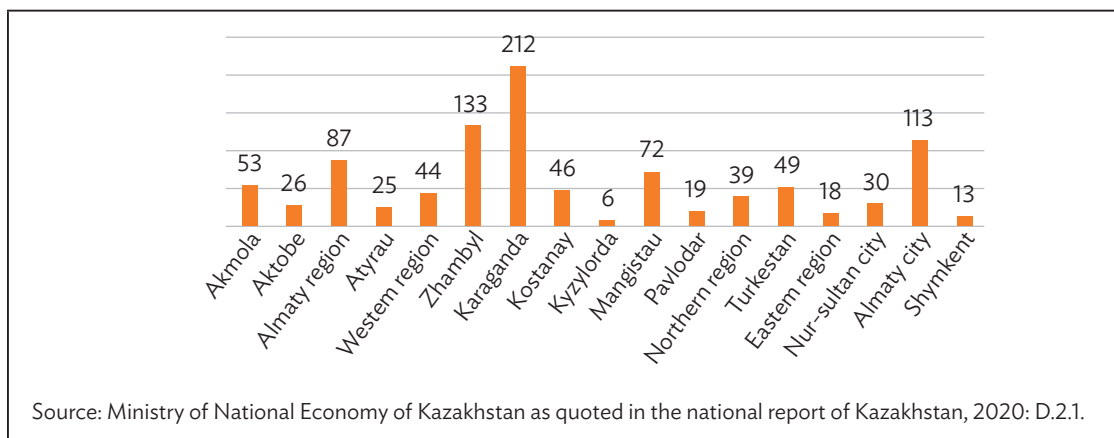
One main reason of the mismatch between the supply of TVET and demand of labor market is the lack of incentive mechanism for the cooperation between TVET and industries and enterprises. Mongolia has no effective mechanism to facilitate the school-to-work transition due to weak linkages of the TVET system with industries and employers.⁵³ A recent study suggests that although vocational colleges enter into a mandatory agreement with employers and local authorities in Uzbekistan, colleges and firms do not sufficiently interact to address important issues, such as skills development, curriculum revisions, and practical training.⁵⁴

3.5. The Capability of TVET Teachers is Weak

General speaking, due to low wages and lack of in-service professional development opportunities, it is difficult for TVET institutions in CAREC 6 countries to recruit qualified teachers with industry and enterprise practical experience.

First, due to the low salary, it is difficult to attract talents who combine high professional qualification with teaching skills to engage in TVET.⁵⁵ One of the bottlenecks of TVET development in Kazakhstan judged by ETF in 2010 is the low ability level of TVET teachers. Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan also face difficulties in attracting and retaining TVET teachers with sufficient practical experience due to the medium to low wages and limited career development opportunities. For example, the vacancy rate of master’s positions in Tajikistan is very high (up to 25%). In Uzbekistan, one out of every three teachers in SSVE does not hold a higher education degree.⁵⁶ In 2016, an ADB report showed that Mongolian TVET teachers also had the problem of lacking technical and vocational skills.

Figure 3.3. Shortage of teachers and trainers in TVET (2018) in Kazakhstan⁵⁷



51 ETF, Torino Process 2018–2020 Kazakhstan National Report, P30.

52 TVET Country Profiles | Mongolia June 2020, P16-17 https://unevoc.unesco.org/pub/tvet_country_profile_-_mongolia1.pdf.

53 World Bank, MONGOLIA: Systematic Country Diagnostic, 2018, P38.

54 World bank group, Uzbekistan Education Sector Analysis Final Report, December 27, 2018, P94.

55 ILO, Jobs and Skills for Youth: Review of Policies for Youth Employment of Kazakhstan, First published (2015), P65.

56 World bank group, Uzbekistan Education Sector Analysis Final Report, December 27, 2018, p71.

57 ETF, Policies for Human Capital Development Kazakhstan An ETF Torino Process Assessment, 2020, P23.

Second, lack of TVET teachers training institutions or mechanisms. At present, no institution in Mongolia provides preservice teacher education or in-service teacher training in TVET pedagogy and technical and vocational skills.⁵⁸ Mongolian national education university has been responsible for the preservice training of secondary school teachers, but since 2005, no major or minor in TVET.⁵⁹

Owing to the lack of professional support and on-the-job training, some TVET teachers have limited capability to meet the needs of enterprise development. Many new teachers in Kyrgyz Republic are lack of preservice training, and in-service training opportunities for existing teachers are also limited. These weaknesses are reinforced by a shortage of sophisticated training materials and equipment.⁶⁰ The development of teachers' technical skills is not yet an institutional mechanism and is not supported financially.

3.6. Difficulties in Realizing Practical Training in Enterprises

TVET is a vocational oriented education type, and enterprise practice of TVET students is an important guarantee for the quality of TVET. CAREC 6 countries are facing challenges in ensuring the enterprise practice for TVET students.

Although Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan require all TVET students to practice in enterprises, in fact, many students' practical training is usually carried out in workshops at vocational colleges.⁶¹ Despite efforts by all four countries to promote enterprise based mandatory practices and / or learning, only Kazakhstan and the Kyrgyz Republic reported some progress in this aspect. According to the ETF Turin process report, a key challenge for CAREC 6 countries to implement work-based learning is interaction with small and medium-sized enterprises, especially micro and small enterprises, which also often lack the necessary staff and equipment to carry out work-based learning.⁶² According to a 2013 survey, only about 20% of TVET programs and courses in Mongolia were equipped with sufficient training equipment and facilities.

3.7. Insufficient Funds for TVET

TVET is an expensive education, which needs a lot of funds. Generally speaking, the funds for TVET in CAREC 6 countries are insufficient. This situation is different for Uzbekistan.

Uzbekistan's spending on SSVE in 2017 accounted for approximately 1.27 percent of GDP, higher than the EU average.⁶³

ETF pointed out in its evaluation of TVET in Kazakhstan in 2009 that compared with other levels of education, the public budget expenditure per student in TVET is much lower, which leads to the further deterioration of equipment and material conditions, and the lack of practical training opportunities for

⁵⁸ ADB, ADB Briefs, NO. 58, May 2016.

⁵⁹ TVET Country Profiles | Mongolia June 2020. P13, https://unevoc.unesco.org/pub/tvet_country_profile_-_mongolia1.pdf.

⁶⁰ ADB, Technical and Vocational Education and Training in Tajikistan and Other Countries in Central Asia, March 21, P52.

⁶¹ ETF, Torino Process Central Asia 2016-17, 2017, P1.

⁶² ETF, Torino Process Central Asia 2016-17, 2017, P20.

⁶³ World bank group, Uzbekistan Education Sector Analysis Final Report, December 27, 2018, P23.

students.⁶⁴ According to a report in 2019, from 2001 to 2016, the national budget spending on TVET has hardly changed, accounting for only 0.2% - 0.3% of GDP. This is significantly lower than other countries.⁶⁵

The situation of financing TVET in Tajikistan is similar to that of Kazakhstan. National budget for TVET as a share of GDP in 2013/14 was 0.24%, and this proportion was 0.23% in 2017/18.⁶⁶ ADB conducted a training needs assessment for vulnerable groups in Tajikistan showed that training equipment and teaching methods were outdated due to limited budget.⁶⁷ In year 2021, ADB report mentions that “most vocational lyceums face serious challenges, such as dilapidated facilities and shortage of equipment and learning material”, “Most ‘practical’ training is done by teachers using posters and the limited available outdated equipment”, and “The lyceums do not have facilities for students to conduct practical exercises by themselves”, etc.⁶⁸

The proportion of investment in TVET in Turkmenistan has gradually decreased. In 2011, the secondary TVET funds accounted for 1.2% of the total education funds. By 2012, the proportion decreased to 0.96% and to 0.88% in 2013. See the table 3.1. below for details.

Table 3.1. Expenditure of the State Budget on Public and Social Services (billion Manats)⁶⁹

	2011	2012	2013
Education expenses Total	2,849.9	3,569.6	4,820.6
Preschool education	626.7	858.1	1,071.8
Elementary and general secondary education	1,611.5	1,915.5	2,652.6
Secondary VET	33.7 (1.2%)	34.3 (0.96%)	42.6 (0.88%)
Higher education	207.9	247.3	297.9
Other	370.1	514.4	755.7

Due to the lack of funds, it is difficult in Mongolia to purchase qualified equipment and facilities. According to a survey conducted in 2013, only about 20% of TVET programs and courses were equipped with sufficient training equipment and facilities.⁷⁰ In 2019, the government expenditure on education sector was 15.3%, of which TVET sector expenditure was 6.3%.⁷¹

In Kyrgyz Republic, the capacity of the formal TVET system is limited in terms of its facilities and financial and human resources. Only about 6 per cent of education funding was allocated to TVET in 2017. PVET accounts for 3.7 per cent of the consolidated budgetary expenditure on education, while SVET accounts for 3.1 per cent. PVET receives 91.6 per cent of its funding from the state budget; for SVET, the share is

⁶⁴ ADB, Concept Paper, Project Number: 51011-001, November 2018, Proposed Grant, Tajikistan: Skills and Competitiveness Sector, Development Program.

⁶⁵ Jan Helbich, Diana Laipniece and Lucia Ulbrikova / on behalf of the EC and GOPA, Effective Financing of Education Systems and Education Institutions in Higher Education and TVET And Training In The Eu And Central Asia Review Report, January 2019, P29-30.

⁶⁶ Effective Financing of Education Systems and Education Institutions in Higher Education and Vocational Education and Training In The Eu And Central Asia Review Report, January 2019, P35.

⁶⁷ ADB, Concept Paper, Project Number: 51011-001, November 2018, Proposed Grant, Tajikistan: Skills and Competitiveness Sector, Development Program.

⁶⁸ ADB, Technical and Vocational Education and Training in Tajikistan and Other Countries in Central Asia Key Findings and Policy Options, March 2021, P40.

⁶⁹ ETF, Turkmenistan Overview of TVET And Training and The Labor Market Update 2015, P29.

⁷⁰ ADB, ADB Briefs, NO. 58, May 2016

⁷¹ TVET Country Profiles | Mongolia June 2020, P12, https://unevoc.unesco.org/pub/tvet_country_profile_-_mongolia1.pdf.

57.1 per cent, with the remainder coming from private tuition fees.⁷² Financial resources are inadequate for funding sufficient qualified and motivated teachers, learning equipment and tools, resulting in a poor quality of service delivery.^{73 74}

3.8. Lack of High-quality ICT Education

Due to lack of trained teaching staff and lack of funding, TVET institutes in CAREC countries have not provided good-quality ICT education and training.

According to an ADB report, though ICT could have a high impact on TVET provision and access to learning opportunities, its development has mostly been at the low level and usually, it's confined to simple ICT skills rather than supporting more specialized technical training that could help the development of industries and services in the region. This report also holds that the use of the Internet in teaching and learning is largely absent from TVET classes, most ICT use in TVET schools is directly related to the teaching of basic ICT skills, made little use of ICT in the teaching of technical subjects and skills under TVET programs, and the development of ICT-based distance education in technical and vocational subjects has been limited.⁷⁵

Up to now, ICT education in TVET system in CAREC 6 countries is almost facing the same challenges. Though the digitalization of its economy is on top development priority in Kazakhstan, TVET system is not ready for these tasks. Not all colleges have teachers' workplaces equipped with personal computers, computer programs are outdated.⁷⁶ One reason is the acute shortage of teaching staff with enough knowledge of ICT. Another reason is the gap existing between the education and training system and the ICT sector because of the lack of involvement of the ICT sector in the process of preparing TVET specialists.⁷⁷ In Kyrgyz Republic, the concept of e-learning and digital management was developed and approved by Ministry of Education and Science and is under consideration by an inter-ministerial working group.⁷⁸

3.9. Analysis on the Problems and Challenges Faced by the Development of TVET in 6 CAREC Countries

TVET is a type of education which is most closely related to economy. Based on economic indicators, the six CAREC countries can be divided into different group countries. Generally speaking, the development basis, problems and challenges of TVET among same group countries are similar.

According to the latest criteria of World Bank, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of \$1,045 or less in 2020; lower middle-income economies are those with a GNI per capita between \$1,046 and \$4,095; upper middle-income economies are those with a GNI per capita between \$4,096 and \$12,695; high-income economies are

⁷² ILO, State of skills, Kyrgyzstan, P27.

⁷³ ILO, State of skills, Kyrgyzstan, P28.

⁷⁴ ILO, State of skills, Kyrgyzstan, P35.

⁷⁵ ADB, ICT in Education in Central and West Asia education Executive Summary, central and West Asia, 2012, P7-8.

⁷⁶ ETF, Torino Process 2018–2020 Kazakhstan National Report, P59.

⁷⁷ ETF, Policies for Human Capital Development Kazakhstan an ETF Torino Process Assessment, 2020, P21–22.

⁷⁸ ADB, Technical and Vocational Education and Training in Tajikistan and Other Countries in Central Asia, March 21, 2021, p53.

those with a GNI per capita of \$12,696 or more⁷⁹. Kazakhstan and Turkmenistan belong to Upper middle-income economies, due to the GNI of Kazakhstan was 8680 US\$ in year 2020, and Turkmenistan was 7220 US\$ in 2019. Kyrgyz Republic, Mongolia, Tajikistan and Uzbekistan belong to lower middle-income economies, their GNI were 1160, 3670, 1060 and 1670 separately in year 2020.⁸⁰

Based on World Bank classification, CAREC 6 countries can be divided as two groups, Kazakhstan and Turkmenistan belong to Upper middle-income economies (Group 1 CAREC countries), while Kyrgyz Republic, Mongolia, Tajikistan and Uzbekistan belong to lower middle-income economies (Group 2 CAREC countries). In terms of TVET development, by and large, the CAREC 6 countries could also be divided as two groups. While there are lot of similarities between those two groups of countries, different groups do have different stage of development and different priorities in terms of TVET development.

As an upper middle-income economy, Kazakhstan and Turkmenistan have a relatively better TVET system. In order to promote the connection between TVET and industry (enterprises), Kazakhstan established National Council for Vocational Education and regional and sectoral councils, National Chamber of Entrepreneurs, and public-private dialogue system⁸¹; In order to make TVET teaching meet the needs of industry and enterprises, 60% of VET colleges has introduced dual approach and modular and competent approach⁸²; To meet the learners' demand, Kazakhstan allow TVET graduates to retake the Comprehensive Test, creating flexible pathways between different levels and sectors of the education system⁸³, etc. But Kazakhstan is also facing TVET problems and challenges, such as Labor market dissatisfaction with the quality of training with TVET, Higher unemployment rates for TVET graduates, digital skills development and upgrade teachers' skills. Incentive mechanism should also be provided to make industries and enterprises participate in TVET actively and effectively.

As lower middle-income economies, Kyrgyz Republic, Mongolia, Tajikistan and Uzbekistan are facing similar problems and challenges. TVET problems and challenges faced by these four countries are mainly basic problems, including lack opportunities to access TVET, lack TVET teachers/qualified TVET teachers and training opportunities for TVET teachers, lack information system and systemic social partnership, lack reliable evaluation system, etc. These are basic problems related to operation of system of TVET. More detailed recommendations will be presented in the following chapters.

⁷⁹ <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>.

⁸⁰ <https://data.worldbank.org/indicator/NY.GNP.PCAP.CD?locations=KZ-TM-MN-UZ-KG-TJ>.

⁸¹ ADB, Technical and Vocational Education and Training in Tajikistan and other Countries in Central Asia, March 2021, P50.

⁸² Andrea Dubecova, Jan Helbich and Lucia Ulbrikova / on behalf of the EC and GOPA, Review Report 'Summary and Update on Education Systems and Policies in Central Asia', March 2019, P9.

⁸³ ADB, Technical and Vocational Education and Training in Tajikistan and Other Countries in Central Asia, March 2021,P50.

CHAPTER IV. TVET IN THE PRC: HISTORY AND RECENT DEVELOPMENT

4.1. The Brief History of the PRC's TVET Sector

TVET development has a long history in the PRC. It dates back as early as year 1866, when the first modern vocational school, Fuzhou Ship Affairs Institution (Mawei Ship Affairs Institution), was established by Qing government.⁸⁴ However, in 1949, 83 years after, the total number of students in TVET was less than 300,000 in the entire country. Since the establishment of the PRC in that year, TVET had become an important part of the education system.

There are three stages of the TVET development in the PRC.

In the first stage, the country largely adopted the Soviet Union's model of vocational education and mainly developed secondary vocational schools.⁸⁵ Most TVET schools belonged to factories or government departments. By 1991, the country had 9,572 secondary vocational schools with 3.12 million students.

After the speeding up the economic reform and opening up to the rest of the world in the middle 1990s, the vocational education had been quickly development. The People's Congress promulgated the Vocational Education Law in 1996,⁸⁶ which established the guiding principles for TVET and broadly defined the TVET system to include all forms of pre- and in-service training for all ages. After this law, the number of TVET institutions at tertiary level had increased sharply.

In 2005, the State Council published the Decision to Vigorously Develop Vocational Education,⁸⁷ which reiterates the strategic importance of developing TVET for social economic development and calls for deeper employment-oriented reforms. By the end of this stage of TVET development in 2013, the country had 1,312 tertiary level of TVET colleges with 9.74 million students and 12,262 secondary level of TVET schools with 19.23 million students.

The third stage of TVET development started from 2014, when State Council issued its Decision on Accelerating the Development of Modern Vocational Education.⁸⁸ Six Ministries issued the Modern Vocational Education System Development Plan (2014-2020) to establish a modern TVET system with deep integration of production and education, connecting between secondary and tertiary vocational education, and channels between vocational education and general education.⁸⁹

⁸⁴ Fuzhou Chuanzheng Communications College, <http://www.fjcpc.edu.cn/177/list.htm>.

⁸⁵ Tianshan Zeng, 2019, Laying the foundation for the vocational education system with Chinese characteristics, 7 Nov 2019, China Education Daily.

⁸⁶ Vocational Education Law, 1996, http://www.moe.gov.cn/s78/A02/zfs___left/s5911/moe_619/tnull_1312.html.

⁸⁷ The State Council, 2005, Decision to Vigorously Develop Vocational Education http://www.gov.cn/zwggk/2005-11/09/content_94296.htm.

⁸⁸ State Council, 2014, Decision on Accelerating the Development of Modern Vocational Education, http://www.gov.cn/zhengce/content/2014-06/22/content_8901.htm.

⁸⁹ Ministry of Education and other ministries, 2014, the Modern Vocational Education System Construction Plan (2014-2020), <http://old.moe.gov.cn/publicfiles/business/htmlfiles/moe/s8159/201406/170737.html>.

In 2018, the National Vocational Education Reform Implementation Plan⁹⁰ was approved. This document clearly stated, “Vocational education and general education are two different types of education with equal importance.” which aiming at establishing a modern vocational education system at various degree levels (certificate/diploma, associate degree, bachelor’s degree, and master’s degree) and opening up collaboration possibilities with international players. By the end of 2018, the country had 1418 tertiary level of TVET colleges with 11.33 million students and 10240 secondary level of TVET schools with 15.55 million students.

In the past 70 years, the PRC has made remarkable achievements in TVET sector: First, it established the world’s largest vocational education system. Second, the world’s most complete TVET category has been established, with more than 1,000 majors covering all industries in the national economy. Third, it fostered the world’s largest professional vocational teacher team. At present, the total number of full-time teachers in secondary and tertiary vocational schools in the PRC has reached 17.52 Million. Finally, tens of millions of professional and technical talents have been graduated from TVET schools to support economic transformation and industrial upgrading.⁹¹

4.2. The PRC’s TVET System: Overview

In the PRC, TVET can take place in two levels: secondary vocational schools; tertiary education (mainly in 3-year vocational colleges and vocational universities).

The secondary vocational education is the vocational education carried out at the stage of post junior high school and includes part of post senior high school vocational trainings. Secondary vocational education is the main body of the PRC’s TVET, including adult specialized secondary schools, vocational high schools, skilled workers schools, regular specialized secondary schools, etc.⁹² The enrollment target is mainly post junior high school graduates and the basic education period is mainly three-years.

Tertiary education includes Higher Vocational Education Institution and Specialized Vocational College.⁹³ Many of them were high-quality secondary vocational schools and have been upgraded to tertiary institutions in the past decades. Tertiary TVET colleges teach higher level knowledge and conduct professional vocational skills training. Tertiary education emphasizes the cultivation of application-oriented and craft-oriented highly skilled personnel.⁹⁴ Recently there is also the application-oriented vocational universities in the PRC. The enrollment target is mainly post senior high school graduates and the basic education period is mainly three-years.

Aside from the formal TVET education, the country has large scale of informal vocational education including adult education and on-job training⁹⁵. Informal vocational training is activity to improve workers’ technical and vocational skills. Compared with formal school education, informal vocational training has highly targeted content, flexible time, diverse methods, and unlimited enrollment targets.

⁹⁰ The State Council, 2018, National Vocational Education Reform Implementation Plan, http://www.gov.cn/xinwen/2019-02/19/content_5367087.htm.

⁹¹ Xin Lu, History and path for PRC’s vocational education in the past 70 years, speech at the 2019 PRC vocational education society annual meeting, https://news.eol.cn/yaowen/201912/t20191221_1700452.shtml.

⁹² Ministry of Education’s classification.

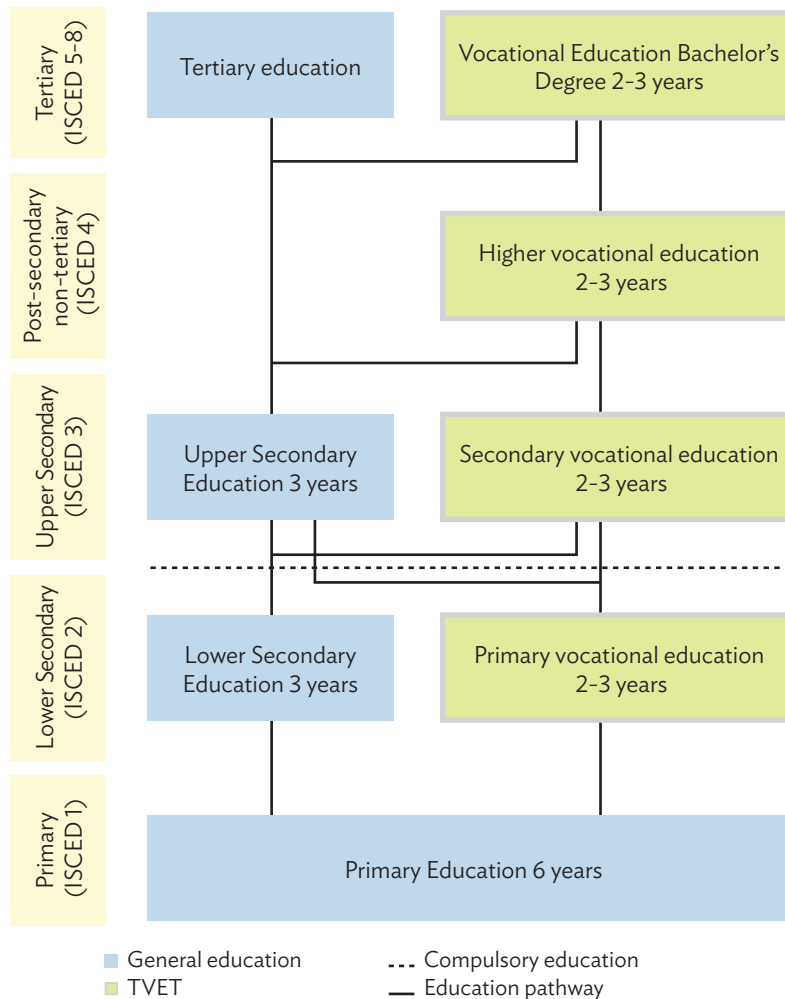
⁹³ Po, Yang, 2014, Understanding Vocational Education Market in China, Chinese Education Research & Exchange Centre (CEREC) Working Paper No. 6 September 2014.

⁹⁴ UNESCO, 2018, TVET Country Profile, PRC, November 2018, UNESCO-UNEVOC TVET Country Profiles.

⁹⁵ Po, Yang, 2014, Understanding Vocational Education Market in China, Chinese Education Research & Exchange Centre (CEREC) Working Paper No. 6 September 2014.

At present, the main informal vocational training institutions in the PRC include adult technical training schools. According to different training targets, they are divided into employee technical training schools and farmers technical training schools. The training content mainly includes certification training, employment training (including first employment training and reemployment training), on-the-job training, rural labor transfer training, and practical skills training for farmers.

Figure 4.1. TVET in the PRC’s education system



Source: TVET Country Profile, the PRC, November 2018, UNESCO-UNEVOC TVET Country Profiles.

4.3. Institutional Coordination System of TVET in the PRC

In the early years of development of TVET, most vocational schools and colleges were affiliated with different ministries, state-owned enterprises or communities. The situation changed fundamentally after the restructuring of government agencies during the 1990s and 2000s. At present, vocational education in the PRC is managed mainly by the Ministry of Education (MOE) and its provincial and county level education bureaus. A small number of TVET schools belong to the Ministry of Human Resources and Social Security (MHRSS) and the Ministry of Agriculture and Rural Affairs.

Ministry of Finance (MOF) and its provincial bureau provides budgeting and funding services for vocational institutions, including offering recurrent and earmarked funding for institutions and financing student aid programs. National Development and Reform Commission (NDRC) is also responsible for educational infrastructure development and key TVET projects development.⁹⁶ For certain economic sectors such as transportation, health, and agriculture, line ministries share responsibility in delivering sector-specific training. The Ministry of Education has been charged with a leading role in implementing the TVET system reform, with input from a broad spectrum of stakeholders including the public and private sectors, donors, and training providers.⁹⁷

On the top level, the National Inter-Ministry TVET Coordinating Committee was set up and led by the Vice Premier, composed of members from the MOE, MHRSS, the MOF, the NDRC, and sector departments such as the Ministry of Agriculture and Ministry of Culture and Tourism.⁹⁸ At the local level, several provinces have also established such coordinating committees. Examples can be found in Xinjiang and Shanghai.⁹⁹ Xinjiang replicates the national coordination model at the provincial level. Shanghai goes further to consolidate functions such as admissions, curriculum and teaching, teacher management, and student registration under the Education Bureau.

Box 4.1. Regulatory Body for Vocational Higher Education

- State Council is the overarching organization which makes strategic educational planning, deciding the scope of educational development and its priorities. In the past years, it has issued several opinions on accelerating the development of vocational education.
- National Development and Reform Commission (NDRC) and its Bureau for Development Planning are also responsible for part of educational funding. They initiate and implement most earmarked funding programs for educational infrastructure construction, including approving capital expenditure for vocational colleges.
- Ministry of Education (MOE) is the umbrella organization which supervises the operation of most public vocational colleges, using budgetary and regulatory policies. MOE's Bureau for Vocational and Adult Education is mainly responsible for initiating, implementing, and evaluating various policies related to vocational higher education, which also manipulates and manages vocational and technical education at macro level.
- Ministry of Finance (MOF) provides budgeting and funding services for vocational institutions, including offering recurrent and earmarked funding for institutions and financing various student aid programs. On program basis, the MOF approves funding for the construction of workplace learning bases and exemplary vocational colleges.
- Ministry of Human Resources and Social Security (MHRSS) is the major sponsor of the national vocational qualification system and guiding the development of some vocational middle schools and colleges. They also make policies for college graduates' employment and help graduates start their own business or become self-employed.

Source: Po, Yang, 2014.

⁹⁶ Po, Yang, 2014, Understanding Vocational Education Market in China, Chinese Education Research & Exchange Centre (CEREC) Working Paper No. 6 September 2014.

⁹⁷ Xiaoyan Liang and Shuang Chen, Developing Skills for Economic Transformation and Social Harmony in China, *A Study of Yunnan Province*, World Bank.

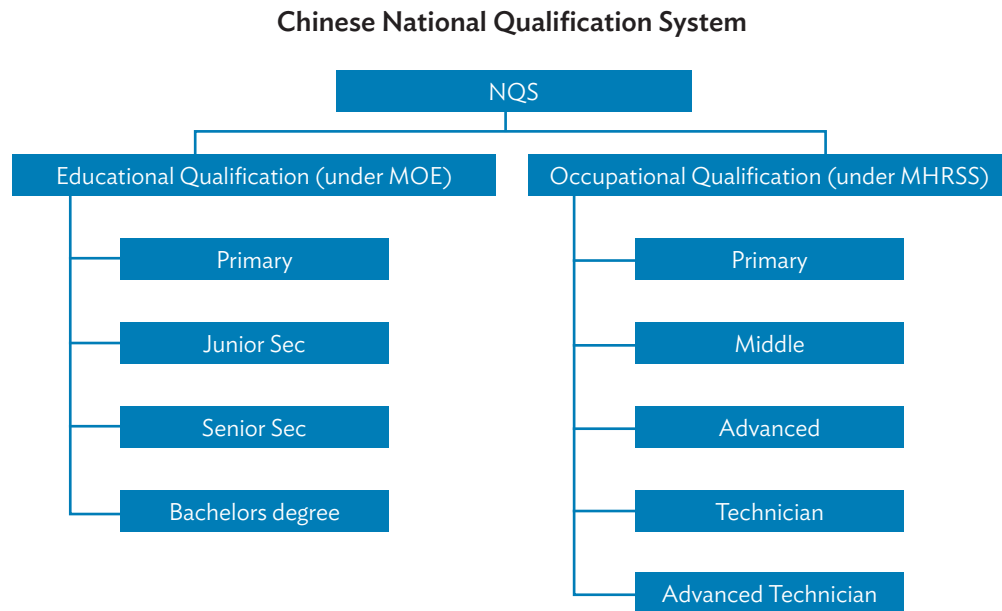
⁹⁸ The State Council, the establishment of inter-ministerial joint conference on TVET http://www.gov.cn/gongbao/content/2004/content_62819.htm.

⁹⁹ Xiaoyan Liang and Shuang Chen, Developing Skills for Economic Transformation and Social Harmony in China, *A Study of Yunnan Province*, World Bank.

4.4. National Qualification Framework and Standard System of TVET in the PRC

At current, the PRC does not have a unified national qualifications framework (NQF). The qualification system is mainly composed of two systems: educational qualification system and occupational qualification system. The Ministry of Education oversees the educational qualifications system, and the Ministry of Human Resources and Social Security is in charge of the occupational qualifications system¹⁰⁰. Figure 4.2. shows the two separate systems.

Figure 4.2. NQF in the PRC¹⁰¹



The occupational qualification certificates are based on skill units required by specific occupations. Examinations consists of two parts, knowledge examination and vocational skills assessment. Certificates are issued in accordance with the vocational skill standards or qualification requirements established by the government.¹⁰² However, the certificate system is perceived as not functioning well, so that employers do not necessarily require job applicants to hold a certificate for the employment.

There are continuous efforts from the PRC to establish the NQF. For example, the State Council proposed in Modernization of the PRC’s Education towards 2035¹⁰³ and National Vocational Education Reform Implementation Plan¹⁰⁴ that to “establish a lifelong learning system for all citizens and establish the national qualification framework”.

¹⁰⁰ Overview for PRC, Promoting Skills Development and Job Creation in East Asia Project, 2015, Korea-World Bank partnership facility, <http://documents1.worldbank.org/curated/en/216651508745207540/pdf/120583-WP-P150980-PUBLIC-PRC-NQF-summary.pdf>.

¹⁰¹ Overview for PRC, Promoting Skills Development and Job Creation in East Asia Project, 2015, Korea-World Bank partnership facility, <http://documents1.worldbank.org/curated/en/216651508745207540/pdf/120583-WP-P150980-PUBLIC-PRC-NQF-summary.pdf>.

¹⁰² TVET Country Profile, PRC, November 2018, UNESCO-UNEVOC TVET Country Profile.

¹⁰³ The State Council, 2019, Modernization of China’s Education towards 2035, Feb 2019, http://www.moe.gov.cn/jyb_xwfb/s271/201902/t20190223_370865.html.

¹⁰⁴ The State Council, 2019, National Vocational Education Reform Implementation Plan, No. 4 2019, http://www.gov.cn/zhengce/content/2019-02/13/content_5365341.htm.

4.5. Quality Assurance

At school level, TVET standards are monitored and evaluated by the Ministry of Education and Ministry of Human Resources and Social Security. The standards ensure the quality and relevance and recognize learning outcomes related to TVET.

At the end of 2011, the Ministry of Education issued the ‘Supervising and Evaluating Specification of Secondary Vocational Education’. According to the specification, each province is required to set up a standardized supervision and evaluation system that considers regional needs. The evaluation system includes eight category indexes, namely: (i) policy construction; (ii) system innovation; (iii) total investment; (iv) special investment; (v) infrastructure; (vi) teacher teams; (vii) developing scale; and (viii) education quality.

These standards serve as the basis for the initial licensing of institutions and for the school annual inspection conducted by the local government authorities. Schools not meeting the standards are issued a warning and put on probation. Schools that do not improve during the probation period may be prohibited from admitting any students. Local governments are encouraged to help schools reach the standards through macro-level planning, targeted public investment, and integrating and reallocating resources.

To promote the establishment of quality assurance, the Ministry of Education promulgated the Action Plan for Innovation and Development of Higher Vocational Education (2015–2018) (hereinafter referred to as the Action Plan).

The Action Plan can be summarized as follows:¹⁰⁵ 1) establish one platform -- the vocational colleges training data management system; 2) form two mechanisms: internal quality assurance mechanism and external quality evaluation mechanism. The internal guarantee mechanism is the guarantee mechanism established by the school itself, including quality management, quality supervision, self-evaluation and so on. External quality evaluation mechanism is the quality inspection and evaluation carried out by the government and the society, including quality certification, quality audit, quality evaluation, social evaluation, etc.; 3) give full use of three parties: TVET schools, the market, and the government; 4) conduct four tasks. First, revise the Catalogue of Specialties of Higher Vocational Colleges and the Measures for the Administration of Specialty Setting in Higher Vocational Colleges. Second, improve the supervision and evaluation system for higher vocational education. Third, establish teaching diagnosis and improvement system. Fourth, improve the annual quality report system.

Other reforms are also on the way. Starting from 2019, the PRC had been exploring the establishment of a national “credit bank”, an individual learning accounts for vocational education, to make learning outcomes traceable, searchable and convertible. For example, Shanghai has created an implementation plan for establishing Academic Credits Bank, which allows residents to apply for pre-approved adult higher education courses and vocational certificate programs and to establish individual learning files for accumulating credits. Such credits are recognized by several educational institutions for their selected programs.

¹⁰⁵ Qingzhi Guo, 2015, Thoughts on the quality assurance system for higher vocational education in the new era, China Technical and Vocational Training Education, 15 Dec 2015.

An 1+X model had also been piloted in some schools and regions, with the 1 representing for the academic certificate and X for one or more vocational certificates, exploring towards a national qualification framework tailored to national conditions.¹⁰⁶

4.6. Address Imbalance of Regional Distribution of TVET

The vocational education development is not balanced across regions in the PRC. Those in the east coastal regions, such as Beijing, Shanghai, Zhejiang, Guangdong and Tianjin, are at the top in vocational development in the PRC, while provinces in central and western regions relatively lag behind. The comparative indicators include enrollment rate, average resource level per student, financial investment, teachers' qualification, etc.¹⁰⁷ For example, in 2010, the gross higher vocational education enrollment rates in Shanghai, Beijing and Tianjin had exceeded 59%, while the number for Yunnan, Guizhou and Guangxi was lower than 20%. This is a clear indication of unbalanced higher education expansion and regional differentiation¹⁰⁸.

To address those problems, the MOE and the State Council Leading Group Office for Poverty Reduction jointly issued the TVET East-West Cooperation Action Plan (2016-2020)¹⁰⁹.

The Action Plan includes three major initiatives. The first is to implement the full coverage of paired assistance between east and west vocational institutions including vocational colleges, and secondary vocational schools. The second is to implement the East-West secondary vocational enrollment cooperation initiative. The eastern region recruits students from impoverished families in the western region if they are unable to go to schools at home. After graduation, they can choose to work in the eastern region. The third is to facilitate vocational colleges to fully participate in east-west cooperation and provide vocational trainings on employment and entrepreneurship for those impoverished people who could work and who are willing to participate in vocational training.

¹⁰⁶ Australian government, March 2019, PRC announces major reform to vocational education sector, <https://internationaleducation.gov.au/News/Latest-News/Pages/China-announces-major-reform-to-vocational-education-sector.aspx>.

¹⁰⁷ Shuchao Ma, Song Chen, 2005, A comparative study on regional vocational education development in PRC, National education "the 10th Five Year" research project, *Education Development Research*, June 2005, http://www.moe.gov.cn/jyb_xwfb/xw_zt/moe_357/s3579/moe_906/moe_912/tnull_9423.html.

¹⁰⁸ Po, Yang, 2014, Understanding Vocational Education Market in PRC, Chinese Education Research & Exchange Centre (CEREC) Working Paper No. 6 September 2014.

¹⁰⁹ Ministry of Education and the State Council Leading Group Office for Poverty Reduction, 2016, TVET East-West Cooperation Action Plan, http://www.moe.gov.cn/srcsite/A07/zcs_zhgg/201706/t20170615_307017.html.

Box 4.2. Vocational Smart Park in Lanzhou

Lanzhou New District Vocational Education Park is located in Lanzhou City, Gansu Province, one of the poorest provinces in the PRC. To change the scattered and backward situation of vocational education in Gansu, since 2015, a vocational education park has been built from scratch on a piece of 34 square kilometers of land. After the completion of the Vocational Education Park, there will be 31 secondary and higher vocational colleges with more than 300,000 students, and a public resource sharing area. This park is a new modern vocational education park integrating teaching, training, scientific research, skills appraisal, and technical services.

So far, there have been 16 vocational colleges and universities in the Park with 75,000 students and a total investment of 25.2 billion yuan. The higher vocational education colleges that have settled in include Gansu Health Vocational College, Gansu Vocational College of Finance and Trade, etc. There are also several secondary vocational and technical schools in the park.

In order to effectively serve the vocational education park and facilitate resource sharing, a public resource sharing area is established in the core area of the park. The building area of the shared area is 192,300 square meters. It is composed of functional areas such as the public training center, public library, college student innovation and entrepreneurship incubation base, student activity center, student health care center, teacher's apartments, and business service center. Lanzhou Vocational Education Park has realized the gathering and sharing of resources of various schools, which can be called the first-class "smart park" in the PRC.

4.7. On Job Skills Training Program for Rural Labor

Another important role of TVET in the PRC is to provide skill trainings to rural migrants. The PRC has undergone rapid urbanization. According to the National Bureau of Statistics, in 2019, the rural migrant workers in urban areas has reached about 300 million¹¹⁰. Ministry of Agriculture, MOE and other four ministries jointly issued the 2003-2010 Training Plan for Rural Migrant Workers, in which it set out the targets that providing vocational skills training and employment service training for migrant workers and on the job training for those already find job in non-agricultural professions¹¹¹. In recent year, the MHRSS has also conducted vocational skills training for more than 2.4 million rural migrant workers since 2017¹¹², and plans to conduct vocational trainings for another 7 million rural workers per year from 2020 to 2021, helping them to integrate into the urban life and start their own businesses back home.

4.8. Private Owned TVET Schools

For many years, TVET used to be provided only by public sector. However, private sector plays an increasingly role in both formal and non-formal TVET sector in the past decade. In 2019, there were 1985 private secondary vocational schools, with 2.2 million students and 340 tertiary level of TVET

¹¹⁰ National Bureau of Statistics, 2020, Monitoring report of rural migrant workers in 2019, 30 Apr 2020, http://www.stats.gov.cn/tjsj/zxfb/202004/t20200430_1742724.html.

¹¹¹ Six ministries issued the 2003-2010 Training Plan for Rural Migrant Workers, 2003, 2010 Training Plan for Rural Migrant Workers, China News, 2003, <http://news.sina.com.cn/c/2003-10-01/1916853045s.shtml>.

¹¹² Ministry of Human Resources and Social Security, 2020, Notice on vocational skills training plan for rural migrant workers, No. 48 2020, http://www.gov.cn/zhengce/zhengceku/2020-06/02/content_5516681.htm.

colleges with 2.7 million students¹¹³. This reflects the increasing recognition of private education and the increasing influence of private schools in higher education.

Many of the private vocational schools are operated by large education enterprises groups. For example, the China East Education Holding Limited, a Hong Kong listed company have 194 campuses and 29 out of 31 provinces in the PRC, and 26 of them can provide vocational technical secondary school degree. Those 194 campuses are under 7 famous education branches, including the well-known brands New East Cuisine Education and Wontone Automotive¹¹⁴.

Some private vocational training companies focus on informal education. For example, China Education Group and Zhonggong Education, a Shenzhen listed education group specializing in civil servants' examination trainings, and Eastern Pioneer, specializing in drivers training. Another technology company, Meituan, has established Meituan University, providing online courses in the field of domestic services, including catering, beauty, hotel management, delivery, and logistics, as well as wedding services. Meituan set the target that in the next 10 years, it aims at collaborating with 1,000 vocational schools in the PRC and promoting the digital development of 100 million domestic service professionals.¹¹⁵

Box 4.3. China Education Group¹¹⁶

China Education Group Holdings Co., Ltd. (China Education Group) is a Hong Kong listed company and a large-scale private higher education group for application oriented higher education and vocational education, providing undergraduate, short term training, technical, vocational secondary, as well as teachers training and continuing education services. The Group has undergone quick expansion through acquisitions. The group has now 11 colleges and vocational schools with more than 220,000 students. China Education Holdings was actually formed by the merger of two private universities, Jiangxi University of Science and Technology and Guangdong Baiyun University, one of the earliest private universities approved in the PRC. Jiangxi University of Science and Technology is the largest private university in Jiangxi Province, Guangdong Baiyun University is the third largest private university in Guangdong, and Baiyun Technician College is the largest private technical school in the country. Since its listing, China Education Group has continuously expanded its territory through continuous mergers and acquisitions. From 2018 to 2019, the company acquired six domestic universities and vocational schools, namely Guangzhou Songtian University, Chongqing Translation College, Shandong Quancheng College, Songtian Vocational College, Xi'an Railway Institute, and Zhengzhou Urban Rail School. The Group also acquired King's College in Sydney in Australia. It is committed to integrating educational resources in colleges and universities and has established a top-down vocational education industry chain.

¹¹³ Ministry of Education, Education statistics 2019, http://www.moe.gov.cn/s78/A03/moe_560/jytjsj_2019/qg/202006/t20200611_464801.html.

¹¹⁴ Introduction of the China East Education Holding Limited, <https://www.chinaeastedu.com/about-us/>.

¹¹⁵ Qiuyue Zhao, 2019, Meituan University founded and declared the target of "10 year, 1000 schools, 100 million people, Xinhua news, 16 Oct 2019, http://www.xinhuanet.com/tech/2019-10/16/c_1125110717.htm.

¹¹⁶ Summarized from the website of China Education Group, <http://www.chinaeducation.hk/sc/about.php>, and the crazy M & E of China's largest education group, 10 Aug 2020, Sina Finance, <https://finance.sina.com.cn/stock/relnews/hk/2020-08-10/doc-iihvwpwy0302884.shtml>.

CHAPTER V. SUGGESTION 1: EMPLOYMENT IS THE TOP PRIORITY: MATCH TVET WITH THE MARKET DEMAND

As we discussed in chapter II and III, the problems faced by TVET in CAREC 6 countries include mismatch between the supply of TVET and the demand of labor market, outdated curricula, lack of qualified teachers, insufficient funds, and inactive participation of enterprises in TVET. These problems are intertwined and have reciprocal relationships. Restricted by the financial and human resources shortage, it is difficult to make a breakthrough if we push forward the solutions together. Among all things, to achieve high employment rate for the graduates of TVET schools is on the top priority for TVET schools in the PRC and so as in CAREC 6 countries.

5.1. Employment Situation for Vocational Colleges in the PRC¹¹⁷

What is the employment situation after graduated from TVET schools in the PRC? According to the employment report of the PRC's Higher Vocational College Students released by Mycos institute in 2020¹¹⁸, the employment rate of higher vocational college graduates has stabilized at about 92% in the past five years. Among the 8 percent unemployed graduates, 4% of them for preparing next year graduate school entry exam, and 2% of them are still actively to find a job. Only 2% of them just stay home without looking for a job opportunity.

Mycos divides the situation of the PRC's higher vocational graduates after graduation into five categories: employed, self-employed, enlisted, further study to undergraduate and waiting for employment. The fresh graduates of higher vocational colleges mainly go to work directly, while the proportion of students who seek further study to universities continues to rise, and there is no obvious increase in unemployed. Over the past five years, the diversion effect of seeking further study to university on graduates continues to expand, and the proportion of students seeking further study rises from 4.7% in 2015 to 7.6% in 2019.

¹¹⁷ Figures and data are from the Chinese 3-year vocational college graduates' employment annual report 2020, Blue book of employment from Mycos Institute.

¹¹⁸ Boqing Wang, Yan Ma, Mycos institute, 2020, Chinese 3-year vocational college graduates' employment annual report 2020, Blue book of employment, Social science academic press (China), Beijing.

Figure 5.1. Trends of the Employment Rates of Higher Vocational College Students Half a year after Graduation, 2015-2019

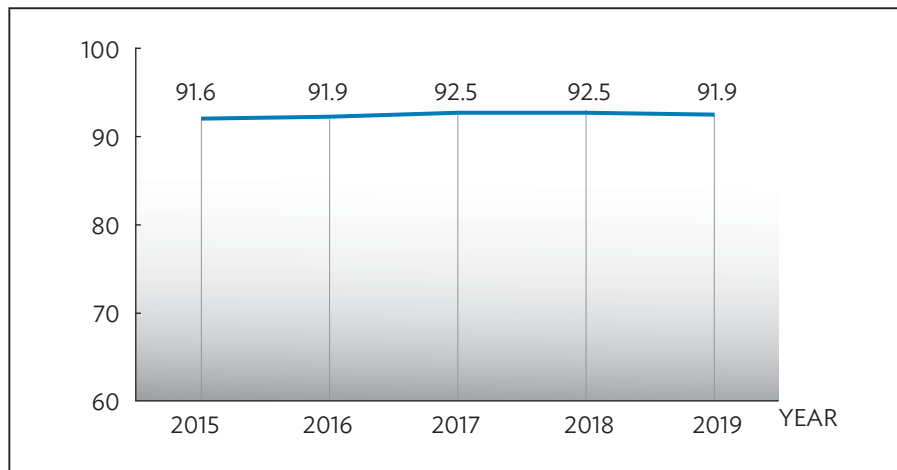


Table 5.1. Direction of Higher Vocational School Graduates Half a year after Graduation, 2015-2019

Unit: % percentage

Graduation	2019			2018			2017			2016			2015		
	DH	O	G	DH	O	G	DH	O	G	DH	O	G	DH	O	G
Direction															
Job	80	80	80	83	82	82	84	82	83	85	82	83	85	82	83
Startup	3.3	3.4	3.4	3.6	3.6	4	3.8	3.8	3.8	3.7	3.9	3.9	3.7	3.9	3.9
Military	0.7	0.5	0.6	0.5	0.6	1	0.4	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.5
Further study	9.9	7.2	7.6	7.6	6.1	6	6	5.3	5.4	5.2	4.8	4.9	5	4.6	4.7
Unemployment ¹¹⁹	6	8.6	8.1	5.6	7.9	8	5.6	8	7.5	6	8.7	8.1	6.4	8.9	8.4

DH= "Double High" Higher Vocational Colleges, O=Other Higher Vocational Colleges, G=General Higher Vocational Colleges.

The starting salary level of higher vocational graduates continues to improve. According to the data in the past five years, the starting monthly income of graduates increased from 3,409 yuan (about 530 USD) in 2015 to 4,295 yuan (about 666 USD) in 2019, which is higher than the average disposable income of urban residents (3,530 yuan) in 2019.

The more interesting data is the rate of salary increase after a few years of graduation. From the perspective of 2016 graduates, the monthly income after three years' work has reached 6,379 yuan, an increase of 77% compared with that after school (3,599 yuan). From the perspective of 2014 graduates, their income after five years further increased to 7,788 yuan, 143% compared with that after half a year of the same year students (3,200 yuan), far exceeding the wage increase of urban residents and farmers in the same period (47% and 38% respectively).

¹¹⁹ Including those students preparing for graduate schools, actively searching for job and stay home without looking for job.

Figure 5.2. Trends of Monthly Income for Higher Vocational Schools Graduates half a year after Graduation, 2015-2019

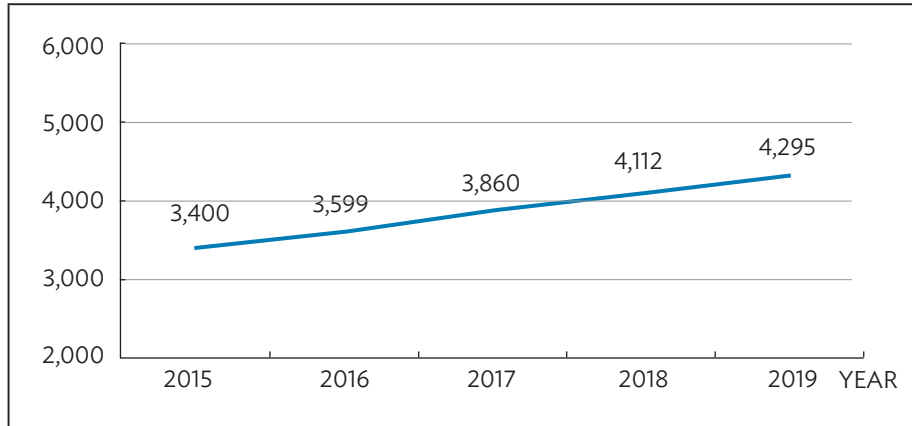


Figure 5.3. Monthly Income and Three-year Increase for Higher Vocational Schools Graduates of 2016

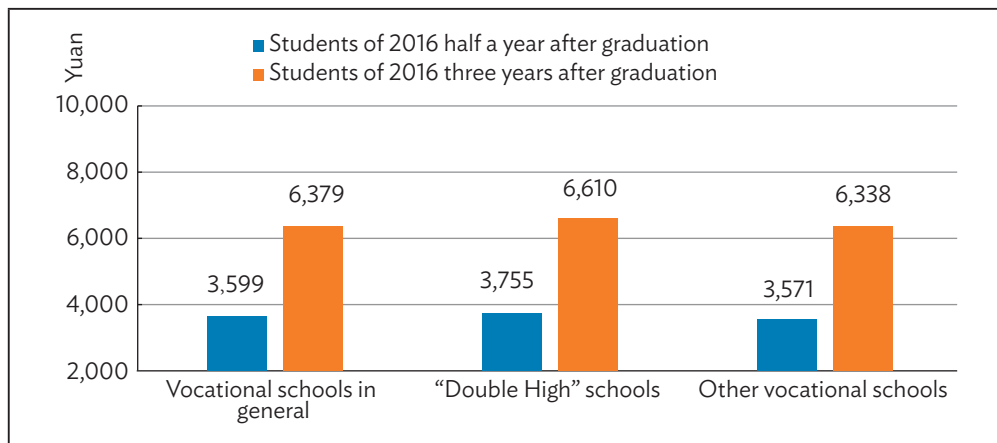
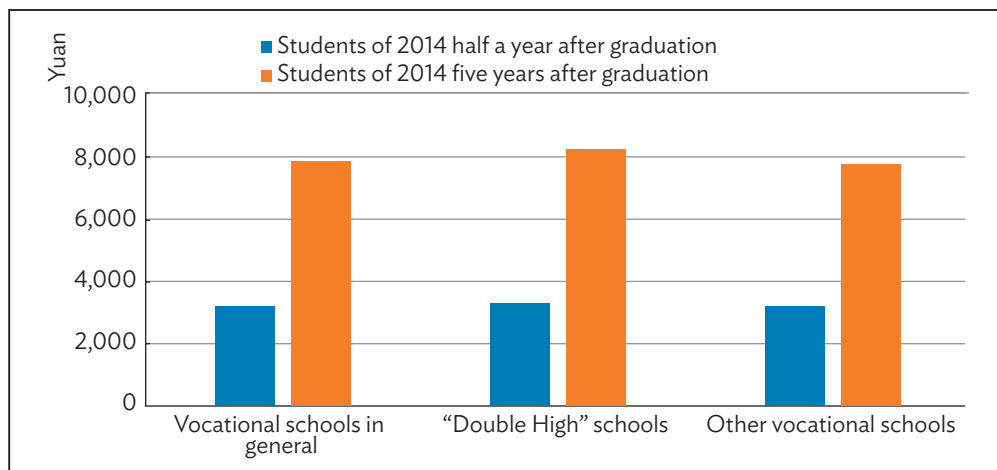


Figure 5.4. Monthly Income and Five-year Increase for Higher Vocational Schools Graduates of 2014



Private owned enterprises are the main sources of employment of higher vocational graduates. The proportion of higher vocational graduates in private enterprises has been relatively stable in the past three years. In 2019, it is the highest (68%), followed by state-owned enterprises (16%), government agencies and other institutions (10%). Private owned small, medium and micro enterprises are the most important source to absorb higher vocational graduates.

Does attending TVET school help the students from poor families? The total proportion of rural students from poverty-stricken areas in 2017–2019 is 9.9%. In 2019, the monthly income of higher vocational graduates from rural families in poor areas is 4,125 yuan, which is 4.3 times the average monthly income of rural residents in poor areas (964 yuan) and 1.04 times of the average monthly income of migrant workers in the PRC (3,962 yuan). As the working time goes on, the income advantage is further expanded. The monthly income of higher vocational graduates from rural families in poverty-stricken areas after three working years is 6,199 yuan, which is 6.4 times of the average monthly income of rural residents in poverty-stricken areas, and 1.6 times of the average monthly income of migrant workers in PRC, respectively. This shows that the poverty reduction impact of higher vocational education is remarkable.

5.2. TVET Policies to Promote Employment

The high employment opportunities of TVET are due partly to the fast economic growth of the country and partly to government policies towards employment promoting for TVET schools. MOE repeatedly emphasized the employment-oriented policy. The graduate employment rate has become the first factor in assessing the performance of TVET schools, and employment quality has become the primary indicator to evaluate the school quality.

For example, in 2009, Ministry of Education issued Notice on Accelerating the Reform of Higher Vocational Education and Promoting Employment of Graduates from Higher Vocational Colleges¹²⁰. The notice states that 1) Every school should actively adjust the majors and courses to meet the requirements of the job market. 2) In the first quarter of each year, all local concerned government should review the demand and implementation conditions of job market in the current year, report to the MOE for record, and all TVET schools to adjust their major structure in a timely manner. 3) Strengthen students' practice before graduation to improve their employability. 4) Implementing the "double certificate" system, i.e., each student should have a graduate certificate and some professional skills certificates before he/she graduated.

In recent years, because of the slowing down of economic growth, job market is becoming tight. In 2019, the Ministry of Education, Ministry of Human Resources and Social Security and twelve other departments issues Notice on Comprehensively Developing Vocational Training to Promote Employment and Entrepreneurship at Vocational Schools.¹²¹ The notice develops plans for vocational training from schools not only for TVET students, but also for enterprise employees, migrants, disabled, ex-servicemen and unemployed. It states that:

¹²⁰ Ministry of Education, 2009, Notice on Accelerating the Reform of Higher Vocational Education and Promoting Employment of Graduates from Higher Vocational Colleges, No.3 2009, http://www.moe.gov.cn/jyb_xxgk/gk_gbgg/moe_0/moe_2642/moe_2680/tnull_45311.html.

¹²¹ Ministry of Education and other 13 department, 2019, Notice on Comprehensively Developing Vocational Training to Promote Employment and Entrepreneurship at Vocational Schools, No. 5 2019, http://www.moe.gov.cn/srcsite/A07/zcs_zhgg/201911/t20191118_408707.html.

- 1) extensively carry out on job skills training for enterprise employees.
- 2) actively carry out employment and entrepreneurship training for college graduates, migrant workers, the disabled and the unemployed.
- 3) vocational colleges should provide trainings to unemployed youth, rural left behind women and elderly unemployed people, particularly in the fields of labor shortage such as housekeeping services, elderly care, nursing, infant care, e-commerce, and express delivery.
- 4) promote and develop career guidance and employment services. Vocational colleges should guide the trainees to enhance the awareness of market employment, and help them establish a correct concept of career, employment laws and regulations, career development and entrepreneurship.
- 5) promote the development of training resources and the reform of training mode.
- 6) improve the support and incentive policies for the trainees. Provide vocational training subsidies and living expenses subsidies to qualified trainees. Establishment of the “academic certificate + several vocational skill level certificates” (1 + X certificate for short) system and encourage trainees to obtain vocational skill certificates. Implement the national “credit bank” project. The training certificates are registered and stored in the credit bank and are included in the personal learning account which should be recognized by all parties in job market.

5.3. Curriculum Reforms and Apprenticeship System

As industries and job market change continually in PRC, the curriculum reform of TVET sector should also be continually modified which is an important factor for high job opportunities of TVET students. There is clear emphasis from the policy to reform the “teachers, curriculum and pedagogy” from the varies TVET policies.

5.3.1. Continually Revise Majors Catalogue for TVET Schools

As guided by MOE, in principle, revise the vocational courses and major’s directory once every five years. Schools can flexibly adjust their own majors according to the directory and adjust majors once a year.

For example, the 2010 Edition of “Specializations Catalogue of Secondary Vocational Schools” was divided into 18 categories and 367 majors. In 2011, 85 new majors were added, covering nearly 80% of new occupations, in 2019, other 46 new majors were added. In the college level, the 2015 edition “Specialization Catalogue of Higher Vocational Education in General Colleges and Universities” has a total of 769 majors. In 2016 - 2018, 13, 6, and 3 majors were added, respectively. In 2021, the new version of specialization catalogue has been updated, with 358 majors at the secondary level, 744 at the higher vocational level, and 247 at the university level¹²².

Since 2014, the MOE vocational education and adult education department entrusted the 48 industrial vocational education teaching guidance committees to conduct 74 reports on industrial skills demand

¹²² Tang Qianer, 2021, Vocational Specialization Catalogue has been updated by Ministry of Education, 23 Mar 2021, http://www.gov.cn/xinwen/2021-03/23/content_5595031.htm.

and provided guidance for vocational colleges in major setting. The government also promoted the vocational schools to conduct skills demand survey with enterprises.¹²³

5.3.2. The Competency-based Curriculum System¹²⁴

In the PRC, the curriculum system has been transforming from subject-based to competency-based. Provinces have carried out curriculum reforms in secondary and higher vocational schools and adopted the skills oriented and competency-oriented curriculum with regional and sectoral characteristics. For instance, Zhejiang province proposed to optimize the selective course system, which is composed of core courses and elective courses, to provide students with diversified course plans of their own choice¹²⁵.

Industrial enterprises have also been involved in the curriculum reform. For those actively involved in the reform, they participated in the design of the talent training scheme, the job demand and career analysis, as well as the curriculum development and monitoring¹²⁶.

Firstly, participating in the design of talent training programs in vocational colleges. This is currently the most common form for the PRC industry companies to participate in curriculum development. For many years, in many vocational colleges, professional teachers are still the ones developing talent training programs, and industry enterprise personnel do not participate in this process. To reflect the needs of enterprises, the usual practice of schools is to ask suggestions from some industry enterprise personnel according to the needs of industry after the talent training program is formulated.

Secondly, participating in career analysis. Career analysis is one of the key elements in curriculum development. At present, some vocational colleges invite industry and enterprise experts to participate in career analysis for the reform of the curriculum system and content.

Thirdly, participating in the development of curriculum resources. Some invited industry personnel not only participate in career analysis, but also participate in the development of specific curriculum resources, so that the content of the curriculum is closer to actual work needs.

As part of the reform, online vocational course databases had been developed in recent years. In 2003, the Ministry of Education launched the national quality courses database project for higher vocational education, and by 2010, 1,022 national quality courses had been established. The database includes courseware, electronic lesson plans, teaching cases, videos, animations, tests, and learning, to facilitate the classroom teaching, improve teaching efficiency and stimulate students' interest in learning. The databases also created opportunities for students' self-learning¹²⁷.

Finally, the student-centered teaching methods has been widely adopted. Based on the content of the course, teaching units are organized based on real production projects, work tasks, cases, etc., to implement case study teaching, project-based teaching, modular teaching, online and offline mixed

¹²³ Tianshan Zeng, 4 Feb 2020, How can vocational schools meet sector human resources demand, Guangming Daily, <http://edu.people.com.cn/n1/2020/0204/c1006-31570032.html>.

¹²⁴ Han Xu, 2017, Curriculum reform in PRC's vocational education in the new century: achievements, challenges and suggestions, Modern Education Management, 2017 (4).

¹²⁵ Zhejiang Education Bureau, 2014, Zhejiang Secondary Vocational Education Curriculum Reform Plan, 4 Nov 2014, http://www.zjzfw.gov.cn/art/2014/11/17/art_358_7646.html.

¹²⁶ Yuquan Yang, 2011, Thoughts on curriculum reform of higher vocational education in PRC, Career Horizon, 2011 (2) <http://www.101505.com/duhougan/2019/0331/156292.html>.

¹²⁷ Chunqing Meng, 2016, Curriculum reform in PRC's higher vocational education: A change makes a change, China Education Daily, 13 Sep 2016, <http://www.hbhgz.com.cn/Article/zjqy/2016/11/17/10514.html>.

teaching, and strengthen the combination of theoretical teaching and practical teaching. The “three classes” pedagogy has been initiated at this reforming process¹²⁸, namely school class, online class and enterprise class, to connect the students’ school learning with work practice and industrial demand and optimize the process with ICT and technology.

5.4. Apprenticeship System

How can students acquire vocational skills effectively is the top priority for vocational school. In this aspect, the PRC adopts the apprenticeship system learnt from European and US with some modifications. The approach is called “modern apprenticeship pilot.”

In August 2014, the MOE issued the “Opinions on Carrying out the Pilot Work of Modern Apprenticeship. In 2015 further issued the “Notice on Carrying out the Pilot Work of Modern Apprenticeship”, formulated a work plan and launched the pilot for modern apprenticeship. In July 2015, the MHRSS and the MOF jointly issued the “Notice on the Pilot Work of New Apprenticeship for Enterprises”¹²⁹, initiating the “new apprenticeship”.

Although the two documents are both notices about the apprenticeship pilot work, they are different in terms of target audience, perspectives, and responsibilities. There are similarities and differences: the main content for the modern apprenticeship and the new apprenticeship is to realize “enrollment equals to recruiting, entering the school equals to entering the factory, and school-enterprise joint training”. From the perspective of training targets, the targets of modern apprenticeship are vocational school students, and the training are conducted by schools and enterprises. The training targets of the new apprenticeship are newly recruited and newly transferred personnel who have already signed labor contracts with enterprises for more than 6 months, and the main body of training is enterprises.

According to the plan, the modern apprenticeship is through the signing of cooperation agreements between schools and enterprises. The two parties jointly develop a talent training plan, the TVET schools undertake systematic professional knowledge learning and skills training, while the enterprises conduct job skills training accordingly. From 2015 to the first half of 2020, a total of 562 vocational schools across the country participated in the modern apprenticeship pilot program, covering more than 1,000 majors, benefiting more than 90,000 students each year¹³⁰. There were about 200 enterprises involved the plan in the areas of machinery, chemical industry, electrical, and auto repair, welding, etc.

A tripartite agreement between students, schools and enterprises are signed to protect the rights and obligations of the enterprise, guarantee the education rights and labor protection rights of apprentices. Enterprises are also involved in the enrollment and recruitment of students at the beginning and provide allowances for students during the apprenticeship period.

Under new apprenticeship, since the apprentices are already enterprise employees, the apprentice’s salary, training expenses, tutor allowance, and internal training expenses are the responsibility of the company. Specifically, during the period of study and training, the enterprise shall pay apprentices’ wages

¹²⁸ Yangzhou Polytech Institute, 2019, Exploration of the reform paths for teachers, curriculum and pedagogy in vocational schools, China Vocational Education, Issue 17 2019, <http://www.ypi.edu.cn/2019/0909/c2257a42488/page.htm>.

¹²⁹ Ministry of Human Resources and Social Security, Ministry of Finance, 2018, Notice on the Pilot Work of New Apprenticeship for Enterprises, No. 66 2018, http://www.gov.cn/zhengce/2015-08/05/content_2908919.htm.

¹³⁰ Meixia Bao, 2020, Exploring the modern apprenticeship with Chinese characteristics, Guangming Daily, 4 Dec 2020, <https://www.chinanews.com/gn/2020/12-04/9354496.shtml>.

in accordance with the Labor Law, and the wages shall not be lower than the minimum wage standard where the enterprise is located; the enterprise shall also pay the apprenticeship training fees to the training institution in accordance with the cooperation agreement. Enterprise mentors who undertake the task of apprenticeship enjoy mentorship allowance which is also covered by the enterprises. The government finance grants each apprentice an annual subsidy of not less than 4,000 yuan (about US\$600) in principle. The subsidy standard is determined by the human resources and social security departments of each province.¹³¹

Box 5.1. Nanjing Railway Vocational and Technical College: A Case of Modern Apprenticeship¹³²

Nanjing Railway Vocational and Technical college, as a higher vocational college of rail transit in the Yangtze River Delta, has a history of 78 years.

In recent years, the college has continuously deepened the school enterprise cooperation and actively explored the modern apprenticeship and formed a training model with the integration of enrollment and employment, the co-development of teaching resources, and the sharing of teaching staff.

The schoolteachers and the relevant personnel of the enterprise jointly design the talent training plan, jointly develop the post occupation standard, and jointly formulate the professional teaching standard, curriculum standard, skill master standard, quality control standard and the corresponding implementation plan. The school and enterprises participate in the assessment and evaluation together and monitor the teaching quality through regular inspection and feedback.

The school and enterprise have also set up a professional mixed teaching team and professional quality training project team covering all the metro related majors, composed of enterprise backbone engineers.

In 2019, Nanjing Metro and Nanjing Railway Vocational and Technical College initiated a new initiative of school enterprise cooperation and comprehensive training. The “Pujiang east station” of Nanjing Metro Line 11 passing through the school was renamed as “Nanjing Railway Vocational and Technical College station”, and the ordinary station was redesigned as an equipment centralized station with double parking lines. In order to meet the needs of teaching and training, the rooms for train control, communication, signal, electromechanical and conference were increased. After the completion of the station, it will become the world’s first metro station with multiple functions: operating, teaching, and real time training.

¹³¹ Ministry of Human Resources and Social Security, 2018, Why is the new apprenticeship new? http://www.gov.cn/zhengce/2018-11/22/content_5342349.htm.

¹³² Nan Zhang, 2019, Nanjing Railway Vocational and Technical College: School-enterprise Deep Cooperation Brings High Enrollment and High Employment Rate, China Education Daily, <https://www.tech.net.cn/news/show-83573.html>.

Box 5.2. Xuzhou Construction and Machinery Group: New Apprenticeship¹³³

In 2015 and 2016, the Ministry of Human Resources and Social Security and the Ministry of Finance successively carried out pilot work on the new enterprise apprenticeship in 22 provinces. The training targets are newly recruited staff and transferred staff, and the goal is to realize “recruitment equals to enrollment, entering enterprise equals to entering college, and dual qualification teaching and training”. In March 2016, Xuzhou Construction and Machinery Group (XCMG) became the first batch of pilot units in Jiangsu Province for new apprenticeship and started cooperation with Xuzhou Construction and Machinery Technician College

The group recruited 88 apprentices from the transferred workers from pilot enterprises and providing trainings of two majors in engineering machinery technical service and automotive technical service and marketing. Schools and corporate mentors were arranged according to the training content and mentor expertise. The training lasts for about more than one year. Apprentices went to XCMG Technical College to have classes and study intensively on weekends. They spent more time at working days on the production line to learn about products and processes.

The apprenticeship training is mainly carried out in a way that is driven by rotation training and typical tasks of enterprises, and enterprise and school carry out training and assessment separately. For apprentices, an average salary of 5,000 yuan/month is paid to them during the training period; for masters, performance bonus points are given at the end of the year during performance evaluation, and the assessment of apprenticeship is included in the evaluation. In addition, government will provide vocational training subsidies to enterprises that carry out apprenticeship training.

In the end of the program, all 88 apprentices participating in the pilot program passed the national vocational qualification and skills appraisal and signed long-term (five-year) labor contracts with enterprises.

5.5. Suggestions to CAREC 6 on Matching TVET Supply with the Market Demand

1. The employment-oriented policy should be on the top agenda of Government guild line for all TVET schools. The graduate employment rate can be the first factor in assessing the performance of TVET schools. Employment quantity and quality should be the primary indicators to evaluate any TVET school's performance in CAREC6 countries.
2. It is suggested to have annual skills-demand survey among enterprise and vocational schools as soon as possible. Without such information system, it is difficult for TVET schools to adjust their training plan. It is also difficult for students to determine what major to be selected in school.
3. Some reforms are needed in CAREC 6 including curriculum development and majors setting standards. A systematic mechanism needs to be developed to regularly revise the vocational course curriculum and major's directory. Schools should be also allowed to adjust their own

¹³³ Xuzhou Construction and Machinery Technical College: Best practice in the sector: XCMG Group shares its experience on new apprenticeship, 23 Nov 2018, <https://www.xcmg.com/xgjsxy/news/585437.htm>.

majors flexibly according to the changes of market demand. The curriculum reform, training program design and career analysis need to involve industries and enterprises.

4. It is suggested to establish national TVET steering committees to overlook the structure of TVET system, school major setting, skills demand survey and changes of employment opportunities in the market. The committee could also help government to develop employment laws and regulations.
5. The Group 1 CAREC countries can learn from the experience of “academic certificate + vocational skill level certificates” system applied in the PRC. Students should be encouraged to obtain vocational skill certificates. The government can request enterprises to recognize the skill certificates. Students’ practice before graduation should be strengthened to improve their employability.
6. In longer term, the CAREC 6 countries can try to establish a modern apprenticeship system which is developed in Europe and US and well applied in the PRC. TVET schools and enterprises jointly develop a talent training plan, where “enrollment equals to recruitment and entering college equals entering enterprise”. The TVET schools undertake systematic professional knowledge learning and skills training, while the enterprises conduct job skills training accordingly. Under such arrangement, student no need to worry their job opportunity and enterprises have strong incentives to put efforts for student training.

CHAPTER VI. SUGGESTION 2: SEIZE THE KEY ISSUE: DEEPER INTEGRATION OF INDUSTRY AND EDUCATION

Based on the achievements of the PRC's TVET reform in recent years, we suggest that it is better to seize the key issue, starting from the school-enterprise cooperation and the integration of industry and education.

6.1. Modes of School- Enterprise Cooperation in the PRC

The experience of the PRC's TVET reform in recent years shows that only enterprises' in-depth participation in TVET can solve the problems such as disconnection between TVET and market demand and outdated curricula. The participation of enterprises can also provide part-time teachers for schools, as well as provide learning opportunities for vocational teachers in enterprises, and internship opportunities for students. Enterprises can integrate these activities into their corporate social responsibility practices.

In the PRC, there are currently five main modes of school-enterprise cooperation:¹³⁴

1. **Combination of production and education mode.** The “2 + 1” vocational internship model means that students will study at the school for 2 years, and in the third academic year, they will intern in the enterprise. The students can get a job offer if it satisfies requirement of the enterprise. Students also have the rights to choose to work in other enterprises. It is called “two-way selection” mode.
2. **Directly hire mode.** School recruitment and corporate recruitment are synchronized. After being interviewed and accepted by the partner company, the students enter the “tailor-made” training class. Schools and enterprises jointly formulate curriculum, teaching plans, and training standards. After students complete internships in cooperative enterprises, they will continue to work in the enterprise as formal employees. In this mode, enterprise has less risk to loss the trained talents.
3. **The modern apprenticeship mode.** Under this mode, every student has “dual identity”, student and apprentice. School teachers and corporate teachers implement the “dual tutor” system, and the two parties jointly establish talent training programs, curriculum standards, and evaluation systems to achieve deep integration between schools and enterprises.
4. **Co-establish training base mode.** Practical and training base is an important part of TVET school. Under this mode, school is responsible for providing training venues and resources, cooperative enterprises provide new training equipment and invest part of the funds to jointly build a training base in the school. School and enterprise jointly develop practical training programs in the training base.

¹³⁴ Summarized by author from several policies issued by the government.

5. **Technical cooperation mode.** TVET colleges and enterprises can carry out research cooperation and complementary technical cooperation, such as the establishment of joint technology research and development center. The school shares research outcomes with cooperative enterprise to reduce cost of the enterprise. In return, enterprise provides part time teachers and on-the-job training opportunities to the student.

6.2. Problems of School-Enterprise Cooperation in the PRC

Although the PRC in general achieved some progresses in School-Enterprise Cooperation, many problems remained. From many employers' point of view, industry had inadequate incentive to provide systematic and sustained inputs to the management of TVET schools.¹³⁵ In addition, few institutionalized mechanisms enabled schools to formally incorporate industry in their governance, management, and educational affairs.

Some researches on school-enterprise cooperation in TVET sector mainly includes following aspects: from a policy perspective, school-enterprise cooperation in the PRC faces interdepartmental, interdisciplinary problems in terms of government, industry, enterprises, schools and students, and no single aspect can effectively solve the problem alone. Therefore, it is necessary for the government to carry out top-level design and establish coordinated school-enterprise mechanisms.¹³⁶

Some scholars provide their views on this issue. Wang¹³⁷ puts forward that we should abandon the model of running school solely by the schools and adopt the model of running school by both schools and enterprise, letting enterprises hire before TVET schools recruit and giving TVET students the identity of "prospective employees". (Tang Guohua et al.)¹³⁸ indicated that the motivation of cooperation between organizations comes from their resource dependence on each other. Enterprises have demand on human resources, technical resources, information resources and reputation resources in school-enterprise cooperation. Therefore, corresponding measures should be taken to strengthen the development of these core resources to encourage enterprises to participate in the in-depth cooperation in TVET.

Lastly, from empirical research, it is indicated that the problems of PRC's TVET school-enterprise cooperation include lack of incentives, inadequate quality, insufficient depth of cooperation etc, and it is suggested to encourage enterprises to participate in vocational education and encourage local pilot in innovative school-enterprise cooperation models.¹³⁹

A recent research funded Ministry of Education of the PRC which surveyed more than 1,400 enterprises involved in TVET school-enterprise cooperation showed that, most of the enterprises acknowledge the significance of school-enterprise cooperation, contrary to the traditional impression that they are relatively indifferent. Enterprises expect a more positive and ad hoc collaboration mechanism with TVET schools, taking a more leading role instead of the current supporting and peripheral role. Companies

¹³⁵ Xiaoyan Liang and Shuang Chen, *Developing Skills for Economic Transformation and Social Harmony in China, A Study of Yunnan Province*, Chapter 4, p68, World Bank.

¹³⁶ Zhen He, 2013, Policies and challenges for school enterprise cooperation in vocational education, *China Higher Education Research*, 2013 (1).

¹³⁷ Weimin Wang, Qidong Yu, 2014, the Fireplace phenomenon in school enterprise cooperation: a perspective from Marxism enterprise theory, *Education Research*, 2014(7).

¹³⁸ Guohua Tang, Yanying Zeng, Jieling Luo, 2014, Resource-based research on school enterprise cooperation in higher vocational education, *Higher Engineering Education Research*, 2014(4).

¹³⁹ Haisheng Pan, Shibin Wang, Deyi Long, 2013, Analysis of the current situation and factors influencing school enterprise cooperation in higher vocational college in China, *Higher Engineering Education Research*, 2013(3).

expect the TVET schools to better service for the industry, co-establish the training bases, share teaching resources, and increase the collaboration in the field of continuous education. In terms of course design, enterprises would like to participate more with schools and integrate the courses into the production process. For student interns, enterprises expect the substantive management right and examination right.¹⁴⁰

It can be summarized that first, it is generally believed that school-enterprise cooperation has become the inevitable trend of TVET development; second, that schools are much more interested in school-enterprise cooperation than enterprises; third, that the current school-enterprise cooperation still remain superficial.

To this end, the PRC has carried out a variety of attempts from policy to practice, with the aim of integrating industry and education and gradually promoting the participation of industry and enterprises in TVET school operation.

6.3. Policies to Enhance School Enterprise Cooperation in TVET

The core of the integration of industry and TVET schools is to involve industries and enterprises into vocational school operations. However, without public policy support and sometimes fiscal incentives, enterprises, particularly private enterprises, have no willingness to be involved school-enterprise cooperation. Government needs to promote from the policy level the integration of industry and education together, to attract enterprises in school operations.

In 2014, in the Plan for Modern Vocational Education System (2014-2020)¹⁴¹, the PRC government indicated a model vocational education framework including school-industry integration and school-enterprise collaboration. In 2017, the State Council issued Opinions on Deepening Industry-Education Integration¹⁴², in which it states that vocational education should serve for the regional economic development, and enterprises should play a key role in talent training, teachers' training, student recruitment and school management. In 2018, the Ministry of Education and other five departments issued Notice on Promoting School Enterprise Cooperation in Vocational Schools¹⁴³, identifying cooperation modes between schools and enterprises in training, employment, innovation and social service, measures to encourage enterprises, and monitoring measures. In 2019, the National Development and Reform Commission and the Ministry of Education jointly issued the Pilot Implementation Measures for the Establishment of Industry-education Integrated Enterprises¹⁴⁴. It emphasizes more on industry-education integration. The two policy documents jointly promote the in-depth collaboration between the industry, the TVET schools and enterprises.

The new policies defined the “two-subject” “collaboration mechanism, with schools and enterprises both playing the leading role, identifying several cooperation modes in terms of human resources

¹⁴⁰ Haisheng Pan, Shibin Wang, Deyi Long, 2013, Analysis of the current situation and factors influencing school enterprise cooperation in higher vocational college in China, Higher Engineering Education Research, 2013(3).

¹⁴¹ Ministry of Education and five other ministries, 2014, Plan for Modern Vocational Education System (2014-2020), No. 6 2014, <http://old.moe.gov.cn/publicfiles/business/htmlfiles/moe/s8159/201406/170737.html>.

¹⁴² State Council, 2017, Opinions on Deepening Industry-Education Integration, No. 95 2017, http://www.gov.cn/zhengce/content/2017-12/19/content_5248564.htm.

¹⁴³ Ministry of Education and other five departments, 2018, Notice on Promoting School Enterprise Cooperation in Vocational Schools, No. 1 2018, http://www.gov.cn/xinwen/2018-02/20/content_5267767.htm.

¹⁴⁴ National Development and Reform Commission and Ministry of Education, 2019, Pilot Implementation Measures for the Establishment of Industry-education Integrated Enterprises, <https://www.ndrc.gov.cn/xxgk/zcfb/tz/201904/W020190905514348741731.pdf>.

training, technology innovation, employment, social service etc., and clarifies the responsibilities of central government and local government in promoting school-enterprises cooperation. The new policy also proposes other measures such as Private-Public Partnership (PPP), TVET education group, the exchanges between TVET teachers and enterprise staff, etc.

Box 6.1. Local Legislation of Jiangsu Province

Local governments have their roles to promote school-enterprise cooperation. For example, the Regulations of Jiangsu Province on The Promotion of School-enterprise Cooperation in Vocational Education which takes effect on May 1, 2019 is the first local legislation at the provincial level. The regulations focus on strengthening the willingness of enterprises and avoiding the emphasis on enterprises' obligation. It encourages and advocates for enterprises' participation while clearly defined the duties and obligations for TVET schools in school-enterprise cooperation.¹⁴⁵

6.4. Policy Incentives to Promote School-Enterprise Cooperation

The PRC government provided a series of policy incentives for enterprises cooperated. For example, the National Development and Reform Commission and the Ministry of Education jointly issued a policy named “the Pilot Implementation Measures for the Establishment of Industry-education Integrated Enterprises”. In 2020, the Ministry of Education and other six departments issued “a Notice on Promoting School Enterprise Cooperation in Vocational Schools”. For enterprises deeply involved in school enterprise cooperation, they will get combined incentives of “finance + budgetary allowance + land + credit”, and relevant tax exemptions according to regulations.

Those incentive policies are summarized mainly as the following:

1. Recognition and corresponding policy support are given to enterprises that have participated deeply in school-enterprise cooperation and achieved remarkable results. The industry and information departments of the Government should regard the participation in school-enterprise cooperation as an important indicator for the selection of service-oriented manufacturing demonstration enterprises.
2. The taxation department should take school-enterprise cooperation as an important measure for structural tax reduction and implement the fiscal and taxation incentives.
3. The actual expenses incurred by the enterprise for accepting student internships shall be deducted when calculating the taxable income. Management personnel, professional and technical personnel have been appointed by the vocational school, can serve as full-time and part-time teachers and enjoy relevant income and benefits.
4. Encourage banking and other financial institutions to provide loans and credits to support school-enterprise cooperation. Encourage TVET schools to apply Chinese government-enterprise cooperation investment funds, international financial organizations loans, and

¹⁴⁵ Jiangsu vocational education school enterprise cooperation promotion guidelines, 29 March 2019, http://www.jsrd.gov.cn/zyfb/sjfg/201904/t20190404_512545.shtml.

foreign government loans to support the construction of school-enterprise cooperation projects.

5. Supporting enterprises to participate in vocational education in the form of sole owned, joint venture, and private-public ownership and shareholding system. Support enterprises to participate in the running of public vocational schools through purchasing services and entrusting management.
6. Land used by enterprises to invest or cooperate with the vocational schools shall be managed according to the land used for science and education, and land can be provided through free allocation or leasing.
7. Select about 10 provinces, about 100 cities, about 1,000 model vocational schools (vocational education groups) and enterprises to carry out pilot projects for the integration of production and education.

6.5. Suggestions to CAREC 6 Countries in School-Enterprise Cooperation

1. Based on the achievements of the PRC's TVET reform in recent years, we suggest that the school-enterprise cooperation is the key policy measure to substantially integrate industry and education in CAREC 6 countries. Only enterprises' in-depth participation in TVET can solve the problems such as disconnection between TVET and market demand and outdated curricula. The participation of enterprises can also provide part-time teachers for schools, as well as provide learning opportunities for vocational teachers in enterprises, and internship opportunities for students. Enterprises can integrate these activities into their corporate social responsibility practices. However, this may be applied more to Group 1 CAREC countries where industries are more developed locally. In Group 2 CAREC countries for them going abroad and being a migration worker is the major job opportunities, efforts may need to make to attract foreign enterprises to participate TVET development in the countries.
2. The core of the integration of industry and TVET schools is to involve industries and enterprises into vocational school operations. However, enterprises are generally lack enthusiasm to participate it. CAREC 6 Governments need to promote from the policy level the integration of industry and education together, and gradually attract enterprises in school operations.
3. Many School-Enterprise Cooperation modes developed in PRC can be applied in CAREC 6 countries with some modifications. For example, the "2 + 1" mode, school study for 2 years, and 1 year intern in the enterprise. Directly hire mode, synchronize school recruitment and corporate recruitment. The modern apprenticeship mode, student has "dual identity", student and apprentice. Co-establish training base mode, school is responsible for providing training venues and resources, cooperative enterprises provide new training equipment and invest part of the funds to jointly build a training base in the school.
4. CAREC 6 countries need to provide a series of adequate policy incentives for enterprises cooperated with vocational schools. For enterprises deeply involved in school enterprise cooperation, a structural tax reduction and actual expenses for student internships shall be deducted from taxable income. it would be effective if some combined incentives are given including finance + budgetary allowance + land + and relevant tax exemptions.

5. CAREC 6 countries could consider to establish a school-enterprise cooperation investment funds to support enterprises or schools. Private-Public Partnership could be applied to support enterprises to participate in vocational education in the form of sole owned, joint venture, and private-public ownership. Support enterprises to participate in the running of public vocational schools through purchasing services and entrusting management. CAREC 6 countries could also apply international financial organizations loans, and foreign government loans to support the construction of school-enterprise cooperation projects.
6. In addition to knowledge learning at schools, acquiring vocational skills is also of the top priority for vocational school students. In particular, CAREC 6 country can learn from apprenticeship system successfully applied in Europe and the North America.

CHAPTER VII. SUGGESTIONS 3: TVET GROUPS: AN EFFECTIVE WAY TO IMPROVE QUALITY OF TVET

As discussed in the chapter V, school-enterprise cooperation has a significant positive impact on TVET development in the PRC. However, one problem remained: a single school and enterprise cooperation cannot address fast changes of demand of industries. In addition, few institutionalized mechanisms enable schools to formally incorporate industry in their governance, management, and educational affairs.¹⁴⁶

7.1. TVET Group Approach for School-Enterprise Cooperation

Forming TVET group is one way to address weakness of simple school-enterprise cooperation. In a TVET group, cluster of similar enterprises and group of TVET schools form a joint management group that oversees vocational education. It is supported by government, guided by TVET schools, and participated by enterprises. It plays an important role in promoting the organic integration of education chain and industrial chain. According to the statistics of the Ministry of Education, there were more than 1400 TVET groups in the PRC in 2018¹⁴⁷.

A typical TVET group lead by some schools and institutions and involving resource sharing, such as student internships in enterprises, industrial experts instructing in schools, and collaboration in development of training materials. The TVET group provides an integrated approach to linking industry, research and development, and training.¹⁴⁸ TVET group is an important engine for school enterprise cooperation and industry-education integration.

In the State Council's Decision on Accelerating Modern TVET¹⁴⁹, the PRC government promoted TVET group further. The MOE released Opinions on Deepening the Development of TVET Groups¹⁵⁰, targeting at expanding the TVET groups and establishing another 300 key TVET groups by the year 2020. It also set out the strategic directions for the development of TVET groups:

1. **Standardizing and improving the governance structure of TVET groups.** TVET groups should establish joint meetings, councils or boards of directors, secretariats, etc., and establish the operating mechanisms such as decision-making, consultation, assessment, and supervision. Exploring the registration as corporates through the lease, custody, and transfer of the right to use land, premises, assets, capital, equipment, and technology.

¹⁴⁶ Xiaoyan Liang and Shuang Chen, *Developing Skills for Economic Transformation and Social Harmony in China, A Study of Yunnan Province*, Chapter 4, p68, World Bank.

¹⁴⁷ Xinhua News Agency, 8 Nov 2018, *PRC has over 1,400 TVET groups with participation of nearly 30,000 enterprises*. http://www.gov.cn/guowuyuan/2018-11/08/content_5338311.htm.

¹⁴⁸ Xiaoyan Liang and Shuang Chen, *Developing Skills for Economic Transformation and Social Harmony in China, A Study of Yunnan Province*, Chapter 4, p68, World Bank.

¹⁴⁹ The State Council, 2014, *Decision on Accelerating Modern TVET*, NO. 19 2014, http://www.gov.cn/zhengce/content/2014-06/22/content_8901.htm.

¹⁵⁰ Ministry of Education, 2015, *Opinions on Deepening the Development of TVET Education Group*, NO. 4 2015, http://www.gov.cn/gongbao/content/2015/content_2937331.htm.

2. **Encouraging multiple stakeholders to participate in TVET groups.** Supporting backbone vocational colleges to take the lead in the formation of regional TVET education groups. Supporting industry associations, SOEs, industry-leading enterprises to take the lead in the establishment of industry-based vocational education groups. Supporting the cooperation between localities and industries and establish cross-region and cross-industry compound TVET groups.
3. **Improving the capability of TVET groups for employment and entrepreneurship.** The members of the vocational education group should share enrollment and employment information, promote school-enterprise cooperation, and carry out entrusted training, directional training, tailor-made training, and modern apprenticeship. Carry out pre-job training, on-the-job training, and continuing education for employees of vocational education groups, develop vocational trainings for unemployed junior high school graduates, rural migrant labor, unemployed, and disabled groups.
4. **Mobilizing more resources in vocational education groups, increasing investment through multiple channels and support the development of vocational education groups through government purchases of services.** Supporting vocational education groups to share training bases, professional teaching resources and simulation training systems, and establishing information sharing platforms on employment, enrollment, teachers, books, technology, and management.

7.2. Cases: TVET Group in Tianjin and Henan Province

Tianjin, the third largest city in the country, developed another form of regional level of TVET group. In 2005, Tianjin and the Ministry of Education signed an agreement to jointly build a national vocational education reform pilot zone. To this end, the city government had carried out large-scale adjustments. They adjust the layout of vocational education, integrate the city's vocational education resources, and comprehensively promote the reform of the school-operating system. Based on 8 industries of the city, electronics, metallurgy, chemical industry, transportation, etc., the government established 22 new vocational education groups connecting secondary and the higher vocational education, focusing on promoting the development of manufacturing and regional vocational education cooperation¹⁵¹.

In 2015, Tianjin was upgraded to the only “national modern vocational education reform and innovation demonstration zone”. The National Vocational College Skills Competition Museum, the National Vocational Education Teacher Training Center, the National Vocational College Skills Competition Center, and the National Vocational Education Quality Development Research Center etc. have been implemented one after another. With 7 municipal vocational education and teaching steering committees have been established, the “Tianjin Model” has been recognized as demonstrative for school-enterprise cooperation in vocational education in the PRC.

In order to help weak TVET schools in rural area, the PRC government also encourage TVET schools in rural areas, ethnic minority areas, and poverty-stricken areas to group with urban TVET schools.

¹⁵¹ Tianjin deepens school enterprise cooperation and establishes modern TVET system with local characteristics, 29 June 2019, China Education Daily, https://hudong.moe.gov.cn/jyb_xwfb/moe_2082/zl_2019n/2019_zl45/201907/t20190701_388393.html.

Under this policy, Henan province established TVET groups with schools from both urban and rural areas with resource sharing and mutual collaboration. The enrollment of urban vocational schools was extended to junior high schools in rural areas, and the employment of rural vocational school graduates was extended to jobs outside the county, city, province, and even abroad. The cooperative education between urban and rural schools of the TVET Groups basically adopts the “1+1+1” model, that is, students learn theoretical courses in rural vocational schools in the first year, and study professional skills in urban vocational schools in the second year. In the third year, students went to enterprises for internship.

For example, the urban and rural schools in the Henan Information Technology Vocational Education Group have formed 30 “pairs”, and more than 2,600 students have adopted the “1+1+1” cooperative education model. The rural schools of the TVET groups adopted the same principles within the groups in terms of training objectives, teaching plans, syllabus, teaching materials, and assessment methods, sharing the urban high-quality vocational education resources. Urban schools have helped rural schools in teachers training and training equipment. Since 2004, 18 urban vocational education groups have trained 4,898 teachers in rural schools, sent 2,198 outstanding teachers to teach in rural areas, and conducted 441 exchange activities for teachers in urban and rural schools. By adopting the “1+1+1” cooperative model, urban schools can solve the problem of insufficient students.

Rural schools can also have the resources, brand advantages and employment networks of the urban schools. All vocational education groups “package and label” graduates of group member schools and coordinate the placement of students for employment. Over the past few years, 18 vocational education groups have placed a total of 239,000 graduates from secondary vocational schools, including 138,000 graduates from rural secondary vocational schools. The employment rate of graduates from secondary vocational schools in Henan Province has remained above 95% for four consecutive years¹⁵².

7.3. TVET School Led and Invested by Enterprises

In recent years, PRC also tried to promote another kind of TVET grouping: enterprise lead TVET schools group. This section introduces some company run vocational schools.

In 2016, Lenovo Vocational Education Group was established by Lenovo Group, a giant computer manufacture company. It has an initial member of 107 vocational education schools nationwide. As one of the leading enterprise in the IT industry, Lenovo Group participated in the reform and development of vocational education, focusing on the ICT industry, deepen the school-enterprise cooperation, and strengthen basic capacity building. Lenovo Vocational Education Group established a talent training standard work committee, a professional construction work committee, and an employment guidance work committee, which are committed to the research and application of ICT-related professional and technical skills training programs and ICT-related curriculum, carry out ICT talent market demand research, innovation, entrepreneurship education, etc¹⁵³. In 2019, Lenovo Vocational Education Group was recognized as the first batch of demonstration TVET groups nationwide and the demonstrative TVET group led by an enterprise.¹⁵⁴

¹⁵² Modes and types of TVET groups in PRC, 18 Apr 2009, China Education Daily; <http://210.37.123.82:8009/Article/ShowArticle.asp?ArticleID=69>; Report on TVET group cases in Henan, Henan TVET group research group, <http://hbdmjt.cjxy.edu.cn/info/1031/1093.htm>.

¹⁵³ Beijing Education Committee, 2016, Lenovo Vocational Education Group founded, http://jw.beijing.gov.cn/jyxx/jyxw/201606/t20160601_637334.html.

¹⁵⁴ Ministry of Education, 2020, Notice on the list of the first batch of demonstrative TVET Group (alliances), No. 33 2020, http://www.moe.gov.cn/s78/A07/A07_sjhj/202010/t20201016_495041.html.

In 2013, Huawei Group, the largest ICT hardware company, launched the school enterprise cooperation project “Huawei ICT college”, providing courses and supporting services to colleges and universities, helping them with teachers training, improving the curriculum system, and developing more innovative and applied technical labor for the ICT industry¹⁵⁵.

In addition to Lenovo and Huawei, there is another kind of enterprise which is not only establishing its own TVET schools, but also providing services to TVET schools nationwide.

Established in 2000, Shenzhen Gou Tai An (GTA) Education Tech Ltd. is a national level “High-Tech Enterprise” as well as the “Key High-Tech Enterprise of the PRC TVET Program”.¹⁵⁶ It dedicated to providing integrated solutions of education for vocational education. The company now has over 2000 professionals, offering products and services to about 1000 vocational colleges and schools in the country as the follows:

- Applying the latest innovative technologies such as big data technology, cloud computing technology, robotics technology, Internet technology, VR and AI to the field of TVET and providing a core product system comprising of management line, platform resource line of teachers, teaching and training line, VR characteristic line and education equipment line.
- Putting the advanced concepts of entrepreneurship education into practice, the company has established the GTA College of Entrepreneurship (the first secondary college offering four-year undergraduate education in entrepreneurship in the PRC) and set up a relatively complete system of entrepreneurship education training practice incubation.
- Build together with Ningbo Economic & Trade School the first national-level career experience and development base in the PRC—Ningbo Students’ Career Experience and Development Center.
- In cooperation with the governments of Fangchenggang in Guangxi Province, Hefei in Anhui Province, Fuping in Hebei Province, Xuchang in Henan Province, Changji in Xinjiang Province, Shandan in Gansu Province, the company has undertaken the local vocational education and industrial development planning project to construct the entrepreneurship incubation and collaborative innovation centers, vocational skilled talent training bases, industrial and educational integration parks, etc.
- Assisting in promoting innovative development of ICT-enabled vocational education, advancing the “Targeted Poverty Alleviation Program through Vocational Education” and building an Online to Offline (O2O) linkage platform. As to poverty-stricken areas and underprivileged population, realize the goal of “lifting one family out of poverty by training one family member to obtain employment” through vocational skill training.

At present, GTA Education Tech Ltd. is conducting an in-depth cooperation with several secondary vocational education schools and higher vocational education colleges in Gansu Province. (See Box 7.1.)

¹⁵⁵ Summarized from Huawei Academy website (<https://e.huawei.com/en/talent/#/ict/introduction>), Huawei ICT Academy brochure, Huawei and Shenzhen Vocational College: Pas de deux for school-enterprise collaboration, 22 June 2020, China Education Daily, http://www.moe.gov.cn/jyb_xwfb/moe_2082/zl_2020n/2020_zl31/202006/t20200622_467495.html, and Huawei News, Deepening industry-education integration, Huawei and vocational colleges co-establish alliances, <https://bbs.huaweicloud.com/blogs/142577>.

¹⁵⁶ Author’s summary based on Guotai’an group’s official website, <http://www.gtafe.com/WebShow/Index/1>.

Box 7.1. Cooperation between GTA and Lanzhou Vocational Technical College¹⁵⁷

In September 2017, Lanzhou Vocational and Technical College (referred to as the College) signed a strategic cooperation agreement with GTA. Based on the top-level design, GTA would fully explore the characteristics of the College, closely connect the College with the market and deeply integrate it with industries to set the course of future development. Secondly, it would help the College construct an ICT platform, set up an interactive teaching mode, and build a modern education and curriculum system by utilizing modern technical means such as VR. Thirdly, it would transform and upgrade the existing training rooms, conduct the planning and building of training centers in accordance with the situation of local economy, social services, innovation and entrepreneurship, and targeted poverty alleviation. Finally, it would carry out deep cooperation between schools and enterprises and collectively construct distinctive secondary colleges, explore ways of cooperation to promote the development of “PRC-Germany Class”, and jointly set up service companies to explore the mechanism and system of social training.

7.4. Suggestions to CAREC 6 on TVET Group

1. TVET group is another type of TVET operating system supports by government policy, guided by industry and participated by enterprises. It plays an important role in promoting the organic integration of education chain and industrial chain. However, there must be some good TVET schools and enterprises to lead the grouping. It may be applied mainly in Group 1 CAREC countries. It can be pilot test in some countries first.
2. Government in CAREC 6 countries can also try to group TVET school led and invested by enterprises. the PRC's experience shows that as long as the enterprise has a right to run TVET schools, incentives to provide systematic and sustained inputs to TVET schools are established.¹⁵⁸ In this regard, it should select enterprise very carefully to run TVET school group.
3. In most cases, only large scale enterprises have incentive and capacity to lead the TVET school group. Enterprises in this area should not be for high profit. A clear policy guild line needs to be established in this area to protect public and student's interests, including the education rights and labor protection rights for students, the rights and obligations of the enterprise, incentives for enterprise set up TVET school group, and governance structure of TVET groups, etc.
4. An institutional mechanism should also be set up among the schools of the TVET group. It should share professional teaching courses, training materials, enrollment and employment information. It should also carry out jointly pre-job training, on-the-job training, and continuing education for employees of vocational education groups.

¹⁵⁷ Strategic partnership established between Guo Tai An and Lanzhou Vocational Technical College, 28 Sep 2017, https://www.sohu.com/a/195174093_99919273.

¹⁵⁸ Xiaoyan Liang and Shuang Chen, Developing Skills for Economic Transformation and Social Harmony in China, A Study of Yunnan Province, Chapter 4, p68, World Bank.

5. Governments of CAREC 6 can also try to support some local specialized or bring in some international TVET serving companies. Those TVET serving companies provided practical courses which may yet be offered in schools, solving the problems such as schools do not acquire the latest technology, in shortage of “dual qualification” teachers etc. If there is a need, concerned officials could visit some of those companies in the PRC and see how they served TVET schools.

CHAPTER VIII. SUGGESTION 4: DUAL QUALIFICATION TEACHERS: DEVELOPING TEACHERS' LEADING ROLE

Since the number of TVET schools in the PRC increased rapidly only in the past three decades, there are inadequate qualified TVET teachers. Many of them graduated from academic institutes and lack practical experience in enterprises. As a result, TVET schools have difficulties to reach the required quality of vocational education. In recent years, the PRC government has increased its investment in teachers' development. Shortage of high qualified teachers in CAREC 6 need also addressed as that of the PRC.

8.1. Improving Quality for TVET Teachers

As discussed on Chapter 1, the scale of TVET students increased by more than 800% in the past three decades in the PRC. The number of teachers working in TVET schools also jumped dramatically. Up to now, there are 1.332 million full-time teachers in the PRC's vocational schools, including about 800,000 in secondary vocational schools and about 500,000 in higher vocational schools. However, vocational schools generally have surplus teachers for theoretical courses and insufficient teachers for vocational courses¹⁵⁹.

Therefore, in recent years, the PRC's vocational education system is transforming from having a "quantity focus" to a "quality focus", with greater importance being placed on teaching quality. The plan seeks to increase the proportion of teachers who have at least 3 years work experience in industry and a 3-year vocational diploma. A part-time employment mechanism for professional experts is also introduced. To carry out this plan, new teaching positions at TVET institutes will generally not be open to new graduates with only academic background¹⁶⁰.

8.2. Government Policies on TVET Teachers

In order to improve the quality of TVET teachers, the MOE and MOF together issued the TVET Teachers' Quality Improvement Plan during 13th Five-year Plan period.¹⁶¹ The plan identified a comprehensive trainings program for dual-qualification teachers, teachers in high demand majors and part-time teachers from enterprises. In 2017 alone, at the first year of plan implementation, the central government allocated 675 million yuan (about US\$100 million) to support the vocational teacher training system.¹⁶² The national teaching standards and 1+X certificate system were included in the training program. The training system, including national level, municipal level and school-level training, aims at providing trainings for all teaching staff.

¹⁵⁹ Ministry of Education, 2019 National Education Data, http://www.moe.gov.cn/s78/A03/moe_560/jytjsj_2019/qg/.

¹⁶⁰ Po, Yang, 2014, Understanding Vocational Education Market in China, Chinese Education Research & Exchange Centre (CEREC) Working Paper No. 6 September 2014.

¹⁶¹ Ministry of Education and Ministry of Finance, 2016, TVET Teachers' Quality Improvement Plan during 13th Five-year Plan period, 28 Oct 2016, http://www.moe.gov.cn/srcsite/A10/s7011/201611/t20161115_288823.html.

¹⁶² Ying She, 2017, PRC has allocated 675 million yuan from the central government budget for TVET teachers' training, China Education Daily, http://www.ce.cn/xwzx/gnsz/gdxw/201708/30/t20170830_25504154.shtml.

In 2019, the State Council issued the Implementation Plan for Deepening the Reform of the Development of “Dual Qualification” Teachers in Vocational Education in the New Era”. The plan sets out the target as follows: By 2022, the proportion of dual qualification teachers in TVET schools will be more than 50%¹⁶³. It will establish 100 training bases for dual qualification teachers and 100 national enterprise practice bases, and organize 360 national TVET teacher’s innovation team. Also, TVET teachers will have more opportunities to have oversea field visits. The plan is also to improve the incentive mechanisms for TVET teachers. The income generated by TVET schools from school enterprise cooperation, technical trainings can be used as a source of additional wages.

Furthermore, the MOE and other three Ministries jointly issued the “Notice on the First Batch of National Vocational Education teachers’ Enterprise Practice Bases.”¹⁶⁴ Many large state-owned enterprises are among the first batch of national vocational education teachers’ enterprise practice bases. Some other teacher’s practice bases include companies in strategic key industries such as equipment manufacturing and new materials, and enterprises in areas regarding people’s livelihood, such as elderly care and nursing care.

To ensure the quality of TVET teacher’s training, the certification system for TVET normal education is established. For example, the MOE formally issued the “Measures for the Implementation of Normal University Professional Certification”¹⁶⁵ in 2017. It clearly stated that standards for vocational education and special education should be formulated as the basis for the development of professional teaching certification. In October 2019, the MOE issued the “Professional Certification Standards for Vocational and Technical Normal Education”, to improve the quality of vocational normal school students.

8.3. Expanding the Quantity and Quality of the Vocational Teachers

Expanding TVET normal universities is another important measure to promote in large scale of high quality TVET teachers. There are initially eight vocational normal universities for vocational education, which is called the “old eight”. Based on the “old eight”, since 2015, four technical normal universities have been added. In 2015, Guangxi Normal University of science and technology and Dianxi Normal University of science and technology have been added. In 2019, Guangxi Vocational Normal University and Fujian Normal University of technology have been added. In total, there are 12 vocational and technical normal universities. Ordinary normal colleges and universities have also started the diploma training of vocational teachers¹⁶⁶.

In 2015, the Academic Degrees Committee of the State Council added a new Master of Education in the field of Vocational Technology under the Master of Education degree. 49 comprehensive universities are recruiting graduate students of vocational technology. In recent years, these schools recruit about 20,000 vocational teachers to receive master’s degree every year.

¹⁶³ Ministry of Education, 2019, *Reform and Implementation Plan of the Development of “dual qualification” teachers in TVET in the New Era*, http://www.moe.gov.cn/fbh/live/2019/51475/mtbd/201910/t20191022_404718.html.

¹⁶⁴ Ministry of Education, National Development Reform Commission, Ministry of Industry and Information Technology, and State-owned Assets Supervision and Administration Commission, 2019, *Notice on the First Batch of National Vocational Education teachers’ Enterprise Practice Bases* http://www.moe.gov.cn/fbh/live/2019/51475/mtbd/201910/t20191022_404719.html.

¹⁶⁵ Ministry of Education, 2017, *Measures for the Implementation of Normal University Professional Certification (Interim)*, No. 13 2017, http://www.moe.gov.cn/srcsite/A10/s7011/201711/t20171106_318535.html.

¹⁶⁶ Ministry of Education, 2019, *Press conference: Releasing Reform and Implementation Plan of the Development of “dual qualification” teachers in TVET in the New Era and introduction of the progress*, 17 Oct 2019, http://www.moe.gov.cn/fbh/live/2019/51475/twwd/201910/t20191017_404061.html.

On March 5, 2019, Premier Li Keqiang proposed in the government work report that higher vocational colleges will expand the enrollment by 1 million. On April 30, the State Council executive meeting passed the “Special Implementation Plan for Higher Vocational Colleges Enrollment Expansion”¹⁶⁷. Government has taken active actions to implement the central government’s deployment. More vocational teachers need to be recruited as the expansion of student enrollment. The MOE had implemented the plan of “five batches”¹⁶⁸ to fulfill gap for vocational teachers, which is including recruited teachers through resource integration, through fast training, through school enterprise cooperation, through part-time teachers, and through recruiting some high qualified retired teachers back to the schools.¹⁶⁹

Box 8.1. Teacher’s Training by Chinalco

As a state-owned enterprise directly managed by the central government, Chinalco¹⁷⁰ is the world’s largest supplier of alumina. While doing well in its main business, Chinalco actively participates in development of vocational education. It operates Shandong Aluminum vocational college, the only higher vocational college in the aluminum industry in the PRC.

First, the Group actively participates in the training of vocational teachers. Each member enterprise of Chinalco group allocate some special technical personnel to connect with vocational teachers, and let teachers work in enterprises at winter and summer vacations or at their spare time. Teachers can also bring their own research topics to the enterprises and conduct research with technical personnel and senior skilled talents of the enterprise,

Second, the Group organizes enterprise experts to teach in the vocational colleges. Staff who have won the national skills competition are employed as the college’s skill tutors and career tutors. Many senior engineers and management experts of the enterprise are employed as the visiting professors. Skills tutors, career tutors, visiting professors and full-time teachers at the college jointly discuss the training plan and curriculum development.

Third, provide opportunities for new teachers. The Group requires that the full-time teachers who are newly employed must arrange more than half a year to work in the relevant enterprises for at least two years.

8.4. Suggestions for CAREC 6 on Dual Qualification Teachers

1. The quality of the teachers has always been regarded as the key to the quality of vocational education. It should be recognized that TVET teachers have their own unique professional characteristics. Concerned government departments in CAREC 6 country could establish a national qualification standards and certification system for TVET normal education.

¹⁶⁷ Ministry of Education and other five ministries, 2019, Special Implementation Plan for Higher Vocational Colleges Enrollment Expansion, No. 12 2019, http://www.moe.gov.cn/srcsite/A07/moe_737/s3876_qt/201905/t20190513_381825.html.

¹⁶⁸ Ministry of Education, 2019, Press conference: Releasing *Reform and Implementation Plan of the Development of “dual qualification” teachers in TVET in the New Era* and introduction of the progress, 17 Oct 2019, http://www.moe.gov.cn/fbh/live/2019/51475/twwd/201910/t20191017_404061.html.

¹⁶⁹ Ministry of Education, Ministry of Finance, 2018, Notice on Yinling Teaching Plan, No. 7 2018, http://www.moe.gov.cn/srcsite/A10/s7151/201807/t20180719_343448.html.

¹⁷⁰ Ministry of Education, 2019, Press conference: Releasing *Reform and Implementation Plan of the Development of “dual qualification” teachers in TVET in the New Era* and introduction of the progress, 17 Oct 2019, http://www.moe.gov.cn/fbh/live/2019/51475/twwd/201910/t20191017_404061.html.

2. Develop a comprehensive trainings program for dual-qualification teachers. Provide opportunities for vocational teachers work part-time in enterprises to gain industrial experience. Increase the proportion of teachers who have academic training background and certain year work experience in industry. Special funding needs to be allocated in this area.
3. Encourage enterprises staff to work at TVET schools as part time teachers. Government should encourage large public and private enterprises to provide practical opportunities for TVET teachers. Vocational schools are to give preference policies to dual-qualification teachers in terms of promotion and salary increase. As many of them may not have high academic degrees, a special policy needs to be applied to those teachers in terms of promotion and salary determination.
4. If it is possible, in longer term some CAREC countries could consider to establish TVET normal university in order to promote in large scale of high quality TVET teachers. Ordinary universities can also offer some diploma training of vocational teachers.

CHAPTER IX. SUGGESTION 5: ICT + TVET: “TIGER WITH WINGS”

With the changing industry, the requirements for the contents and teaching quality of vocational education are higher than ever before while it is difficult for vocational colleges to keep up with the times due to the limited investment, limited number of teachers and lack of information of new industrial trends. In CAREC 6, with relatively backward TVET system, the TVET development of these countries must be conducted through an unconventional way to bring its advantages into full play. Information and Communication Technology (ICT) is one of the areas which the PRC stands out and some of the experiences may be interested by CAREC 6.

9.1. Why Internet Plus?

TVET development in developing country is always facing the problem of lack of qualified faculties and lack of up-to-date courses. In the traditional TVET development mode, there is no way out for these problems. Nowadays, ICT could provide some new hopes. The high-quality courses among schools can be shared through internet and Massive Open Online Courses (MOOCs). For students, they can access to the high-end courses and the top teachers nationwide easily through the internet. For teachers, they can focus on the key disciplines and teaching areas while sharing their excellent courses with other schools. In this way, a win-win situation can be realized.

The PRC experience showed that one advantage of this mode is to improve students' learning interests and learning effect. Many surveys show that the insufficient learning interest in many vocational schools lies in the poor teaching quality and the traditional teaching methods. Compared with the regular universities, these students in vocational colleges and schools have a relatively deficient learning ability and behavioral habit. Therefore, it is difficult to make achievements if they are taught as those in the regular institutions or high schools. Then, the internet learning must be developed actively to activate the slumberous classes.¹⁷¹

Under the mode of “Internet plus”, the way to acquire knowledge for students is more and more convenient. Teachers also play a different role in teaching in classes. For teachers, the application of teaching methods such as MOOCs and flipped classrooms can lead students to explore and think independently under their guidance.¹⁷² Modern teaching technology should be introduced into classes in vocational institutions, thus, to create an active atmosphere for students. In this way, they can improve their interests in learning with enthusiasm. However, the negative impacts of “Internet plus” on the students must be taken into consideration. The teachers are also responsible to equip students with the ability to distinguish the negative messages from the internet and eliminate them.

¹⁷¹ Jeffrey Jian Xu, Sungsup Ra, and Brajesh Panth, 2020, Lessons learned from the massive shift to online learning due to COVID-19, <https://blogs.adb.org/lessons-learned-from-the-massive-shift-to-online-learning-due-to-COVID-1>

¹⁷² Nouri, J. The flipped classroom: for active, effective and increased learning – especially for low achievers. *Int J Educ Technol High Educ* 13, 33 (2016). <https://doi.org/10.1186/s41239-016-0032-z>

There are a plenty of courses like this in the PRC now. For example, hundreds of courses related to vocational education are shared on “MOOCs for Chinese Universities”¹⁷³ for free, which are provided by dozens of the excellent vocational colleges in the PRC. Such courses are also provided by the enterprises. At present, the application of MOOCs is widespread in many colleges that students can learn independently and take the exam sometimes online through the internet. The credit bank system which shares courses among institutions and credit transfer among colleges is also under testing. The double teaching system, a class that is managed under cooperation between an excellent teacher online via recorded teaching and a local teacher is adopted in some schools.

9.2. Internet Plus Policy in the PRC

To promote ICT development in TVET schools, the PRC government put forward many policies in recent years. The MOE issued Notice on Promoting the Development of ICT + TVET as early as in 2012¹⁷⁴, and Guidance on Further Promoting the Development ICT+TVET in 2017¹⁷⁵. The two policies noted that “... Vocational education should focus on the transformation of traditional teaching methods with modern information technology, focusing on solving the problems of in vocational practices such as unable to enter enterprises, enable to participate in real-time production, unable to learn vocational skills and unable to simulate real time work.” and “...Upgrade the teaching resource database of vocational education and enrich the learning resource system of vocational education”.

The MOE, in line with the 13th five-year plan and the action plan 2.0, aimed at facilitating the ICT + TVET in the following aspects:

- 1) **Improve the ICT infrastructure.** Establish the nationwide vocational education network and resource sharing mechanism in which local education administrative departments, vocational colleges, industrial enterprises, and scientific research institutions cooperate with each other. Local education administrative departments should also establish provincial vocational education websites. Provinces and vocational colleges should promote the application of multimedia classrooms, digital laboratories, remote collaborative classrooms and other digital classrooms.
- 2) **Speed up the development of quality digital resources database of vocational education.** The resources include online courses, virtual simulation training platform, work process simulation software, digital library, etc. The policies include also accelerating the development of national vocational education digital database and establishing a number of national demonstrative vocational training virtual simulation training centers.
- 3) **Strengthen E-governance in vocational education.** The MOE guides the development of national vocational education management information system, and ensures the integrity, accuracy and timeliness. The Government identified some pilot areas to establish innovative public information service platforms such as human resource market demand, employment early warning and talent training management information system.

¹⁷³ MOOCs for Chinese Universities, <https://www.icourse163.org/>.

¹⁷⁴ Ministry of Education, 2016, the Notice on the 13th Five Year Plan on ICT + Education, No. 2 2016, http://www.moe.gov.cn/srcsite/A16/s3342/201606/t20160622_269367.html.

¹⁷⁵ Ministry of Education, 2018, Action Plan 2.0 for ICT + Education, http://www.edu.cn/edu/zheng_ce_gs_gui/zheng_ce_wen_jian/zong_he/201804/t20180426_1597254.shtml.

- 4) **Improve the digital literacy of TVET teachers.** The Government formulated standards for teachers’ IT skills in vocational colleges. The country holds regularly the National Vocational College Teachers’ information teaching competition.
- 5) **Improve the digital literacy of TVET students.** Education administrative departments at all levels should guide schools to actively open relevant elective courses, and improve students’ general ICT capability, digital learning ability and comprehensive information literacy.
- 6) **Raise funds for ICT+TVET through multiple channels.** Central and local governments increased finance support for the development and application of ICT in TVET. Provinces are encouraged to set up special projects for ICT + TVET and increase investment. Enterprises are encouraged to participate in the development of ICT + TVET in various ways.

9.3. Implementation of ICT Policies in TVET Schools

To monitor and implement those policies, the MOE established the National Vocational ICT Teaching Guidance Committee¹⁷⁶ in 2012. The MOE also launched the pilot ICT projects in TVET schools, including digital campus, high-quality ICT-based teaching resources, as well as ICT trainings. Further promoting development of ICT + TVET issued by the MOE in 2017. About 280 experimental schools have been selected in two batches for pilot.

In the National Public Service Platform for Education Resources, there is a section for vocational education, at which there are best practices for digital campus development, online vocational skills courses, and demonstrative course for ICT + TVET¹⁷⁷. Students can also get certificates if they learned the courses and pass the exams. Another online TVET courses database is “Wise TVET”¹⁷⁸, a website operated by the Higher Education Press, containing more than 10,000 online vocational courses classified by major categories and 1+X certificates. This website also includes a MOOC platform and a learning database from which you can find PPTs and pictures.

Practice training is an indispensable part of the vocational education. However, it is difficult for students to get the real-time on-site training in enterprises and in manufacturing factories. Virtual simulation (VR) is a solution for the challenges for TVET students in their practice and trainings. Students can see, touch, assemble and dismantle via VR in the production process and they can also practice with some high consumables and experience trainings with high risks. Many vocational schools in the PRC have established VR training laboratories.

¹⁷⁶ Ministry of Education, 2012, Notice on the establishment of the National Vocational ICT Teaching Guidance Committee, No. 11 2012. http://www.moe.gov.cn/srcsite/A07/moe_953/201212/t20121231_146764.html.

¹⁷⁷ National Public Service Platform for Education Resources, <https://zj.eduyun.cn/home/index.php>.

¹⁷⁸ https://www.icve.com.cn/portal_new/portal/portal.html.

Box 9.1. First National TVET Virtual Simulation Training Base in Jiangxi¹⁷⁹

In Feb 2020, the Vocational Education Department of the MOE and the Jiangxi Provincial Government had initiated to set up the first national vocational education Virtual Simulation (VR) training base in Nanchang City. This project is intended to provide VR training “resources + equipment” solution for TVET schools and provide VR training courses and resource services for TVET students, enterprise employees, demobilized military personnel and migrant workers. The project developed in two phases. The components includes the world’s leading VR demonstration training center, professional VR teaching and experimental centers, innovation and entrepreneurship incubation center, product R & D center, and research workshops jointly built by multiple enterprises. There are eight major categories and 25 majors in the training base: equipment manufacturing, transportation, medicine and health, tourism, electronic information, civil architecture, culture and art, public management and service, etc. It is expected to accommodate 10,000 students for practice and training at the same time and set up eight major virtual simulation teaching areas and 28 major virtual simulation teaching experimental centers.

Box 9.2. Urumqi Sports School: ICT in Physical Education Teaching¹⁸⁰

Xinjiang Urumqi Sports School is a sports secondary vocational school. At present, the school has 15 sports majors such as track and field, wrestling, boxing, basketball, table tennis, football, volleyball, aerobics etc. The school actively develops an information-based teaching mode and achieves remarkable results. It explores a way of ICT + vocational sports education to provide the quality of education in remote areas. The school had experimented the innovative Internet+ approach and a blended teaching method using the form of “flipped classroom”. With mobile terminal app You MOOC and chatting tools such as WeChat and QQ going with the whole teaching process before class, in class and after class. According to the teaching tasks, teachers guide the students to carry out self-learning and online testing on the course through the online course teaching platform, intuitively learn for the first time and students can discover their questions. Then in the offline classes, students cooperate, and practice together solve their problems. Teachers combined online and offline tools after class to help students carry out self-learning, consolidate classroom learning. Through learning and doing, the task driven methods and teamwork, the students can achieve the teaching goal and obtain knowledge and skills better.

Compared with the traditional teaching mode, students’ learning situation has changed significantly. Students’ interest in learning, autonomous learning ability and academic performance are all improved. Teachers’ teaching design ability and the ICT capability are also improved. The school had been recognized as a digital campus demonstrative vocational school, and the blended teaching methods with online and offline classes had proved as innovative for the sports vocational schools in the PRC.

¹⁷⁹ Ministry of Education, 2019, Notice on Entrusting to Establish the National TVET Virtual Simulation Training Base, 23 August 2019, <http://www.vr.edu.cn/NewsDetail.aspx?id=91>.

¹⁸⁰ Urumqi Sports School: The Blended Teaching Mode in Sports Vocational Secondary School, <https://hl.nxeduyun.com/index.php?r=space/school/portal/content/view&id=1637218>.

9.4. Funding for ICT + TVET

Promoting ICT needs money, a lot of money. However, it also saves money, if you do it right. The PRC government has been improving the efficiency of TVET investment by investing in more ICT. As it was mentioned above, it is highlighted in the previous MOE notices that government and local government should mobilize resources for ICT + TVET via multiple channels. They also promote to reducing the investment of physical equipment and expanding the use of computer simulation, virtual reality (VR), augmented reality (AR) and other advanced technology with lower cost in practice and trainings.

The MOE also Implemented operating mechanism and benefit distribution system of school sharing training equipment, so that different TVET schools can save costs and share training bases and equipment. For example, there was initiative in 2016 that the TVET schools in Beijing, Tianjin and Hebei area can share the training bases¹⁸¹. The training bases can open to the public and to other vocational schools.

In addition, the government is also exploring low-cost and efficient teachers’ training mode for TVET sector and introducing high-quality courses and teachers’ training through massive open online courses (MOOC) in order to maximize the training impact and results.

9.5. Suggestions to CAREC 6 on ICT+TVET

1. Chinese experience showed that ICT could provide some new hopes for fast development of TVET. The high-quality courses particularly those lecture based courses among schools can be shared through internet and Massive Open Online Courses (MOOCs). CAREC 6 countries can enhance ICT policy, mobilize more investment in this area to promote the development of digital campus. Multimedia classrooms, interconnections’ channels and public service platforms are the basic for ICT facilities in campus.
2. Building a strong foundation with good hardware facilities in CAREC 6 countries. The Ministry of Education and the Finance Ministry in CAREC 6 countries should give priority to improving the hardware facilities as soon as possible. The infrastructure depends largely on the government input with preferential resources from TVET schools and colleges.
3. Paying special attention to software. The integrate software purchase can be realized among the alliance of schools and colleges. A large number of courses can be shared between schools and colleges at least inside of one country. Under the “Internet Plus”, the new types of teaching are including MOOCs and flipped classrooms, etc. The types of teaching mode require a higher standard to the internet resources and teaching staff in vocational institutions. Meanwhile, the training of teachers in vocational institutions must be enhanced first.
4. Promoting the reform of modern teaching skills and methods. The technology of virtual process, craft and production line must be put into good use to improve the efficiency and effect of teaching and training for a cost-saving. Adopting a student centered, competency-based teaching mode with mixed channels of interactions, enhancing the students’ online

¹⁸¹ Establishing the Beijing-Tianjin-Hebei Vocational Colleges Sharing Mechanism, 4 May 2017, Tianjin Daily. http://www.xinhuanet.com/local/2017-05/04/c_129588014.htm.

learning capability and self-management, creating an active learning community with innovative approaches.

5. In longer term, building a credit transfer system among schools and colleges. While it may be too early to apply the credit transfer system right now, some pilot projects can be considered in the Group 1 countries of CAREC. The courses and examination methods in vocational institutions must be checked for approval, and the system of credit accumulation and storage as well as the credit transfer can be realized among vocational institutions in near future. “Credit bank system” can also be taken into consideration to carry out when condition permits. The accumulation of learning achievements and the credit transfer among schools and colleges in the credit bank system will promote the interconnection and combination between academic education and vocational skills. It is a good opportunity for CAREC 6 to catch up with the development by taking advantage of the most advanced methods in the first place. Otherwise, the Matthew Effect in the field of internet will make vocational institutions in the poor areas and countries worse and worse.

CHAPTER X. SUGGESTION 6: ENHANCE THE INVESTMENT AND REFORM OF TVET: WHAT GOVERNMENT CAN DO

10.1. Financing of the PRC's TVET

TVET finance is part of total public finance to education. Proportional public finance to education of the PRC used to less than many countries in the world. Only in the past decade, the share of public finance in education passed 4% of GDP. The total government expenditure on education among the PRC and the CAREC 6 countries is shown in Figure 10.1. The PRC has kept a steady rate of roughly between 4-4.2%, with a slight declining trend in 2019. Kyrgyz republic, Mongolia and Uzbekistan have a higher expenditure rate, while Kazakhstan remained lower than 3% from 2015 to 2018.

Figure 10.1. Government Expenditure on Education as Percentage of GDP (%) of CAREC 6 and the PRC

Indicator	Government expenditure on education as a percentage of GDP (%)						
	2014	2015	2016	2017	2018	2019	2020
Kazakhstan	..	2.79	2.98	2.75	2.62	NA	..
Kyrgyzstan	5.53	5.99	6.59	6.03	NA	NA	..
Mongolia	4.71	4.18	5.18	4.09	NA	NA	..
Tajikistan	NA	5.23	NA	NA	NA	NA	..
Turkmenistan	NA	NA	NA	NA	NA	NA	..
Uzbekistan	(¥)6.03	(¥)5.79	(¥)5.67	(¥)5.28	NA	NA	..
PRC	4.1	4.26	4.22	4.14	4.11	4.04	

Source: World Bank, UNESCO UIS Database, Ministry of Education of the PRC.

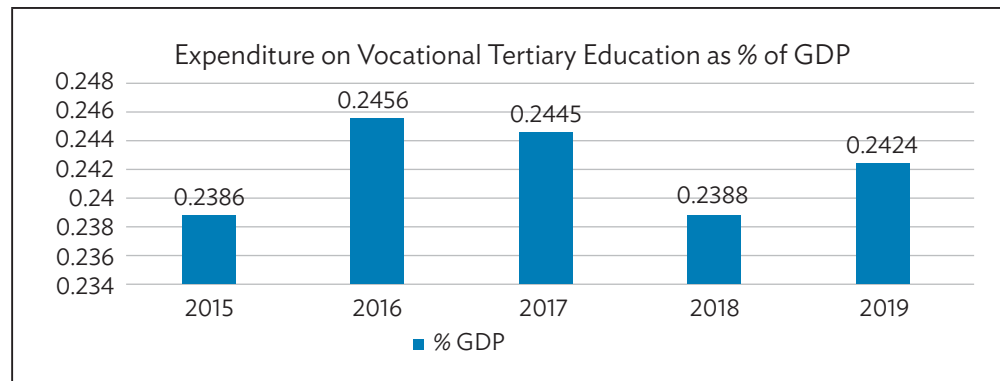
In the PRC, the source of vocational education funding mainly includes government fiscal investment and tuition fees. Government funding is the most important funding source for TVET in the PRC, accounting for 74% of the financial resources for the PRC's vocational schools¹⁸². The MOE is responsible for planning and locating central government's financing for TVET with collaboration with the MOF, NDRC, and the Ministry of Human Resources and Social Security.

Amongst all financing sources, local budgets play an important role. There are three kinds of TVET schools in terms of financing, central government financed, provincial government financed as well as city or prefecture financed. As a result, the funding input between the eastern, central and western regions is very different, and the average budgetary inputs in central and western regions are low since those provinces have weak public finance. Provincially, the finance gaps are also large among provincial financed and city or prefecture financed, due to their fiscal capability.

¹⁸² Ministry of Education, 2014, 1.2 trillion in ten years: boosting the healthy development of TVET- press conference from the financial department of the Ministry of education on financial investment in TVET, http://www.moe.gov.cn/jyb_xwfb/s271/201406/t20140630_170903.html.

In 2019, the total national funding for higher education was 1346.4 billion yuan, while the total financed in higher vocational education was 240.2 billion yuan, 17.8% of total financed. Figure 10.2. shows that the percentage of expenditure on vocational tertiary education in the PRC from 2015 to 2019, it remained below 0.25% of GDP and with fluctuation.

Figure 10.2. Government expenditure on vocational tertiary college as % of GDP, the PRC



Source: Ministry of Education, the PRC.

10.2. Funding Per Student and others for TVET in the PRC

The PRC government established the funding and grants system for upper secondary and tertiary students, establishing the per student funding system for tertiary students¹⁸³, and a policy of “tuition fees exemption supplemented by national grants and school scholarships”. For the expenditure per student, the public budget on secondary vocational schools is roughly equivalent to ordinary high schools. But in the higher vocational schools, the per student public expenditure was only half of ordinary undergraduate education before 2010.

To address this problem, in 2014, the MOF and the MOE issued the “Opinions on Establishing and Improving a Reform and Performance-Oriented per student funding System to Speed up the Development of Modern Higher Vocational Education”, and proposed that by 2017, the average annual per student public funding level of vocational colleges should be no less than 12,000 RMB, reached the same level of the undergraduate student at regular universities.

The biggest challenge for the implementation of this policy is the uneven fiscal abilities among different provinces. Statistics show that in coastal areas such as Beijing and Shanghai, the per student funding for vocational schools has already exceeded 12,000 yuan. However, in the central and western regions where financial resources are limited, the average public budget expenditure per student at vocational colleges in many central and western region was less than 9,000 yuan in 2012, and some provinces were only 6,000 yuan. Even in coastal provinces such as Guangdong, there are differences among TVET schools in different cities.

¹⁸³ Ministry of Finance and Ministry of Education, Notice on Establishing Average Student Funding Allocation System for Advance Higher TVET, http://www.gov.cn/gongbao/content/2015/content_2827229.htm.

The comprehensive establishment of the per-student funding system is conducive to promoting the reform and development of higher vocational education, and overall improving the quality and funding for vocational colleges. In 2013, the central government proposed a “reward for subsidy” mechanism to give incentives to local government. For provinces where the per student funding has reached 12,000 RMB per year and keep steady, the central government will provide subsidies and stable support. For those provinces not reaching 12,000 RMB after 2017, the central government would not provide any performance-based support and would further reduce the provincial TVET student enrollment plan. According to statistics, as of December 2015, all 31 provinces across the country have established a per-student funding system for vocational colleges.¹⁸⁴ By 2019, the per-student funding reached 21,203 RMB in TVET school.

In the PRC, vocational education is not a compulsory education and students have to pay some tuition and fees. However, many students of TVET schools come from poor family and have difficulties to pay. Starting from 2012, the government exempted tuition fees for rural secondary vocational school students, as well as urban students from impoverished families or studying agriculture related majors. The tuition fee exemption is divided between the central government and local governments, with total funding of 2,000 RMB per year per student. For students from western regions, the central government took 80% of the total funding, 60% in central regions. Local government of eastern regions had to subsidize student by their own budget.¹⁸⁵

Aside from waving tuition and fee, the government also provided scholarships for first year and second year secondary vocational school students from impoverished families or in agriculture related majors, with total scholarship of 2,000 RMB per year per student, which is divided between central and local government at the same proportion of the tuition fee exemption. In addition, according to the China Rural Area Poverty Reduction Development Plan (2011–2020), secondary vocational school students from 11 extremely poor areas and Tibetan areas, and three prefectures in southern Xinjiang are all included in the scholarship scheme, regardless of the programs.¹⁸⁶

10.3. National Demonstrative Vocational Schools Development Plan

In order to deepen TVET reform and maximize demonstrative effects, the PRC Government mobilized additional resources to construct model TVET schools. A lot of new reforms and innovative activities, and new policies are tested in the model school first and gradually expanded to other schools. At the secondary level, since 2010, the MOF, the MOE, and the MHRSS have launched the “Secondary Vocational Education Reform and Development Demonstrative Schools Development Plan”, focusing on supporting 1,000 secondary vocational schools in school–enterprise cooperation, pilot recruitment, and internship Reforms.¹⁸⁷

¹⁸⁴ Ministry of Education, 2016, 31 provinces have established the per student funding allocation system for vocational college students, 11 Jan 2011, http://www.gov.cn/xinwen/2016-01/11/content_5032008.htm.

¹⁸⁵ Ministry of Finance, 2013, *90% of students from upper secondary vocational schools have tuition fee exemption*, http://www.moe.gov.cn/jyb_xwfb/s5147/201308/t20130820_155947.html.

¹⁸⁶ Ministry of Education and Ministry of Finance, 2012, Notice on further improving the national education aid system and enlarging the scope of tuition fee exemption in secondary vocational schools, No. 376 2012, http://www.moe.gov.cn/jyb_xgk/moe_1777/moe_1779/201210/t20121030_143848.html.

¹⁸⁷ Ministry of Education, Ministry of Hunan Resource and Social Security, Ministry of Finance 2011, Notice on the draft plan for Secondary Vocational Education Reform and Development Demonstrative Schools, http://www.moe.gov.cn/srcsite/A07/zcs_zhgg/201107/t20110706_122441.html, No. 7 2011.

Meanwhile, from 2006 to 2014, the central government allocated 15.08 billion yuan for the development of 200 demonstrative higher vocational colleges.¹⁸⁸ It is mainly used for the construction of demonstration colleges to explore the system and mechanism of school-enterprise cooperation in running schools, the mode of training talents combining work and study, enhancing social service capabilities, and sharing high-quality educational resources across regions.¹⁸⁹ This program directly benefited more than 600,000 students; established 500 high-quality and specialized major clusters with wide industry coverage; recruited “dual-qualification” professional teachers; developed 4,000 high-quality vocational courses, 1500 kinds of textbooks and teaching courseware; established online teaching resources library and facilitating students’ independent learning, etc.¹⁹⁰

Box 10.1. Innovations in mobilizing resources among the National Demonstrative Vocational Colleges¹⁹¹

Located in Hunan Province, Loudi Vocational College’s coal mining technology majors were founded in 1987. In 2010, the college was recognized as a national key vocational college. The Loudi Municipal Government promised to set a special fund of 0.30 yuan per ton of coal produced in Loudi City to support the management of Loudi Vocational and Technical College.

In terms of school management system, Hebei Vocational and Technical College of Chemical Industry and Medicine has established a school board of directors, with the head of Hebei Provincial Bureau of Chemical Industry as the chairman and more than 30 large and medium-sized chemical companies as the board members.

Regarding student internships, to support Hangzhou Vocational and Technical College, the Hangzhou government has issued a special policy stipulation: the labor and social security department will subsidize commercial insurance for trainees at a standard of 50 yuan per person for half a year. The government also provide training fee subsidies at the vocational trainee base, and the subsidy standard is 400 yuan/person/ for professional and technical positions, and 150 yuan/person/month for non-technical positions.

Double High-level Program

Encouraged by the success of demonstrative colleges, in 2019, the PRC government launched the “double high-level” program. With “leading investment” from the MOE and “follow-up investment” from various ministries and commissions, the “double high-level plan” (high-level tertiary colleges development and high-level majors’ development) has allocated a total investment of 65 billion yuan to vocational colleges¹⁹². The “Double High-level Plan” proposes that every five years as a support cycle,

¹⁸⁸ The PRC central government budget promotes the reform and development of TVET, 12 Aug 2020, <http://www.yutainews.com/yw/2020/0812/16617.html>.

¹⁸⁹ Introduction from Ministry of Education on National Demonstrative Vocational College Development Plan, 14 Nov 2006, http://www.gov.cn/xwfb/2006-11/14/content_441758_2.htm.

¹⁹⁰ Ministry of Education and Ministry of Finance, 2006, Notice on implementing National Demonstrative Vocational College Development Plan and promote higher vocational education development, N. 14 2006, http://www.moe.gov.cn/srcsite/A07/moe_737/s3876_qt/200611/t20061103_109728.html.

¹⁹¹ Guosheng Liang, 2010, The List of 100 National Demonstrative Vocational Colleges came out, 11 Oct 2010, China Youth Daily, http://zcc.hljedu.gov.cn/zjdt/201010/t20101012_38913.htm.

¹⁹² Think tank on China higher TVET development, 12 Jul 2019, *Four higher TVET schools have budget exceeding 1 billion yuan from the “double high-level” plan*, <http://www.zggzsk.com/redianzixun/shownews.php?id=387>.

the first round was launched in 2019 and the final stage is till 2035. Eventually, it will focus on establishing 50 high-level vocational colleges and about 150 high-level professional major groups. According to the requirements of the Notice on Carrying out the Development of High-level Vocational Colleges and Majors Development with Chinese Characteristics¹⁹³, the list of the “Double High-level Plan” recommended by 32 provincial administrative regions had been released, and a total of 230 vocational colleges and 453 high-level professional groups. The higher vocational colleges listed in the “Double High Plan” in the future will have capital investment in addition to preferential policy support.¹⁹⁴

Unlike the previous demonstration school plans which has a strong government lead, The Double High-level plan put great emphasis on the independent development and innovation of vocational colleges. It encourages schools to explore innovative modalities to promote industry-education integration, establish majors’ clusters based on the local industrial demand and production chains, improve the quality and relevance of TVET with their own characteristics, improve the management and institutions of TVET schools, and explore the international exchanges and opportunities¹⁹⁵.

10.4. Suggestions to CAREC 6 on Reform and Investment

1. Government funding is the most important funding source for TVET. Government finance should be enhanced with certain percentage of education funding allocated to TVET schools in CAREC 6 countries. On average, running TVET schools need more money than normal high school and academic universities as TVET schools need to purchase a lot of expensive equipment and to provide practice facilities to students.
2. For those CAREC countries where TVET funding is divided by central and local government, equalize public funding per student is important. The PRC experience showed that sometimes, a “reward for subsidy” mechanism could give some incentives for local government to put more money in their TVET schools.
3. Other sources of finance should be explored including provide short term training service to general public, community support service, and mobilizing donations. Expansion of private owned or enterprises owned TVET schools can save some public resources.
4. Given limited resource of the government, CAREC countries could try a model TVET school system of the PRC. Additional human and finance resources should be put into such model schools to support their new reforms and innovative activities. Many new policies can be tested in those model school first and gradually expanded to other schools.
5. Applying loans and technical assistance from ADB, World Bank and other bilateral donors to address the problem of insufficient funding. (more detailed discuss is in next chapter)

¹⁹³ Ministry of education, Ministry of Finance, 2019, Notice on Carrying out the Development of High-level Vocational Colleges and Majors Development with Chinese Characteristics, No. 5 2019, http://www.moe.gov.cn/srcsite/A07/moe_737/s3876_qt/201904/t20190402_376471.html.

¹⁹⁴ Haotian Jin, 2019, The present and future of Double High-level Plan—an interview with Daren Huang, Principal Committee Member, Development Committee for Double High-level Plan 26 Oct 2019, Guangming Daily, http://m.xinhuanet.com/edu/2019-10/26/c_1210327610.htm.

¹⁹⁵ Ministry of Education, Ministry of Finance, Opinions on implementing the high-level vocational colleges and major’s development plan, No. 5 2019, http://www.moe.gov.cn/srcsite/A07/moe_737/s3876_qt/201904/t20190402_376471.html.

CHAPTER XI. SUGGESTION 7: SEEKING HELPS FROM INTERNATIONAL ORGANIZATIONS: WHAT LEARNED FROM THE PRC

As discussed in previous chapters, to develop a solid TVET system, limited financial resources are always the biggest constraint for CAREC 6 countries. Without address this problem, all suggestions that we made above are difficult to apply. However, as a developing country, not only CAREC, but also the PRC has very limited fiscal capacity. One way out of this problem is the effective use of loan and technical assistance from international organizations and bilateral agencies. CAREC countries can learn some experience and lessons from the PRC in this area.

In order to promote TVET development, ADB and the World Bank have implemented a number of TVET projects in the PRC starting from the year 2000. Those TVET projects focus mainly in the western region, such as Chongqing, Guizhou, Guangxi, Xinjiang and Hunan provinces. In addition, the two organizations also implemented vocational skills training projects for rural migrant workers to help them integrated into urban life.

More than 10 years working in the TVET sector in the PRC, the ADB and World Bank had accumulated a lot of experiences in the project design and implementation process in the PRC. Those projects had also contributed to set up national frameworks and other policy reforms in TVET sector development in the PRC.

11.1. An Overview of ADB TVET Projects

ADB has been implementing TVET programs in the PRC since 2006, starting with a rural number of 17 TVET projects have been approved in the past ten years, including 5 loans and 12 TA, mostly in the western regions of the PRC. Table 5.1. below summarizes the five ADB loan projects.

Table 11.1. List of ADB TVET Loan Projects

Project name	Approve date	Loan Amount (million \$)	Location
Hunan Technical and Vocational Education and Training Demonstration	28-Jun-2013	50	Hunan
Guangxi Nanning Vocational Education Development Project	13-Dec-2013	50	Guangxi
Guangxi Baise Vocational Education Development	08-Dec-2014	50	Guangxi
Guizhou Vocational Education Development Program	08-Dec-2015	150	Guizhou
Guangxi Modern and Technical and Vocational Education and Training Development Program	20-Sep-2017	250	Guangxi
Chongqing Innovation and Human Capital Development Project	19-Mar-2020	200	Chongqing

The Guizhou and the most recent Guangxi project used the Results-Based Lending (RBL) approach to achieve outcomes more effectively and efficiently. The approach links disbursements to project results rather than based on expenditure and disbursement. The RBL will also reduce transaction costs associated with investment project requirements, enable ADB's financing to leverage wider provincial TVET reforms, and strengthen the policy dialogue for future priorities of the TVET reform program. In addition, ADB project integrated TVET capacity building component into Gansu Baiyin Integrated Urban Development Project.

In Chongqing Innovation and Human Capital Development Project, one of its aims is to strengthen local vocational training, so as to support Chongqing's innovation-driven economic transformation. By cooperating with 5 higher education institutions (including vocational colleges), a supportive environment for promoting institution-industry cooperation will be built to guarantee innovative and entrepreneurial skills can be obtained by the TVET students.

In line with the PRC government's 12th and 13th five-year program, ADB's projects focus on the following issues¹⁹⁶ :

1. Improve the TVET quality, including developing strategy for the Multi-level TVET system, reforming curriculum, developing course materials, adopting new teaching methods, developing teachers' training centers, and upgrading assessment and quality assurance standards.
2. Promote school-enterprise collaboration, including formulating industry committees into the management of vocational schools, defining the standards of training materials and curriculum, implementing pilot modern apprenticeship, and promoting the establishment of TVET groups and supporting industrial visits opportunities for vocational teachers.
3. Improve the physical conditions of vocational schools, including constructing new campus, procuring more training equipment.
4. Enhance capacity of school management, including providing management trainings for implementing TVET reforms, establishing provincial TVET management and monitoring system.
5. Improve inclusiveness of TVET, including providing more ICT service and online courses at TVET schools, reducing dropout rate by providing financial assistance to students from impoverished families, and establishing local TVET bases to promote ethnic culture inheritance and innovation.
6. Enhance research in TVET, including gender analysis of local TVET, methods to reducing poverty through TVET, developing majors in line with local industrial priorities, exploring the establishment of regional NQF, as well as regional cooperation plans to enhance mutual learning between the PRC and other countries.

¹⁹⁶ Author's summary from ADB loan/TA project documents.

11.2. Impact of ADB TVET Projects

11.2.1. Improve the School-Enterprise Cooperation

All ADB projects have components related to school-enterprise cooperation in various forms. This has been integrated into the overall project design and implementation.

It started from a series of policy studies. In 2011, the MOE requested ADB to study specific factors constraining school-enterprise cooperation in TVET and to provide inputs to draft national regulations on school-enterprise cooperation. The TA outputs were highly relevant and timely for MOE which was preparing for a national conference on TVET. The TA outcome was also fully achieved by providing policy recommendations tailored to the needs of MOE.

In order to promote the school-enterprise cooperation, the newly approved Shaanxi TVET TA aimed at promoting vocational education groups by analyzing the local labor market, human resources need, skills qualifications framework and policies and research on current vocational education groups and providing recommendations on incentive mechanisms to promote the participation of enterprises in TVET development.¹⁹⁷

In the Gansu TVET poverty reduction TA, research on local school-enterprise cooperation were conducted. Many policy recommendations were provided in the TA including innovating the apprenticeship scheme, structure adjustment of secondary and tertiary vocational schools, supporting students from poor households. The TA also recommended internet-based education, and improving employment rate of TVET students and quality of TVET schemes. The recommendations were disseminated to more than 300 TVET schools, agencies, and poverty reduction partners and enterprises in Gansu. The Gansu Provincial Education Department issued two important documents, i.e., “Gansu Provincial Implementation Plan to Enhance TVET Enterprise Cooperation” in 2019 and “Implementation Plan for Synergizing Vocational Education and Poverty Reduction” in 2018, which have adopted some policy recommendations provided by the TA report.

After the policy dialogue, the school-enterprise cooperation component is integrated into loan projects. The Guangxi Baise TVET project includes a thorough analysis of the level and type of enterprise participation in TVET in the PRC by function, activity, and level of authority in terms of standards and curricula development, training Delivery, training finance & resources, graduates’ employment, and assessment. The project established an enterprise education facility fund to provide opportunities for teachers and students to develop small scale enterprise projects with industry links. It also established school-industry leading groups at the faculty and school level and designed and implemented an entrepreneurship incubation program¹⁹⁸.

In Hunan TVET loan project, there is components combining both research and projects for strengthening school industry links, e.g. establish formal partnership agreements between the project TVET institutions and enterprises; assess the quality and relevance of training programs by measuring graduate employment and employability through improved tracer studies; conduct policy research studies and undertake skills mapping to identify the skills needed for environmentally sustainable development, etc.¹⁹⁹.

¹⁹⁷ ADB, 2012, Strengthening Technical and Vocational Education and Training for Development of Priority Sectors in Shaanxi Province, Project Number: 45069, Policy and Advisory Technical Assistance (PATA).

¹⁹⁸ ADB, 2014, Guangxi Baise Vocational Education Development Project, TA consultant’s report, Sep 2014, TA 8448 - PRC.

¹⁹⁹ ADB, 2013, Hunan Technical and Vocational Education and Training Demonstration Project, Project Number: 45511, June 2013.

11.2.2. Explore the Establishment of the NQF-MLT System

Though the PRC has no National Qualification Framework (NQF), the country has been long endeavored to establish the NQF. A statement was made by the PRC Vice-Premier Liu Yandong to the *Third International Congress on Technical and Vocational Education and Training* in Shanghai in March 2012 regarding the establishment of modern TVET system that is relevant, connective, and multidimensional, and well-structured and better coordinated multi-level TVET” (MLT) subsystem.

In order to anchor the PRC’s demand for NQF and MLT, ADB in its Guangxi Baise TVET project supported the pilot establishment of the MLT system in Baise University and its contributory secondary vocational schools and vocational colleges to provide integrated curriculum linking vocational secondary, college, and undergraduate levels of TVET. The focus of the pilot programs will be based on seven priority areas across different institutional and qualifications levels initially in preschool education, design, aluminum processing, engineering management, agriculture, tourism and logistics ²⁰⁰. These industries are the main priorities for the Guangxi Baise region and within each of them there is a high demand for skill development at all levels. An entrepreneurship and employability curriculum and modular curriculum addressing migrant workers’ training were also developed to facilitate adult and lifelong learning and establish entry points and learning pathways to higher study. ²⁰¹

It is anticipated that MLT systems will evolve and become more sophisticated once their use is widespread. The information relating to the MLT system is to be included in the planned communication strategy and outreach plan for stakeholders, particularly students in Baise, the province, and eventually more broadly as part of a regional cooperation program.

11.2.3. Establish the Provincial Level TVET Information Management System

To enhance the equity, effectiveness, and efficiency of vocational training and subsidies, the PRC Government requires provincial and municipal governments to establish a unified information management platform for vocational training that is integrated with employment and social security information systems, within the framework of the Golden Social Security Project of the Ministry of Human Resources and Social Security ²⁰².

In the Hunan TVET loan project, ADB established a pilot labor market information system involving two priority industries, established a provincial level interagency labor market information system coordination committee, as a policy discussion vehicle to discuss data sharing and development of the labor market information system, and strengthened the capacity of local Education Department staff to collect and analyze labor market information.

In a TA enhancing Chongqing TVET information system, ADB supported the Chongqing municipal government to development a unified information management platform for vocational training and dissemination of information and knowledge on the platform, linking social security system with employment and vocational training within the framework of the Golden Social Security Project. The platform highlights integration of TVET trainings, trainees and certificate information into the employment and social security systems, and automated calculation of vocational training subsidies

²⁰⁰ ADB, 2014, Guangxi Baise Vocational Education Development Project, TA consultant’s report, Sep 2014, TA 8448 - PRC.

²⁰¹ ADB, 2014, Guangxi Baise Vocational Education Development Project, TA consultant’s report, Sep 2014, TA 8448 - PRC.

²⁰² Ministry of Human Resource and Social Security, 2011, Introduction of the Golden Social Security Project, http://www.mohrss.gov.cn/SYrlzyhshbzb/zhuanti/jinbaogongcheng/jbgcxitongjieshao/201111/t20111122_46100.html.

across the city. The TA also supported online training modules for such information platform. After completion of the TA in 2015, The Chongqing municipal government has been continuously upgrading the functions of the platform and expand users in other bureaus of Chongqing Municipal Government to ensure the sustainability of the platform.

11.2.4. Improve the Skills Capacity in Local Priority Areas

All ADB projects have pilots in selected priority areas both locally and nationally, both for immediate needs and for the future demand. The selection has been based on local demand and strategic priorities in line with the local development plans. For instance, in the Guangxi Nanning TVET project, ADB helps improve the capacity and effectiveness of social services through TVET programs being delivered in two Nanning secondary vocational schools. The project is focused on pre-school education, nursery, healthcare, including rural health care. The project aims to train qualified kindergarten teachers and nurses to address current skilled worker shortages and inadequate extension of social services.

The Shaanxi TVET TA conducted an in-depth analysis of the work of VEGs, focusing on four sectors of the economy prioritized in the provincial development strategy, namely, agriculture, energy, manufacturing, and services. There will be a new TVET TA in Shanxi province in 2021, focusing on green skills development.

11.3. World Bank TVET Projects

Started a bit earlier than ADB, the World Bank has been supporting TVET development in the PRC since 2000. Table 5.2. illustrates the 9 loan projects from the World Bank:

Table 11.2. World Bank TVET Loan Projects

Project name	Approve date	Loan Amount (million \$)	Location
Rural Migrant Skills Development and Employment Project	2008	50.00	National
Guangdong Technical and Vocational Education and Training Project	2009	20.00	Guangdong
Liaoning and Shandong Technical and Vocational Education and Training Project	2010	40.00	Liaoning, Shandong
Yunnan Technical and Vocational Education and Training Project	2012	50.00	Yunnan
Guangdong Social Security Integration and Rural Worker Training	2013	80.00	Guangdong
Xinjiang Technical and Vocational Education and Training Project	2015	50.00	Xinjiang
Gansu Technical and Vocational Education and Training Project	2017	120.00	Gansu

The 8 TVET projects not only focuses on the western regions in the PRC such as Yunnan, Gansu and Xinjiang, but also focuses on coastal and northern areas of Guangdong, Liaoning and Shandong, supporting the provinces to improve the relevance and quality of TVET before 2010. The TVET projects also helped with social security issues, and rural migrant workers' training issues. In addition, the Fujian fishing port project started in 2014 contains components of training and capacity building focusing on training of fishermen, increasing awareness of administrators and teachers for safety and emergency skills, and developing curricula, textbooks as well as upgrading facilities and training equipment.

11.4. Impact of World Bank Projects in the PRC

11.4.1. School-based Reform and School-enterprise Cooperation

In July 2006, the PRC State Council approved proposals from three Provinces - Guangdong, Shandong, and Liaoning - each to borrow US\$20 million (under a combined loan) from the World Bank for a TVET operation designed to support emerging skill needs in their more advanced economies.

The projects had findings and lessons through the implementation that could be of reference to other projects²⁰³: 1) strengthening school-industry linkages, especially in the areas of curriculum development, student evaluation, and teacher training; (2) accelerating student evaluation with engagement of all teachers; and (3) improving the quality and relevance of teacher training with better designed training programs of relevant content and proper methods, among others, by developing a training plan. In the project provinces, school reform activities deepened and the implementation of detailed plans to disseminate best practices and lessons through various means including seminars, videos, and publications were carried out.

In the following TVET projects in Xinjiang, Gansu and Yunnan, with the successful lessons learned from the Shandong and Liaoning project, the World Bank focused on strengthening and institutionalizing linkages between schools and enterprises, including setting up industry advisory committees and skills council, adopting other modalities such as establishing vocational education groups, piloting technical staff exchange programs between schools and industries, piloting flexible credit system and modern apprenticeship, etc.²⁰⁴ the World Bank also introduced CBT curriculum and the learner-centered pedagogy in project schools, as well as develop competency-based evaluation instruments to assess students' learning outcomes and teachers' teaching effectiveness.

11.4.2. Monitoring and Evaluation, Policy Studies and Dissemination

Given the piloting status of the projects, the World Bank put great emphasis on the monitoring and evaluation of students, teachers, school-based reforms, and school-enterprises collaboration, developing management information systems, developing competency-based evaluation instruments, and developing capacity for tracer studies and employer satisfactions. The results were included in the provincial-level policy studies for policy makers. Shandong province used the results and lessons from the Project to inform the development of provincial guidelines related to TVET such as 'Suggestions on Further Improving the Modern Technical and Vocational Education System' issued by the Provincial Department of Education. Shandong also used the project experience and lessons to inform the new regulation on the General Course Reform in the province.²⁰⁵

To tackle the problem of lack of coordination for TVET, the World Bank had supported provincial institutional capacity building. In Gansu, a Skills Council was established to provide skills demand information through updated occupational standards, employment perspectives, and other information such as competence standards in Lanzhou city, where the project schools are located. The other non-project schools also benefited from occupational standards, employment perspectives, and competence

²⁰³ World Bank, 2016, Implementation completion and results report on a loan of PRC for a Liaoning and Shandong Technical and vocational education and training project, June 6, 2016.

²⁰⁴ Author's summary based on World Bank project documents.

²⁰⁵ World Bank, 2016, Implementation completion and results report on a loan of PRC for a Liaoning and Shandong Technical and vocational education and training project, June 6, 2016.

standards developed by the Skills Council ²⁰⁶. In Xinjiang, the World Bank established an Inter-Departmental TVET Coordination Committee to improve the governance of TVET in the Province, to minimize resource wastage, coordinate policy, and to ensure coverage of TVET across the province for more vulnerable groups ²⁰⁷.

11.5. How did ADB and World Bank Projects Meet the Needs of the PRC at Different Stages?

The PRC's TVET has experienced many transformations and reforms in line with national social and economic development. ADB and World Bank adjusted their project strategy according to the different skills demand in the PRC. Starting from 2000, the PRC has undergone substantial economic growth, and there is massive migration and labor mobility from rural to urban areas. According to the Rural Household Survey of the National Bureau of Statistics, the total number of migrants in 2006 was over 130 million²⁰⁸. There was need at all levels of government to facilitate migration and ease the transition of rural workers to urban centers.

In 2006, the ADB implemented employment service for migrant workers TA, providing policy recommendations to enhance the public employment service system, provide training and employment guidance for rural-urban migrant workers. In 2008, the World Bank implemented the rural migrant skills development and employment service loan project in the provinces of Anhui and Shandong and the Ningxia, providing tailored trainings and supporting to the transition of rural workers to urban areas, enhancing the relevance and quality of trainings, and raising the awareness of worker protection in legal frameworks. The evaluation report shows that rural migrants graduated from the program and obtained the national occupational qualification certificate almost doubled or tripled in the three provinces, and the income of migrant workers have been improved, and the working conditions have been improved. Following this, the World Bank had implemented the Chongqing rural-urban integration project and Guangdong Social Security Integration and Rural Worker Training project in 2010 and 2013 respectively, integrating the social security system and training for rural migrant workers and supporting the employment transfer.

In line with the demand for developing the NQF, establishing a multi-level TVET modern system and creating more paths for TVET students, the ADB had been exploring the MIL system and establishing policy frameworks for accelerating the reform of application-oriented undergraduate programs at local universities in projects in Guangxi and Yunnan in 2014 and 2018 respectively. Anchoring the PRC's national strategy of eliminating extreme poverty in 2020, ADB had supported the policy research on poverty reduction through TVET in Gansu province. There were also plans in ADB TVET loan project in Guangxi to facilitate knowledge sharing among TVET institutions in ASEAN and GMS regions. ADB is also flexible in bridging skills gap in current priority areas in the PRC. For instance, in the Guangxi Nanning loan project approved in 2013, the ADB supported to improve the capacity and effectiveness of social services, focusing on pre-school education, nursery, healthcare, including rural health care, to address the local skilled worker shortages and inadequate extension of social services. In 2021, there will

²⁰⁶ World Bank, 2017, Project appraisal document on a loan to the PRC for a Gansu technical and vocational education and training project, March 10, 2017.

²⁰⁷ World Bank, 2015, Project appraisal document on a loan to the PRC for a Xinjiang technical and vocational education and training project, May 6, 2015.

²⁰⁸ World Bank, 2015, Project appraisal document on a loan to the PRC for a Rural migrant skills development and employment project, August 26, 2015.

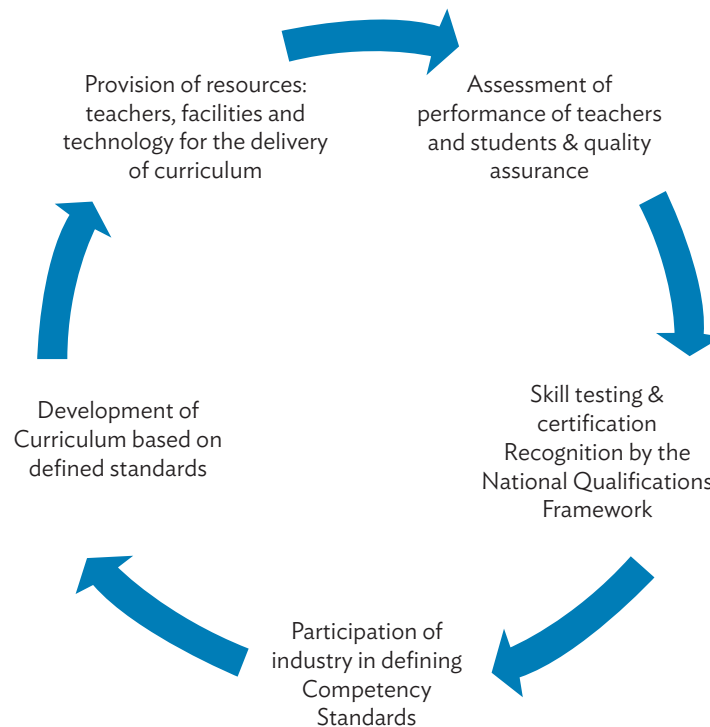
be a new TVET loan approved by ADB focusing on enhancing the capacity for green skills, to tackle the need from the greener transformation of the economy²⁰⁹.

11.6. Lessons Learned from ADB and World Bank Projects²¹⁰

There are plenty of findings from the projects, the most significant one being that the most successful projects are the ones that have close links with employers and that give careful attention to labor market conditions. The World Bank had been developing the lessons learned and following the lessons in project designs, a most recent one including the following:

- Strong links between schools and industry are an underlying factor for success of school reforms. TVET success is tied to how closely the programs are linked to the industrial demands of the labor market, which requires employers to be involved in the teaching and learning process at the school level. There is need to explore mechanisms to incentivize enterprises' participation in the training process at the project, provincial and central government level. The World Bank also develops a conceptual framework for school-based reforms, and followed with the framework since it was developed (Figure 6).

Figure 11.1. School Reform Cycle



Source: Xinjiang TVET project document, World Bank.

²⁰⁹ Author's summary based on ADB TVET project documents.

²¹⁰ Author's summary based on the project appraisal documents of the World Bank TVET projects and ADB projects.

- School reforms need to be accompanied by structural and institutional reforms, and systematic reform at the provincial level helps the project achieve its objectives and allows the project results to be sustainable in the long run. The capacity development at the institutional level and at local level is also very important.
- School teachers' training is key for school reforms. To enhance the effectiveness of teachers' training, schools should consider developing a customized training plan based on their professional development plan that accurately reflects teachers' training needs, the industry skills demand, and/or good training practices. There is also need to incorporate incentive mechanism for teachers and link with their performance goals.
- Importance of strong M&E in project implementation. It is critical that TVET programs be accompanied by a strong M&E able to monitor outcomes and inform policy makers. Knowledge sharing of lessons learned can also enhance effectiveness. Developing capacity to undertake tracer studies and follow-up of trainees beyond placement also seems important to measure impact accurately as there is some evidence suggesting that the impact of training is larger when measured one to two years after completion.
- Pro-poor and gender focus in TVET project development is relevant in the PRC. Based on ADB's summary, emphasizing on TVET quality and capacity improvement will result in wider opportunities for both female and male students. In the PRC, students from poorer and predominantly rural backgrounds commonly rely on TVET education to acquire skills that would allow them to gain employment. There is also focus on benefiting ethnic minority students in some projects, a disproportionate number of whom come from high-poverty rural counties²¹¹.

11.7. Suggestion to CAREC 6 Countries in Using Donor Funding

1. We strongly recommend to use ADB, World Bank and bilateral donor's technical assistance in TVET development as much as possible, and as soon as possible. Projects from International organizations are not only providing much needed financial resources to CAREC 6 countries, but also bringing in international experience and reform measures to improve development environment of the TVET. The project areas should include further improvement of NQF System, long term development policy and national program on TVET and Trainings, reforming the curriculum, developing course materials, enhancing teachers' capability and skills, and formulating lending program, supporting institutional capacity building in education department of the government and TEVT schools, etc.
2. Using loan project to promoting school-enterprise collaboration is essential, including involving enterprises to define the standards of training materials and curriculum, piloting modern apprenticeship, and promoting the establishment of TVET groups, providing industrial visits opportunities for vocational teachers.

²¹¹ ADB, 2020, Vocational Education-Enterprise Collaboration for Student Employment-Based Poverty Reduction in Gansu: Technical Assistance Completion Report, April 2020, <https://www.adb.org/projects/documents/prc-50034-001-tcr>.

3. Using loan project to improve the physical conditions of vocational schools is another important area for TVET development, including constructing new campus, procuring more training equipment, establish an effective labor market information service system, and
4. The loan project can also be used to enhance the capacity of the school management, providing managers and teachers trainings to implement institutional TVET reforms, establishing TVET management and monitoring system and integrated management information system platform, providing financial assistance to students from impoverished families
5. If it is possible, it is recommended to use ADB and World Bank's results-oriented loan and technical assistance to support reform and development of TVET system in CAREC 6 countries. This kind of loan is funded through tracking the completion of evaluation outcome indicators to improve the project management efficiency and address the inconsistency between the domestic bidding procedure for procurement and the international common procedures as well as the inefficient withdrawal and reimbursement process.
6. Using loan project to provide more ICT service and online courses at TVET schools, support vocational institutions to share quality courses with excellent vocational institutions at home and abroad through the Internet and MOOCs; support the construction campus network to ensure the sound condition of hardware and infrastructure; support the collective purchase of software via the alliance of vocational institutions, enhance the information and communication technology training of teaching forces.
7. Promote lifelong learning is needed in CAREC 6 countries and loan and TA from international organization can play an important role in this area. Both secondary and tertiary level schools can include a strong lifelong training in their development program. This requires attention to the mobilization of lifelong training programs in curriculum development.

CHAPTER XII. SUGGESTION 8: TVET COOPERATION WITH OTHERS INCLUDING THE PRC

12.1. Learning from Other Countries

After the establishment of the PRC, the government has made several attempts to learn from other countries and adopt TVET models from other countries. The most typical cases were the adoption of the Soviet Union model in the 1950s and the piloting of the European models in the late 1990s. The learning from Soviet Union is more of a result of following the industrialization strategy of the Soviet Union. The PRC borrowed the Soviet Union's workplace-based training model and established secondary vocational and technical schools affiliated to state-owned enterprises (SOE). Meanwhile, the government converted schools and universities to specialized vocational schools and colleges, tailoring to skill needs of a narrowly defined heavy industry base. These reforms of TVET at both secondary and tertiary level had significant impact on skill accreditation and vocational qualification, matching skill supply with industry demand, TVET school and industry linkage.

After reform and opening up policy adopted since later 1970s, the state started to search for new options for TVET sector reform. The Education Commission intended to borrow Germany's Dual System of apprenticeship training, while Ministry of Labor inclined to learn from British National Vocational Qualification system²¹². Education Commission collaborated with the *Gesellschaft für Technische Zusammenarbeit (GTZ)*; and Ministry of Labor cooperated with the British Embassy and the British Council. In addition, the World Bank and Asian Development Bank played a role of facilitator through its aid and technical support projects.

Learning from Germany

The cooperation between the PRC and Germany in the field of vocational education can be traced back to the beginning of the PRC's reform and opening-up in 1978.

The smooth progress of Sino-German vocational education cooperation is that this is a government-led strategic cooperative action. The government-led cooperation has established a three-dimensional structure composed of three sub-levels: central government level, ministerial level and local level. Government cooperation agreements that represent the country are mainly agreements signed at the level of the State Council of the PRC and the German Federal Cabinet. The agreements signed at the national level have an overall guiding role, highlighting the function of cooperation in decision-making and planning at the national level. For example, the "Joint Statement between the Government of the PRC and the Government of the Federal Republic of Germany on Strengthening Cooperation in the Field of Vocational Education" signed by Premier Li Peng of the State Council of the PRC and the German Chancellor Kohl in Germany in July 1994 is a special issue for it is the first and only bilateral agreement signed by the PRC and other countries, and it is the overall guiding document for Sino-German vocational education exchange and cooperation²¹³.

²¹² Müller, A., 2021, Bureaucratic conflict between transnational actor coalitions: The diffusion of British National Vocational Qualifications to China. *Social Policy & Administration* (1).

²¹³ Dayuan Jiang, 2020, Experiences and implications for 30 years of Sino-Germany TVET cooperation, TVET Development Research No. 2 2020, p1-8.

In the government-led cooperation, one of the actions of great historical significance was that the State Education Commission in 1985 determined that the six cities of Suzhou, Wuxi, Changzhou, Shashi, Shenyang, and Wuhu would learn from the German “dual system” model, and conduct pilot projects for the PRC’s TVET sector reform. This action was based on the experience of 35 German aid projects on TVET in the PRC. It has greatly enhanced the concept of “school-enterprise cooperation, work-study integration” and effectively promoted the all-round development of Sino-German vocational education cooperation across the country.

The cooperation mode between the PRC and Germany is mainly based on projects. The first type of project coordination is a gradual transition from “imported substation” to “exported guidance” strategy. In the initial stage of cooperation, a large number of German experts “walked in” for a long-term and teaching the PRC TVET practitioners, or PRC practitioners went out for short-term inspections. With the development of the cooperation, it gradually turned to the PRC vocational educators “go out” for a relatively long time to gain in-depth field learning.

The second type of project coordination is a gradual transition from “passive acceptance” to “active acquisition”. In the initial stage of cooperation, one-way introduction, teaching and copying of German prototype materials are generally adopted by the German side. As the cooperation progresses, it gradually shifts to the PRC side’s initiative to raise questions and related ideas based on national conditions, and the two sides jointly conduct interactive learning.

In the project-oriented cooperation, the most pioneering actions include: as a result of the Sino-German vocational education cooperation project, the Institute of Vocational Education of the Ministry of Education of the PRC has been training vocational education managers and vocational education teachers since 2005; The Vocational and Technical Education College of Tongji University was established on the basis of the Sino-German “Tongji University Vocational Education Teacher Training Project”; jointly launched in 2008 with the German Federal Ministry of Economic Cooperation, the “Vocational Education and Training Asia Regional Cooperation Platform Project” conducted capacity building for vocational education teachers in Southeast Asian countries such as Thailand, Laos, and Vietnam. This has realized the leap from “bilateral cooperation” to “multilateral cooperation”, making milestone achievements of Sino-German vocational education cooperation to go global.

Learning from UK

The cooperation with UK is mainly through the British Embassy and its Cultural and Education Section, the British Council²¹⁴. The UK government implemented the Skills for Employability Project (SfE) since 2009, focusing on the establishment of a long-term strategic partnership between the PRC and the UK, and focusing on the promotion of the successful experience of vocational education in the UK.

The Employment Skills Program works in the following areas:

- Organize high-level vocational policy dialogues between the PRC and the UK to discuss common skills issues and challenges
- Support cooperation projects between the PRC and British vocational education institutions to promote the cultivation of skills talents

²¹⁴ British Council, 2011, Skills partnership between the PRC and UK: together to create a win-win situation and a prosperous future, https://www.britishcouncil.cn/sites/default/files/jiu_ye_ji_neng_xiang_mu_jie_shao_.pdf.

- Promote effective ways of developing skilled talents in Sino-British vocational education cooperation
- Establish best practices of Sino-British vocational education school-enterprise cooperation
- Promote high-standard Sino-British exchanges in professional positions
- Carry out broader employment- and employer-oriented skills development cooperation
- Through cooperation with the World Skills Organization, change the public's traditional impression of vocational education

With the assistance of the Cultural and Education Section of the British Embassy, the PRC and British governments signed two memorandums of understanding (MOU) on cooperation in the field of vocational education.

The first MOU was signed by the Ministry of Education of the PRC and the Ministry of Business, Innovation and Skills of the United Kingdom. This memorandum is jointly funded by the two countries and lasts for three years. The key areas of cooperation include Shadow Principal Program (about 100 principals of model vocational colleges from both sides participated in the “Sino-British “Shadow Principal” program. In three years, the principals of the PRC and Britain will visit partner colleges for in-depth learning and observation); Modern Apprenticeship Program, and Curriculum development program.

The second MOU was jointly signed by the Ministry of Human Resources and Social Security of the PRC and the Ministry of Business, Innovation and Skills of the United Kingdom. The memorandum covers five aspects of vocational training cooperation: apprenticeship and school-enterprise cooperation; professional standards and classification; cooperation between vocational schools; skills competition; and teachers' training.

Box 12.1. Cooperation between Britain and the PRC for the 2011 World Skills Competition

The 2011 World Skills Competition was successfully held in London, attracting a total of 950 contestants from 51 countries to compete for 46 technical awards of different types of work. It involves all aspects of skills, from electrical installations to pipeline installation, from candy pastry making to woodworking. The British team achieved the fifth best result in history in this competition, winning 5 gold medals, 2 silver medals, 6 bronze medals, and 12 excellence awards. The PRC also sent 6 candidates for the first time to the competition after joining the World Skills Organization. Although there was only 6 months of preparation time, they also achieved good results, winning a silver medal and 5 excellence awards.

The 4-day competition attracted more than 200,000 spectators of different age groups to visit the scene. The spectators were all infected by the serious and calm competitive state and superb skills of the players. At the same time, the audience can also participate in the “Try it” session of various skills on the spot to experience the fun of different skills. The British Council also organized an observation group of Chinese representatives, and invited officials from relevant Chinese government departments, principals and teachers of vocational colleges, and business industry executives to observe the 2011 London WorldSkills Competition. The Chinese delegation had the opportunity to communicate with relevant departments in the UK technical field, visit model vocational colleges in the UK, observe some vocational courses on-site, communicate face-to-face with teachers and students, and visited employers and business partners including IBM.

In 2011, the British Council, the PRC Ministry of Human Resources and Social Security (MHRSS) and the World Skills Organization worked together to help the PRC better prepare for the training of experts and players and assist the young Chinese team to achieve excellence in the London WorldSkills Competition. The British Council also invited British experts and coaches to the PRC to train Chinese skill experts and gave specific professional advice on selection and training of players for the Chinese team. In June 2011, the Chinese team was also invited to participate in the British team’s national finals to help young players gain valuable experience in international skills competitions. After that, the British Council also organized a number of China-UK WorldSkills Tournament exchange activities (“Skills Roadshow”) in the PRC to show the superb skills of Chinese and British players and tell their inspiring personal growth stories.

The Opening-up Policy has been and will continue to be the driving force of the PRC’s reform in every field, including in educational administration and school running system²¹⁵. The content and method of teaching and learning are significantly changed. International cooperation and exchange of TVET in the PRC are also multi-dimensional. From governmental to nongovernmental organizations and agencies, more and more institutions are committed to facilitating the international cooperation and exchange of TVET.

Among them, China Education Association for International Exchange (CEAIE) has been one of the most important platforms since its establishment in 1981. Among some 60 CEAIE programs and activities, broadening the international dimension of TVET has always been the focus. For example, the Vocational Education Leadership Training (VELT) Program VELT was launched in 2008 with special financial support of MOE (Ministry of Education) and MOF (Ministry of Finance) of the PRC. It is an important part of National Model Higher Vocational College Plan.

²¹⁵ China’s TVET: Reform and Opening-up —Speech at the WFCP 2012 World Congress Dr. Jiang Bo, Secretary-General, CEAIE May 27, 2012, Halifax, Canada, <https://wfcpc.org/wp-content/uploads/TVET-Reform-and-Opening-up-in-China.pdf>.

So far, among over 1,000 higher vocational colleges, more than 500 leaders have joined the program, which cooperate with America, Canada, Germany, Britain, Singapore, etc. It is the biggest training program in Chinese educational history. The program helps TVET leaders to study and share good practices together, which greatly promotes TVET development in the PRC. Another example would be TVET Excellent Teacher Exchange Program.

In recent 5 years, about 2,000 teachers were sent abroad through the program. The program activities mainly include curriculum development, teachers' training and teachers and staff development. Through those activities as well as teaching and learning experiment, high-quality resources have been introduced. It plays the role of excellent teachers to guide and motivate others to improve continuously.

12.2. The PRC's TVET Assistance to Other Countries

As the PRC's production and equipment manufacturing enterprises are investing abroad, the "going global" of vocational education has become increasingly necessary. It can not only help development of other countries, but also Chinese companies working abroad. Some developing countries do not have comprehensive vocational education systems. TVET schools can train local skilled workers who understand not only Chinese technology and equipment standards, but also Chinese and Chinese corporate management culture, as well as overseas project management, operation, and maintenance, helping companies reduce labor costs and promote cross-cultural communication.

The PRC government actively promotes international cooperation in vocational education, and encourages in policy dialogue, personnel visits, inter-school exchanges, personnel training, curriculum development, school construction, scientific research, and other fields ²¹⁶.

As part of the TVET "going aboard" policy, the central government actively hosts worldwide vocational education conferences to build platforms for exchanges and cooperation, such as the 3rd International Vocational and Technical Education Conference and the World Vocational Education College Alliance Conference. Secondly, the local government participates regional cooperation and sharing in TVET. For example, the PRC-ASEAN Vocational Education International Forum is regularly held in Guizhou, and the PRC-ASEAN Vocational Education Summit Forum is regularly held in Guangxi.

Helping key industries to establish schools overseas is also part of the TVET going abroad policy. For example, the China Nonferrous Mining Group and 8 domestic higher vocational colleges implemented a pilot program for vocational education in Zambia. (see Box 12.2) At present, similar programs have carried out exchanges and cooperation with schools more than 30 countries. Some of the program are cooperated with other developed countries and international organizations such as Germany, United Kingdom, Netherlands, Australia and UNESCO, UNICEF, ADB, and World Bank.

²¹⁶ Ministry of Education, 2017, Introduction to TVET Development in PRC, https://hudong.moe.gov.cn/jyb_xwfb/xw_fbh/moe_2069/xwfbh_2017n/xwfb_070703/170703_sfc/201707/t20170703_308410.html.

Box 12.2. The China-Zambia Vocational and Technical College

The China-Zambia Vocational and Technical College was established to promote the “going out” of teaching standards, organize study and short-term training in the PRC, and establish the “Chinese language + vocational education” model in Zambia. At present, the pilot project has formed a four-in-one school model consisting of China-Zambia Vocational and Technical College, China Nonferrous Metals Zambia Enterprise Training Center, National Open University Overseas Study Center, and independent Confucius Classroom. By cultivating a group of skilled personnel who can master the technical standards of the PRC’s equipment and solve local employment problems.

The China-Zambia Vocational College has six secondary schools, including the School of Automation and Information Technology, the School of Mechanical and Electrical Equipment Management and Maintenance, and the School of Mechanical Manufacturing and Automation. The college provides three-year higher education for Zambian high school graduates. Guangdong Construction Vocational and Technical College actively participates in the construction of China Zambia Vocational College.

The PRC also collaborated with governments and institutions of TVET in Africa. Over the last two decades, Sub-Saharan African countries experienced significant growth as a result of the rapid transformations and foreign investments which helped boost the demand for greater technological skills. But industries often identify the shortage of an adequately educated workforce as a major constraint to further growth and development²¹⁷.

The World Bank finances and supports a significant portfolio of skills and Technical Vocational Education and Training (TVET) development projects in Africa. PASET, which is a unique Africa led initiative, was launched in 2013 with support from the World Bank and partner countries including Korea and the PRC.

Tripartite partnership on education between the PRC, Africa, and the World Bank is progressing well. Several Chinese institutions have built partnership with African institutions financed by the World Bank projects. For example, the University of Addis Ababa center for the railway technology, is cultivating partnership with the Southwest Jiao Tong University and Shanghai Jiao Tong University in the PRC. These partnerships have turned out to be mutually beneficial. A Forum on China-Africa-World Bank Education Partnership has also been initiated as a potentially sustainable mechanism to maintain the tripartite dialogue and partnership. The 1st of the series focused on science and technology in higher education. A 2nd one focused on TVET and skills development in 2018.

At the local level, many vocational schools in Beijing, Shanghai, Jiangsu, Zhejiang, and Guangdong have launched overseas school program, covering many countries. Among them, the Tianjin Municipal Education Commission supports Bohai Vocational and Technical College to establish a “Luban Workshop” in Ayutthaya Institute of Technology in Thailand. This is the first such a workshop in the field of vocational education²¹⁸. (see Box 12.3.)

²¹⁷ World Bank, 8 Sep 2018, Technical and Vocational Education and Training: Lessons from China, <https://www.worldbank.org/en/news/feature/2018/10/30/technical-and-vocational-education-and-training-lessons-from-china>.

²¹⁸ Ministry of Education, 2017, Introduction to TVET Development in PRC, https://hudong.moe.gov.cn/jyb_xwfb/xw_fbh/moe_2069/xwfbh_2017n/xwfb_070703_170703_sfc/201707/t20170703_308410.html.

Box 12.3. Luban Workshop²¹⁹

Luban Workshop is a well-known brand originated in Tianjin for TVET education exchanges between the PRC and other countries. It is committed to cultivating technical and skilled talents familiar with Chinese technology, and Chinese craftsmanship.

On March 8, 2016, Tianjin Bohai Vocational and Technical College established the first overseas Luban workshop in Thailand. Since then, in the United Kingdom, India, and Indonesia, Luban workshops were built by Tianjin Vocational Colleges.

At the opening ceremony of the Beijing Summit of the Forum on China-Africa Cooperation on September 3, 2018, Chinese President Xi Jinping announced to the world that the PRC would set up 10 Luban workshops in Africa to provide vocational skills training to African youth.

On March 28, 2019, the PRC's first Luban workshop in Africa, the Djibouti Luban workshop, was officially completed and put into operation. The Djibouti Luban Workshop adopts a multi-party cooperation model between government, schools, and enterprises. It is jointly built by Tianjin Municipal Government, Djibouti Ministry of Education, Tianjin Railway Vocational and Technical School, Tianjin First Commercial School, Djibouti Business School, and China Civil Engineering Group Co., Ltd. In the first phase, four majors, including railway majors and business majors, will be built. The two railway majors have bridged the gaps in such majors in Djibouti. The international trade and logistics management courses of the business majors are an improvement to the existing majors of local vocational schools.

So far, Tianjin has established 17 Luban workshops in 16 countries in Asia, Africa and Europe. In order to strengthen the development and management of Luban workshops across the country, on November 6, 2020, the Luban Workshop Alliance was formally established in Tianjin, marking the official launch of the Luban workshop model originally built by Tianjin to the whole country. More colleges and enterprises, scientific research institutions and social organizations will participate in the construction of Luban Workshop.

The Lancang-Mekong Vocational Education Base²²⁰ has been established in Yunnan and has trained tens of thousands of professional and technical talents for the five Mekong countries. At present, 30 units including 3 universities in Mekong countries have joined the Lancang-Mekong Vocational Education Alliance.

The PRC established stable contacts with more than 70 countries and international organizations. More than 400 higher vocational colleges have cooperated with foreign educational institutions for co-operating schools²²¹.

²¹⁹ Xinran Chen, 2018, Luban Workshop: PRC TVET going global, China Education Daily, 11 May 2018, http://www.moe.gov.cn/jyb_xwfb/moe_2082/zl_2018n/2018_zl34/201805/t20180522_336778.html.

²²⁰ Li Gao, 2018, Belt and Road Initiative calls for the going out of TVET, Guangming Daily, 2 Feb 2018, <http://opinion.people.com.cn/n1/2018/0202/c1003-29801604.html>.

²²¹ Ministry of Education, 2020, Press conference on the reform and development of TVET during the 13th Five Year Plan, 8 Dec 2020, http://www.gov.cn/xinwen/2020-12/08/content_5568181.htm.

12.3. Cross-Border E-commerce in TVET

One of the most dynamic area for TVET cooperation is in the field of cross-border e-commerce in recent years. The scale of the PRC's cross-border e-commerce import and export transactions has exceeded 10 trillion yuan, but the talent gap is as high as 16 million²²². There are currently 1,500 colleges in the country offering e-commerce majors. Qualified students need to have skills in foreign languages, international trade, E-commerce, business administration, etc. In 2019, the professional catalog of higher vocational education (specialties) added 9 majors, including cross-border e-commerce.

The current training system for e-commerce talents can be roughly divided into two levels: platform companies operation talents, and vocational technical colleges mid- to high-end talents. At the platform level, for example, Alibaba has established the “Hundred Cities and Thousand Schools” project and Taobao University; eBay has held e-commerce talent training camps and competitions; Amazon has also cooperated with many professional training institutions.

As cross-border e-commerce in the PRC plays an increasingly important role in global trade, the vocational education for e-commerce talents in the PRC is also developing fast. Many TVET schools have initiated collaborations with overseas schools especially in bordering areas in the southeast and in the west regions.

Box 12.4. Silk Road Virtual Class of E-commerce²²³

“Silk Road Virtual Class” is an innovative teaching model of e-commerce related courses developed by the Business School of Northwest University of Political Science and Law. It aims to provide e-commerce courses for students in Russia, Kazakhstan, Kyrgyzstan, Uzbekistan and other countries in Central Asia and explore new education model.

E-commerce logistics and electronic payment in Central Asia have not yet formed a complete system, the e-commerce professional education resources at colleges and universities are lacking, and the demand for talents in the e-commerce market is large. At the end of 2017, Northwest University of Political Science and Law and Kazakhstan International Kazakh-Chinese Language Institute signed a strategic partnership agreement, which involved the joint development of a “cross-border e-commerce virtual classroom”.

The “Silk Road Virtual Class” was officially launched on July 20, 2020. The first phase of teaching was carried out from September 25 to December 31, 2020. It lasted for 15 weeks and introduced the basic theories of e-commerce and mainstream e-commerce platforms to 75 students of the Kazakh Language Institute.

In response to the students' difficulties in internship under COVID-19, a “Cloud Internship” project was launched in March 2021 at the request of the Kazakhstan-Chinese Language Institute. After eight weeks of study, 138 students from 9 classes in Kazakhstan have completed the examination.

²²² Innovative talents training modes in Quanzhou in new ecosystem for education industry integration, 6 July 2021, Quanzhou Net, http://www.qzwb.com/gb/content/2021-07/06/content_7095840.htm.

²²³ Northwest University of Political Science and Law held Silk Road Virtual Class and explore new TVET model for cross-border e-commerce along Belt and Road, 18 May 2021, Xinhua Daily, http://www.sn.xinhuanet.com/2021-05/18/c_1127458764.htm.

Box 12.5. E-commerce Valley for ASEAN in Guangxi²²⁴

On September 12, 2019, the China-ASEAN e-commerce vocational education cooperation and exchange platform—“E-commerce Valley” service and support center was officially launched. The “E-commerce Valley” settled in Guangxi Vocational and Technical College of Economics and Trade will provide training for e-commerce talents in ASEAN countries and export the PRC’s e-commerce vocational education standards.

E-commerce Valley is an e-commerce project initiated by the China-ASEAN E-commerce Vocational Education Forum. The platform focuses on the e-commerce vocational education and training between Guangxi and ASEAN, the development of e-commerce industrial parks, and the cooperation of e-commerce enterprises, and explores the school enterprises collaboration. The platform aims to provide ASEAN countries with e-commerce talent training system solutions and e-commerce industrial park development solutions.

E-commerce Valley connects the country’s high-quality vocational colleges, undergraduate colleges, research institutes, and related large-scale enterprises, adopts the cooperation model of “industry associations + colleges + enterprises”, introduces real e-commerce projects, and develops specific training plans for ASEAN countries to cultivate leading talents and outstanding skilled talents in the e-commerce industry.

On January 18, 2018, the opening ceremony of “E-commerce Valley” was held at Far Eastern University, Chiang Mai, Thailand, marking the official completion of the “E-commerce Valley” overseas center. Guangxi Vocational and Technical College of Economics and Trade will carry out discussion and research on the standard formulation of e-commerce course standards and course development with Far Eastern University under the guidance of the National E-commerce Vocational Education and Teaching Steering Committee.

Guangxi Vocational and Technical College of Economics and Trade, as the first implementing institution of the E-commerce Valley project, signed an “E-commerce Valley” cooperation agreement with the Far East University of Chiang Mai, Thailand at the China-ASEAN Vocational Education Forum in September 2017. Since the start of the cooperation, Guangxi Institute of Economics and Trade has organized innovation and entrepreneurship training camps and “E-commerce Valley” teacher training courses for Far East University in Chiang Mai, Thailand, and developed a series of curriculum standards and resources for promoting rural promote rural tourism routes.

12.4. Suggestion to CAREC 6 Countries: Cooperation with Other Countries including the PRC

1. Although the PRC’s vocational education is still in the early stage of development, it has its own characteristics. With the help of international organizations and bilateral assistance, Chinese vocational education has made great progress in the past decades. It has gradually transitioned from the former Soviet Union model into the internationally standard TVET development model. Those experiences could be a good reference to the TVET development of the CAREC 6 countries.

²²⁴ Zhenhai Xi, 2017, PRC-ASEAN E-Commerce Valley located in Nanning, Guangxi, 13 Sep 2017, Guangxi Daily, http://www.gxzf.gov.cn/sjkhd/sy_29797/gxdm/t1229057.shtml.

2. The PRC has carried out TVET cooperation projects with many countries in Southeast Asia and Africa. This experience can be used in cooperation between the PRC and CAREC 6 countries. Some models, such as Luban workshop can also be used to cooperate between the PRC and CAREC 6 countries.
3. Cooperation between the PRC and CAREC 6 countries can also learn from the PRC's cooperative model in Africa countries in where TVET program in the PRC became some components of international institutional projects. Similarly, Chinese companies invested in CAREC 6 countries can be involved in helping TVET development by not only providing funds, but also giving lectures by the engineers of those companies.
4. Cross-border e-commerce can be a pilot cooperation field of TVET between the PRC and CAREC 6 countries. This field is growing rapidly. Central Asian countries are lack of talents in this area. Recently, CAREC Institute and China Services Trade Association is planning to organize a series of cross-border e-commerce training courses for TVET colleges in Central Asian countries. This cooperation model can be used to explore a broader TVET cooperation between the PRC and CAREC 6 countries.

CHAPTER XIII: CONCLUSION

CAREC 6 countries have encountered three noteworthy challenges in the development of TVET: mismatches between curricula in TVET programs and the skills required by employers; lack or absence of a national qualification framework; and inadequate human and financial resources. While the PRC has similar problems in TVET development for many years, with the rapid economic growth since the reform and opening-up, the country has made great progress in many fields of TVET. The Chinese experience can be a good reference to the TVET development of CAREC 6 countries.

Among all things, to achieve high employment rate for the graduates of TVET schools is on the top priority in CAREC 6 countries. The graduate employment rate can be the first factor in assessing the performance of TVET schools. Employment quantity and quality should be the primary indicators to evaluate TVET school's performance in CAREC 6 countries. It is suggested to have annual skills-demand survey among enterprises and vocational schools. The CAREC 6 countries can learn from the experience of "academic certificate + vocational skill level certificates" system applied in the PRC. A modern apprenticeship system developed in Europe and US can also be integrated into talent training plan particularly in Group 1 CAREC countries.

Based on the achievements of the PRC's TVET reform, it is suggested that the school-enterprise cooperation be the key policy measure to substantially integrate industry and education in CAREC 6 countries. The core of the cooperation is to involve industries and enterprises into vocational school operations. It is needed to provide a series of adequate policy incentives for enterprises cooperated with vocational schools such as a structural tax reduction. It would help if some combined incentives are given including finance + budgetary allowance + land + and relevant tax exemptions.

Sometimes, a TVET group is another type of TVET operating system in promoting the organic integration of education chain and industrial chain. The PRC's experience shows that as long as the enterprise has a right to run TVET schools, incentives to provide systematic and sustained inputs to TVET schools are established. An institutional mechanism should also be set up including sharing professional teaching courses, training materials, enrollment and employment information.

The quality of the teachers has always been regarded as the key to the quality of vocational education. It is important to develop a comprehensive trainings program for dual-qualification teachers, to provide opportunities for vocational teachers work part-time in enterprises to gain industrial experience. Also, encourage enterprises staff to work at TVET schools as part time teacher is another way to strengthen teaching ability of the school. Vocational schools are to give preference policies to dual-qualification teachers in terms of promotion and salary increase.

Nowadays, ICT could provide some new hopes for fast development of TVET. The high-quality courses among schools can be shared through internet and Massive Open Online Courses (MOOCs). It is suggested to enhance the policy design at the government level, where more investment could be mobilized in this area to promote the development of digital campus. Importance can be attached in terms of software. The integrate software purchase can be realized among the alliance of schools and colleges. A large number of courses can be shared between schools and colleges at least inside of one country. Under the "Internet Plus", the new types of teaching are including MOOCs and flipped classrooms, etc. The types of teaching mode require a higher standard to the internet resources and

teaching staff in vocational institutions. Meanwhile, the training of teachers in vocational institutions must be enhanced first.

Government funding is the most important financial resource for TVET. On average, running TVET schools need more money than normal high school and academic universities as TVET schools need to purchase a lot of expensive equipment and to provide practice facilities to students. Equalize public funding per student is important. Other sources of finance should be explored including provide short term training service to general public, community support service, and mobilizing donations. Expansion of private owned or enterprises owned TVET schools can save some public resources.

Projects from international organizations are not only providing much needed financial resources to CAREC 6 countries, but also bringing in international experience and reform measures to improve development environment of the TVET. Using loan project to promoting school-enterprise collaboration is essential. Taking advantage of loan project to improve the physical conditions of vocational schools is another important area for TVET development. If it is possible, it is recommended to use ADB and World Bank's results-oriented loan and technical assistance to support reform and development of TVET system in CAREC 6 countries.

The PRC experience in helping Southeast Asia and Africa can be used in cooperation between the PRC and CAREC 6 countries. Some models, such as Luban workshop, can also be used to cooperate between the PRC and CAREC 6 countries. Cross-border e-commerce can be a pilot cooperation field of TVET between the PRC and CAREC 6 countries. Recently, CAREC Institute and China Services Trade Association is planning to organize a series of cross-border e-commerce training courses for TVET colleges in Central Asian countries. This cooperation model can be used to explore a broader TVET cooperation between the PRC and CAREC 6 countries.

