

Asia Region

**Data Collection Survey on
Advanced Industrial Human
Resource Development
in Central Asia**

Final Report

July 2017

Japan International Cooperation Agency (JICA)

**O.P.C Corporation
Global Development & Management Consultants Inc.**

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Location Map of the Survey Sites



Surveyed 5 Countries (Kazakhstan, Uzbekistan, Turkmenistan, Tajikistan and Kyrgyz)



Areas of the First Field Survey



Areas of the Second Field Survey

Asia Region
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Location Map of the Survey Sites

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List of Annexes

Annex 1: Schedule of the Field Survey

Annex 2: List of the Respondents

List of Abbreviations

4M	Man; Machine; Material; Method (4 factors for machining production)
5S	Sort (Seiri), Set In Order (Seiton), Shine (Seiso), Standardize (Seiketsu), Sustain (Shitsuke)
AACSB	The Association to Advance Collegiate Schools of Business
AIDS	Acquired Immunodeficiency Syndrome,
AIIB	Asian Infrastructure Investment Bank
ADB	Asian Development Bank
APED	Action Plan of Education Development
AMBA	The Association of MBA
AMED	Japan Agency for Medical Research and Development
ATAMEKEN	The National Chamber of Entrepreneurs of the Republic Kazakhstan "Atameken"
ATM	Automatic Teller Machine
ATU	Almaty Technological University
ATZ	Awaza Tourist Zone
AUCA	American University of Central Asia
BOP	Base of the Economic Pyramid/ Bottom of the Pyramid
C/P	Counterpart
CAD/CAM	Computer Aided Design/ Computer Aided Manufacturing
CAEP	Central Asia Education Platform
CARDA	International Center for Agricultural Research in the Dry Areas
CAREC	Central Asia Regional Economic Cooperation
CBHE	Capacity Building in Higher Education
CBT	Competency Based Training
CCI	Chamber of Commerce and Industry
CCI-KR	Chamber of Commerce and Industry of Kyrgyz
CCI-UZ	Chamber of Commerce and Industry of Uzbekistan
CEATM	Center for Educational Assessment and Teaching Methods
CEO	Chief Executive Officer
CER	Center for Economic Research
CHT	Centre for High Technologies
CIA	Central Intelligence Agency
CICA	Conference on Interaction and Confidence-Building Measures in Asia
CIS	Commonwealth of Independent States
CS	Customer Satisfaction
CSTO	Collective Security Treaty Organization
DAAD	Der Deutsche Akademische Austauschdienst
DNP	Dai Nippon Printing Co., Ltd
EACEA	Education, Audiovisual and Culture Executive Agency
EAEC	Eurasian Economic Community
EAEU	Eurasian Economic Union
EBRD	European Bank for Reconstruction and Development
ECO	Economic Cooperation Organization
EEU	Eurasian Economic Union
EFMD	European Foundation for Management Development
EMIS	Educational Management Information System
ENU	L.N.Gumilyov Eurasian National University
EPC	Engineering, Procurement, and Construction

Erasmus +	European Region Action Scheme for the Mobility of University Students
ESCoMIAD	Economic and Social Connections: A Multi-Input Area Development Financing Facility for Tajikistan
ESD	Education for Sustainable Development
EU	European Union
EUA	European University Association
EURAS	Eurasian Universities Union
FEZ	Free Economic Zone
F/R	Final Report
FAO	Food and Agriculture Organization of the United Nations
FSSC	Food Safety System Certification
FTA	Free Trade Agreement
GDMC	Global Development & Management Consultants Inc.
GDP	Gross Domestic Product
GIS	Geographic Information System
GIZ	Gesellschaft für Internationale Zusammenarbeit (in German)
GM	General Motors Company
GMO	Genetically Modified Organism
GNI	Gross National Income
GNP	Gross National Product
GTL	Gas to Liquids
HACCP	Hazard Analysis and Critical Control Point
HIV	Human Immunodeficiency Virus
HEIs	Higher Education Institutions
IAU	International Association of Universities
IBRD	International Bank for Reconstruction and Development
IC/R	Inception Report
IC	Integrated Circuit
ICARDA	International Center for Agricultural Research in Dry Areas
ICT	Information and Communication Technology
IEA	International Energy Agency
IELTS	International English Language Testing System
IFC	International Finance Corporation
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
IntUIT	International University of Innovative Technologies
ISA	International Standards on Audit
ISO	International Organization for standardization
IT	Information Technology
IUK	International University of Kyrgyzstan
JBIC	Japan Bank for International Cooperation
JDS	Japanese Grant Aid for Human Resource Development Scholarship
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JSC	Joint Stock Company
JV	Joint Venture
KNU	Kyrgyz National University named after Jusup Balasagun
KOICA	Korea International Cooperation Agency
KOTRA	Korea Trade-Investment Promotion Agency
KSU	Kyrgyz State University named after I. Arabaev
KSTU	Kyrgyz State Technical University named after Iskhak Razzakov

KMG	KazMunayGas
LLC	Limited Liability Company
MAN	Maschinenfabrik Augsburg-Nurnberg (独)
MASHAV	Israel's Agency for International Development Cooperation in the Ministry of Foreign Affairs (בפיתוח בינלאומי פעולה לשיתוף היהודית הסוכנות)
MBA	Master of Business Administration
MDGs	Millennium Development Goals
MIS	Management Information System
MIT	Massachusetts Institute of Technology
MoHSSE	Ministry of Higher and Secondary Specialized Education
MoPE	Ministry of Public Education of the Republic of Uzbekistan
MTDS	Medium-Term Development Strategy
MSMEs	Micro-Small-Medium Enterprises
MTP	Management Training Programme
MOU	Memorandum of Understanding
NAOJ	National Astronomical Observatory of Japan
NGO	Non-Governmental Organizations
NOS	National Occupational Standards
NPPT	National Program for Personnel Training
NQF	National Qualifications Framework
ODA	Official Development Assistance
OECD	Organization for Economic Co-operation and Development
OEM	Original Equipment Manufacturer
Off-JT	Off-the-Job Training
OJT	On-the-Job Training
OPEC	Organization for Petroleum Exporting Countries
OVOP	One Village One Product
PBL	Project Based Learning
PISA	Program for International Student Assessment
PhD	Doctor of Philosophy
PLC	Programmable Logic Controller
PMP	Project Management Professional
PPP	Public-Private Partnership
QCD	Quality, Cost, Delivery
R/D	Record of Discussion
R&D	Research and Development
SATREPS	Science and Technology Research Partnership for Sustainable Development
SCM	Supply Chain Management
SCO	Shanghai Cooperation Organization
SDC	Swiss Agency for Development and Cooperation
SDGs	Sustainable Development Goals
SME	Small and Medium Enterprises
SNS	Social Networking Service
SQC	Statistical Quality Control
SSVE	Secondary Specialized Vocational Education
STC	State Testing Center
STEP	Skills Towards Employability and Productivity
STEM	Science, Technology, Engineering and Mathematics
TAJSTAT	Agency on Statistics under President of the Republic of Tajikistan
TB	Tuberculosis

TCTI	Tashkent Chemical Technology Institute
TIC	Tokyo International Center
TSAU	Tashkent State Agrarian University
TSPU	Tajik State Pedagogical University
TSTU	Tashkent State Technical University named after A.R. Beruni
ToT	Training of Trainers
TQM	Total Quality Management
TVEM	Technical & Vocational Education Modernization
TVET	Technical Vocational Education and Training
UCA	University of Central Asia
UIET	Union of Industrialists and Entrepreneurs of Turkmenistan
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
USA	United States of America
USAID	United States Agency for International Development
VET	Vocational Education and Training
WB	World Bank
WTO	World Trade Organization

Photos of the Field Survey

(1) Kazakhstan



Interview with Holding Kasipkor



Research equipment procured by Japan
(Nazarvaev University)



Interview with Al-Farabi Kazakh National
University



Tour of the museum at Al-Farabi Kazakh
National University



Interview with ATAMEKEN



Visit to ATAMEKEN



Green house of Astana Eco Standard



Wool products of AigulLine



Experimental equipment of Almaty University of Power Engineering and Telecommunications



Equipment of Almaty Polygraphy College



Entrance of Japan Center



Interview with Almaty Management University

(2) Uzbekistan



Cultivation equipment of Tashkent State Agrarian University



Air jet waving machine procured by Toyota Tsusho (Tashkent Institute of Textile and Light Industry)



Class at Tashkent Chemical Technological Institute



Equipment of Turin Polytechnic University in Tashkent



Class at Bukhara State University



Visit to Bukhara Japan Center



Tour of Samarkand State University



Tour of Samarkand State University



Class at Samarkand branch of Tashkent University of Information Technologies



IT system used at Tashkent State Pedagogical University



Interview with National University of Uzbekistan



Experimental equipment procured by Japanese grant (Tashkent Institute of Textile and Light Industry)

(3) Turkmenistan



Interview with Ministry of Education



Interview with the World Bank



Observation of International University for Humanities and Development



Interview with International University for Humanities and Development



Equipment at Centre of Technologies of Academy of Sciences of Turkmenistan



Group Photo at University of Engineering Technologies of Turkmenistan named after Oguz Khan



Observation of Turkmen State Institute of Transport and Communications



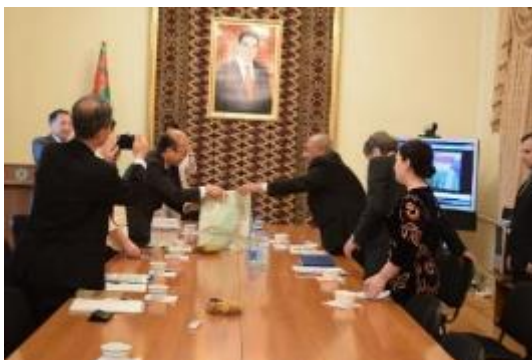
Observation of Turkmen State Institute of Architecture and Construction



A Student of Turkmen State Institute of Architecture and Construction



Equipment at International Oil and Gas University



Interview with the Academy of Sciences of Turkmenistan



Group Photo of the Interview with Institute of Seismology and Atmospheric Physics of the Academy of Sciences of Turkmenistan

(4) Tajikistan



Interview with the Ministry of Education and Science



Courtesy Call to the Ministry of Foreign Affairs



Interview with the Ministry of Labour and Social Security



Interview with the Ministry of Economic Development and Trade



Interview with Swiss Agency for Development and Cooperation



Interview with UNDP



Interview with Kyrgyz State Pedagogical University



Class at Technical Industrial College



Observation of Tajik Technical University named after academic Osimi



Class at Technological University of Tajikistan



Interview with Tajik National University



Observation of a Local Company "Saodat"

(5) Kyrgyz



Interview with the Ministry of Education and Science



Interview with GIZ



Interview with JDS



Observation of Kyrgyz State University named after I. Arabaev



Chemistry Laboratory of Kyrgyz Turkish Manas University



Observation of Kyrgyz State Technical University named after Iskhak Razzakov



Chemistry Laboratory of National Academy of Science of Kyrgyz



Observation of Institute of Mining and Mining Technologies Academician named after W. Asanalieva



Observation of Kyrgyz State University of Construction, Transport and Architecture named after N. Isanov



Laboratory of Kyrgyz-Russian Slavic University named after B.N. Yeltsin



Visit to OVOP Center



Observation of a Local Company, "Kukikovskiy Confectionery House"

1. Outline and Background of the Field Survey

1.1. Background and Objectives of the Survey

1.1.1. Background of the Survey

As mentioned in the Japanese Prime Minister Mr. Shinzo Abe's policy speech for Central Asia in October 2015, the "sophistication of industry and human resource development" is one of the main components of the Japanese development cooperation with Central Asian countries. It aims to support their transformation from planned economies to market economies while promoting economic development.

Under these circumstances, the Japan International Cooperation Agency (JICA) has been supporting the industrial human resource development and capacity building of young administrative officers in five Central Asian Countries; namely, Uzbekistan, Kazakhstan, Kyrgyz, Tajikistan, and Turkmenistan. JICA's assistance consists of: (1) business human resource development at Japan Center pursuing the development of industry and small and medium enterprises (SMEs) to promote market economy, and (2) Japanese Grant Aid for a Human Resource Development Scholarship (JDS) to develop the capacities of young government officials by awarding them opportunities for study at universities or training in Japan.

1.1.2. Objectives of the Survey

(1) Two main components of Japan's support toward Central Asian countries have been "Governmental Sector" (JDS for the capacity development of government officials) and "Industrial Sector" (Japan Centers that support industrial development). "The Data Collection Survey on Advanced Industrial Human Resource Development in Central Asia" (hereinafter referred to as "the Survey") will collect the following types of information on advanced industrial human resource¹ development in the targeted countries: the policy agenda of each country, socio-economic situations, industrial structures and trends, education systems, and programs for human resource development. The Survey intends to support the "Educational Sector" as the third component of Japan's development cooperation with Central Asian countries. The Survey will subsequently analyze the current challenges and needs of support, then draft possible forms of cooperation between Japan and the five Central Asian countries with concrete implementation plans in mind.

¹ In this Survey, 'advanced industrial human resources' are defined as 'human resources who receive higher education necessary for supporting industry, specifically, those who have execution capabilities.'

- (2) Through the invitation program to Japan, this Survey also aims to promote understanding of the Japanese model of advanced industrial human resource development among such key personnel as director generals of the ministries responsible for higher education, senior executives of science and engineering departments of major national universities, and executives of vocational training institutions in the five Central Asian countries.

1.1.3. Main Components of the Work

The following are the main components of the work.

- Baseline survey of the five Central Asian countries
- Survey on projects of other donors
- Proposal for possible assistance
- Invitation program to Japan

1.1.4. Geographical Areas of the Survey

The table below lists the geographical areas covered by the Survey and the schedule for the field survey. A more detailed schedule for each of the five countries can be found in attachment 1.

Table 1-1 Geographical Areas of the Survey and Schedule for the Field survey

	Geographical Areas of the Survey	Schedule
The 1 st Field survey	Kazakhstan (Astana and Almaty)	January 23 – February 3, 2017
	Uzbekistan (Tashkent, Samarkand and Bukhara)	February 6 – 15, 2017 March 1 – 17, 2017
The 2 nd Field survey	Tajikistan (Dushanbe)	April 14 – 21, 2017
	Turkmenistan (Ashgabat)	April 24 – May 2, 2017
	Kyrgyz (Bishkek)	May 3 – 17, 2017

1.1.5. Methodology of the Survey

Interviews with relevant government agencies, higher education institutions, vocational training education and training (TVET) institutions, private enterprises, other donors, Japanese experts, etc. in the areas surveyed above were conducted based on questionnaires. The Survey Team also gathered and analyzed existing related materials and grasp the current conditions.

The field survey focused on the following as major research items.

- Economic situation, priority industries
- Current status and problems of local companies
- Trends of Japanese and Foreign companies and their investment activities
- Education systems, and related issues and future prospects

- Major higher education institutions in science and engineering
- Current status and issues of higher education institutions in science and engineering
- Current status and problems of TVET, and future prospects
- Current status and issues of industry-academia collaboration

1.2. Outline of the Target Area

1.2.1. Outline of the Target Area

Table 1-2 Surveyed Country Overview

Country	Kazakhstan	Uzbekistan	Turkmenistan	Tajikistan	Kyrgyz
Country area (km ²)	2,724,400	447,400	488,000	about143,100	198,500
Territorial area versus Japan	7 times	About 1.2 times	1.3 times	About 40%	About half
Population (thousands)	1,836	2,947	529	833	573
Nominal GDP per capita (US \$)	7,452.77	2,121.77	6,622.41	779.83	1,072.75
Unemployment rate (%)	5.7	4.9	10.6	2.5	8.1

Note) Nominal GDP per capita is the IMF's forecast for 2016. According to some sources, the actual unemployment rate in Tajikistan is higher than the official figure given above.

1.2.2. Participation in International Organizations



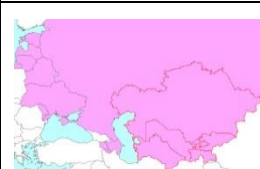



Some of the surveyed countries participate in international organizations for the purpose of multilateral cooperation and promotion of exchange. The measures and agreements of these international organizations might have some impacts on each country.

From the economic point of view, the Eurasian Economic Coalition can be mentioned. In addition, a free trade agreement (FTA) between Vietnam and the Eurasian Economic Union (EEU: Russia, Belarus, Kazakhstan, Armenia, Kyrgyz) came into force on October 5, 2015. Due to this FTA, both Vietnam and EEU will eliminate tariffs of approximately 90% on both item basis and trade value basis². It is estimated that trade volume will expand to 10 billion US dollars (about 1.2 trillion yen) by 2020 because of this agreement. The current trade amount of EEU and Vietnam is 4 billion US dollars (about 480 billion yen). Some articles say that EEU exporters can save 60 million US dollars (about 7.2 billion yen) while Vietnamese exporters can save 10 million US dollars (about 1.2 billion yen) in the first year.

As the Eurasian Economic Coalition will mobilize the movement of products, funds, and human resources within the region, there is a possibility that the expansion of intra-regional transactions and outward transactions will be more severely managed.

² JETRO, <https://www.jetro.go.jp/biznews/2016/09/108c35311903a565.html>, (Accessed June 16, 2017).

Table 1-3 International Participation

Central Asia 5 countries	Kazakhstan	Uzbekistan	Turkmenistan	Tajikistan	Kyrgyz	Overview	
The Eurasian Economic Coalition EEU	•	----	----	---	•	It was established for the purpose of strengthening mutual economic relations among countries which were formerly parts of the same state. Customs offices at the borders of the countries that joined this agreement were abolished. The free movement of the following four things: goods, services, capital, and labor is expected. Russia, Belarus, and Armenia are also member states. The Eurasian Economic Community (EurAsEC) ceased its activities with the establishment of the EEU.	
Independent State Cooperative CIS	•	•	----	•	•	CIS is a loose coalition which was formed when the Soviet Union collapsed. 12 (10 in the beginning) of the 15 countries constituting the Soviet Socialist Republic Federation (excluding the Baltic States) are members. There is no original constitution or parliament.	
Collective Security Treaty Organization CSTO	•	----	----	•	•	CSTO aimed at the national security and territorial integrity of the treaty member countries. In the event of a threat to a Member State, other Member States are obligated to provide necessary assistance, including military aid.	
Shanghai Cooperation Organization SCO	•	•	----	•	•	SCO is a mechanism to strengthen cooperation in a wide range of fields such as economy and culture, in addition to cooperative efforts to cope with problems facing the Member States such as international terrorism, national isolation movements, and religious extremism. China and Russia are also official members. As of 2017, India and Pakistan are prospective members.	
Asia Infrastructure Investment Bank AIIB	•	•	----	•	•	It is an international development financial institution for Asia. It was launched in 2013 with the initiative of the People's Republic of China. It was officially launched in 2015, meeting the conditions of entry ³ . The participating countries / areas in 2017 are 70. Kazakhstan, Uzbekistan, Tajikistan, Kyrgyz have participated since 2016 ⁴ .	

³ The conditions mean that more than 10 countries complete the internal process whose invest figures amount to more than 50% of the total amount.

⁴ AIIB, <https://www.aiib.org/en/about-aiib/governance/members-of-bank/index.html>, (Accessed June 17, 2017).

1.2.3. "Central Asia + Japan" Dialogue

The "Central Asia + Japan" dialogue was established in 2004 as a framework for dialogue and cooperation between Japan and Central Asian countries.

(1) Participating countries list

(Uzbekistan, Kazakhstan, Kyrgyz, Tajikistan, Turkmenistan) + Japan

(2) Basic policy

To support stable, autonomous, and opened development of Central Asia and to contribute to regional and international peace and stability

(3) 3 pillars of Central Asia diplomacy

The three points shown in the table below have been laid out as pillars of diplomacy with Central Asia.

Table 1-4 Three Pillars of Diplomacy with Central Asia

Cooperation to respond to development issues in each country	Dependence on the export of resources, cooperation for industrial diversification, infrastructure improvement
Cooperation that emphasizes "human beings"	Human resource development (Advanced Industrial Human Resource Development utilizing Japanese-type engineering education), medical
Deepening human-cultural exchange	Video content, Japanese language education, exchanges in sports, cultural asset / cultural heritage cooperation

(4) Five areas encompassing common regional cooperation issues in Central Asia⁵

- Trade and investment (including agriculture)
- Environment, Energy Saving · Renewable Energy
- Achievement of Millennium Development Goals (MDGs) and correction of disparities
- Cooperation for stabilizing Afghanistan
- Disaster reduction cooperation



1.2.4. Import / Export Values in Each Country

The tables below show the import and export values in the five Central Asian countries.

Here, we show the data of each country's trade, divided into CIS and other regions. As data

⁵ Ministry of Foreign Affairs "Central Asia + Japan" Dialogue - Decade Road (2014) (11 July 2014)
<http://www.mofa.go.jp/mofaj/press/pr/wakaru/topics/vol117/ Index.html>, (Accessed May 31, 2017)

combines multiple data sources, there are areas where country data and numbers do not coincide with each other, and some data was not available for certain countries. However, the data is shown here to grasp the overview of each country. Individual economic indexes for each country will be shown on the following chapters.

Table 1-5 Import / Export Values, Kazakhstan (unit: US \$ million)

Kazakhstan		Year 2000	(%)	Year 2015	(%)	Year 2016	(%)
Export	Total	8,812	100	45,956	100	32,789	100
	CIS	2,337	27	7,908	17	5,629	17
	Others	6,475	73	38,048	83	27,160	83
Import	Total	5,040	100	30,568	100	22,631	100
	CIS	2,732	54	13,062	43	9,903	44
	Others	2,308	46	17,506	57	12,728	56
Balance		3,772		15,388		10,158	

Source: CIS Statistics Committee: <http://www.cisstat.com>
 Numbers from January to November 2016.

Table 1-6 Import / Export Values, Uzbekistan (unit: US \$ million)

Uzbekistan		Year 2000	(%)	Year 2015	(%)	Year 2016	(%)
Export	Total	2,700		11,695	100	No data	
	CIS			5,111	44		
	Others			6,584	56		
Import	Total	2,820		8,689	100		
	CIS			3,006	35		
	Others			5,691	66		
Balance		▲ 120		3,006			

Source: United Nations conference of Trade and Development;
 Created based on Uzbekistan Economic Trend 2015 data

Table 1-7 Import / Export Values, Turkmenistan (unit: US \$ million)

Turkmenistan		Year 2000	(%)	Year 2015	(%)	Year 2016	(%)
Export	Total	2,506		12,164	2,506	No data	
	CIS						
	Others						
Import	Total	1,785		14,051	1,785		
	CIS						
	Others						
Balance		721		▲ 1,887	721		

Source: Statistical Yearbook of Turkmenistan 2012, 2016

Table 1-8 Import / Export Values, Tajikistan (unit: US \$ million)

Tajikistan		Year 2000	(%)	Year 2015	(%)	Year 2016	(%)
Export	Total	784	100	891	100	809	100
	CIS	374	48	227	25	261	32
	Others	410	52	664	75	548	68
Import	Total	675	100	3,436	100	2,726	100
	CIS	560	83	1,819	53	1,502	55
	Others	115	17	1,617	47	1,224	45
Balance		109		▲ 2,545		▲ 1,917	

Source: CIS Statistics Committee: <http://www.cisstat.com>
 Numbers from January to November 2016.

Table 1-9 Import / Export Values, Kyrgyz (unit: US \$ million)

Kyrgyz		Year 2000	(%)	Year 2015	(%)	Year 2016	(%)
Export	Total	511	100	1,470	100	1,268	100
	CIS	214	42	565	38	459	36
	Others	297	58	905	62	809	64
Import	Total	558	100	4,070	100	3,620	100
	CIS	302	54	2,181	54	1,542	43
	Others	256	46	1,889	46	2,078	57
Balance		▲ 47		▲ 2,600		▲ 2,352	

Source: CIS Statistics Committee: <http://www.cisstat.com>
 Numbers from January to November 2016.

1.2.5. Logistics Efficiency

Kazakhstan, Kyrgyz, Tajikistan, Turkmenistan, and Uzbekistan are landlocked countries without direct exits to sea routes, so logistics efficiency is low overall.

Uzbekistan, in particular, is one of only two "double-landlocked countries" in the world (a double-landlocked country is surrounded on all sides by other landlocked countries). Hence, an Uzbek must cross at least two borders to reach the sea (sea route) (the Caspian Sea, an enclosed body of water, is treated as a lake rather than a sea).

The following are the results of a survey on logistics efficiency by the International Bank for Reconstruction and Development (IBRD). The survey targeted over 1,200 logistics-related companies in 160 countries.

Table 1-10 Physical Distribution Efficiency Index 2016⁶

(Unit: Rank, inside the cell is score)

		Kazakhstan	Uzbekistan	Turkmenistan	Tajikistan	Kyrgyz
Total		86 (2.52)	118 (2.40)	140 (2.21)	153 (2.06)	146 (2.16)
1. Efficiency of Customs	Efficiency of response in the clearance process at the border · Speed of customs procedures, extent of streamlining	86 (2.52)	114 (2.32)	143 (2.00)	150 (1.93)	156 (1.80)
2. Accuracy of transportation price	Fairness/accuracy of transportation price: ease of negotiating fair transportation price	65 (2.57)	91 (2.39)	103 (2.09)	130 (2.12)	150 (1.96)
3. Quality of infrastructure	Sea route, land route (railway / road), degree to which information and communication technology is used	82 (2.76)	130 (2.36)	127 (2.37)	151 (2.12)	152 (2.10)
4. Quality of Service	Quality and efficiency of the clearance process and customs officers	92 (2.75)	116 (2.39)	145 (2.09)	143 (2.12)	151 (1.96)
5. Timeliness of transport	Rate of on-time delivery (by the specified delivery date)	71 (3.06)	143 (2.83)	154 (2.59)	144 (2.04)	115 (2.72)
6. Package tracking ability	Tracking ability of shipper	92 (2.86)	114 (2.05)	142 (1.84)	159 (2.04)	126 (2.39)

1.2.6. International Competitiveness

The following is the international competitiveness index published by the World Economic Forum. In this survey, international competitiveness is defined as the "productivity level of a country" based on an evaluation of 12 items, including infrastructure, education, labor market, financial services, business sophistication. The highest possible score is 7 points⁷.

⁶ World Bank "2016 logistics performance index ranking, Germany top" (June 28, 2016)
<http://www.worldbank.org/en/news/press-release/2016/06/28/germany-tops-2016-logistics-performance-index>,
 (Accessed May 31, 2017)

⁷ World Economic Forum, "The Global Competitiveness Report 2016-2017", <http://reports.weforum.org/global-competitiveness-index/>, (Accessed May 31, 2017).

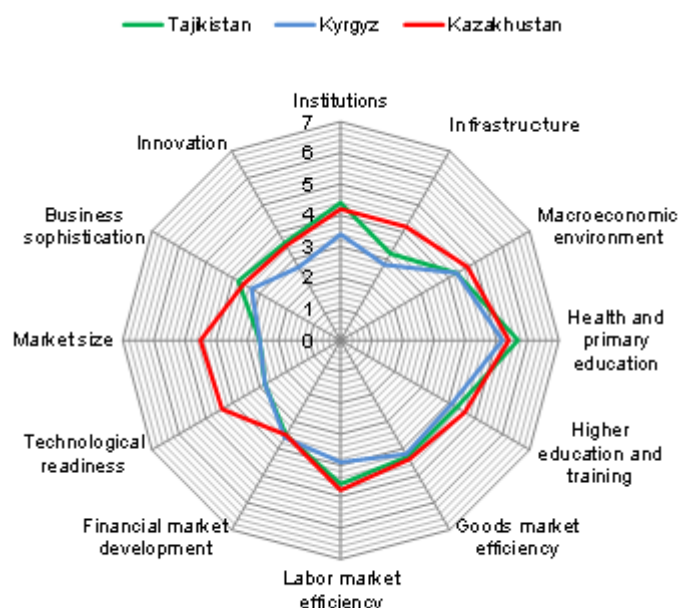


Figure 1-1 International Competitiveness of Kazakhstan, Tajikistan, and Kyrgyz

Table 1-11 International Competitiveness Index

(Unit: points)

Country name	Kazakhstan	Tajikistan	Kyrgyz
1. Organization	4.2	4.4	3.4
2. Infrastructure	4.2	3.2	2.8
3. Macroeconomic environment	4.7	4.3	4.3
4. Health and Primary Education	5.4	5.7	5.2
5. Higher Education and Training	4.6	4.3	4.1
6. Goods market efficiency	4.4	4.3	4.2
7. Labor market efficiency	4.8	4.6	3.9
8. Financial Market	3.5	3.5	3.6
9. Technology	4.4	2.8	2.8
10. Market size	4.5	2.6	2.6
11. Business environment	3.6	3.8	3.3
12. Innovation	3.5	3.6	2.7

Note: There are no data for Uzbekistan or Turkmenistan.

1.2.7. Human Resources

Based on the idea that securing talented personnel is indispensable for innovation, competitiveness, and growth, the "human capital index" shown below is a survey conducted by World Economic Forum.

46 indicators such as education, labor, environment for human resource development, and skill are focused and then analyzed separately in five age groups. Not only the individual's labor capacity, but also the legal framework of the country and traffic and communications infrastructure, are included

in the evaluation. One hundred and thirty countries were surveyed in 2016.

Table 1-12 Human Capital Index⁸

(Unit: Rank)

	Total score	0-14 years old	15-24 years old	25-54 years old	55-64 years old	65 years and over
Kazakhstan	29 (77.57)	27 (91.01)	30 (75.45)	36 (70.91)	14 (80.95)	21 (68.78)
Tajikistan	58 (70.53)	52 (87.17)	81 (63.06)	51 (65.42)	43 (74.40)	71 (53.96)
Kyrgyz	47 (72.35)	67 (83.64)	35 (74.44)	52 (65.13)	37 (75.58)	35 (65.01)

Note: There are no data for Uzbekistan nor Turkmenistan. The scores are shown in parentheses.

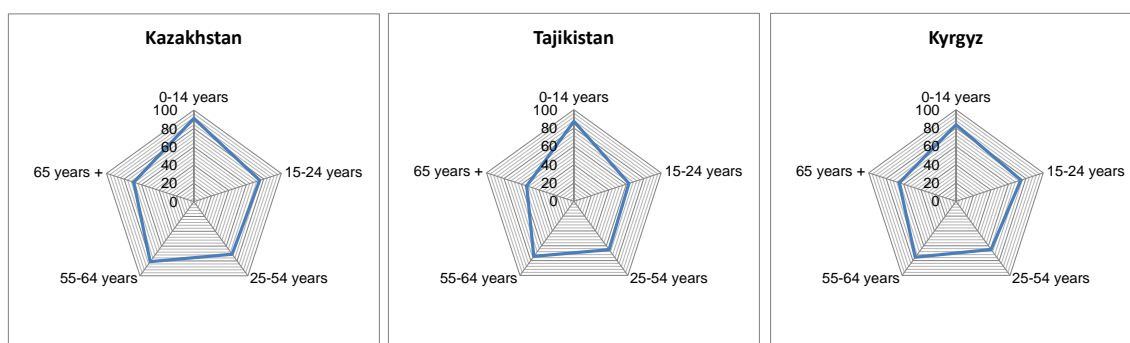


Figure 1-2 Human Capital Index per Age

- (1) The 0 - 14, 55 - 64, and 65 + “talent age” segments push up the total score in Kazakhstan. In turn, the human capital score of 15-54 years old brings down the total score in Kazakhstan.
- (2) The 15-24 and 65+ “personnel age” segments bring down the total score in Tajikistan.
- (3) The 0 to 14 and 25 to 54 “talent age” segments bring down the total score in Kyrgyz. The 15-24, 55 + human capital score contribute positively to the total score in Kyrgyz.

⁸ World Economic Forum "Technical note" (July 2015), <http://reports.weforum.org/human-capital-report-2016/technical-notes/>, (July 2015), (Accessed: May 31, 2017).

2. Kazakhstan

2.1. Needs for Industry Human Resources

2.1.1. Present Status of the Economy

2.1.1.1. Economy and Industrial Structure

Kazakhstan has the largest land in Central Asia (approximately 2.72 million square kilometers, about 7 time larger than that of Japan) and the second largest area following to Russia among CIS countries. Most of the land is consisted of dissert or dried step areas where people cannot live in. Hence, most of the population live in the capital city or specific areas.

On the other hand, it is said that Kazakhstan is a most culturally Europeanized country among 5 Central Asian counties. GNI⁹ per person is over 10,000 US dollars, which shows the steady economic growth of the country.

According to the report of UN Population Fund in 2016, the characteristics of the country are only 18.36 million people in the vast land and a wide variety of ethnic groups including Kazakh (65.52%), Russian (21.47%), Uzbek (3.04%), Ukraine (1.76%), Uighur (1.44%), Tatar (1.18%), German (1.06%) and others (4.53%). In the past, there were more Russian than Kazakh, but the ratio of the latter is increasing and becoming more than the former because of the outflow of Russian after the independence.

The Economic White Paper in 2015 shows that Kazakhstan has rich natural resources such as oil, gas, urine, rare metal, rare earth, etc., most of which are utilized for export products.

Due to such export of natural resources, Kazakhstan grows its economy and GNI per person has reached around 10,426 US dollars (IMF estimated figure 2015). Meanwhile, inflation rate is 6.5% (IMF, 2015) and unemployment rate is 5.0% (IMF, 2015).

While Kazakhstan is the fourteenth largest oil exporting country, in 1990s, petroleum fields and mines of majors and multinational companies became under controlled by the government due to the increasing nationalist toward natural resources. According to International Energy Agency, Kazakhstan's largest 3 petroleum fields in the Western area (Tengiz, Karachaganak, Kashagan) produced around 1.7 million barrels (including other liquid fuel) in 2014. Statistics of United Nations Conference on Trade and Development (UNCTAD) shows that the total amount of oil

⁹ Gross National Income. It is used as the same concept of GNP.

export in 2015 was about 25,956 trillion US dollars, which was approximately 65% of its total export amount.

Such statistics data clearly indicates that Kazakhstan's economic growth is based on rich natural resources and its economy and industrial structure are dependent on such resources.

2.1.1.2. Overview of the Economy

Kazakhstan devalued its currency, the tenge, in August 2015, due to the impact of a decline in the Russian rouble during the same period, while also introducing a floating exchange rate system at the same time. Indicators of Kazakhstan's economy and industry are shown below:

Table 2-1 Trend of the Kazakhstani Economy¹⁰

	2012	2013	2014	2015	2016
Real GDP (in billions) Tenge	16,270	17,246	17,987	18,195	18,058
USD ¹¹	52	55	57	58	57
Nominal GDP (Billions of USD)	216	224	227	184	128
Per-capita GNI ¹² (USD)	12,766	14,202	13,055	10,426	7,138
Fiscal balance (% of GNP)	4.3	4.8	1.7	▲6.9	▲5.7
Economic growth rate (%)	5.0	6.0	4.3	1.2	▲0.8

Table 2-2 Trend of Industry (% of GDP)¹³

	2012	2016	Principal products
Primary industry	5.2	5.1	Grain (mainly wheat and barley), vegetables (potatoes) fruit (melons), livestock
Secondary industry	37.9	33.0	Petroleum, coal, iron ore, gold/mining, non-ferrous metal mining, uranium, steel, machinery (agricultural machinery such as tractors, electric motors) and construction materials
Tertiary industry	56.9	61.9	-----
Industrial production growth rate ¹⁴	3.4	1.4	-----

10 IMF, The World Economic Outlook Database (<https://www.imf.org/>) (Most recently accessed: March 31, 2017)

11 XE quick cross rate (<http://www.xe.com/>) (Most recently accessed: May 13, 2017) 1 US dollar= 315.7734 Tenge

12 World Bank (<http://data.worldbank.org/>) (Most recently accessed: March 31, 2017)

13 CIA, The World Factbook (<https://www.cia.gov/>) (Most recently accessed: March 31, 2017)

14 Industrial growth rate follows the definition of CIA, The World Fact Book (<https://www.cia.gov/library/publications/the-world-factbook/geos/xx.html>) (Most recently accessed March 31, 2017)

Table 2-3 Trade indicators (Billions of USD)

	2012	2013	2014	2015	2016
Export ¹⁵	86.45	84.70	79.46	45.73	-----
Import ¹⁶	46.36	48.81	41.30	30.19	-----
Principal trade items ¹⁷	Export	Petroleum/petroleum products, natural gas, steel, chemical products, machinery/equipment, grain, wool, meat, coal			
	Import	Machinery/equipment, metal products, food products			
Principal trade ¹⁸ counterparts	Export	China: 15.1%, Russia: 12.3%, France: 9.2%, Germany: 7.9%, Italy: 6.7%, Greece: 4.1%			
	Import	Russia: 32.9%, China: 25.9%, Germany: 4.2%			

2.1.2. Industrial Promotion and Prioritized Industrial Areas of Kazakhstan

2.1.2.1. National Policy

Presidential Statement "Kazakhstan Strategy 2050", which was regulated on December 2012 indicates the priority sectors. They are (1) human development, (2) energy, (3) green economy, (4) urban and rural development, and decentralization, (5) knowledge-based economy, (6) international / regional cooperation, (7) organization strengthening, and it shows the direction to diversify the economy from its current economic structure of resource dependency. Specifically, the government decided to double the proportion of non-resource mining industries, which was 7% in 2015, by 2025 and 3 times the proportion by 2040. To that end, 10 priority development fields by 2050 are listed as follows; petroleum gas infrastructure and refining, metal, chemical / pharmaceutical, machine manufacturing, construction, agriculture, communication, energy division including nuclear power and alternative energy, tourism and space industry, indicating that the entire domestic production facility should be renewed. The final goal is to enter the advanced 30 countries of the world by January 31, 2017.

The above direction can be confirmed on the presidential message¹⁹ issued on January 31, 2017. It described that the government should work on the development of new industries and basic industries by utilizing digital technology. As priority industry fields, the President indicated agriculture, transportation, logistics and construction. In addition, automobile industry (a large-scale assembly plant for hybrids and electric vehicles) was introduced as an ongoing project. The agricultural sector is considered as a driving force of the economy and high value added products can gain competitiveness in the international market through the shift to the production of organic

15 United Nations Conference on Trade and Development (<http://unctad.org/>) (Most recently accessed: March 31, 2017)

16 United Nations Conference on Trade and Development (<http://unctad.org/>) (Most recently accessed: March 31, 2017)

17 JETRO (https://www.jetro.go.jp/ext_images/world/russia_cis/outline/centasia_20160411.pdf) "Overview of countries in Central Asia" (Most recently accessed: March 31, 2017).

18 CIA, The World Factbook (<https://www.cia.gov/>) (Most recently accessed: March 31, 2017)

¹⁹ The President of Kazakhstan Nursultan Nazarbayev's Address to the Nation of Kazakhstan. January 31, 2017,

http://www.akorda.kz/en/addresses/addresses_of_president/the-president-of-kazakhstan-nursultan-nazarbayevs-address-to-the-nation-of-kazakhstan-january-31-2017, (Accessed March 31, 2017).

food as well as high quality processed goods. The government also indicated its intension to increase the export of agricultural products by 40% by 2021.

2.1.2.2. Industry Promotion Policy

The Kazakhstan government is focusing on promoting entrepreneurship (business establishment) and SMEs policy. According to "Entrepreneurial Code of Republic of Kazakhstan", the Government of Kazakhstan is working with the Chamber of Commerce (National Chamber of Entrepreneurs, hereinafter referred to as ATAMEKEN) for the purpose of activities by SMEs and aims to simplify and electronic procedural documents concerning the establishment and registration of SMEs.

ATAMEKEN is a regional, comprehensive, and public organization which supports private companies to obtain net profit by selling private property rights (private enterprises), property, production, products, works and services. It supports not only domestic enterprises, but also gives assistance to international investors. The following 6 points can be listed as main supporting activities for such foreign investors.

- 1) Assistance for foreign investor to apply for business permission
- 2) Support for exemption for imported value-added tax to investment business and investee business
- 3) Advice to abolition of corporate investment application registration tax
- 4) Protection of competitiveness and support among companies
- 5) Advice to revocation of market-based national registration
- 6) Suspension of the governmental inspection of private business

2.1.2.3. Priority Sectors

On the "Kazakhstan Strategy 2030", the Government of Kazakhstan set priority on the following topics; economic growth based on the market economy, promotion of health, education and wealth, economic development and improvement of national standards of living through the development and export of energy resources, and development of infrastructure including transportation and communication. Besides, under the "Strategy of Industrial and Innovation Development 2003 – 2015", national development is promoted through modernization of production, update of facilities and support for investment.

In terms of the priority areas for the development, 10 fields; petroleum gas infrastructure and refining, metal, chemical / pharmaceutical, machine manufacturing, construction, agriculture, communication, energy division including nuclear power and alternative energy, tourism and space industry, are listed. In order to develop those areas, the following policies are implemented.

- 1) Formulation of effective innovation system and development of innovation infrastructure

- 2) Promotion of innovation in the development of new products and new services
- 3) Modernization of techniques and management levels of domestic companies

2.1.3. Current Status of Private Companies in the Manufacturing Industry

2.1.3.1. Corporate Chamber (ATAMEKEN)

As previously stated, in Kazakhstan, ATAMEKEN emphasizes support for entrepreneurs (founders) and managers of private enterprises, and provides loans, funds and technical advice from the preparation stage to when they become investable projects.

ATAMEKEN is actively engaged in activities such as seminars for businesses in the metropolitan area as well as local cities, business information distribution, and establishment of a forum for information exchange among entrepreneurs. ATAMEKEN uses the subsidy system to support especially SMEs, from the preparation stage of an investment project.

2.1.3.2. Interviewed Company Overview

In the field survey of both Astana City and Almaty City, the Survey Team received an introduction of private companies from ATAMEKEN, and conducted interviews with a total of 13 companies. The interview targeted business owners, executives or managers. There were five manufacturing companies, and one company in other industries (total of six) visited in Astana City. There were five manufacturing companies, and two other companies (total of seven) visited in Almaty city. The list of companies visited is shown in Table 2-4.

Table 2-4 Lists of Interviewed Companies

	Company Name	City	Field	Products/ Service
1	Astana Eco Standard	Astana	Agriculture	Greenhouse vegetable production
2	UTARI	Astana	Light industry	Clothing, sewing
3	DD21	Astana	Light industry	Original furniture
4	Astananinsky Electrotechnical Plant	Astana	Light industry	Enclosures for large electrical equipment
5	Socks Manufacture Bota	Astana	Light industry	Carpet, bedding, socks
6	Trading House Ecolos	Astana	Light industry	Large scale sewage treatment facility
7	AB3	Almaty	Light industry	Large fans for industry
8	AigulLine	Almaty	Light industry	Wool products (clothing, carpets, accessories)
9	Almaty Autocenter KAMAZ	Almaty	Light industry	Vehicle Heavy Equipment / Automobile Maintenance

10	ASIA Avto Gaz	Almaty	Service industry	Transforming gasoline cars into gas cars
11	IBS	Almaty	Software industry	Financial system, security system
12	IDC	Almaty	Light industry	High-end furniture attached with information terminal (system integrator)
13	SOLO Ltd.	Almaty	Light industry	Analytical instrument development

(1) Astana Eco Standard

Founded in 2012, it has 50 to 60 employees. Tomatoes are harvested all year round, while cucumbers are harvested directly from the farm. In Kazakhstan, Their vegetables cannot compete in price and quantities with those imported from China or Italy in bulk, but they are devising ways to compete in the future.

Quality control of shipping is done according to the domestic standards, and the company plans to expand facilities by obtaining loans from the Ministry of Agriculture. There are few competitors in the vicinity but only one company. They are seeking a chance to expand their business with the support and cooperation of government agencies, stakeholders of the Ministry of Agriculture and overseas organizations.

In-house training is actively managed at the in-house training center with the cooperation of government agencies and foreign donors (World Bank, EU, and NGO: H2O, etc.).

(2) UTARI

Established with 100% own funds in 2013, it has developed various kinds of business. 350 full-time employees and 130 part-time employees are working.

Five years ago, the company gained free loan of the site for 25 years under the government's "Free Zones" plan, and developed the textile industry. Mainly produces and processes work clothes for large companies and SMEs, sports clothes, bedding, etc., to the domestic market. In particular, they are focusing on the development of work clothes for government agencies and large enterprises participating in mining and industries (they have also adopted Japanese-made knitting machines and embroidery machines, etc. for machine processing indispensable for mass production).

As for the human resources development, they have set up a technical training room for beginners and intermediate employees in the company and implement in-house training.

The current products are primarily targeting the domestic market, but in the future they are planning to distribute UTARI brands to Japan and the Western countries.

(3) DD 21

Started in 2012 with 3 collaborative managers, they are collectively designing, processing and selling furniture, with the cooperation of production technology from German and Italian manufacturers, etc. At the moment, 28 employees are working under them.

The orders from government-related business are nearly 80%, and recently the company is aiming to receive orders for design and plan of furniture for the new building of Astana station.

(4) Astananinsky Electrotechnical Plant

Founded in 2009, 120 employees are working now. They are conducting production and sales of transmission and distribution equipment to major electric power supply companies in the country. Currently, the company conducts from designing to manufacturing of circuit breakers and control system storage boxes necessary for transmission and distribution. Safety control at workplace, such as countermeasures against fire and steel material fall, is thoroughly carried out by the production engineers.

(5) Socks Manufacture Bota

It is a sock manufacturing company founded in 2011. It is a company hiring a total of 10 workers: 1 technician and 1 machine manager at the processing plant, and 4-5 workers at the hand-woven bedding processing plant. Rather than state-of-the-art technology, it values the basic skills affecting quality such as spinning, cutting of cloth material and angular folding.

There is no active support for the non-resource sector of government agencies and there are few core companies, but they expect exports by product development within the country, productivity improvement, as well as securing quality.

There is no facility for technical training inside the company, but the foreman of the technical section train the workers when necessary.

(6) Trading House Ecolos

The company was established by the diversified business company in Russia as a water purification business division in Kazakhstan 10 years ago. This company sells water purification and garbage disposal facilities in major cities. They have set up a branch office in Astana City, and currently they are preparing a business expansion plan to undertake planning, manufacturing, installation and

maintenance of wastewater treatment facilities for individual household in the future.

Employment is total of 1,000 employees, including two plant facilities in Russia and employees, sales, management, construction, and service department of its managed warehouse.

Major client is the government of Kazakhstan. The company is marketing wastewater treatment facility that meets the purification standard. It applies the method for treating sludge utilizing microorganism that are adopted in Germany, France, China, and so on. They have just awarded a big project, which is now under contract negotiation.

Meanwhile, The Company is currently negotiating contracts with a Chinese company for large-scale projects for city sewerage construction in Astana.

(7) AB 3

This company manufactures many types of industrial blowers for governmental facilities, large-scale hotels, and large-scale commercial facilities. The production system of this company is modern and the management system is being developed. For Survey Team's visit into the factory facilities, the safety management specialist explained the factory safety management and prepared safety equipment.

It seems that 5S / KAIZEN's activities are proceeding smoothly, as the production facility is very organized. The production system and the safety management are practiced based on the manager's experience of the training in Russia. Their aim is to improve the plant like a German company's production plant.

Particularly, in the process of manufacturing the product, there are pictures of model products of skilled technicians, or defects to avoid, in each processing department. This helps the workers visually to practice quality control.

Because all the employees in this company are required professional skills, it is necessary for them to receive skill training as skill is considered to be more important than knowledge. They aim to construct a structure that a methodology is practiced in real production site.

(8) Aigul Line

The company was founded in 2011, and now employing 15 employees. Aigul Line's products are hand-made high-design clothing, carpet, accessories and ornaments using felt and wool materials.

In addition to the domestic market, it is sold to Russia, Kazakhstan and Europe in order.

This business is operated by family; the owner's son is in charge of marketing and office work. The owner has a pride in hand-made, however, she would like to apply machine processing for stone decoration making as it is time consuming. She thinks that she would rather apply Chinese machines, although the Japanese ones that she prefers are more expensive.

AigulLine is a famous handicraft enterprise in Kazakhstan. UNDP, UNESCO, and other international organizations and donors have been offering support.

(9) Almaty Autocenter KAMAZ

Autocenter KAMAZ located in Almaty specializes in refurbishing the cargo of large automobile special vehicles. Those departments such as planning and design, manufacturing, materials, sales are organized into the management offices, and a total of 80 employees work. The factory is thoroughly organized, as the 5S / KAIZEN method was introduced by the Russian production groups and practiced.

(10) ASIA Avto Gaz

Asia Avto Gaz launched the business in 1996 and has been operating for over 20 years. It is a micro enterprise with total of three persons employed.

They import resolving gas and gasoline switching injector (DIGI) that is predicted to be effective for suppression of exhaust gas (CO₂) and apply them into about 20 passenger cars per month, under a distributor contract with Nederland's DIGI development company.

The DIGI keeps the share of 15% to 20% in the car market of Almaty City because the price is cheaper than gasoline.

As employment conditions for new graduates of Asia Avto Gaz, they expect young people who graduate from engineering university, have knowledge of gas and electricity, and are familiar with environmental engineering and automotive engineering. Also, immediate OJT training will be given to the recruiters.

Looking forward to supplying eco-friendly cars, they are expecting to develop the business of electric system vehicles jointly with Nederland.

(11) IBS

IBS collectively manages cash automatic payment systems of banks by IT industry. It is a group of 10 companies including automatic payment equipment production enterprise (ATM service),

software Development Company (IT service), equipment Maintenance Company (technology management), customer equipment operation management enterprise, customer Service Company, Consultant Company, etc.

There are 300 employees in total: 160 employees in technical positions, and 20 in IT engineers. 100 of them are bachelor's degree holders. The characteristic of this group company is that the entire group is united to construct a production management organization by making full use of IT technology.

Production engineers within the group are applying KAIZEN method in each stage or production (planning stage, design stage, detailed design stage, production stage, production installation stage, delivery stage, and maintenance/repair stage), while ensuring maintenance capacity and flexibility.

(12) IDC

Mr. Vladmir Vorobiev V. of iDC implemented a project related to oil resource development, but now is working on guarantee business for asset management and developing teaching materials with IT technology. There is three management staff, one IT engineer, and 12 employees; and all are a college graduates with specialized in degrees. The average age of administrator is 30 to 40 years old.

Currently, the company is producing animation-based children and primary teaching materials, and selling reporting system by cell phone for safety management.

In the future, they are planning to expand the domestic market, targeting the neighboring countries to the whole region of Central Asia. In order to do so, they plan to improve product quality by applying Japanese machinery instead of Korean machinery.

(13) SOLO Ltd.

Founded in 1991, at the time 25 employees are producing research and measurement equipment in the field of radiation management and weighing device manufacturing. It is a leading manufacturer of radiation measuring instruments in Kazakhstan, and has earned high praise in the market of CIS countries. It is widely used in nuclear power industry, petroleum production plant and refinery, gas sampling and processing plant, mining and processing plant, sanitation inspection, nature protection and environmental protection organization, and so on.

2.1.3.3. Challenges of Interviewed Companies

Based on the interviews with private companies, the challenges of private sectors in Kazakhstan are analyzed as follows:

(1) Human Resource Management

Among the companies visited, several had inadequate systems for human resources management, such as recruitment and in-house training.

However, some companies, such as UTARI (clothing manufacturing industry), use temporary staffing agencies for recruitment. At the time of recruitment, the company presents the specifications of manufacturing technology to temporary staffing agencies, but in reality there are variations in the technical ability of applicants. For that reason, management has to confirm each applicant's skill level on recruitment. This process seemed heavier burden to the management.

As a countermeasure of above issue, a common certification system of technical levels among graduates of lyciums and colleges could be constructed.

Furthermore, delivery of knowledge will be effective as step-by-step education system for internal staff; e.g., training of core staff capable of judging the technical ability of employees, or creation of skill maps, etc.

As a good practice, UTARI accepts students from vocational schools as interns for a certain period under the assumption that they acquire necessary skills before joining the company as employees. Collaboration with such educational institutions is expected to work effectively in training human resources.

(2) Marketing

Although our survey found that the companies were seeking to expand sales channels abroad, many companies do not have the know-how on marketing development, sales promotion, or advertisement, and the Survey Team has confirmed the situation that no action to improve this situation has yet been taken.

For example, Socks Manufacture Bota manufactures and sells carpets as high-priced items, bedclothes as medium price range products, and socks as low-priced items. Although they participate in exhibitions to develop sales channels, they are currently only participating in temporary promotional activities.

Since sales for products with higher price is not very good, they are seeking to expand sales channels to overseas. However, it seems that they do not have enough knowledge or know-how shortage to take concrete measures. They are also building websites and selling activities, but they have not been able to update the site, and it is not an effective construction for product appeal.

Utilization of a WEB site is effective as sales tool that contributes not only to abroad sales but also to the development of sales channels within Kazakhstan.

(3) Production Management and Financial Management

It can be observed that the managers of the interviewed companies do not have much know-how of managing the production lines efficiently as well as of establishing an efficient production system which meet the orders. Hence, our survey recognized the necessity of improvement of productivity on-site and securing a company's profitability that was particularly relevant in the manufacturing industry.

The 5S / KAIZEN activity is to understand, including onsite workers, that pursuing safety, safety and efficiency at the production site, "activities that lead to the goal of increasing worker income through securing corporate profits". SMEs in Kazakhstan are required to grow up as profitable companies and internationally competitive companies.

2.1.4. Japanese Companies' Presence and the Fields of Investment

2.1.4.1. Policies to Attract Foreign Investment

Kazakhstan has been actively accepting investment from overseas. The new investment law has been in operation since January 1 in 2015. The following shows the outline of the new law.

- (1) Exemption of corporate enterprise tax for 10 years
- (2) Exemption of land tax for 10 years
- (3) Exemption of fixed asset tax (8 years after initiation of factory operation, only in the case of newly established facilities)
- (4) Subsidization up to 30% for salary for factory construction workers and for purchase of facilities (Evidence documents, certificate of operation as well as the certificate of audit should be submitted.)
- (5) Exemption of labor permission for field workers, general contractors, sub-contractors, consultant, staff of designing office, engineers, etc. (The field of works and numbers of people should be submitted.)

Ministry of Justice is in charge of foreign investment. As a promotion policy, they have been working on the development of One Stop Service, which realizes the simplification of the acquisition of the construction lands. After the construction is started, the investment committee promises the Government's order for the products of the factory. Import tax for facilities and materials for factories can be exempted up to 5 years.

2.1.4.2. Japanese Companies' Presence and the Fields of Investment

According to the information from the Japanese expert and general merchants and traders companies, the number of Japanese companies in Kazakhstan are 43 at the point of October 2014. The document provided by the Mitsubishi Corporation Almaty Office says that there are 25 companies on January 2017. While the Survey Team could not confirm all of the companies' information, it could be found out that some offices were closed in the past few years according to the interview with Japanese people living in Kazakhstan. The number of Japanese at the point of October 2016 was 165. As it can be seen on the decrease of the number of Japanese companies, the current number of companies and their fields of investment is rather limited. Main fields are natural resources by major companies and sales of automobiles. On the other hand, for the purpose of contributing to the agricultural development in Kazakhstan, Toyota Tsusho invested 20% of the local company called Koktem EA, which export Kampo materials to Southeast Asian countries.

From the interviews in Japan, many people mentioned that Kazakhstan is not so attractive for Japanese companies' investment destination, specifically by Japanese SMEs. The factors which prevent the active investment from Japanese companies can be considered as cost ineffectiveness of transportation, risk of management due to the cultural difference, severe weather conditions, and little prospect to compete with other multinational companies which are already present in terms of the cost.

China and European countries have superiority in terms of geography. By air, it takes 5 hours from Moscow to Almaty, 5.5 hours from Beijing, 6.5 hours from Seoul, 6 hours from Istanbul, and 4.5 hours from Dubai. It should be said that Japan does not have much superiority in terms of transportation and cost competition

The language is a barrier as well from the perspective of culture. In Kazakhstan, many people still use Russian and it is difficult to do business in English, while Japanese products can be observed to some extent in the market. For instance, the Survey Team observed that some production companies imported Japanese companies' machines produced in Turkey.

2.1.4.3. Presence of Foreign Countries Other than Japan and Their Investment Fields

The activities and investment targets of countries other than Japan are summarized as follows:

China

Toward the end of 2014, China advocated the New Silk Road-Belt and Road Initiative and in

February 2017, China announced that it would hold a “Belt and Road” Summit Forum for International Cooperation in May in Beijing.

The government of China held the Belt and Road High-Level Forum for International Cooperation in Beijing on May 14 and 15, 2017. State Minister Matsumura attended the forum. In addition, as representatives of Japan, Mr. Toshihiro Nikai, Secretary-General, Liberal Democratic Party of Japan (LDP), Mr. Sadayuki Sakakibara, Chairman, Keidanren, Mr. Motoo Hayashi, acting Secretary-General, LDP, and other officials attended. The forum also brought together the leaders of 29 countries from all over the world and as many as 1,500 people representing governments, international organizations, companies and other entities²⁰.

Korea

Since 2006 it has been actively advancing into the ICT sector. Based on an MOU with Kazakhstan Post (postal service) and the Ministry of Transportation and Communication, Korea is supporting electronization of the utility sector on a government-to-government basis. The efficiency of transportation is an issue for landlocked county of Kazakhstan. Korea supports Kazakhstan the field of customs clearance, freight tracking system with utilizing ICT technologies.

According to the Korea Trade-Investment Promotion Agency, approximately 200 Korean companies operate business in Kazakhstan. Their operating sectors are finance, insurance, construction, manufacturing, real estate, and lease. The finance and insurance sectors operate large-scale business.

For example; Company “A” of construction industry sells 3,600 of Korean style condominium for wealthy citizens. Company “B” of the confectionery manufacture purchased the largest confectionery manufacture of Kazakhstan in 2013. They have factory in Almaty and Shymkent. They focus on market not only in domestic but also in other CIS countries including Russia²¹.

United Arab Emirates

According to a questionnaire survey from the local Japanese staff and the Ministry of Investment and Development, some advancement for construct building has been made in terms of investment.

It is assumed that the decision of holding Astana EXPO 2017 influences on the investment of building construction.

20 Ministry of Economy, Trade and Industry (http://www.meti.go.jp/english/press/2017/0517_002.html) (Most recently accessed: June 18, 2017)

21 JETRO “World Business News” January 26, 2016 (<https://www.jetro.go.jp/biznews/2016/01/a68f8beb9e9ff0d9.html>) (Most recently accessed: June 17, 2017)

In 2012, when holding Astana EXPO 2017 was decided, the number of officially registered hotels in Astana was 75. There were only four large hotels which have rooms over 150. Most of hotels have rooms four to 30. However, the number of hotels increased and currently 160 of hotels are officially registered. The number of hotels became approximately double the number compared with 2012.

It can be found that foreign investors have interests in real estate and construction from the research data of Ernst & Young.

Table 2-5 Sectors of Interest for Foreign Investors

Question: Which business sectors will attract the most foreign investment projects in Kazakhstan over the next three years? (multiple answer) (unit: %)

Sector	2013	2014
Energy	41.5	48.5
Automotive, Infrastructure (Roads, Highways, Ports), Real estate and Construction	22.5	37.3
Mining and Metals	28.8	18.5
High-tech and telecommunication infrastructure and equipment	6.2	14.9
Private and business services	14.0	13.9
Agriculture	10.2	10.9
Consumer products	5.6	9.2
Life science	11.9	8.1

Source: EY's Attractiveness survey Kazakhstan 2014, The brand paves the way²²

2.1.5. Industrial Human Resources Needs of Local Industry

In Kazakhstan there is a government scholarship program called "Bolashak International Scholarship" that allows excellent young people to study abroad at foreign universities. Furthermore, in 1997, "Provisions for Selection Procedures for International Students" was established to clarify document acceptance and selection procedures.

While most of the scholarship has gone to students of humanities faculties, it has expanded its door to those in the field of science and engineering by easing the criteria of language requirements.

Since 2005, the government set the target number of scholarship recipients as 3,000 per year and established the "International Education Program Center" to support the Bolashak Program.

Meanwhile, it is pointed out that the local enterprises are lacking in technical skills, management skills, sales capabilities, etc. of corporate managers and staff. The main cause is that Russian engineers with high technology returned home after the collapse of the former Soviet Union, and there was a delay in training Kazakhstan engineers thereafter.

²² Ernst & Young ([http://www.ey.com/Publication/vwLUAssets/EY-kazakhstan-attractiveness-survey-2014-eng/\\$FILE/EY-kazakhstan-attractiveness-survey-2014-eng.pdf](http://www.ey.com/Publication/vwLUAssets/EY-kazakhstan-attractiveness-survey-2014-eng/$FILE/EY-kazakhstan-attractiveness-survey-2014-eng.pdf)) (Most recently accessed: June 18, 2017)

For such private enterprises, it is a major task to foster personnel who can give instruction to improve production environment, such as productivity, quality assurance, and operation cost reduction. From that viewpoint, it is also important to collaborate with educational institutions in order to utilize human resources complementing technical capabilities in various fields abroad that have been educated in the Bolashak Program.

2.1.6. Sectors to be Intervened for Further Human Resource Development for Industrial Promotion

2.1.6.1. Priority Sectors

When visiting private companies, productivity inefficiencies such as in-house training system related to human resource management and inadequacies of production system and inadequate administrative capacity could be observed. Specifically,

(1) Development of human resource who are capable of operation and maintenance of the production system is important, and it is also critical to establish a technical learning level accreditation system common to engineering universities and technical vocational schools.

(2) In addition, it is important to train IT engineers who are responsible for the product development and marketing to expand their sales channels to overseas markets.

These are indispensable for improving the production efficiency and expanding profitability of companies. It is notable to set opportunities to hire government-sponsored international students and to train personnel by the company's internal education system to develop industrial human resources.

2.1.6.2. Focus Industrial Areas by Japan

In Kazakhstan, industries are expecting highly advanced technology from Japan to diversify the economy, to spur innovation, and to help escape the resource-dependent economy²³.

In the field of the first industry, technical transformation of production technologies for horticultural products using green house and processing systems of low temperature storage and clean lapping are promising areas. On the other hand, in the field of the secondary and third industries, in addition to the direct technical assistance to the system of processing technologies and sales systems which utilize materials, the support to the development of advanced industrial human resource, who have know-how of production development, production technologies and management skills are required.

²³ Mizuki Chuma, "Event Report: The Fifth Conference on Japan-Kazakhstan Economic Public-Private Partnership", in *Russia NIS Research Monthly Report December 2014*, 2014.

2.2. Outline of the Education Sector

2.2.1. Basic Data for Education

The following table shows the basic data of education in Kazakhstan. Data regarding the number of schools and students for TVET institutions can be found on Table 2-11.

Table 2-6 Basic Data of Education in Kazakhstan

	Figure	Year
Enrolment Rate		
Primary Education	86%	2015
Secondary Education	98%	2015
Number of Schools		
Higher Education	126	2015
Number of Students		
Primary Education	1,186,166 (State : 1,176,734 Private : 9,432)	2015
Secondary Education	1,448,518 (State : 1,439,164 Private : 9,354)	2015
Higher Education	477,387 (State : 232,072 Private : 245,315)	2015
Number of Teachers		
Primary, Secondary Education	300,441 (State : 297,293 Private : 3,148)	2015
TVET	38,971	2015
Expenditure for Education (as a percentage of GDP)	2.8%	2015

Reference: Ministry of Education and Science of the Republic of Kazakhstan²⁴, World Bank²⁵

2.2.2. Education Policy and Education Law

2.2.2.1. Education Policy

As stated in 2.1.2.3 Priority Sectors, in the “Kazakhstan Strategy 2030” formulated in October 1997, the second ten years plan of “Kazakhstan Republic Development Strategic Plan 2020”

24 Ministry of Education and Science of the Republic of Kazakhstan, Statistics of the Educational System of the Republic of Kazakhstan, 2015, <http://edu.gov.kz/storage/5c/5cf546d3d9bb95ba0aea592d1d090261.pdf>, (accessed June 1, 2017) .

25 World Bank, World Bank Open Data, <http://data.worldbank.org/>, (accessed June 1, 2017) .

prioritized seven issues²⁶. In the plan, a vision for educational sector development is described in the section “Investment for the Future”, as follows:

- Education of all levels, from pre-school to higher education, will be modernized by 2020. In addition to transmission of knowledge at all levels of education, opportunities to improve occupational skills as well as acquire new knowledge/skills throughout one’s life will also be provided by 2020.
- The state will provide all children with opportunities of pre-school education.
- Transition to a twelve-year education model comprised of a ten-year compulsory education and two-year professional education will be enacted. Education in physics, mathematics, chemistry, biology, as well as languages, will be strengthened in such projects as “Nazarbayev Intellectual Schools”, etc.
- Development of industrial human resources will be based on the demand of the modern labor market, following the national plan of industrialization. Technical education, occupational education, and higher education will shift to a market-oriented system, with NQS-based occupational standards.
- E-learning education system will be introduced into secondary, technological, occupational, and higher education.
- Principles of business administration will be introduced to institutions of higher education. Academic freedom in those institutions will be also secured.
- The “University of Nazarbayev” will be established in Astana City as one of the landmark projects in higher education. (Established in 2011)

The strategic targets in higher education, and graduate education in the natural sciences are as follows:

²⁶ “Kazakhstan Republic Development Strategic Plan till 2020” (February 12, 2010)

Table 2-7 Strategic Target by 2015 and 2020

Strategic Target by 2015	<p>Higher education institutions in Kazakhstan will function effectively in accordance with the Bologna Process²⁷.</p> <p>Corruption²⁸ will be dramatically decreased, ensuring transparency at all levels of the higher education system.</p> <p>50% of higher education institutions in Kazakhstan will implement a credentials system based on international standards.</p> <p>An effective mechanism of technical transfer will be established in research institutions of colleges/universities.</p> <p>Nazarbayev University will produce professionals and young researchers.</p>
Strategic Target by 2020	<p>The quality of higher education of Kazakhstan will catch up with top-level education institutions around the world.</p> <p>At least two higher education institutions in Kazakhstan will be included in the world's top-ranking universities.</p> <p>The graduates of these higher education institutions will be in demand to employers.</p>

“State Program of Education Development in the Republic of Kazakhstan for 2011-2020”, as a national educational policy, was formulated on December 7th, 2010. This program includes the following goal and eleven program aims:

Goal: Increasing competitiveness of education and development of human capital by ensuring access to quality education for sustainable economic growth

Program Aims:

- Improvement of financing system aimed at provision of equal access to education services;
- Enhancing prestige of the teaching profession;
- Establishment of state-public education management system;
- Ensuring equal access of all participants of the educational process to the best educational resources and technologies;
- Providing all children with a pre-school education;
- Development of competitive human capital for economic prosperity of the country in a rapidly changing world;

27 A joint communique issued in 1999. The creation of a “European Higher Education Area” is targeted, which includes the establishment of a common framework for academic degrees and credits, as well as personnel exchanges within the area.

28 The bribe for employment and promotion of teachers and bribe for entrance and promotion of students are reported during the Data Survey hearing at universities and donors.

- Transition to twelve-year educational model;
- Modernization of the vocational education system in accordance with the needs of industrial-innovative development of the economy, and integration into the international educational sphere;
- Improve the quality of higher education to meet the demands of the labor market, and to meet the objectives regarding industrial-innovative development of the country;
- Ensuring life-long education;
- Encouragement of active citizenship, social responsibility, patriotism, high moral, and leadership skills among young people.

Each of these objectives has concrete activity plans with indicators of achievement in five years.

Elaborate contents and approaches to achievement are described for the above objectives. Pertinent sections for 8) TVET, and 9) Higher Education are shown below:

Technical and Vocational Education

- 1) Updating the structure of technical and vocational educational content in accordance with the requirements of industrial-innovative economic development;
- 2) Development of staff training infrastructure for various sectors of the economy;
- 3) Enhancing prestige of technical and vocational education;

Undergraduate, Graduate, and Postgraduate Education

- 1) Training professors for undergraduate, graduate, and post-graduate degrees and meeting the demands of the country's industrial-innovative development;
- 2) Integration into the European higher education space;
- 3) Industry academia collaboration in the area of education, science, and culture;
 - Creation of conditions for commercialization of intellectual property products and technologies
 - Training highly-qualified scientific and scientific-pedagogical staff

2.2.2.2. Education Law

Kazakhstan's education laws are the "Law on Education", enacted in 1992, and the "Law on Higher Education", enacted in 1993. These laws define the national education system, purpose and principles of education, and the education administration in Kazakhstan, and are therefore perceived as fundamentals for the formation of the education system. The Law on Education was revised in 2007 in order to match the international standard, as Kazakhstan was participating WTO and Bologna Process at that time (participated in the Process in 2011). Mandatory pre-school education

and transition from an 11 year system of compulsory education to a 12 year system was introduced in the revision²⁹.

2.2.3. Education System

2.2.3.1. Compulsory Education

The Kazakhstan education system can be divided into Early Childhood Development (ECD), primary, secondary and higher education, primary and secondary of which count as compulsory education. As explained above, Kazakhstan is in the process of transitioning from 11 to 12 years of compulsory education. The following table compares previous and current education systems.

Table 2-8 Comparison of the Education System

	Grade		Age	
	Previous	Current	Previous	Current
Primary	1 - 4	1 - 4	7 - 10	7 - 10
Secondary (Basic)	5 - 9	5 - 10	11 - 15	11 - 16
Secondary (Upper)	10 - 11	11 - 12	16 - 17	17 - 18

After completing six (previously five) years of basic secondary level education, students can proceed to secondary upper level or go to secondary level TVET institutions called lyceums (the duration of which is generally four years). Compulsory education at state educational institutions is free of charge.

2.2.3.2. Higher Education

Students having completed secondary education have a choice to go to higher education institutions (HEI) including universities, institutes and colleges. The characteristics of each institution are explained in the table below:

29 World Data on Education: Kazakhstan, UNESCO and International Bureau of Education, 2010

Table 2-9 Characteristics of Main Higher Education Institutions

	Year of Study	Characteristics
University	BA : 4 years MA : 1-2 years PhD : 4-5 years	<ul style="list-style-type: none"> ▪ HEI with faculties in various fields ▪ Students can obtain Bachelor, Master and PhD degrees.
Institute	4 - 5 years	<ul style="list-style-type: none"> ▪ Specialty schools offering education in specific fields ▪ Students can obtain Diploma of Specialist degrees.
College	2 - 3 years	<ul style="list-style-type: none"> ▪ In many cases, graduates from lyceums go to colleges. ▪ Colleges are considered part of secondary education rather than lower tertiary education³⁰.

Reference: Drafted from the data of UNESCO, *World Data on Education: Kazakhstan*

After joining the Bologna Process in 2010, Kazakhstan has promoted the establishment of a higher education system along with the European model. A three-level structure of a higher education system (four years of Bachelor, two years of Master and four to five years of PhD) is becoming the national standard.

2.2.4. Education Administration

Education administration is managed by the Ministry of Education and Science of the Republic of Kazakhstan and oversees the following tasks³¹:

- Developing and implementing educational policy
- Establishing educational standards such as curricula and syllabus
- Drafting the education budget
- Implementing training for experts in the educational field
- Establishing an international agreement in education
- Supervisory activity for all educational institutions, including those supported by local government finance and private institutions

On a local level, each province and district has an education department which oversees the implementation of national strategy for education on a local level and decisions to allocate funds from provincial budgets to the education sector. Such departments are also responsible for establishing and managing education institutions in the areas in charge, procuring equipment and

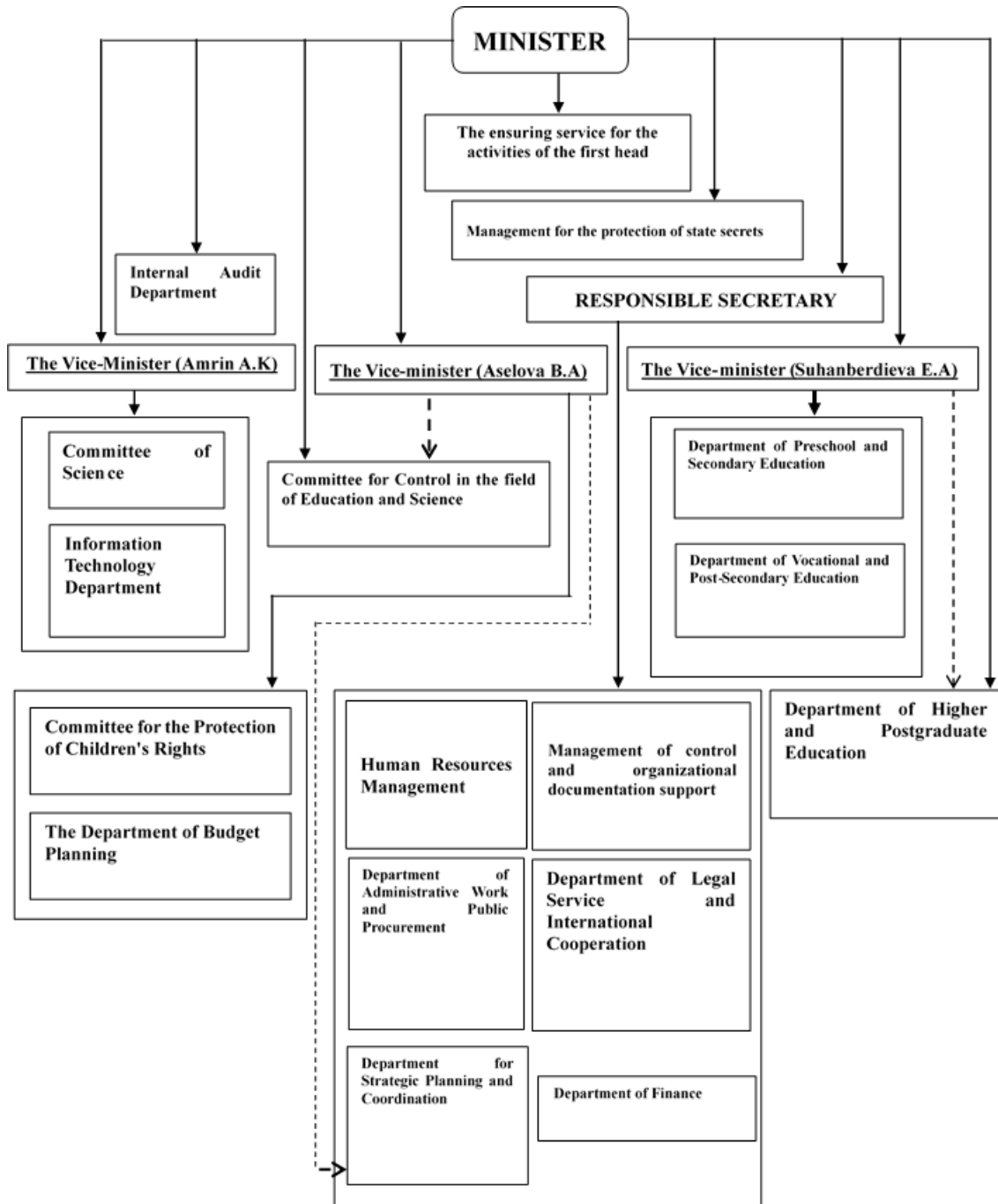
30 UNESCO, "World Data on Education: Kazakhstan", <http://unesdoc.unesco.org/images/0021/002113/211305e.pdf> (accessed March 27, 2017).

31 Ibid.

appointing rectors and heads for each institution³². In this Survey, due to the lack of any opportunity to visit a local education department in the field operation, the Survey Team were unable to work out the extent of activities performed on a local level, but it can be said that the system of decentralization has been formulated to some extent.

The following figure shows the organizational structure of the Ministry of Education and Science.

³² Ibid.



Reference: Website of Ministry of Education and Science of the Republic of Kazakhstan³³

Figure 2-1 Organizational Structure of Ministry of Education and Science

³³ Ministry of Education and Science of the Republic of Kazakhstan, "Organizational Structure", http://edu.gov.kz/ru/page/ministerstvo/organizatsionnaya_struktura (accessed March 27, 2017) .

2.2.5. Issues of Education Sector for Industrial Human Resource Development

(1) Immature System to Meet the Industry Needs

Human resources to meet the needs of MSMEs are not yet sufficient in the industry/labor market.

The TVET system that meets the current needs of the industry is not yet established, lacking a modern credential system and occupational standards.

Industry-academia collaboration is also not established under the bureaucratic sectionalism. However, individual efforts in universities and TVET institutions are in place. For example, inviting instructors from Samsung in Korea and Siemens in Germany, or collaborating with certain enterprises for students' internships and job placement.

It is critical that the educational institutions be able to cope with trends or market needs in order to develop human resources of entrepreneurs or private companies' managers.

(2) Result of Adaptation to the Western Standard

Joint research and academic exchanges with universities in Britain, Germany, and the United States are established in university-level education in Kazakhstan. However, full-scale adaptation of the Western standard in accordance with the Bologna Process is still in progress. Nazarbayev University, a leading university, is strengthening its collaboration with Western universities such as Oxford University. The result is yet to come, as the collaboration is still young in history.

The number of students who studied abroad with the government scholarship "Bolashak Program" has been increasing and the graduates are expected to become leaders for the national economic development.

(3) Low Employability of Professional Education in Higher Education

Many of university graduates are perceived as incapable in regard to professional knowledge and skills. Therefore, the supply of manpower in industry is not meeting the needs of the employers in terms of quantity or quality. Some data shows that only 30% of university graduates have a chance at employment in their academic majors.³⁴

There is an observable sense of distrust among people because of corruption³⁵ within the higher

³⁴Fact Finding Report on BOP group in Kazakhstan', JETRO, March 2015.

https://www.jetro.go.jp/ext_images/theme/bop/precedents/pdf/lifestyle_education_201503_kz.pdf, (accessed March 20, 2017)

³⁵ The bribe for employment and promotion of teachers and bribe for entrance and promotion of students are reported during the

education sector. The quality of private colleges/universities is questioned, even though quantity is sufficient. Professors in the natural sciences are elderly, and funds for research are scarce. Thus, young people are noticeably not attracted to the natural sciences³⁶.

As for TVET, there is a view that the outdated training courses such as masonry and welding and lack of job opportunities are not attractive to the younger generation. Moreover, the business sector does not show much interest in TVET. On the other hand, one of the more successful practices are that in Kasipkor³⁷ which obtains guidance and advice from first-class organizations and enterprises.

(4) Sustainable Implementation of the Revised Educational System

Sustainable implementation of the revised educational system should be secured. The National System of Education Quality Assessment was initiated along with the transition to a 12-year compulsory education system; systems of examination, certification, licensing, and rating have also been restructured. It is therefore essential to observe how it is regularly implemented.

Securing competent teachers/instructors is also necessary, as public teachers/instructors have poor incentives, such as low salaries (80,000 Kazakhstan tenge monthly as of 2013³⁸) or less chances of training.

(5) Maintenance and Utilization of Education Infrastructure and Granted Equipment

In the field survey, the modern equipment for research and practice were found at some universities. However, the maintenance and utilization of this equipment is questionable. For instance, the Industry Automation System for Education which modularizes motors, conveyors, sensors and robot arms in Nazerbayev University was found to be under utilized in actual research or practice of machinery when the Survey Team visited³⁹. It is necessary for the universities to create a feasible plan to utilize the equipment that meets the international standards for beneficial research and practice. However, existing laboratories seemed too old to be able to serve advanced research. Therefore, it is recommended to study the current situation from the perspective of market needs.

2.2.6. Vision of Educational Reform

As described in 2.2.2 Education Policy, human resource development for industrial development

Data Survey hearing at universities and donors.

³⁶ Fact Finding Report on BOP group in Kazakhstan', JETRO, March 2015.

https://www.jetro.go.jp/ext_images/theme/bop/precedents/pdf/lifestyle_education_201503_kz.pdf, (accessed March 20, 2017)

³⁷ Policy implementation institution under Ministry of Education and Science for promotion of TVET development, established in 2011

³⁸ Fact Finding Report on BOP group in Kazakhstan', JETRO, March 2015.

https://www.jetro.go.jp/ext_images/theme/bop/precedents/pdf/lifestyle_education_201503_kz.pdf, (accessed March 20, 2017)

³⁹ Granted by JICA Support for Japanese SMEs Overseas Business Development

that corresponds to industrialization and innovation is the major agenda in State Program of Education Development in the Republic of Kazakhstan for 2011-2020. The following are aims of the educational reforms in Kazakhstan made by analyzing information of interviewees (mainly international organizations such as Erasmus + and the World Bank):

- Global human resources development
- Human resource development to meet the needs of industry and economic trends
- Human resource development corresponding to technological innovation
- Industry-academia collaboration, commoditization of soft-assets
- Innovation of TVET system
- Development of entrepreneurs
- Sustainable implementation of the 12-year education system
- Integration into the European standard education system
- Internationalization via tri-lingual education (English, Russian, Kazakh) and revitalization of ethnic pride via the preservation of Kazakh.

2.3. Higher Education Institution in the Science and Engineering Field

2.3.1. Outline of Educational institutions for Higher Education

Trilingual education in Kazakh, Russian, and English is conducted in higher education institutions according to the abovementioned "State Program for Education Development in the Republic of Kazakhstan for 2011- 2020". The "History of Kazakhstan," for example, is taught in Kazakh, "World History" is taught in Russian, and chemistry, biology, physics, information science, etc. are taught in English.

As entrance examinations for institutes and universities nationwide, a uniform academic ability test has been introduced. Some students also study in part-time/distance education systems rather than full-time universities.

The results of PISA (Program for International Student Assessment) conducted by the OECD (Organization for Economic Cooperation and Development) can be referred to as a rough educational knowledge level of the students to enter higher education. PISA has been implemented every 3 years from 2000. PISA seeks to measure the degree to which the knowledge and skills acquired through compulsory education (up to 15 years old) is effectively applied to tasks faced in various real-life situations. The results of PISA conducted on Kazakhstan students in 2015 demonstrate improved performance in mathematics, reading, and science compared to the results in 2012. Kazakhstan students could not, however, reach the average score of the OECD countries.

2.3.2. Current Situation and Issues Facing Higher Education Institutions in the Science and Engineering Field

(1) Curriculum

Curriculum development must follow the Policy (Guidelines) of the Ministry of Education and Science. A university, however, can reflect the needs of Kazakhstan's main industries (energy, minerals, resource development, space development, mobile phones, IT-related, etc.) into its curriculum. Curriculum is being developed in accordance with the Bologna process. Curriculum development is still transitioning from the previous system, so the results have not yet been shown. Many engineers are invited from abroad to work in foreign companies doing business in Kazakhstan. Seven years have already passed since Kazakhstan joined the Bologna process. It will be necessary to monitor how students who studied under European standards are performing in society and to reflect the monitoring results into curriculum development.

(2) Research equipment and related resources

Research institutes, such as Nazarbayev University and Kazakhstan National University, have connections with overseas universities and research institutes. These universities receive support

from overseas donors or domestic and overseas companies (e.g. Nazarvaev University is supported from Astana Bank, RBK Bank, Eurasian Bank, etc.), which enables them to use new research equipment. The study environments in private institutions are also well equipped. State institutions, meanwhile, are using older types of equipment that can conceivably limit their opportunities to pursue new research areas. Nazarbayev University and Kazakhstan National University are leading research institutions in Kazakhstan for understandable reasons. With regard to their research equipment, there is a stark gap between the leading institutions in Kazakhstan and others.

(3) Post-graduation environment for students

The economy of Kazakhstan has been steadily growing and the GDP (Gross Domestic Product) grew by more than tenfold from the year 1999 (about 1.7 billion US dollars, weakest in the last 25 years) to 2015 (about 18.4 billion US dollars) according to World Bank statistics⁴⁰. The employment rate of graduates from the Eurasian National University in 2015 was 85%, which is about the same as the lowest employment rate recorded among female students from Japanese junior colleges in the past nine years (84.1%, March 2011). For reference, the employment rate of university students in Japan in 2015 was 97.3%⁴¹. Many Kazakh students actively engage in English education and then study abroad using the "Bolashak" program. Some students find their own careers (places of employment) outside of Kazakhstan. Others find employment in overseas companies which support universities in Kazakhstan, such as Germany and Korea⁴².

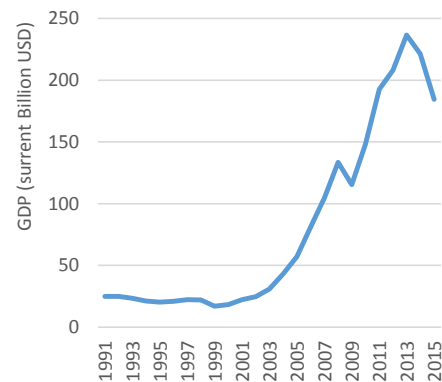


Figure 2-2 GDP Data

The graph prepared by Survey Team based on World Bank's data

In order to reduce the outflow of Kazakh students educated in Kazakhstan, it will be important to provide them attractive employment opportunities within the country. Some universities have already started programs to contribute to develop domestic industries. For instance, Kazakh National University supports students and researchers who start up their business before graduation, while Nazarbayev University attracts domestic and foreign entrepreneurship to advance research.

⁴⁰ World Bank, "Countries and Economies, Kazakhstan," <http://data.worldbank.org/country/Kazakhstan>, (Accessed: June 6, 2017).

⁴¹ Japanese Statistics Bureau, "FY2001 Survey on the job vacancy status, etc. of graduates from universities, junior colleges, technical colleges, and vocational schools" (April 2016), <http://www.e-stat.go.jp/SG1/estat/List.do?bid=000001073365&cycode=0>, (Accessed: June 6, 2017)

⁴² JICA Report "Engineering Education Research on Higher and Technical Education Survey in Republic of Kazakhstan" (July 2014), pp. 10

2.3.3. Information on Major Higher Education Institutions in the Science and Engineering Field

The names in the following list of institutions (mainly state) with science/engineering faculties in Astana and Almaty were retrieved from websites. The Survey Team managed to schedule appointments with these institutions with the support of the JICA Kazakhstan Field Office.

Table 2-10 List of Major Higher Education Institutions in the Science and Engineering Field

Visit Day	Location	Names of Institutions
January 25	Astana	L.N. Gumilyov Eurasian National University
January 26	Astana	Nazarbayev University
January 31	Almaty	Almaty Technological University
January 31	Almaty	Almaty Management University
February 1	Almaty	Al-Farabi Kazakh National University
February 1	Almaty	Kazakhstan Engineering-Technological University
February 2	Almaty	Kazakh National Technical University after K.I. Satpayev
February 2	Almaty	Kazakh-British Technical University
February 2	Almaty	Almaty University of Power Engineering and Telecommunications
February 3	Almaty	National Academy of Sciences of Kazakhstan
no meeting	Almaty	International IT University

Due to 28th Winter Universidad⁴³ in Almaty, the Survey Team could not make an appointment with the International IT University.

No critical gap could be found between the facilities and equipment between universities located in Astana and those in Almaty. Some facilities/equipment in Astana, the capital from 1998 onward, are newer, while "Al-Farabi Kazakh National University" in Almaty has an abundance of advanced equipment.

The institutions are outlined below.

⁴³ The international multi-sport event, organized for university athletes by the International University Sports Federation (Fédération Internationale du Sport Universitaire: FISU). 28th Winter Universidad was held from January 29 to February 8, 2017

(1) L.N. Gumilyov Eurasian National University

Name of Institution	L.N. Gumilyov Eurasian National University
written in Russian	Евразийский национальный университет имени Л.Н. Гумилёва
URL	http://www.enu.kz/ (accessed: June 18, 2017)
Description Language	Kazakh, Russian, English

"L.N. Gumilyov Eurasian National University" is a comprehensive university established in the capital city Astana in 1996. One of its purposes for the establishment is to become a center of science, research, society, and culture in the Eurasian region. Another is to provide leading and advanced knowledge. The university provides educational programs in the fields of technology, economy, natural science, and humanities.

The educational policy of the university is to foster trained specialists required for the competitive world market and develop an array of knowledge and skills, including skills in self-development. Fourteen faculties are educating students at the university.

The faculties of the science and engineering departments include the: Faculty of Information Technologies, Faculty of Natural Sciences, Faculty of Mechanics and Mathematics, Faculty of Transport and Energy, Faculty of Architecture and Construction, and Faculty of Physics and Technical Sciences.

Academic exchange agreements with Japan are available at the University of Tsukuba, Kinki University, Tokai University, etc.

(2) Nazarbayev University

Name of Institution	Nazarbayev University
written in Russian	Назарбаев Университет
URL	http://nu.edu.kz (accessed: June 18, 2017)
Description Language	Kazakh, Russian, English

Nazarbayev University was established in the capital city of Astana in 2011 with the aim of becoming the world's top research university under the initiative of President Nalslutan Nazarbayev in Kazakhstan.

The activities of the university are to develop sophisticated research capabilities and technological innovations reflecting industrial needs. Their activities also seek to contribute both to the development of the national economy and diversification of the global economy by linking

education and scientific industries.

For these purposes, the university engages in collaborative partnerships with the following top-ranking universities around the world:

- University College London (UK) School of Engineering
- University Wisconsin-Madison (USA) School of Humanities and Social Sciences
- University of Pittsburgh (USA) School of Medicine
- Duke University, Fuqua School of Business (USA) Graduate School of Business
- National University of Singapore, Lee Kuan Yew School of Public Policy (Singapore) Graduate School of Public Policy
- University of Pennsylvania (USA) Graduate School of Education
- University of Cambridge (UK) Graduate School of Education
- Colorado School of Mines (USA) – partner for the School of Mining

Besides the above-mentioned overseas universities, they have signed exchange agreements with other universities and continue to run an active exchange program.

The undergraduate program has three departments: School of Engineering, School of Science and Technology, and School of Humanities and Social Sciences. All undergraduate classes and studies are conducted in English. The university also offers master's and doctoral degrees in the following science and engineering programs:

- School of Engineering
- School of Science and Technology
- School of Medicine
- School of Mining and Geosciences

A Science Park is available at Nazarbayev University. R&D and mutual exchange is expected to become more active through the provision of the university's facilities and infrastructure to domestic and overseas companies. For that purpose, the university has prepared a system to provide support in terms of law, intellectual property, finance, etc.

In connection with Japan, Mr. Shigeo Katsuo, a former vice president of the World Bank, serves as the president of the university. On October 27, 2015, Japanese Prime Minister Shinzo Abe gave a speech at the university. In addition, a "Pilot Survey for Disseminating SME Technologies for Technical Education System for Industrial Automation Technology" was implemented from July 2013 to September 2014 under a JICA cooperation scheme, "Partnerships with Private-Sector Activities in Developing Countries". An industrial automation education system made by a Japanese

SME was installed at an educational training center under this program⁴⁴.

The first students to complete undergraduate programs at Nazarbayev University graduated in June, 2015. Among the university's graduates, 56% have found employment with firms and 39% have been admitted to postgraduate programs, including 11% who were admitted directly to PhD programs. Some of graduates from the university have been admitted to prestigious international universities such as the Massachusetts Institute of Technology (MIT), Stanford University, London School of Economics, University of California-Berkeley, University of Wisconsin - Madison, University of Illinois, University of Warwick, and the Technical University of Munich⁴⁵.

(3) Almaty Management University

Name of Institution	Almaty Management University
written in Russian	АЛМАТЫ МЕНЕДЖМЕНТ УНИВЕРСИТЕТ
URL	http://www.almau.edu.kz (accessed: June 18, 2017)
Description Language	Kazakh, Russian, English

Almaty Management University is a private university in Almaty. It was established as the Almaty School of Management in 1988 and changed to its current name in 2014.

The purpose of the school is to produce next-generation leaders and create new knowledge for a vibrant society and global innovation economy. The school also pursues the following strategic goals as a future vision:

- become one of the top-200 world business universities; 5 palms
- become one of the best three business universities of the Eurasian Economic Union (EAEU)
- become one of the top-100 entrepreneurial universities of the world
- become one of the top-100 universities in knowledge management
- become an institution of higher education accredited by "Triple Crown"⁴⁶

The school has entered more than 100 partnerships with overseas business universities in countries such as the United States, the UK, Germany, Australia, and the countries of the former USSR (Union of Soviet Socialist Republics).

⁴⁴ The purpose of the center is to train faculties and staff as a master trainer and to train trainers (vocational training university teachers, government officials, business technicians, students of the same university, etc.) in the future through them.

⁴⁵ Nazarbayev University, "Address by the president of Nazarbayev University," <http://fund.nu.edu.kz/>, (Accessed: June 6, 2017).

⁴⁶ "Triple Crown" is an accreditation awarded by the three largest and most influential business school accreditation associations, namely, the AACSB, AMBA and EQUISB.

(4) Almaty Technological University

Name of Institution	Almaty Technological University (ATU)
written in Russian	Алматинский Технологический Университет
URL	http://www.atu.kz (accessed: June 18, 2017)
Description Language	Kazakh, Russian, English, Chinese

ATU was established in Almaty in 1957 as one of the major education and science centers in the fields of food industry, light industry, etc. in Kazakhstan and Central Asia. ATU has more than 9,200 students, more than 800 teachers and staff, and faculties such as the Faculty of Food Production, Faculty of Light Industry and Design, and Faculty of Engineering and Information Technologies.

ATU has partnerships with the International Association of Universities (IAU), European University Association (EUA), ISEKI - Food Association, Eurasian Universities Union (EURAS), etc.

ATU has facilities such as a Food Safety Certification Testing Laboratory, Food Quality Safety Evaluation Inspection Laboratory, Textile Material Testing Laboratory, Processing Training Center for Bread, Meat, Milk, Pasta, etc.

(5) Al-Farabi Kazakh National University

Name of Institution	Al-Farabi Kazakh National University
written in Russian	Казахский Национальный Университет имени аль-Фараби
URL	http://www.kaznu.kz (accessed: June 18, 2017)
Description Language	Kazakh, Russian, English

Al-Farabi Kazakh National University was established in Almaty in 1934. It ranked along Moscow State University in the former USSR. Many Nobel Prize winners have been produced there.

As a relationship with Japan, the University has many partnerships with the Japanese universities such as the University of Tokyo, Tsukuba University, Osaka University, etc. It also has a partnership with the Japan Atomic Energy Association. Furthermore, Japanese language has been offered in the department of Japanese Language Education at the Oriental Studies faculty for more than 15 years.

The university's mission is "Formation of personnel potential – highly qualified specialists competitive in the domestic and international labor market" with a vision of becoming one of the world's TOP-200 leading research universities. It pursues following six strategic directions over the five-year period from 2015–2020, as defined in the Strategic plan of Al-Farabi Kazakh National

University for 2015-2020:

- To improve the quality of educational activities
- To develop and improve the quality of scientific research and innovative activity
- To extend international cooperation
- To improve welfare activity and involve youth in the social and economic development of the country
- To develop infrastructure and implement the latest information technologies
- To improve the efficiency of financial and economic activities.

There are 10 of scientific institutes and 12 research centers at the university. Each faculty has separate facilities. The faculties of Science and Engineering include the Faculty of Biology and Biotechnology, Faculty of Mechanics and Mathematics, Faculty of Physics and Techniques, Faculty of Chemistry and Chemical Technology, and Faculty of Geography and Nature Management. Prioritized research areas include Information Technology, Green Energy, Green Technology, Chemical Industry, and Nanotechnology.

The campus has a Techno Park, a business incubator that serves as platform for students and graduates to apply research results to their own businesses. Students hold an Innovation Project Competition at the Techno Park every year.

Startup companies in the fields of mobile applications development, industrial chemistry, greenhouse (cultivation of vegetables, flowers, and strawberries), biogas (vegetable and organic waste gas), wind power, etc. are actively working in the Techno Park. Famous companies such as Hewlett Packard, Microsoft, Kaspersky Laboratory, Konica Minolta, etc. are providing support.

(6) Kazakh National Research Technical University named after K.I. Satpayev

Name of Institution	Kazakh National Research Technical University named after K.I. Satpayev (KazNRTU)
written in Russian	Казахский национальный технический университет имени К. И. Сатпаева
URL	http://kaznitu.kz/ (accessed: June 18, 2017)
Description Language	Kazakh, Russian, English

KazNRTU, one of the oldest universities in Kazakhstan, was established in Almaty as Kazakh Mining and Metallurgical Institute (KazMMI) in 1934. It was renamed Kazakh Polytechnic Institute in 1960, and then Kazakh National Technical University in 1994. It took its existing name, KazNRTU, in 1999.

KazNRTU intends to be an international research university linking academics and students of the world.

The University is actively working on the industrialization and development of infrastructure for sustainable development of the Kazakh economy, enhanced competitiveness of human capital, modernization and training of new engineers, and transfer of the country into a knowledge-based economy.

KNTU offers engineering education for advanced human resources and innovative research to contribute to Kazakhstan.

The main research institutions are the:

- Institute of Geology and Oil Gas Business
- Mining and Smelting Institute
- Institute of Information and Telecommunication Technologies
- Institute of Industrial Engineering
- Architecture and Building Institute
- Institute of Hi-Tech and Sustainable Development
- Military Science Institute

(7) Kazakh-British Technical University

Name of Institution	Kazakh-British Technical University (KBTU)
written in Russian	Казахстанско-Британский Технический Университет
URL	http://www.kbtu.kz/ (accessed: June 18, 2017)
Description Language	Kazakh, Russian, English

KBTU was established in Almaty in 2001 by a signing between President Nursultan Abishevich Nazarbayev and former British Prime Minister Anthony Charles Lynton Blair. The council of KBTU is organized by the Ministry of Education and Science, Ministry of Energy and Mineral Resources, Ministry of Finance, State Agency for Strategic Planning, etc.

KBTU is located next to the abovementioned KazNRTU. KBTU fosters future business leaders by providing high-quality education and advanced training on Oil and Gas, Management, etc. supported by British partners such as the University of Aberdeen, Robert Gordon University, Heriot-Watt University, and University of Westminster.

(8) Almaty University of Power Engineering and Telecommunications

Name of Institution	Almaty University of Power Engineering and Telecommunications (AUPET)
written in Russian	Алматинский Университет Энергетики и Связи
URL	http://www.aipet.kz (accessed: June 18, 2017)
Description Language	Kazakh, Russian, English

AUPET is based in the Almaty Energy Institute, an entity that separated from the Kazakh Polytechnic Institute in 1975. AUPET adopted its present form and system in 1997.

The main research institutions are as follows:

- Space Engineering and Technology
- Radio Engineering, Electronics and Telecommunications
- Heat Power Engineering
- Electrical Engineering
- Computer Engineering and Software
- Information Systems
- Automation and Control
- Instrumentation
- Life Safety and Environmental Protection
- Agriculture Power Supply

After a rector of the university visited Japan in 2016 at the invitation of JICA, the school began encouraging its graduate students to study about improvement of efficiency of solar panel technology for the promotion of clean energy.

2.4. Technical Vocational Education and Training (TVET)

2.4.1. History of TVET

In around 1970, during the former Soviet Union era, vocational training schools were established in the country, since which time the center of the Soviet government in the socialist economic system, Moscow and Leningrad, have centrally controlled the courses, curriculum, teaching materials arrangement and other aspects as part of traditional planning and centralized control. Subsequently, the development of the TVET field is underway based on the “State program of education development in the Republic of Kazakhstan 2011-2020” after the “State Program of Education Development in the Republic of Kazakhstan for 2005-2010” from 2005 and the “State Program on Development of Technical and Vocational Education in the Republic of Kazakhstan 2008-2012”.

Since independence from the former Soviet Union in 1991, under the strong leadership of the president and establishing a long-term strategy until 2030 in the presidential textbook “Prosperity, Safety and Welfare Improvement of the Kazakhstan People” of October 1997 (Hereinafter referred to as the "Kazakhstan 2030 Strategy"), the country has been promoting reforms of its structure in TVET as part of efforts to strengthen the economic system.⁴⁷

2.4.2. Outline of TVET

In terms of vocational education and training in Kazakhstan, education and training institutions such as colleges, lyceums existed in mixed form depending on the year of education grade and contents until around 2012. Among them, the college which was formerly called Technicum conducted vocational technical education and training mainly in the field of technology such as manufacturing, construction, transportation and agriculture, and Lyceum in in the field of teacher's primary training, beauty, dance, theater etc., to prepare specialist and skilled workers of 150 professions in more than 15 fields. Currently, colleges for secondary vocational education and training are unified⁴⁸.

In the education system, as stated in 2.2.3 Education System, when students complete their study of secondary basic level education for 6 years, they can chose the options either to proceed to secondary upper level or to go to vocational technical education and training, the latter of which usually involves students taking education for four years, although it differs somewhat depending on the type of course.

On graduation, students receive a diploma as a professional qualification in each course, which

⁴⁷ Kazakhstan Skya Pravda (Feb.12, 2012)
http://www.keepeek.com/Digital-Asset-Management/oced/education/reviews-of-national-policies-for-education-secondary-education-in-kazakhstan/vocational-education-and-training-in-kazakhstan_9789264205208-9-en#.WNxat-pMTDc#page13

paves their way to employment. When finding employment, most go to local companies that correspond to qualifications; presumably to be workers or craftsmen.

In 2011, Holding Kasipkor was established as a policy-implementing institution under the umbrella of the Ministry of Education and Science to promote the development of vocational technical education and training, carrying out practices such as setting up schools, improving curriculums and textbooks, retraining instructors.

Students enter school in September, have winter holidays and the school year ends in June. They study five days a week and receive five subjects per day.

Table 2-11 The Basic Data of the College (as of 2015)⁴⁹

Number of schools	Total - 807 Public – 462 Private – 345
Number of students	Total– 499,477 Public – 289,308 Private – 210,169
Students by state budget	242,302
Private students	257,175
Number of students in Kazakh language	287,162
Number of graduates in2015	165,746
Number of students enrolled in 2015	163,099
Number of teachers	44,482

(1) Aim and policy

As mentioned above, Holding Kasipkor is the executing agency and develops vocational technical education and training with the following perspective⁵⁰:

1) Aim

To promote the development and upgrading of vocational technical education and training.

⁴⁹ Compiled from questionnaire answer from Kasipkor

⁵⁰ <http://kasipkor.kz/?lang=en>

2) Policy

Renewing recent educational contents, including curriculums

- Improving educational content
- Improving the status of technical vocational training education through industry collaboration and participation in the Turin Declaration⁵¹
- Promoting the introduction of advanced colleges and introducing school evaluations
- Strengthening ten colleges⁵² to correspond to six industrial fields⁵³ and regions in priority areas

(2) Courses

Diverse departments have been established in response to industry requests, which are further subdivided into various sectors such as dressmaking, car maintenance, building design, computers, interiors, printing, bookkeeping, welding and tile processing. Based on the subject-setting tendency of each school, requests from local industry are emphasized, as there is no focusing on industry field in selection of course at each school (for example mechanical course, electrical course, and textile course in technology school or farming course, agriculture management course, and pastoral course in agricultural school), knowledge and skill cannot be concentrated at specific industry field by school with a lack of coherence in terms of educational fields.

(3) Curriculum

Curriculum schools operate based on a national standard curriculum for each course. For subjects jointly implemented with sponsor companies, meanwhile, the curriculum may be partially revised reflecting corporate opinion. Besides class study and practical training, the idea of a German origin dual education system⁵⁴ has also been adopted and internships are incorporated into the curriculum. Given the diversity of courses, there are well over 100 curriculums nationwide, which Holding Kasipkor is reviewing and preparing with the cooperation of UK and German donors, having completed more than 50 cases to date. Though the contents of vocational technical education and training implemented by a conventional college has remained at the TVET level (on the 4th grade, 4 school years) corresponding to the worker class at the job position in the industry as described above, Holding Kasipkor decided that it is necessary for the level of TVET education and training to reach on the 8th grade, 8 school years which prepares quasi-engineering class personnel with technical

⁵¹ Activities to improve the vocational training field led by the ETF - European Training Foundation (European Union EU specialized agency headquartered in Turin). 30 countries other than the EU, including the five Central Asian countries gather in Turin to summarize activity and declare as a declaration once every two years

⁵² -SCCE "Higher College of Kokshetau" – SMGE "Almaty State Power and Electronic Technology College" – «Aktobe Polytechnic College» JSC – SCCE «"West Kazakhstan Industrial College"» – MSPE «Temirtau polytechnic college» – SCCE "Kostanay Polytechnic College" – SCCE "Zhambyl Polytechnic College" – SCCE "Shymkent Agro-Technical College" – SCCE "Kyzylorda agrarian-technical college named after I.Abdukarimov" - SCCE "Mangistau polytechnic college".

⁵³ Food, machinery, metal, oil, gas, construction chemistry

⁵⁴ It is called a dual system, learning practical skills at workplaces such as private enterprises and public utilities, theory at vocational schools, learning practice and theory simultaneously for two to three and a half years.

judgment knowledge in the enterprise. Holding Kasipkor has defined the level of Currently It is working on the development of the school system and curriculum necessary for this, and is undergoing trial operation at the SCCE “Higher College of Kokshetau”.

(4) Instructors

Instructors with university graduation level are placed in college and handle an average of three to four subjects in the curriculum. The statutory salary is paid according to the position and work record base, but may well not exceed that of other educational institutions or the private sector. Reeducation of instructors to maintain ability also follows based on the two ministerial ordinances established by Ministry of Education and Science in January and March 2016, unified nationwide rules; implemented once every few years and including company interns in the program.

(5) Facilities / teaching materials

Many of the facilities are somewhat simplified building and premises taken over from the former Soviet era and are often located in the suburbs, but well-maintained, as is the educational environment. Although most of the necessary equipment for training was available, much of it was old and obsolete, although some of the latest equipment lent by partner companies was also seen.

(6) Industry collaboration

From the time of the Soviet Union, in Kazakhstan, where vocational training has been positioned at the core of the educational system, it is understood that the history of cooperation with industry in terms of curriculums, internships and employment, etc. has been long and steady. Though concentrated in neighboring areas and the number of enterprises is limited to several companies, in-depth collaboration includes setting up special classrooms at school, receiving equipment loans and grants and concluding contracts. Meanwhile, efforts are also being made to promote active involvement from the industry to educate human resources at educational institutions and ATAMEKEN develops activities under the guidance of the relevant ministries and agencies.

2.4.3. Survey Visit Results

(1) Polytechnic college of Astana

Located in the heart of the Old Town, this school is a secondary vocational training school that has been in operation since the Soviet era and offers courses of IT, vehicle operation and maintenance, tourism, medical care, building construction and management, design, public facility reform and accounting, with 113 instructors.

After graduating from nine years of general education, students learn a four-year curriculum comprising class study, practical skills training and internships, many of whom then find

employment in industries at the worker level on graduation. About 500 students entered last year. Education and training is carried out in accordance with the standard curriculum and based on market demand. They can also participate in the practical course established by Bosch and Knaph in the school to learn practical elements at the company site. Moves to add similar courses in ties with REHAU and HILTI are also underway.

As support from overseas, under the cooperation of KOICA, students are learning a one-year training program in Korea and GIZ is also working on a dual system trial.

There was hope that JICA would help provide training opportunities in Japanese industry.

(2) Almaty State Polytechnic College

This is a secondary vocational training school located in the outskirts of Almaty city, which was founded as a school in 1940 to train professional film technicians. It currently offers courses in IT, telecommunications, machinery and accounting and educates over 1,300 students with 144 teachers to prepare professional technicians.

It operates in collaboration with Kasipkor to prepare the curriculum and adoption of the curriculum prepared under Kasipkor leadership commenced in 2016. In addition, it is also participating in the instructors' reeducation program and there are plans to train all instructors.

Cooperation with companies has also progressed and 20 companies have become partners.

It has also cooperated with Turkey in overseas support. Expectations of JICA included proposals to renew equipment and provide technical know-how by strengthening machine-related courses.

(3) Central Asia technical-economic college

Located in the center of Almaty city, this school was founded in 1940 as Almaty Film College, followed by the name of Kinoteknicum, centering on cinema technology. Work is currently underway to train mid-level industrial human resources as a secondary vocational training school with five courses, Computer IT, radio electronic Communication, Information System, Equipment Engineering and Accounting.

Students enroll after graduating from nine years of general education and take a four-year curriculum. Approximately 1000 students are currently studying under 60 teachers.

More than 160 companies are in cooperative relationships and 25 enterprises participate in round-table discussions about curriculum and internship. Consultations with companies are not limited to the point of graduation and employment and when setting the student enrollment capacity,

recruitment forecasts of each company were collected and reflected in the annual admission policy. On the day of the survey visit, there were five company representatives with tight partnerships, including representatives of business associations in the special economic zone.

2.4.4. Issues and Prospects of TVET

(1) Position uplift of vocational technical education and training

Compared to general education, the status of vocational technical education and training is low. Moves toward higher education of students and parents comprise the larger proportion, but qualifications obtained by graduation, the level and quality of education and training at schools, the competency level of teachers, the degree of fulfillment of facilities and equipment reflecting the policy of government in relatively joining and influencing the position. Efforts to raise the value of vocational technical education and training, centering on policy setting by the Ministry of Education and Science under jurisdiction, setting and implementing concrete measures to improve the management position of each school led by Kasipkor is desirable

(2) Level of vocational technical education and training

Positions open to current graduates when entering a company are limited to those for workers or craftsmen as mentioned above. According to the Kasipkor definition, the current training has reached only four of these levels among eight in total (eight years of learning) of education and training defined, by achieving eight levels (to take eight grade students) he can have quasi-engineer ability. There is an urgent need to introduce senior-level vocational technical education and training equivalent to Japanese technical college, upgrading contents of the education and training of the current college onto advanced level by modifying course to 8 years schooling and adding the curriculum and instructor, or setting up senior college to enroll after the current college graduation. It is also imperative to find human resource needs from industry for this purpose

(3) Level of educators

The degree of accomplishment of education and training is largely dependent on the ability and motivation of educators, including teachers, but hardly suffices at present. Given the education and training situation at each school, particularly the portion related to practical training, learning to touch and handle materials and equipment needed to acquire skills is lacking in general, reflecting a lack of educational ability on the part of educators. During the survey visit, feedback from the school management indicated that teachers were dissatisfied with the status of the work itself and compensation. Though retraining to maintain capacity is implemented nationwide, it is thought that enhancing this retraining as well as reexamining treatment is necessary.

2.5. Donor Assistance in the Industrial Human Resource Development Field

2.5.5. Overview of Donors in the Education Sector

In higher education, researchers and university students who participated in the Erasmus+ program share 55% of the grant as the country which receives the most benefit in Central Asia and the progress of research into science and technology is seen to have overtaken other countries. In the Newton & Al-Farabi Partnership Program of the British Council, many researchers are supported in areas of science and innovation.

In TVET development, GIZ is supporting universities, colleges and the private sector in areas of agricultural food processing and training in Kazakhstan, Kyrgyz and Tajikistan. The World Bank is preparing for the Skills and Jobs Project utilizing the outcomes of former assistance of Technical & Vocational Education Modernization (TVEM), while also targeting in-service trainers and employment centers. The British Council conducts a college exchange program with ATAMEKEN and Kasipkor Holdings, while UNESCO is planning a survey to start a new TVET Project to develop industrial human resource to meet labor market needs.

2.5.6. Overview of Donors in the Industrial and Private Sectors

In terms of SME development, the ADB provides ongoing financial assistance to MSMEs and plans to target micro enterprises in rural areas. The World Bank conducted research into the business environment of SMEs in Kazakhstan and has also just published a book called Doing Business in Kazakhstan 2017 as well as implementing the SME Competitiveness Project.

Regionally, GIZ promotes regional trade among four countries in Central Asia.

2.5.7. Donor's Current Information

The fields of support from each donor in Kazakhstan can be found on the following donor map.

Table 2-12 Donor Map

donor	Industry sector	Education sector		Other Priority Sectors
		Higher education	Technical training education	
ADB	Supporting Resilience of Micro, Small, and Medium-Sized Enterprises Finance Project (2016) End. Currently preparing micro enterprise support fund			Central Asia Regional Economic Cooperation (CAREC) Program · Economic development · Finance · Transportation · Water supply
British Council		Newton & Al-Farabi Partnership Researchers who contribute in the field of science and innovation · Fame Lab young scientists	International Skills Partnership College Exchange Study Abroad Program (in cooperation with ATAMIKEN)	
Erasmus+ (EU)		Collaborative research project with EU universities · International Unit Movement Project EU Short Term Study Abroad · Higher education seminar		
GIZ	Support to regional Trade in Central Asia (2014-2019) Strengthen regional trade promotion for Central Asian countries		Professional education and vocational training in Central Asia (2010-2018) Agricultural food processing and job training support for Kazakh, Kyrgyz, Tajik	infrastructure Economic development · Employment · Security measures · Peacebuilding · Governance · Environment and climate change · Social development
UNESCO		Conducted Central Asia Education Forum · ICT Education Conference · SDGs research	Preparing the TVET support project in collaboration with Kasipkor Holdings	Climate change · Environmental protection · Natural resource management
World Bank	Doing Business in Kazakhstan 2017 SMEs analysis in Kazakhstan · Analysis of business environment · SME Competitiveness Project (up to 2020) Strengthen SMEs' capacity and promote collaboration		Utilizing the results of Technical & vocational Education Modernization (TVEM), preparing the Skills and Jobs Project (2017-2021)	Country Partnership Strategy 2012-17 · Environment · Private Sector Development · Finance

(1) Asian Development Bank

The ADB is continuing to assist public sector lending to Kazakhstan's SMEs by providing liquidity support to financial institutions to increase employment and generate income for them, particularly those located in rural areas and operated by women entrepreneurs⁵⁵. 25% of all loans should go to women entrepreneurs and 60% to regions outside Almaty and Astana.

It has conducted the Multi-Financial Facilities (MFF) project (Total budget: 500 million US dollars) including "Micro, Small- and Medium-Sized Enterprise Development" (2015) and "Supporting the Resilience of Micro, Small and Medium-Sized Enterprises Finance Project"(2016). Kazakhstan is a target country for "SME Development in Emerging Asia: Integration with the Global Value Chain" in 2016. This year, the ADB is planning to start a new project to provide financial assistance to local micro enterprises, where borrowing is low due to the lower price of collateral of rural land.

In the ADB Country Operations Business Plan 2016-2018, the main cross-cutting strategic priorities are regional cooperation, private sector development, environmental sustainability, governance and knowledge solutions. For sustainable growth, ADB will support the government strategy to accelerate diversification and increase economic competitiveness.

(2) British Council

In Kazakhstan, the British Council is working to strengthen science education, vocational training and life skills training as well as spreading English Education and IELTS. In higher education, four projects are implemented:

1) The "Newton & Al-Farabi" Partnership Program⁵⁶

A jointly financed program by the UK and Kazakhstan to support researchers who are contributing in fields of science and innovation, named after prominent scientists of UK and Kazakhstan. (2014~2018, Budget: 20,000,000 pounds). Grants are provided for research activities including travel, workshop and projects. Main research target areas are energy, ecology, food and water, agro-technology, medicine and natural disasters. It includes the following components:

- Institutional grant: 300,000 pounds over a two-year research project for a team of Kazakhstanian and British researchers;
- Workshop grant: 50,000 US dollars – Support Joint Scientific Workshop in Kazakhstan;
- Travel grant: a maximum of about 15,000 US dollars to allow researchers or scientists from Kazakhstan to travel to Britain and spend up to six months, during the research;

⁵⁵ ADB, Asian Development Bank Member Fact Sheet, 2017.

⁵⁶ British Council, "Newton & Al-Farabi" Partnership Program, www.britishcouncil.kz/newton-al-farabi, (Accessed June 1, 2017).

- Post-doctoral grant: for Kazakhstani researchers, to spend one or two years in the UK.

2) Fame Lab⁵⁷

It provides a forum for young scientists aged 18 to 35 years to compete. The winners have the travel and living costs covered for a period of study in the UK.

3) School STEM (Science, Technology, Engineering and Mathematics)

The same scheme as the Fame Lab; targeting those aged 10 to 16 years and sponsored by the Chevron Company.

In the TVET field, the following two projects are underway: the International Skills Partnership⁵⁸ is an exchange program for college teachers in the UK and Kazakhstan, whereby Kazakh teachers visit the UK and exchange knowledge and information on curricular development, English education and career guidance with UK colleges. The program partners are ATAMEKEN and Kasipkor Holdings. The British Council has also regularly published a Vocational Online Magazine⁵⁹ for TVET educators to share their knowledge, skills and experience.

(3) Erasmus+

The Erasmus+ Program is the EU program for education, training, youth and sport for the period 2014-2020, which offers a number of opportunities for higher education students, doctoral candidates, staff and institutes (Budget: 16.5 billion Euro. In Kazakhstan, the program comprises the following activities:

1) Capacity-Building of Higher Education Institutes

It supports joint research projects between European and Kazakh universities and system development of Kazakh universities such as:

- Curricular development
- Teacher training and training methodology
- Social protection
- Industry-academia collaboration

⁵⁷ British Council, Fame Lab, www.britishcouncil.kz/famelab (Accessed June 1, 2017).

⁵⁸ British Council, International Skills Partnership, <https://www.britishcouncil.org/education/skills-employability/what-we-do/international-skills-partnerships>, (Accessed June 1, 2017).

⁵⁹ British Council, Vocational Online Magazine, <https://www.britishcouncil.kz/programmes/education/vocational> (Accessed June 1, 2017).

In Kazakhstan, 13 projects were selected in 2015 for funding (Budget: 10,587,447 Euro) and ten in 2016 (9,446,289 Euro) in fields of mathematics, medical science, agriculture and environmental protection⁶⁰.

4) International Credit Mobility

It supports the short-term exchange of students for periods of around three to 12 months between universities within and outside the EU. The unit acquisition of EU universities is also certified in Kazakh universities and two months of overseas training is prepared for university lecturers. Lecturers and students in EU universities are also invited to Kazakh universities to promote mutual understanding and learning.

5) Seminar

According to needs raised by the Ministry of Education and Science in Kazakhstan, European experts come to have seminars in Kazakhstan for 2 – 3 days. Topics include NQF development for government officers, teacher training and PhD preparation for rectors and teachers. In March 2007, a seminar on Student-Centered Learning was also held in Astana, Kazakhstan; featuring participants from 27 countries.

According to staff from the Erasmus+ office, among five Central Asian countries, Kazakhstan receives the largest share of grant under the program of 55%, with the remaining 45% shared by the four remaining countries. It clearly shows Kazakhstan's significant interest in developing higher education.

(4) GIZ

GIZ established Kazakhstan offices in 1996 in Astana and Almaty. The main areas of assistance are sustainable economic development, security, reconstruction and peace, education, vocational training, good governance, environment and climate change, water security and health⁶¹. Recently, one Transregional Program on security, reconstruction and peace has got underway. Regional Programs include three on sustainable economic development, two in education, two in good governance and two in environment and climate change; all of which ongoing. Programs on green economy and climate resilience are also under preparation.

In higher education and TVET fields, GIZ is implementing a regional project of Professional

⁶⁰ Erasmus+ Programme of the European Union, *Erasmus+ in Kazakhstan First Call Projects*, 2015.

⁶¹ GIZ Kazakhstan, Portfolio of projects, 2017.

Education and Vocational Training in Central Asia (2010-2018)⁶² to improve agricultural food processing in Kazakhstan, Kirgizstan and Tajikistan. It provides modern training and continuing professional development courses for experts and managers in food technology and vocational teachers to produce high-quality products. It also promotes partnerships between training institutions and the private sector.

(5) UNESCO

The officer in charge of higher education has just arrived in UNESCO Kazakhstan office and is prospecting to support the TVET system with the collaboration of Kasipkor Holdings and others. To achieve Sustainable Development Goals: SDG, Education for Sustainable Development: ESD⁶³ and realize education for global citizen, which exemplify the UNESCO vision, she considers TVET development the most effective approach in Kazakhstan. A survey of the current status of industry-academia collaboration will be planned to launch a project on promoting collaboration between TVET institutions and industries. For higher education, UNESCO plans to build partnerships with universities, particularly for entrepreneurship education.

The following activities are currently implemented in the higher education field:

- An Educational Forum in Central Asia
- A conference on ICT education with UNESCO Bangkok⁶⁴
- Joint research on SDGs and Education with the Al-Farabi Kazakh National University
- An International Workshop on ESD in February 2017, Almaty
- For all learners in formal and informal education, a project on EDS and Global Citizenship Education has been provided since 2015

On a regional basis, UNESCO supports science and technology in fields of earth science, earthquakes, natural resource management and climate change.

(6) The World Bank

The World Bank had conducted a Project on Technical & Vocational Education Modernization (TVEM) from 2011 to 2015 with the partnership of the Ministry of Education and Science to efficiently improve the TVET system via an improved policy framework and institutional capacity. Consequently, a conceptual framework for NQF was adopted by government. 147 competency-based

⁶² GIZ, Professional education and vocational training in Central Asia, <https://www.giz.de/en/worldwide/14054.html>, (Accessed June 1, 2017).

⁶³ UNESCO, Education for Sustainable Development: ESD, <http://www.unescobkk.org/education/ict/current-projects/casie2016/>, (Accessed June 1, 2017).

⁶⁴ UNESCO, ICT education, <http://www.unescobkk.org/education/ict/current-projects/casie2016/>, (Accessed June 1, 2017).

modular programs were developed, industry-led, employer-driven occupational standards in 11 economic sectors were formulated and a modernized accreditation program to ensure the quality of TVET institutions was developed.

The World Bank has analyzed the achievement, impacts and lessons learned of the project⁶⁵ and started preparing a new TVET Project called "Skill and Job Project"; aligned with government strategy on TVET reform. The details are as follows:

Title: Skills and Jobs Project ⁶⁶

Duration: 2017-2021

Partner: Department of Labor and Employment at the Ministry of Social Development

Budget: 137 million US dollars (37% of which funded by the Kyrgyz government)

Components:

- Continuation and follow-up of previous TVEM (consolidating NQF foundations)
- Development of Employment Centers
- Training program for unemployed, in-service workers, unproductive self-employed

Expected Outcomes:

- Improved training institutions,
- Service development,
- Employment in industry after graduation,
- Development of a number of new educational programs based on occupational TVET and higher education standards.

In the field of SMEs development, World Bank published *Doing Business in Kazakhstan* in 2017 and analyze business environments for SMEs. The SME Competitiveness Project ⁶⁷(2015~2020) is supporting capacity development SMEs through training, networking, monitoring, impact evaluation and institutional building.

⁶⁵ World Bank, IMPLEMENTATION COMPLETION AND RESULTS REPORT FOR A TECHNICAL AND VOCATIONAL EDUCATION MODERNIZATION PROJECT, June 30, 2016

⁶⁶ World Bank, PROJECT APPRAISAL DOCUMENT FOR A SKILLS AND JOBS PROJECT, March 4, 2015

⁶⁷ World Bank, SME Competitiveness Project ,<http://projects.worldbank.org/P147705?lang=en>, ([Accessed June 1, 2017](#)).

2.6. Analysis of Contents of Support by Japan

This chapter confirms the "development policy" by Kazakhstan, Japan and other donors. Also, "Industrial Human Resources Needs", "Outline of Education Sector", "Science and Technology Higher Education Organization", "Vocational Technical Education and Training (TVET)", "Support by Other Donors" And the development policy will be extracted. Among these tasks, we examined what is to be prioritized and the resources of Japan that contribute to solving the problem, and summarized it as a solution approach.

2.6.1. Kazakhstan Policy

2.6.1.1. Kazakhstan's National Development Strategy

The Kazakhstan country development plan, as specified in the Kazakhstan 2050 strategy, shows seven priority areas.

Table 2-13 Table Kazakhstan Development Plan

Strategy Kazakhstan 2050 (formulated in December 2012)	Priority area 1) Human development 2) Energy 3) Green economy 4) Urban and rural development and decentralization 5) Knowledge-based economy 6) Cooperation internationally and regionally 7) Organization enhancement
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2.6.1.2. Participants of Invitation to Japan

The following table shows the affiliation of participants from Kazakhstan:

Table 2-14 Name of Organization Invited

1st invitation in Japan (February 2016)	2nd invitation in Japan (March 2017)
Ministry of Education and Science	Ministry of Education and Science
Al-Farabi Kazakh National University	L.N.Gumilyov Eurasian National University
	Almaty University of Power Engineering and Telecommunications

2.6.2. Assistance Policy to Kazakhstan

2.6.2.1. Japan's Country Assistance Policy

The content of support in Japan is based on the framework of the country-specific aid policy (Kazakhstan Country Assistance Policy was formulated in May 2012), in addition, under “Central Asia + Japan” dialogue⁶⁸ framework, five issues such as “Trade and Investment (including agriculture)”, “Environment, Energy Conservation and Renewable Energy”, “Millennium Development Goals (MDGs) Achievement and Disparity Correction”, “Afghanistan for Stabilization Cooperation”, “Cooperation for Disaster Prevention”, “Disaster Prevention Cooperation” must be considered.

Table 2-15 Kazakhstan Country Orientation Policy (formulated May 2012)⁶⁹

Basic policy (large goal)	A well-balanced country balancing economic and social development		
Priority field (medium target)	Improvement of economic infrastructure, including the energy resource field	Environmental Conservation and Climate Change Measures	Other
Development issue (Small target)	Improvement of economic infrastructure, including the operation and management system	Measures for environmental conservation and climate change utilizing advanced technology	Formulating policies, developing institutions and human resources for sustainable economic growth
Current situation and issues	1. Electricity: Electricity shortage is a concern in the 2020s, following increased demand due to economic development and aging facilities. There is also a delay in improving the national transmission line network given the vast area involved and	1. In radioactivity, air, water, soil contamination, industrial waste, air, rivers, lakes, forests, grasslands, deserts and other areas, problems are scattered. 2. Floods and floods of rivers, sediment-related	1. Although achieving high economic growth, despite soaring energy prices, it is needed to diversify the industrial structure to achieve stable economic development by increasing the value of industries and promoting small- and

68 Ministry of Foreign Affairs “Central Asia + Japan” Dialogue - Decade Road (2014), <http://www.mofa.go.jp/mofaj/press/pr/wakaru/topics/vol117/index.html> (accessed June 1, 2017)

69 Ministry of Foreign Affairs ‘Kazakhstan Country Orientation Policy’, <http://www.mofa.go.jp/mofaj/gaiko/oda/files/000072282.pdf> (accessed June 1, 2017)

	<p>imbalance in regional supply and demand.</p> <p>2. Transportation and Logistics: The “Eurasian hub” is one of the national growth strategies and has comparatively improved.</p> <p>3. Water Resources: Insufficient drinking water is secured; mainly in the northern, southern and rural areas. Also, the water infrastructure and irrigation facilities of the former Soviet era are becoming obsolete and must be renewed and maintained.</p>	<p>disasters occurred, mainly in southern area and due to artificial causes such as year-round snow melting and lack of water source control. In addition, the southern area is also prone to earthquakes and there is an urgent need to reinforce the disaster response capacity.</p> <p>3. Since the facilities of coal-fired power plants, which account for about 80% of total power generation, are becoming obsolete, acquiring technology and know-how to improve power generation efficiency has become an issue.</p>	<p>medium-sized enterprises.</p> <p>2. Given plans to set up a development aid agency (Kazuade) and assist and support Afghanistan and Central Asian countries as donor countries, there is a need to share knowledge on development cooperation and foster human resources.</p>
<p>Japan’s response policy to development issues</p>	<p>From the perspective of regional infrastructure development in Central Asia, infrastructure development project formation is considered to pursue the possibility of cooperation through ODA, taking into account relationships, such as trade and investment with Japan,</p>	<p>1. Reducing the environmental burden through renewable energy technology and energy saving.</p> <p>2. Water resource management by improving soil and river monitoring technology</p> <p>3. Improving drainage / waste treatment technology</p> <p>4. Improving the capacity of administrative agencies</p>	<p>1. Expert dispatch and trainee acceptance projects are effective to improve government policy-making, implementation and management skills.</p> <p>2. To change the resource energy dependence and economic diversification, it is imperative to train the manufacturing industry by promoting small- and medium-sized enterprises,</p>

		and engineers and train experts 5. Disseminating knowledge and technology related to disaster prevention in Japan, an earthquake country.	promoting trade, developing institutions such as financial and capital markets development and developing business environments according to international standards
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2.6.2.2. Support Policies and Strategies of Other Donors⁷⁰

In educational sector, Erasmus + and British Council are working to support research activities at universities and in addition, GIZ, the World Bank, which has been supporting TVET for many years, is planning to launch a further project from this fiscal year.

ADB and World Bank support projects and researches in SMEs and financial support fields.

⁷⁰ See Table 2-12, Kazakhstan Donor Map

2.6.3. Analyzing Issues related to Advanced Industrial Human Resource Development

2.6.3.1. Problem Analysis

The problems are extracted based on the information described in previous sections and compiled in the table below:

Table 2-16 Problem Analysis of Advanced Industrial Human Resource Development in Kazakhstan

Field		Problem		Cause	Solution
Industry sector	Policy · institution	Industry-aca demia collaboration	Though “Kazakhstan Industrial Innovation Development Industrial Development Strategy Program” (2003 - 2015) aims to ensure diversification of industries, mainly manufacturing and focusing on SME promotion, there is no cooperation with the educational community aiming to introduce advanced technology / innovation technology.	<ul style="list-style-type: none"> · Information exchanged between the Ministry of Education and the Ministry of Industry is lacking. · The employment rate of graduates to domestic companies is low. 	<ul style="list-style-type: none"> · Exchange information among universities, vocational education schools, and companies. · Establish an employment support room in university and vocational training school. · Strongly promote internship in companies.
	Industry human resources needs	Human resource management	Technical Level of employed personnel is uneven. HR development system such as in-house training after entering the company is lacking.	<ul style="list-style-type: none"> · Business managers lack awareness that human resources are one of the components of monozukuri. 	<ul style="list-style-type: none"> · Establish a technical level certification system for instructors and administrative supervisors common to educational institutions such as technical colleges. · Train core human resources capable

					of judging the technical level of human resources within company..
		Marketing	Insight into marketing development, sales promotion and advertisement publicity is lacking.	<ul style="list-style-type: none"> ·Business manager do not understand the global competitive environment of products. ·Personnel in charge is incompetent. 	<ul style="list-style-type: none"> · Corporate personnel can utilize ICT technology.
		Production control and financial management	Awareness of production technology to build efficient and economical production systems and achieve maintenance and improvement is lacking.	<ul style="list-style-type: none"> ·Improve production environment such as quality, cost, delivery date, etc. against production technology. 	<ul style="list-style-type: none"> · Corporate personnel can set standard work, standard times, etc. · Corporate personnel Learns the type of production (production time, production type / production quantity, production instruction, flow of processing, production method).
		Maintenance of production facilities	Knowledge and technology corresponding to complications and advancement due to progress and development of production facilities are scarce.	<ul style="list-style-type: none"> · Corporate managers is lacking awareness of the transition of production facilities in globalization. 	<ul style="list-style-type: none"> · Corporate personnel can conduct safety management and management of the operational status through 5S / KAIZEN activities. For example, Inspection, maintenance, cleaning, refueling, retightening of equipment such as production equipment and tools, measuring instruments etc.

Education sector	Policy · institution	Compliance with European and US standards	The response to European and US standards pursuant to the Bologna Declaration is delayed.	<ul style="list-style-type: none"> · Strengthening of education system varies among educational institutions. · Implementation of national educational policy is delayed. · Evaluation criteria for higher education still not established. · No cooperation system between educational institutions has been established and the exchange of information and opinions among educational institutions has stalled. · The spread of English education is not advanced in all educational institutions. 	<ul style="list-style-type: none"> · Educate human resources who use scholarships such as Erasmus + and Bolashak to construct the Western educational system. · Reflect this issue in the next policy document action plan. · Strengthen the education quality evaluation system. · Establish a forum to exchange opinions among educational institutions. · Strengthen English language education for educators.
		Industry-academia collaboration	Industry-academic collaboration is not progressing systematically.	<ul style="list-style-type: none"> · Cooperation between the Ministry of Education and Science and the Ministry of the Economy is insufficient in a vertically divided administration. 	<ul style="list-style-type: none"> · Strengthen the implementation of industry-university collaboration policy and strengthen collaboration among ministries and agencies. · Certify universities and vocational training schools that are undertaking

				<ul style="list-style-type: none"> · Industry-academia collaboration is left to self-help efforts of educational institutions · Educational institutions cannot fully analyze industrial needs. · No mechanism exists to promote collaborative research between educational institutions and companies. 	<p>advanced initiatives as good practice model schools. Also promote information exchange between institutions.</p> <ul style="list-style-type: none"> · Research industrial and labor market needs. · Create mechanisms to promote collaborative research.
		Innovation and education	The significance of innovation is unclear.	<ul style="list-style-type: none"> · Educational policy documents do not define innovation. · The approach to innovation varies from university. 	<ul style="list-style-type: none"> · Reflect this issue in the next policy document and state it clearly. · Certify universities and vocational training schools that are undertaking advanced initiatives as good practice model schools. Also promote information exchange between institutions.
		Internationalization education	A trilingual education is not established.	<ul style="list-style-type: none"> · Implementation of trilingual educational policy has just begun. 	<ul style="list-style-type: none"> · Certify universities and vocational training schools that are undertaking advanced initiatives as good practice model schools. Also promote information exchange between

					institutions.
		IT education	Many educational institutions lack IT infrastructure and equipment.	<ul style="list-style-type: none"> · Old and deteriorating and maintenance is not done. 	<ul style="list-style-type: none"> · Improve IT infrastructure and equipment and thoroughly maintain.
		Transition to a 12-year system	The 12-year system is not established.	<ul style="list-style-type: none"> · The mechanisms of testing, certification, licensing, etc. have just been revised. 	<ul style="list-style-type: none"> · Promote policy implementation · Reflect this issue in the next policy document action plan.
		Curriculum development	Discretionary curriculum development at individual institutions is limited.	<ul style="list-style-type: none"> · Because of centralized education system, most of the curriculum development is done by central ministries. 	<ul style="list-style-type: none"> · Advance the creation of a system that enables individual educational institutions to develop more curriculum.
	Higher education in general	Teacher's position and ability	The teacher's status is low and there is insufficient ability to meet new needs.	<ul style="list-style-type: none"> · Retraining opportunities are lacking. · Salary is low. 	<ul style="list-style-type: none"> · Strengthen faculty training institutions. · Build a re-education system for educators.
		Educational Infrastructure	Facilities and equipment of universities and research institutions are not fully utilized.	<ul style="list-style-type: none"> · The equipment is not well maintained. 	<ul style="list-style-type: none"> · Maintain infrastructure and equipment and thorough maintenance.
		Entrepreneur development	Job opportunities are less for university graduates.	<ul style="list-style-type: none"> · The state employment policy is not functioning sufficiently. 	<ul style="list-style-type: none"> · After graduation, give training opportunity to be self-employed and entrepreneurs. · Exchange information with universities that are taking advanced

					measures such as operating incubation centers as model schools.
		Education content	Education to meet industrial needs are not provided. There is a gap between industry and educational needs.	<ul style="list-style-type: none"> · Most of the curriculum development is done by central government agencies and there is little room for universities to develop independently. · Collaboration between universities and companies has stalled. 	<ul style="list-style-type: none"> · Advance the creation of a system that enables individual educational institutions to further develop curriculums · Encourage creation of a mechanism to promote collaboration between universities and companies.
	Higher Education in Science and Engineering	Curriculum	But human resource to meet industrial needs is not being nurtured.	<ul style="list-style-type: none"> · It is not easy to investigate the needs of all companies related to the science and engineering science department. 	<ul style="list-style-type: none"> · Select corporate needs and reflect them appropriately in the curriculum.
		Inadequacy of research facility and equipment	With some exceptions in universities, most of the equipment used for research and experiments is obsolete and impossible to ensure the required accuracy.	<ul style="list-style-type: none"> · It is difficult to get budget. · No suitable equipment plan has been established. 	<ul style="list-style-type: none"> · Introduce equipment that can ensure the accuracy required for research and analysis · Develop an appropriate equipment plan.
		Operation of state-of-the-art educational	Although the equipment can be operated according to the manual, technical education taking principles into consideration has not been done.	<ul style="list-style-type: none"> · Teachers lack of insight into the faculty's latest educational equipment. · No suitable equipment plan has 	<ul style="list-style-type: none"> · Provide training opportunities for teachers to respond to new technologies. · Develop an appropriate equipment

		equipment		been established.	plan.
		Career path after graduation	Graduates cannot get a job that exploits the specialty.	<ul style="list-style-type: none"> · There is a gap between educational content and corporate needs and graduates are not accepted from companies. · There are few companies that can optimally exploit the skills of science and engineering students. · Functions of the employment support room like Japan are lacking. 	<ul style="list-style-type: none"> · Enhance the support system that enables graduates to start up with a specialty.
		Reflecting research results to industry	Though international joint researches pursuant to the national strategy are underway, but methods to utilize the results in industry have not been established.	<ul style="list-style-type: none"> · Industry-university collaboration has stalled. · Research content is not put into practical level. 	<ul style="list-style-type: none"> · Build a mechanism to promote industry-university collaboration. · Make a mechanism to train excellent researchers in industry. · Train researchers who can put their researches into practical level.
	TVET	Low popularity of vocational training	Compared with regular education, social evaluation of the qualification, the level and quality of education, the level of instructors and the degree of	<ul style="list-style-type: none"> · Social evaluation of the qualification is relatively low. · The curriculum often fails to correspond to industry changes 	<ul style="list-style-type: none"> · Set and review departments and curriculum according to industry needs · Review re-education contents of

			<p>fulfillment of facilities and equipment of TVET are relatively low. Popularity of TVET among parents and students are low.</p>	<p>and the level and quality of education is low</p> <ul style="list-style-type: none"> · The knowledge, skills and motivation of instructors are not commensurate with changes in industry and the level of instructors is low. · Facilities and equipment are often not renewed / updated and the degree of fulfillment of facilities and equipment is low. · The value of vocational training is not correctly recognized by society in general. 	<p>instructors based on industry trends.</p> <ul style="list-style-type: none"> · Update / renewal of obsolete facilities / equipment. · Conduct PR on vocational training.
		Education level	<p>The current training level encompass only four of eight levels in which graduates are limited to workers or craftsmen class after joining in workplace.</p>	<ul style="list-style-type: none"> · There was no recognition of the need TVET equivalent to 5 to 8 levels in the educational field. · In the industrial world, knowledge and skills necessary for technical personnel were not determined. 	<ul style="list-style-type: none"> · Promote and increase training up to the 8th grade level.

		Educators' motivation	The degree of accomplishment of education and training hardly suffices at present.	<ul style="list-style-type: none"> · It is influenced by the low popularity of the vocational training mentioned above. · Treatment is not commensurate with efforts made. · Trainers are not satisfied with treatment such as salary and status. 	<ul style="list-style-type: none"> · Review re-education contents of instructors based on industry trends. · Update / renewal of obsolete facilities / equipment. · Conduct PR on vocational training. · Review introduction of outcome compensation.
		Embankment of Practical education	In practical training, the skill level is dramatically improved by actual use of equipment, but this level of implementation is often low.	<ul style="list-style-type: none"> · Equipment usage ability of instructor and staff's is not sufficient. 	<ul style="list-style-type: none"> · Re-instruct the use of equipment in re-education.

2.6.3.2. Priority Issues for Developing Advanced Industrial Human Resources in Kazakhstan

Among the tasks extracted in 2.6.3.1 above, priority issues are summarized in the table below:

Table 2-17 Priority Issues

Item Number	Task	Specific content	solution	Utilization of Japanese resources (draft)
1	Human resource management	<ul style="list-style-type: none"> The technical level of the recruited personnel varies, and human resource development system such as in-house training after entering the company is not well developed. 	<ul style="list-style-type: none"> Establish a technology level recognition system common to educational institutions such as specialized technical schools. Developing core human resources within the company that can judge the technical level of human resources 	<ul style="list-style-type: none"> Dispatch of education policy advisor Open new courses at existing Japan Center
2	Marketing	<ul style="list-style-type: none"> Lack of know-how on marketing development, sales promotion and advertisement 	<ul style="list-style-type: none"> Corporate personnel utilize ICT technology. 	<ul style="list-style-type: none"> Open new courses at existing Japan Center
3	Industry-academia collaboration	<ul style="list-style-type: none"> Industry-academia collaboration is not progressing systematically. 	<ul style="list-style-type: none"> Strengthen implementation of industry-university collaboration policy and strengthen collaboration among ministries and agencies. Certify universities and vocational training schools that are undertaking advanced 	<ul style="list-style-type: none"> Dispatch of education policy advisor Implementation of Japanese experts to conduct academic-industry cooperation confirmation survey (information collection and analysis) Implementation of long-term Japanese

			<p>initiatives as good practice model schools. Also promote information exchange between institutions.</p> <ul style="list-style-type: none"> · Research industrial needs and labor market needs. · Promote the creation of mechanisms to promote collaborative research. 	<p>training on joint research between industry and academia</p>
4	Curriculum development	<ul style="list-style-type: none"> · Discretionary curriculum development at individual institutions is limited. 	<ul style="list-style-type: none"> · Advance the creation of a system that enables individual educational institutions to develop curriculum more 	<ul style="list-style-type: none"> · Dispatch of education policy advisor · Implementation of technical cooperation project (curriculum development method) related to strengthening instructor training function · Implementation of long-term Japanese training on joint research between industry and academia
5	Teacher's position and ability	<ul style="list-style-type: none"> · The teacher's status is low, and the ability according to new needs is insufficient. 	<ul style="list-style-type: none"> · Strengthen faculty training institutions. · Build a reeducation system for educators 	<ul style="list-style-type: none"> · Dispatch of education policy advisor · Implementation of technical cooperation project (ToT) on strengthening instructor training function · Implementation of long-term Japanese training on joint research between industry and academia
6	Educational	<ul style="list-style-type: none"> · Facilities and equipment of 	<ul style="list-style-type: none"> · Maintain infrastructure and equipment and 	<ul style="list-style-type: none"> · Dispatch of education policy advisor

	Infrastructure	universities and research institutions are not fully utilized.	thorough maintenance.	· ·
7	Entrepreneur development	· Even graduate from university, difficult to find a job	· After graduation, give training and opportunity to start self-employed and entrepreneurship. · Interchange and exchange information with universities that are taking advanced measures such as incubation centers in the university as model	· Dispatch of education policy advisor · Implementation of technical cooperation project (support for entrepreneurs) · Implementation of long-term Japanese training on joint research between industry and academia
8	Education content	· Can not provide education that can foster human resources that the industry is seeking and diverge from industrial human resources needs	· Advance the creation of a system that enables individual educational institutions to develop curriculum more. · Promote the creation of a mechanism to promote collaboration between universities and companies.	· · Dispatch of education policy advisor Implementation of technical cooperation project (curriculum development method) related to strengthening instructor training function · Implementation of long-term Japanese training on joint research between industry and academia
9	Inadequacy of research equipment and equipment	· Excluding some universities, equipment and facility used for research and experimentation are many old-style machines, and there	· Introduce equipment that can ensure the accuracy required for research and analysis · Develop an appropriate equipment plan	· Implementation of technical cooperation project related to strengthening instructor training function ·

		are few equipment that can ensure required accuracy		
10	Operation of state-of-the-art educational equipment	<ul style="list-style-type: none"> Equipment can be operated according to the manual, but its principle is not educated 	<ul style="list-style-type: none"> Opportunities for training necessary for teachers to respond to new technologies are given. Develop an appropriate equipment plan 	<ul style="list-style-type: none"> Implementation of technical cooperation project related to teacher re-education (equipment procurement and maintenance)
11	Low popularity of vocational training	<ul style="list-style-type: none"> Compared with ordinary education, popularity from parents and students is low 	<ul style="list-style-type: none"> Set up and review the department / curriculum according to industry needs. Review re-educational contents of instructors / instructors based on industry trends Update and renew facilities and equipment that have become obsolete / obsolete. PR to vocational training. 	<ul style="list-style-type: none"> Implementation of technical cooperation project related to teacher re-education (equipment procurement and maintenance)
12	TVET level	<ul style="list-style-type: none"> Training has reached only 4 levels out of 8 levels of education and training overall. Position that graduates can enter after they join remains at workers / craftsmen's classes 	<ul style="list-style-type: none"> Promote education and training up to grade 8 grade. 	<ul style="list-style-type: none"> Dispatch of education policy advisor Implementation of technical cooperation project (ToT) on strengthening instructor training function
13	Educator's motivation	<ul style="list-style-type: none"> Educators involved in education and training are less motivated. 	<ul style="list-style-type: none"> Review the content of re-education of instructors / instructors based on industry trends. 	<ul style="list-style-type: none"> Dispatch of education policy advisor Implementation of technical cooperation projects related to teacher re-education

			<ul style="list-style-type: none"> · Update and renew facilities and equipment that have become obsolete / obsolete. · PR to vocational training. · Introduce a proper performance compensation system 	(equipment procurement and maintenance)
14	Practical training education is lacking	<ul style="list-style-type: none"> · In skill training, the skill level rises dramatically due to actual use of equipment, but in many cases this level of implementation is low 	<ul style="list-style-type: none"> · Re - instruct the use of equipment in teacher re - education. 	<ul style="list-style-type: none"> · Implementation of technical cooperation project (equipment maintenance management) on training practical engineers

2.6.4. Selected Approaches to Solve Priority Issues in Advanced Industrial Human Resource Development in Kazakhstan

As described in 2.6.3.2 the following four approaches to contribute to the priority task of developing advanced industrial human resources in Kazakhstan can be proposed. However, the needs, order of priority and feasibility of the proposed approaches need to be further reviewed within JICA. Hence, the approaches below are shown rigidly as ideas. In addition, we did not address the business of the Japan Center, which operation was already transferred to the Kazakhstan side. Also, we did not pick up projects focused on equipment procurement because it is difficult for Kazakhstan to be eligible for grant aid.

In order to contribute to 3, 4, 5, 10, 11, 12, 13, 14 described in "Table 2-17 Priority Issues", we propose the following approach utilizing Japanese resources:

Table 2-18 Approach 1

Training practical engineers modeled by the Industrial College of Technology

Approach 1	Training practical engineers modeled by the Industrial College of Technology (CoT) (Technical cooperation project)
Objective	➤ Practical technicians are cultivated.
Output	<ul style="list-style-type: none"> ➤ The need for colleges of technology is acknowledged. ➤ Education to nurture practical engineers is conducted. ➤ Graduates are hired by companies that exploit their expertise.
Activity	<ul style="list-style-type: none"> ➤ Conduct an industry needs survey. ➤ Develop departments and curriculum according to industry needs. ➤ Retrain instructors according to the new curriculum. ➤ Maintain necessary facilities and equipment. ➤ Conduct PR on the College. ➤ Provide employment support.
Assumed C / P organization	<ul style="list-style-type: none"> ➤ Ministry of Education and Science ➤ Kasipkor ➤ Atameken
Beneficiary	<ul style="list-style-type: none"> ➤ Teachers and students of the college ➤ Companies in Kazakhstan
Input	<ul style="list-style-type: none"> ➤ Teachers of the industrial college of technology of Japan ➤ Japanese experts ➤ Required equipment

In order to contribute to 1, 3, 4, 5, 7, 8, 12, 13, 14 described in "Table 2-17 Priority Issues ", we propose the following approach utilizing Japanese resources:

Table 2-19 Approach 2
 Dispatch education policy advisor

Approach 2	Dispatch of education policy advisor
Objective	➤ Improve educational policies and systems according to industry needs.
Output	➤ The skill of planning and implementation of Ministry of Education and Science staff involved in the educational policy system are improved.
Activity	<ul style="list-style-type: none"> ➤ Advise and recommend means to develop curriculum development system. ➤ Advise and recommend the establishment of job-hunting support rooms. ➤ Advise and propose internships for students. ➤ Advise and recommend strengthening of industry-academic collaboration. ➤ Advise and recommend the formation of mechanisms to promote industry-academic joint research. ➤ Advise and recommend establishing entrepreneurship support centers. ➤ Advise and recommend making appropriate equipment plans. ➤ Advise and recommend teacher training and reinforcement of re-education. ➤ Advise and recommend the introduction of educational digital / ICT equipment. ➤ Advise and recommend the promotion of education and training up to the 8th year at TVET.
Assumed C / P organization	<ul style="list-style-type: none"> ➤ Ministry of Education and Science, Department of Higher Education ➤ Ministry of Education and Science, Department of Vocational Training
Beneficiary	<ul style="list-style-type: none"> ➤ Higher education institutions ➤ Vocational training institutions
Input	➤ Educational policy advisor

In order to contribute to 3, 4, 5, 7 and 8 stated in "Table 2-17 Priority Issues ", we propose the following approach utilizing Japanese resources:

Table 2-20 Approach 3

Long-term Japanese practical training of higher education institution staff concerning industry-academic- collaborative research

Approach 3	Long-term Japanese practical training of higher education institution staff concerning industry-academic- collaborative research.
Objective	➤ Mechanism for matching in collaborative research between higher education institutions and industry in Kazakhstan is built.
Output	➤ Knowledge on industry and academic collaborative research in Japan is obtained.
Activity	<ul style="list-style-type: none"> ➤ Learn practical skills by engaging in daily work with those in charge of cooperative research between industry and academia in Japanese universities. ➤ Collect information on cases of collaborative research on key industries in Kazakhstan.
Assumed C / P organization	<ul style="list-style-type: none"> ➤ Ministry of Education and Science ➤ Kazakhstan's higher education institutions (Nazarbayev University, Kazakh National University, Eurasia University, etc.)
Beneficiary	➤ Kazakhstan higher education institutions
Input	➤ Host institution in Japan (university)

In order to contribute to 4, 5, 6 and 8 stated in "Table 2-17 Priority Issues ", we propose the following approach utilizing Japanese resources:

Table 2-21 Approach 4

Abai Kazakh National Pedagogical University Faculty Development Teacher Training of Science and engineering Project (Technical Cooperation Project)

Approach 4	Abai Kazakh National Pedagogical University Faculty Development Teacher Training of Science and engineering Project (Technical Cooperation Project)
Objective	➤ The level of science and engineering teachers trained at Abai Kazakh National Pedagogical University is improved
Output	➤ Training courses for science and engineering teachers is strengthened in Abai Kazakh National Pedagogical University, reflecting industrial HR development needs
Activity	<ul style="list-style-type: none"> ➤ Revise the curriculum and training course for science and the engineering teachers ➤ Revise the teaching method used in teaching process of science and engineering ➤ Implement ToT when implementing practical lectures for teachers of Abai Kazakh National Pedagogical University ➤ Improve educational, experimental and IT equipment for use in lessons ➤ Based on this revised curriculum, develop a distance education IT program to train and retrain local teachers
Assumed C / P organization	<ul style="list-style-type: none"> ➤ Ministry of Education and Science ➤ Abai Kazakh National Pedagogical University
Beneficiary	<ul style="list-style-type: none"> ➤ Secondary and higher education institutions in Kazakhstan ➤ Students of secondary and higher education institutions in Kazakhstan ➤ Teachers of Abai Kazakh National Pedagogical University ➤ Students of Abai Kazakh National Pedagogical University
Input	<ul style="list-style-type: none"> ➤ Japanese experts ➤ Training equipment ➤ Training in Japan

3. Uzbekistan

3.1. Needs for Industry Human Resources

3.1.1. Present Status of the Economy

3.1.1.1. Economy and Industrial Structure

Uzbekistan is the world's seventh mining country of gold and also has rich natural resources including natural gas, coal, copper, oil, silver and urine. Such resources are exported as raw materials rather than value added products. In the area of agriculture, the production of cotton in 2011-12 was 9.8 million tons, which was the world's sixth rank. 6.86 million tons out of which was exported, which was the world's 4th rank. It is said that the workers engaged in cotton production consists of 28% of the total labor population⁷¹.

Due to the IMF's program implemented in 2003, currency convertibility inside of Uzbekistan is assured, however spread of double exchange rate⁷² decreases the efficiency of investment from foreign companies. Furthermore, the government imposes expensive tax and custom duties to limit the import of foreign products for the purpose of protection of national local products. Meanwhile, there is a view that most of the increase of GDP has been achieved by investment from international financial organizations as well as foreign countries⁷³.

3.1.1.2. Overview of the Economy

After independence, Uzbekistan elected to pursue economic growth through a mild shift toward a market economy, with two main triggers behind this decision. The first was IMF intervention and the second was the policy of the Karimov government administration, which made notable achievements, including annual GDP growth exceeding 8% from 2007 to 2012. Thanks to these factors, the country could develop without being excessively impacted by the global economic and financial crisis or depression.

The indices of Uzbekistan's economy and industries are shown below.

⁷¹ United States Department of Agriculture, "Cotton: World Markets and Trade", <https://apps.fas.usda.gov/psdonline/circulars/cotton.pdf>. (Accessed March 20, 2017)

⁷² Official exchange rate: 1 US dollar = 3216 Soms / Exchange rate at black market 1 US dollar = 6300 soms (on February 2017)

⁷³ Viktoriya Kan, "The Change in SME Policy and its Outcome in Uzbekistan", <http://cis.ier.hit-u.ac.jp/Common/pdf/dp/2010/dp488.pdf>. (Accessed March 20, 2017)

Table 3-1 Trends of the Uzbekistani Economy⁷⁴

	2012	2013	2014	2015	2016
Real GDP (in billions) Uzbekistani som (UZS)	96,723	119,750	45,999	171,369	195,647
USD ⁷⁵	26	37	12	45	52
Nominal GDP (Billions of USD)	51	57	63	66	67
Per-capita GNI ⁷⁶ (USD)	1,720	1,940	2,090	2,160	-----
Fiscal balance (% of GNP)	7.8	2.4	2.2	0.9	0.0
Economic growth rate (%)	8.2	8.0	8.1	8.0	6.0

Table 3-2 Trend of Industry (% of GDP)⁷⁷

	2012	2016	Principal products
Primary industry	21.6	19.2	Raw cotton, vegetables, fruits, livestock
Secondary industry	37.5	33.6	Cotton fiber, food processing, machine construction, gold, petroleum, natural gas
Tertiary industry	40.9	47.2	-----
Industrial production growth rate ⁷⁸	8.0	4.0	-----

⁷⁴ IMF, The World Economic Outlook Database (<https://www.imf.org/>) (Most recently accessed: March 31, 2017)

⁷⁵ XE quick cross rate (<http://www.xe.com/>) (Most recently accessed: May 13, 2017) 1 US dollar=3,776.67 Som

⁷⁶ World Bank (<http://data.worldbank.org/>) (Most recently accessed: March 31, 2017)

⁷⁷ CIA, The World Factbook (<https://www.cia.gov/>) (Most recently accessed: March 31, 2017)

⁷⁸ Industrial growth rate follows the definition of CIA, The World Factbook (<https://www.cia.gov/library/publications/the-world-factbook/>) (Most recently accessed: March 31, 2017)

Table 3-3 Trade Indicators (Billions of USD)

	2012	2013	2014	2015	2016
Export ⁷⁹	11.21	12.64	13.16	12.30	-----
Import ⁸⁰	12.03	13.00	13.07	10.26	-----
Principal trade items ⁸¹	Export	Energy products, raw cotton, gold, machinery, inorganic fertilizer, ferrous/nonferrous metals, food, automobiles			
	Import	Machine equipment, food, chemical products, ferrous/nonferrous metals			
Principal trade counterparts ⁸²	Export	Switzerland: 25.8%, China: 17.36%, Kazakhstan: 14.2%, Turkey: 9.9%, Russia: 8.4%, Bangladesh: 6.9%			
	Import	China: 20.8%, Russia: 20.8%, Korea: 12%, Kazakhstan: 10.8%, Turkey: 4.6%, Germany: 4.4%			

3.1.2. Industrial Promotion and Prioritized Industrial Areas of Uzbekistan

3.1.2.1. National Policy

Based on the Decree by President of the Republic of Uzbekistan dated April 11, 2005 No UP-3594 “On the Additional Measures Aimed at Attraction of the Foreign Investments into the Joint-Stock Companies”, the Government of Uzbekistan has initiated its strategy⁸³ to attract foreign capital and its focus areas were industrial sectors which deal with raw materials and half-finished goods for export. After 2007, the total amount of investment to Uzbekistan was over 4.3 billion US dollars, which was 23% increase compared with the previous year, and most of the investment was directly from foreign countries. Such policy has brought positive effects and mining and manufacturing production has been strengthened.

In addition, the export promotion agency under the Ministry for Foreign Economic Relations, Investments and Trade made international agreements with 40 countries in the areas of standardization, measuring and accreditation for export. Under the control of the Government of Uzbekistan, the legal mechanism is enforced to realize the development of main macro economy and social economic private sectors. The Government also attempts to improve the quality of business environment⁸⁴.

⁷⁹ United Nations Conference on Trade and Development (<http://unctad.org/>) (Most recently accessed: March 31, 2017)

⁸⁰ United Nations Conference on Trade and Development (<http://unctad.org/>) (Most recently accessed: March 31, 2017)

⁸¹ JETRO (https://www.jetro.go.jp/ext_images/world/russia_cis/outline/centasia_20160411.pdf) “Overview of countries in Central Asia” (Most recently accessed: March 31, 2017).

⁸² CIA, The World Factbook (<https://www.cia.gov/>) (Most recently accessed: March 31, 2017)

⁸³ JETRO, “Uzbekistan: Promotion of Foreign Currency”, https://www.jetro.go.jp/world/russia_cis/uz/invest_03.html (in Japanese) (Accessed March 31, 2017).

⁸⁴ Center for Economic Research, *Uzbekistan Economic Trends Information and Analytical Bulletin for 2016* (CD-ROM) .

3.1.2.2. Industry Promotion Policy

Following are the details of Uzbekistan's main industries:

(1) Manufacturing industry

In the "National strategic program for the growth of manufacturing industry (2015)", report⁸⁵ eight focal industries were highlighted, namely: petroleum and gas, chemical, construction and construction materials, medical and medical equipment, machinery, electric, automotive and food industry and proposals to implement a total of 700 projects were made (with a budget of about 60 billion US dollars) throughout these sectors. Meanwhile, Presidential Order 4707, announced in March 2015, cited a "Program for structural reform/modernization and diversification of the manufacturing industry 2015-2015"⁸⁶; aiming to boost industrial production by 50% within five years.

(2) Automobiles

The Almanac of Uzbekistan 2016⁸⁷, published by the Center for Economic Research, compares the automobile industry between 1995 and 2015. The illustration shows the number of enterprises with General Motors Uzbekistan as the main corporation and the increase in the industry workforce as of 2015. This illustration confirms the growth of the automotive industry as the manufacturing sector of Uzbekistan. A major Korean automobile company is partnering GM to produce passenger cars, while Isuzu Motors is assembling buses and trucks in Samarkand as part of a joint investment operation with the Automobile Promotion Corporation.

The reason for the 2015 production decline is believed to be the decline in sales to Russia, the main export destination, following its economic depression.

Table 3-4 Production Total for Four-wheeled Vehicles in Uzbekistan⁸⁸

(unit: number of vehicles)

Fiscal year	2011	2012	2013	2014	2015
Units produced	224,483	239,906	246,641	245,661	185,400

⁸⁵ The Japan/Uzbekistan Investment Environment Maintenance Network (<http://www.jp-ca.org/>): "Politics and Economics Fixed-point Observation Report" Uzbekistan Now: vol. 34 (Most recently accessed: March 31, 2017)

⁸⁶ The Japan/Uzbekistan Investment Environment Maintenance Network (<http://www.jp-ca.org/>): "Politics and Economics Fixed-point Observation Report" Uzbekistan Now: vol. 34 (Most recently accessed: March 31, 2017)

⁸⁷ About publication of "The Almanac of Uzbekistan 2016", Center for Economic Research (<http://www.cer.uz/en/publications/2830>) (Most recently accessed: May 19, 2017)

⁸⁸ Figures are from; "Uzbekistan Economic Trends 2012" for 2012 and 2013, The Japan Automobile Manufacturers' Association (http://www.jama.or.jp/world/world/world_t2.html) for 2013-2015: (Most recently accessed: May 19, 2017)

(3) Textile industry⁸⁹

Under the 2017-2019 “Action Program for the development of textile industry, sewing/knitting manufacturing industry,” corporations in this sector are exempt from the obligation to convert foreign currency earned from exports into local currency as of January 1, 2017. An inspection facility has also been established to simplify certification procedures for textile products. A private sector enterprise constructed the facility, for which the Ministry of Economy is the competent authority.

(4) Agriculture

November 2016 saw the International Trade Fair of Fruit and Vegetables held in Tashkent to promote fruit and vegetable exports, featuring the participation of over 300 companies, including traders, producers and distributors from more than 20 countries. As a result, Uzbekistan companies were able to conclude 355 contracts for the export of fruit and vegetables worth over one billion US dollars⁹⁰.

3.1.2.3. Priority Sectors

On February 7, 2017, the President approved the “Strategy Action for the Development of The Republic of Uzbekistan 2017-2021”. This action plan calls for modernization and diversification of existing industries, restructuring of the financial system, protection of private business owners and entrepreneurs, expansion of diplomatic ties, incentives for foreign investment, development of tourism and structural reform of farming. The contents of this strategy reflect the Uzbek government’s intentions to focus on the agricultural sector, agricultural product processing sector, financial system, IT-related industries and tourism sector as well as prioritizing small businesses, regardless of sector.

⁸⁹ The Japan/Uzbekistan Investment Environment Maintenance Network (<http://www.jp-ca.org/>): “Politics and Economics Fixed-point Observation Report” Uzbekistan Now: vol. 44 (Most recently accessed: March 31, 2017)

⁹⁰ The Japan/Uzbekistan Investment Environment Maintenance Network (<http://www.jp-ca.org/>): “Politics and Economics Fixed-point Observation Report” Uzbekistan Now: vol. 44 (Most recently accessed: March 31, 2017)

3.1.3. Current status of SMEs (small and medium-sized enterprises) in the Manufacturing Industry

3.1.3.1. Challenges of SMEs

In Uzbekistan, the principle framework of national policy for SMEs have been established by the "Uzbek Republic SMEs and Private Enterprise Activity Support Program" (hereafter national program) enacted in 1995. In 2010, "Industrial Modernization and Infrastructure Development Program 2011-2015" was formulated to establish basic direction of development of industrial development and development priority field.

SMEs have introduced the leading technologies such as sewing equipment by collaborating with foreign-funded enterprises in the textile industry. Meanwhile, the light industry remains in the system of former Soviet Union and many companies still use dilapidated facilities and equipment. In addition, it is reported that procurement of materials do not go as planned due to the shortage of fund. Under such circumstances, there is a need for in - house education such as introduction of 5S / KAIZEN, quality control and CS.

Main factor which prevents overseas enterprises' entry is exchange management by the Government of Uzbekistan. Since domestic commerce mandates the use of domestic currency Sum, it will be paid by Sum when a foreign company conducts a local transaction,

In addition, when using US dollars in foreign commerce, companies have to submit "convert application forms" and "contracts with foreign partners" to banks at the time of purchasing foreign currencies and receive a currency exchange permission from government authorized banks, which makes the convertibility of domestic currency extremely low.

On the other hand, since July 2015, it has been regulated that all JSC and its subsidiaries have to announce financial statements and published financial statements based on IFRS. Furthermore, external accounting audits based on International Standards on Audit (ISA) will become mandatory from 2018. These trends indicate that modern management methods are gradually introduced in Uzbekistan.

The government of Uzbekistan government is gradually promoting the improvement of business environment and privatization for attracting foreign capital. Therefore, there is a possibility that foreign currency regulation will be eased or even abolished⁹¹.

⁹¹ Source: JICA (2011), "Sector Analysis Paper On Small and Medium Business Promotion in the Republic of Uzbekistan"

3.1.3.2. Interviewed Company Overview

In the field survey, interviews were conducted with 10 companies that were introduced from the Japan Center and the local chambers of commerce in three cities of Tashkent, Samarkand, and Bukhara. In addition, there is one more company which was visited by making use of the network of the Survey Team. The interview targeted enterprise owners, executives and management. There were 5 companies in Tashkent: 4 in manufacturing, and 1 in service. There were two companies in Samarkand: 1 in manufacturing, and 1 in service. Bukhara had 3 companies: 2 in manufacturing, and 1 in service. The list of companies visited is shown in Table 2-5.

Table 3-5 Lists of Interviewed Companies

	Company Name	City	Field	Products/ Service
(1)	Samo-Product LLC	Tashkent	Light industry	Production and sales of office furniture
(2)	Art Mebel Group	Tashkent	Light industry	Production and sales of office furniture, Sales of jams
(3)	La Tienda	Tashkent	Textile industry	Clothing (manufacture and sales of own brand products)
(4)	Pronto	Tashkent	Textile industry	Clothing (OEM)
(5)	UZINTOUR	Tashkent	Car service	Hire car for foreigner and foreign companies
(6)	Ziola Medical	Tashkent	Medical industry	Medical durg sales
(7)	LLC Tamirloyiha	Samarkand	Light industry	Clothing manufacture
(8)	URGUT SHANHAI LLC	Samarkand	Textile industry	Clothing manufacture
(9)	Asia-Hotel	Bukhara	Tourism	Hotel management
(10)	SulSherJahon	Bukhara	Food industry	Sausage/Dairy products
(11)	Livadiya-Bukhara	Bukhara	Food industry	Dried Fruits / Small dry fruit making machines

(1) Samo-Product LLC

Samo-Product LLC is a company that produces and sells office furniture founded in 1999. The furniture production factory employs more than 120 employees. Mr. Dadakhodjaev is a chief executive officer (CEO) and learned Japanese style "UJC PMP course" at Japan Center and is familiar with business and KAIZEN system.

Today, based on knowledge and skills gained from Japanese experts, he is reforming his company's management system. He discuss about all problems faced by companies collecting, along with possible solutions, with all the managers of the company during the weekly meeting. Furthermore, these problems are usually discussed internally to find out the solution.

Mr. Dadakhodjaev introduces office furniture produced by companies using direct marketing technique for all exhibitions. He also offers post-sales services to secure customers. All of this promotion technique results in 70% of customers usually purchasing office furniture and returning. The company also has a second factory which produces fruit jam and Uzbek sugar, and these

products are mainly exported to USA, Russia and Kazakhstan. According to Mr. Dadakhodjaev, the company will open a new office to increase its production capacity and export the product to Japan as well.

(2) Art Mebel Group

Established in 1999 as a furniture sales company, it is managed by three relatives. Currently there are 120 employees. Three of these executives are studying management seminars at the Japan Center and engaged in assembling work by using KAIZEN method.

The company serves for business-to-business basis, and it has a business philosophy of "quality first", "customer first", "service first". There are 3,250 SMEs in Tashkent city of which 30% 450 companies are competitors.

As for human resources development, they want to raise the quality of products through education, guidance and training of workers, but they are not satisfied with the progress of technology transfer. For that purpose, they hold a division workshop on a regular basis within the company and conduct training activities, including problem analysis. Their training includes 5S/KAIZEN training at a special course at the Kazakhstan-Japan Human Development Center (hereinafter referred to as "the Japan Center"), or training on furniture design in Italy or Germany.

They have also planned to sell fruit jam produced and processed in Uzbekistan and have exported the jam to American dealers for about the past 4 years. Moreover, they are planning to open an office in Japan to sell furniture as an overseas project.

(3) La Tienda

In 2012, the representative founded the company in collaboration with one college friend. In making this entrepreneur, the representative studied business know-how at the Japan Center under the guidance of Japanese experts, then consulted his friends, and developed business.

The company exports sewn clothing to Russia, and currently employs designers and about 150 workers. In addition, they do not conduct in-house training in human resource development, but are employing technicians with sewing practical experience.

The production facility is still conventional small-scale mass production by semi-automatic production equipment, and upgrading the production system is a challenge in the future. At the time

of establishment, it was using sewing machines made in China, but recently switching to made in Japan⁹². They use regular service of operation and maintenance (including (including instruction on operation technique) from a Japanese sales agent.

(4) Pronto

Utilizing the state-owned factory of the former Soviet era, Turkish family of three brothers is jointly managing the company. The design of the garment is brought in from Italy, and it is manufactured by arranging design inside the company. Then about 80% of the products are also exported to Italy and Germany. Although sewing equipment is Taiwan-made machinery, it was confirmed that they also introduced printing machines made in Japan (Tajima).

About 10 workers in the factory, the management chief and the supplementary administrator carry out the whole management with one person, 450 workers currently are in their factory, and the scale is planned to expand to 1,000 in the future.

As a characteristic of the company, each department including workers, foreman, and management supervisors has know-how such as management of sewing equipment and materials warehouse, other equipment, various design standards, and it is utilized for management of production method. In this garment factory, guidance and training for workers, etc. are conducted in OJT method, while training for industrial personnel are trained in Italy.

(5) UZINTOUR

It is run by an individual entrepreneur who is doing car rental service for tourists and overseas business persons. Currently employees hire 3 drivers and 1 clerk. Especially when he dispatched his car to customer who visit by business from overseas, the president himself is in charge of driving to customer with safety first.

(6) Ziola Medical

Mr. Numon S. Inoyatov, executive manager, was a medical pharmacist studying in Europe, acquiring a bachelor's degree, working for the Ministry of Health, but became independent. He currently works as a medical consultant and imports medical equipment and medicines from Japan and Germany, and has a rich handling capacity and knowledge.

⁹² Japanese sewing machine can produce competitive products with better finishing created by the thinner needle than other sewing machines. While the needle of Japanese does not scatter when broken, the sewing machines made in China has thicker needles that create rough stitches and are producing products for domestic market.

Treatment at public hospital is free in principle in Uzbekistan, but additional medicine is often charged.

Doctors and other staffs at public hospitals are standing behind in terms of training. Therefore it is not possible for them to improve medical technology by overseas training. Citizens as well as people engaged in medical field also wish to establish medical insurance enactment sooner.

(7) LLC Tamirloyiha

The head office is located in Russia and the funds at the time of incorporation were established with subsidies from private funds and CCI. Currently 20 employees are employed from surrounding areas such as Samarkand. Their products are mainly sports garments; 20 to 30 kinds of clothing from children to adults are produced in two to three production lines on small variety mass production system.

The planning and design of clothing is done at the headquarters, sewing equipment is procured from Turkey, Korea and China. About 60% of finished products are exported to Russia and about 30 % to Kazakhstan. Technical management and instruction of operation are regularly provided by visiting Turkey engineers.

(8) URGUT SHANHAI LLC

This garment factory has Chinese capital and operated by a Chinese manager. The sewing machines include machines made in Taiwan and in Japan. Their sewn products are mainly for domestic sales. There are about 12 employees in total: 1 engineer at the production plant and 1 assistant technician.

Product designs are brought from overseas, and some changes are added according to the domestic needs.

There are dozens of sewing factories within Uzbekistan industrial zones: competitors include domestic, Italian, and Turkish enterprises. Therefore it is always necessary for them improve the quality of the products and constantly examine the plan to meet the market needs.

(9) Asia-Hotel

Asia Hotel where Mr. Kamol Mahmudov is the general branch manager operates in four cities of Tashkent, Samarkand, Bukhara, Hiba, which contributes to the regional economy and tourism industry. Especially tourists from Japan are concentrated during the year-end and New Year holidays, from April to May, and September to October.

In his opinion, the hotel is planning to accept larger number of tourists from abroad by upgrading planning skills for the Japanese tourism industry, hospitality service and manner through in-house

training in the future.

(10) SulSherJahon

The company was first established by a father processing ham, sausage, and milk, etc. for the domestic market. In 2007 his three sons took over the company with subsidized funds from CCI and self-fund Established as a primary investment.

Ham products produced from factory have excellent results at regional competition. The dairy processing plant that used to be abandoned at the time of independence from former Soviet Union was sold from the government of Uzbekistan and renovated. Processing technology and production capacity are inherited from the former Soviet Union era, while machinery is imported from Russia and China.

The company has a technical training system and participates in a technical workshop carried out by GIZ to ensure quality and production control thoroughly. Currently there are about 60 employees and the product types are from 6 to 7 processed meat and dairy products.

Currently they are producing for the domestic market, but they want to improve the processing technology, quality control according to the international quality standards, and want to market agricultural and livestock products to the Japanese market in cooperation with Japanese manufacturers.

(11) Livadiya-Bukhara

Private enterprise "Livadia-Bukhara established a production base in Bukhara in 2011. Currently, it is selling locally harvested dried fruit in the country made by a special technique. Their dried fruit has won the first prize in a competition with the recommendation of CCI. They are also awarded the best company in 2015. In Uzbekistan, dried fruits of grapes, apricots, sugar soybeans, peanuts are in demand as teacakes or snacks, therefore the market needs are high.

Initial investment for establishment started with self-financing and subsidies from CCI. They also developed processing equipment. Among them, small dryer are popular among SMEs and other companies in the country. The company owns the patent right over the developed equipment. Fruit drier as well as dried fruits are marketed to the domestic market. Improvement of processing technology, quality control in line with international standards is expected, and they are ready to respond to the task in the future.

3.1.3.3. Consideration from the Current Situation of Interviewed SMEs

Based on the interview survey of local companies, the challenges for SMEs in Uzbekistan and the countermeasure against them are analyzed as follows:

(1) Improvement of quality and technology

Despite the willingness to improve product quality and technology, there were differing opinions about the concrete approach. For example, although Samo-Product LLC is working on improvement of the product quality in food processing by technology transfer from overseas, or improvement of the facilities, there are technical limitations in regard to facility investment and equipment management (maintenance and operation). Therefore, they wanted technical assistance from the outside. On the other hand, La Tienda is also aiming to expand sales channels of its own brand products through the use of ICT, but there is a shortage of human resources familiar with ICT within the company.

(2) Human Resource Management / Quality Control

Textile factory company LLC Tamirloyiha was producing clothing by hiring 120 to 150 local youths. The production facility was a large-scale factory constructed during the former Soviet era and was not equipped with automatic production equipment, and continues small variety mass production system of clothing items. Similar production environment was found in other companies. When evaluating from the perspective of 4M management (Man, Machine, Material, and Method), safety of working environment as well as welfare benefits of the workers has been hardly seen.

As maintenance of the working environment is directly linked to quality control and quality improvement, management needs to deepen their understanding of human resource management, employee treatment, and labor management. In addition, in order to realize a stable supply of products, it is important for management to deepen their knowledge of production control, such as inventory control. We believe that the Japan Center will continue to play a major role in implementing trainings on human resource management and production management for management.

Meanwhile, in regard to quality control, even the companies such as Art Mebel (furniture manufacture) and Livadiya-Bukhara (food processing) that can expect future business opportunities in 5S/KAIZEN activities and third party evaluations (ISO, HACCP, etc.).

3.1.4. Japanese Companies' Presence and the Fields of Investment

3.1.4.1. Policies to Attract Foreign Investment

Uzbekistan is aggressively striving to attract foreign investment, leveraging advantages such as its political and economic stability, low tax rates, rich mining/natural resources, geological advantage in the Central Asia region and high national educational standards.

Conversely, Uzbekistan ranks 118th of 160 countries in a logistical efficiency index announced by the European Bank for Reconstruction and Development (EBRD). Among various shortcomings, the most serious is the lack of effective cargo tracking. One of the reasons is thought to be the fact that as a double-landlocked country, the transporter changes each time a border is crossed, which means cargo cannot be tracked using a single system. Moreover, strict foreign currency regulations are in place in Uzbekistan and overseas fund transfers are restricted. The difficulty in exchanging local and foreign currencies hinders the business environment in general and is considered a weakness.

Free industrial economic zone

As things stand, free industrial economic zones have been established in Navoiy, Angren and Jizzax; tasked with implementing special regulations and administrative measures to enhance economic growth. Activities to attract foreign investors are also implemented by the Ministry for Foreign Economic Relations, Investments and Trade, one example of which included a 2010 seminar at the Japan Chamber of Commerce and Industry entitled “Navoiy Free Industry and Economic Zone – New investment opportunities in Uzbekistan for Japanese partners.”

There are plans to spend 24 billion Som (6.35 million US dollars⁹³) on maintaining infrastructure maintenance, while the Uzbek government also intends to try and simplify and computerize the corporation registration procedure.⁹⁴

During the 2017 investment program, the decision was also taken to expand the limitation on government-guaranteed foreign loans, which is considered attributable to the declining price of natural resources and the economic slowdown facing the country's trading partners (China and Russia etc.), prompting a search for inward investment from other countries. As part of this program, the limit on government guarantees has been increased by 38.5% as part of efforts to secure foreign investment and loans.

⁹³ XE quick cross rate (<http://www.xe.com/>) (Most recently accessed: May 13, 2017) 1 US dollar=3,776.67 Som

⁹⁴ The Japan/Uzbekistan Investment Environment Maintenance Network (<http://www.jp-ca.org/>): “Politics and Economics Fixed-point Observation Report” Uzbekistan Now: vol. 44 (Most recently accessed: March 31, 2017)

3.1.4.2. Japanese Companies' Presence and the Fields of Investment

The activities and investment of Japanese enterprises are focused on natural resources and consumer goods sectors, in which trading companies play a major role. In 2007, ITOCHU Corporation and Isuzu Motors commenced local production. In 2015, meanwhile, Mitsubishi Heavy Industries and Mitsubishi Corporation were awarded contracts from the Chemical Industry Corporation to construct a large-scale fertilizer plant.

The number of Japanese residing in Uzbekistan is quite small at 126 (as of October 2015) and there are 18 Japanese companies with a presence in Uzbekistan, according to JETRO. The lack of increased investment by Japanese companies may be attributable to the fact that compared to pre-existing corporations from China, Korea, Turkey and Germany, inland transportation is restricted, resulting in costlier and uncompetitive transportation.

3.1.4.3. Presence of Foreign Countries Other than Japan and Their Investment Fields

The activities and investment targets of countries other than Japan are summarized as follows:

Korea

During the investigation, it was confirmed that Korean companies are actively engaged in market penetration and investment. Feedback also came against a background of top-level shuttle diplomacy which helped achieve projects successfully and characterized by relatively large numbers of privately invested projects which were not reliant on public funds. In the logistics sector Korean Air operates the Navoiy Freight Terminal by outsourcing management⁹⁵.

The catalyst for progress without relying on public funds seems to be efforts made by Korea to consolidate collaborative relationships since relatively early times. Of course, government policy such as tax incentives may also be attractive but when private companies want to be active at sight, they will need human resources with a full insight into those areas as well as wide-ranging personal connections.

As for interaction of people between the two countries, President Karimov visited Korea in 1992, while between 1994 and 2006, Korea provided Uzbek nationals with the opportunity to work in Korea.

⁹⁵ JETRO (https://www.jetro.go.jp/ext_images/_Reports/01/27c5deac39d69b9c/20150121.pdf) "Korean Enterprises' Market Penetration in Central Asia" (Most recently accessed: May 19, 2017)

Korea is also implementing a policy to expand its human and cultural network. Specifically, Korea is actively supporting Korean oriented people, many of whom reside in Central Asia, through Korean language education and vocational training on IT, farm management, automobile maintenance and so on, as well as promoting exchanges of information via Overseas Internet Volunteers (a branch of World Friends Korea, volunteers dispatched overseas by the Korean government) and Korean IT Support Teams⁹⁶. These activities have spawned a human network which has improved mutual understanding of both countries and subsequently encouraged Korean private companies to advance into Uzbekistan with their own funds.

Germany

It is advancing in the auto industry. MAN Auto Uzbekistan, a joint venture between German MAN Nutzfahrzeuge AG and Uzbek OJSC UzAvtosanoat, is establishing an on-site assembly plant.

United Kingdom

It has established the Uzbek-British Trade and Industry Council⁹⁷ since 1994 as a UK trade promotion body. Its objective is to support enterprises wishing to advance into Uzbekistan as well as supporting enterprises which have already advanced or invested in Uzbekistan. It employs around 130 staff and is supported by the UK Ministry of Foreign Affairs and Uzbekistani Ministry for Foreign Economic Relations, Investments and Trade.

Once a year, they hold a meeting in either Tashkent or London. In 2016, the 23rd such meeting was held in November. During this meeting, participants from Uzbekistan proposed the wish to strengthen fields in industries such as oil/gas, energy, mining, medical, education and tourism⁹⁸.

The investment statuses of major countries are shown below:

⁹⁶ JETRO (https://www.jetro.go.jp/ext_images/jfile/report/07000361/c_asia_krcompany.pdf) "Trend research of Korean enterprises in Central Asia" September 2010 (Most recently accessed: May 19, 2017)

⁹⁷ Uzbek-British Trade and Industry Council (<http://www.ubtic.ort>) (Most recently accessed: May 19, 2017)

⁹⁸ About GOV UK (<https://www.gov.uk/government/world-location-news/uzbek-british-trade-and-industry-council-meeting-held-in-tashkent>) (Most recently accessed: May 19, 2017)

Table 3-6 Investment status by country⁹⁹
(in billions)

Ranking	Country	UZS	US\$100
1	Korea	2,354.7	6.2
2	Russia	1,769.9	4.7
3	China	1,721.5	4.6
4	Switzerland	413.1	1.1
5	The Netherlands	289.3	0.8

3.1.5. Industrial Human Resources Needs of Local Industry

In regard to the needs of industrial human resources in Uzbekistan, the following three points can be found from the results of the field survey:

(1) Management for Industrial Transformation and Necessary Technical Personnel

The level of education in Uzbekistan is high, but the managers who support SMEs generally have poor knowledge of efficient and economic manufacturing. Since the former Soviet era, there has been a trend of small variety mass production system. However, if they aim to transform the conventional production system to labor-intensive, built-to-order manufacturing, and multiproduct variable production, it would be necessary to acquire capacity of optimization, pursuit of economical. Production and production technology are to enhance competitiveness.

Especially in the case of SMEs that do not have human resources with production management technology, training will be expected to capacitate engineers/technicians to be able to manage production processes technically, or be skillful in product development, or in proper management and maintenance of production equipment and tools.

(2) Production Management Personnel for Industrialization with Better Product Quality

In Uzbekistan, many companies manufacture products in a production line that mixes aging production equipment and advanced IT equipment. It is necessary for the companies to renovate aging production equipment, introduce in-house equipment, improve design capabilities, strengthen product inspection functions and strengthen cost and quality-competitiveness with Chinese and Korean products that flow into the country.

Recognition of Toyota's production management method (5S, KAIZEN method, etc.) and the need

⁹⁹ Data from "Almanac of Uzbekistan 2016"

¹⁰⁰ XE quick cross rate (<http://www.xe.com/>)(Most recently accessed: May 13, 2017) 1 US dollar=3,776.67 Som

for environmental improvement at the production site were noted by Art-Mebel (furniture manufacturer), Livadiya-Bukharasya (food processing company).

Therefore, it is required to conduct training of engineers and managers for issues such as quality control, safety management, optimization of production, reduction of environmental burden, etc.

(3) Finance to Support the Industry / Marketing Information, and Information Dissemination through IT Human Resources

In terms of finance, although the microfinance law has been improved, there are bank lending institutions for small companies such as bank micro loans and micro finance, but since interest rates are high and lending periods are short in many cases, long-term borrowing. It is difficult for the manufacturing industry to need fund procurement in particular. In addition, funds for entrepreneurship and capital investment are often covered by self-financing, borrowing from relatives and friends, but since companies also lack fundraising experience and business experience, the fund-raising know-how there is a problem that the necessary documents can not be prepared.

In marketing, information on overseas markets is based on the Internet, and there are many cases of basic knowledge and lack of information.

On the other hand, while the enterprise side is trying to transmit information via the homepage or the mass media, the environment has not yet prepared where the research and development departments which hire IT engineers to create new "wisdom" to lead to the economic development through the formation of products and services transmit and share the information with the manufacturing department.

3.1.6. Sectors to be Intervened for Further Human Resource Development for Industrial Promotion

(1) Re-training Business Managers and Staff

For industry promotion, it is essential to strengthen the capacity of corporate managers and staff. Among the subject company managers for interview survey, there are those who have completed Business Course / Professional Management Program (PMP) at the Japan Center, and as a result of the training, they mentioned the following positive achievements by taking the course;

1. They have obtained new perspectives.
2. They started up new business with other people.
3. They are utilizing what they learned in their own companies.
4. A network of graduates and opportunities to exchange opinions among different fields of work.
5. Managers and lecturers were both supportive and helped in the selection and import of Japanese

equipment.

In addition, the Mini MBA course conducted by the Japan Center offers lively knowledge, beyond academic learning such as business administration, marketing theory, etc. by lecturers. It was confirmed by an interview with the graduates. Further utilization of the Japan Center is expected as a place for re-training for corporate managers and staff.

At the Samarkand Chamber of Commerce and Industry (CCI), the Survey Team heard that there was a lecturer who can teach 5S / KAIZEN. He was trained in Japan by JICA's training system.

In particular, the challenge is that Training of Trainers (ToT) has not been developed for nurturing human resources who is capable of comprehensively guiding entrepreneurship, corporate management, accounting, sales, etc., at supporting organizations at local level.

(2) Strengthening a Competitive Management Structure

In the textile industry of Uzbekistan, in order to secure the foundation in domestic market and overseas market in price and quality under the competition with mass imported goods from China etc., establishment of production system and operating system, management which trains mid-level engineers.

Specifically, some companies such as URGUT SHANHAI LLC specializes their production system in OEM like semi-automatic production equipment (sewing machine). They produce high added value products which meet the foreign market needs. As a result, some companies export 80% of their products to Russia while 20% of those are sold in domestic market.

In addition, La Tienda exports more than 90% of the products with proposals of plans and designs to European countries, mainly in Italy and Germany by minimizing the production system to produce various variable quantities with less varieties.

In this case, the production line corresponds to the market demand by shifting its system among the old type of mass production, the small size production, and the small quantity production. They also add value by establishing their own brands.

(3) Utilization of Tourism Resources

Tourism development is one of the areas prioritized for the future. It is necessary to develop an environment where travelers can enjoy themselves without stress in places with tourism resources, such as Samarkand and Bukhara.

Also, Samarkand and Bukhara have many traditional folk crafts, and these traditional production techniques are passed down through the generations in their own way. For example, ceramic tea ware, golden fiber (silk thread), carpet crafts, paintings, ruins, and photographs the like are part of the charm of these areas as World Heritage Sites.

For companies involved in souvenir production, knowledge education such as the importance of the World Cultural Heritage, existence value, protection of the environment around a cultural heritage, etc., has less given to the employers or employees, including management. As a result, there are outstanding delays in national and regional efforts for infrastructure improvement (toilets, hygiene management, etc.) around cultural heritages.

(4) Learning Practical Applied Technology

As a corporate support in many industrial fields in Uzbekistan, entrepreneurs of SMEs are often seen active in the agricultural fields, food processing fields, textile industry fields, light industry fields, tourism fields, etc., according to the government support policy.

It is necessary to build an environment to foster the ability to combine element technologies related to successful business and unique technology that companies have cultivated over many years. It will be a challenge to construct a system of OJT for engineers/technicians in charge of production technology.

3.2. Outline of the Education Sector

3.2.1. Basic Data for Education

The following table shows the basic data of education in Uzbekistan.

Table 3-7 Basic Data of Education in Uzbekistan

	Figure	Year
Enrolment Rate		
Primary Education	94%	2015
Secondary Education	92%	2015
Number of Schools		
Primary, Secondary Education (integrated)	9,606 (44 for only primary level)	2015
Secondary Education	1,692 (Lyceum: 143 College: 1,549)	2015
Higher Education	75	2015
Number of Students		
Primary Education	2,025,823	2015
Secondary Education	2,432,339	2015
Number of Teachers		
Primary Education	390,105	2015

Reference: JETRO¹⁰¹, World Bank¹⁰²

3.2.2. Education Policy and Law

3.2.2.1. Education Policy

The Education Sector Plan for 2013-2017 was formulated in September 2013 by the Government of the Republic of Uzbekistan. The sector plan comprehensively analyzed the current state of the education system and justified the strategic measures in the education sector. A plan of action encompassing eight programs was developed with a view to achieving the following outcomes:

- Children's health and personalities are developed in preparation for learning in school (Early Childhood Development);
- The general knowledge, independent thinking skills, and organizational skills of learners are developed in preparation for successful progression in the education system (General

¹⁰¹ JETRO, "Uzbekistan BOP Survey Report: Education Situation", https://www.jetro.go.jp/ext_images/theme/bop/precedents/pdf/lifestyle_education_20150107_uz.pdf (accessed March 20, 2017) .

¹⁰² World Bank, World Bank Open Data, <http://data.worldbank.org/>, (accessed June 1, 2017).

Secondary Education);

- Graduates from Secondary Specialized Vocational Education are prepared for successful transition to the labor market or the higher education system (Secondary Specialized Vocational Education);
- Teachers are prepared to transmit knowledge, independent thinking, and organizational skills to learners and to develop the personalities of learners in preparation for their contribution to society (Teacher Training and Re-training);
- Graduates are prepared as highly qualified specialists to contribute to scientific progress and socio-economic and cultural development (Higher Education);
- Adults are empowered to expand their knowledge and skills according to their needs and interests through informal adult education (Adult Education);
- Opportunities are created for children and youth to pursue their interests during their free time (Out-of-School Education);
- Children and youth with special educational needs are supported in accordance with their specific requirements and/or talents to enable them to adequately participate in education (Education for Special Education Needs).

The following tables summarize the outputs for Secondary Specialized Vocational Education, Teacher Training and Re-training, and Higher Education (the outputs related to industrial human resource development).

Table 3-8 Outputs for Secondary Specialized Vocational Education

	Output	Strategic Area
1	Training relevant to the needs of the labor market and society is ensured.	Policy
2	A modern technical and informational base for the respective profiles is ensured.	Infrastructure
3	A system for the recruitment of highly qualified teachers and instructors with skills in modern pedagogy and information technology is ensured.	Staff Development
4	A functional system is established for the professional development and re-training of teachers and practical skill trainers.	
5	A strategy is developed and introduced for monitoring the quality of the training and re-training for personnel for SSVE.	Monitoring and Evaluation
6	Enhanced social partnership mechanisms are in place between vocational colleges and companies for the job placement of graduates by specialization.	Partnerships and integration of approaches
7	An effective system for professional orientation in SSVE schools is ensured.	Professional Orientation

Table 3-9 Outputs for Teacher Training and Re-training

	Output	Strategic Area
1	Teachers and Masters of Professional Education are prepared according to modern requirements for education and upbringing.	Policy
2	A flexible in-service teacher training system in line with the modern requirements, interests, and needs of individual teachers has been developed.	
3	The material, technical, and informational bases for in-service institutions are strengthened.	Infrastructure
4	The capacity of in-service teacher training staff is ensured in terms of modern methodologies and technologies, teaching and research experience, and the ability to pass on knowledge and skills effectively.	Staff Development
5	A mechanism is in place for monitoring and evaluating the effectiveness of re-training and skill-improvement of personnel.	Monitoring and Evaluation

Table 3-10 Outputs for Higher Education

	Output	Strategic Area
1	The continuity of education from General Secondary Education & SSVE to Higher Education is ensured.	Policy
2	The transition into the Bologna Process is intensified to help ensure quality education.	
3	Higher Education Institutions are rehabilitated and laboratories are equipped according to the President's decree of May 2011.	Infrastructure
4	The professionalism of faculty members is strengthened in terms of subject knowledge, and knowledge in IT, English, and contemporary teaching methodologies.	Staff Development
5	An optimized mechanism is in place for monitoring the preparation of highly qualified specialists.	Monitoring and Evaluation
6	The integration of science, higher education, and industry has been deepened.	Partnerships and integration of approaches
7	Staff participation in international research in Education & Science is increased.	International Exchange
8	Universal access to Higher Education is secured.	Access

The sector plan for 2013-2017 is under evaluation and will be followed up. The result will be reflected in the coming sector plan for the 2018- 2022 phase

3.2.2.2. Education Law

Article 41 of the Constitution states that:

- Each person has the right to education.
- The State guarantees free general education.
- The school is supervised by the government.

The following major laws on education are in effect.

Table 3-11 Major Laws on Education

Title	Year	Articles
Law on Education	1997	“Education is promulgated as a priority in the area of public development in the country” (Article 3); “Each person has a guarantee to equal rights to education regardless of the person’s gender, language, age, racial and ethnic background, beliefs, faith, social background, activities, or place duration of residence in the Republic of Uzbekistan” (Article 4)
Law on the National Program for Personnel Training	1997	Development of human resources in Higher Education and Vocational Education to meet the needs of the labor market.
Law on Guarantee of the Rights of the Child	2008	“educational, healthcare, and cultural-enlightenment institutions shall be adapted to provide free access for children with disabilities and children with physical and/or mental impediments” (Article 25); “teaching and sustenance for orphans and children without parental care or other legal representatives is provided with the full support of the state” (Article 27)

In addition, the Law on the State Language (1995) and Law on Social Security for the Disabled (2008) define conditions for the education of children with special needs.

3.2.3. Education System

3.2.3.1. Compulsory Education

Education in Uzbekistan is divided into the following levels: Early Childhood Development (ECD), primary, secondary, secondary specialized, and higher education. Compulsory education continues for 9 years, from the beginning of primary school to the completion of secondary school. Although integrated primary and secondary schools are mainstream, some schools only encompass the primary level for 4 years¹⁰³. ECD education is not compulsory in Uzbekistan. Table 3-12 shows the grade and age for each education level.

¹⁰³ JETRO, “Uzbekistan BOP Survey Report: Education Situation”, https://www.jetro.go.jp/ext_images/theme/bop/precedents/pdf/lifestyle_education_20150107_uz.pdf (accessed March 20, 2017)

Table 3-12 Primary and Secondary Education in Uzbekistan

	Grade	Age
Primary	1 - 4	7 - 10
Secondary	5 - 9	11 - 15
Secondary Specialized		
▪ Academic Lyceum (general high school)	1 - 3	16 - 18
▪ Professional College (vocational school)	1 - 3	16 - 18

While secondary specialized education is not defined as compulsory, students who wish to proceed to higher education must first graduate from either academic lyceums, the equivalent of general high schools in Japan, or colleges, which offer TVET¹⁰⁴. Compulsory education at state educational institutions is free of charge. Some private schools for primary and secondary education in Tashkent, such as the Tashkent International School and British School, target wealthy citizens from foreign countries as well as those from Uzbekistan¹⁰⁵.

Uzbek has been becoming a dominant language of instruction in classes in accordance with the prioritization of Uzbek language since the registration of the “Law on Education.”

3.2.3.2. Higher Education

Universities, academies, and institutes can be listed as higher education institutions (HEIs) in Uzbekistan¹⁰⁶. The table below summarizes the characteristics of each type. Uzbek or Russian is used as the language of instruction at the HEIs. However, as shown on the Output 4 “Table 3-10 Output 5 University Education,” the Government of Uzbekistan has presented a direction focused on the improvement of the teachers’ English abilities. According to the interview with Tashkent State Pedagogical University, the University has applied English as a language of instruction in addition to Uzbek and Russian. The number of HEIs attempting to use English as a teaching language in the manner seen at the Pedagogical University can be expected to increase.

¹⁰⁴ Ibid.

¹⁰⁵ Ibid.

¹⁰⁶ Education, Audiovisual and Culture Executive Agency, “Higher Education in Uzbekistan,” http://eacea.ec.europa.eu/tempus/participating_countries/overview/Uzbekistan.pdf (accessed March 25, 2017)

Table 3-13 Characteristics of the Main Types of Higher Education Institution

	Year of Study	Characteristics
University	BA : 4 years MA : 1 - 2 years	<ul style="list-style-type: none"> • HEIs with faculties in various fields • Students can earn Bachelor, Master, and Doctor of Science degrees¹⁰⁷.
Institute	4 years or more	<ul style="list-style-type: none"> • Specialty schools offering education in specific fields. • Students can earn Bachelor, Master, and/or Doctor of Science degrees in their fields.
Academy	2 years or more	<ul style="list-style-type: none"> • Specialty schools offering education in specific fields. • The duration of study differs according to the course. Medical courses continue for 7 years in some cases. • There are two academies In Tashkent: Tashkent State Medical Academy and the State Tax Academy¹⁰⁸.

3.2.4. Education Administration

Two Ministries manage education administration: the Ministry of Public Education (MoPE) and the Ministry of Higher and Secondary Specialized Education (MoHSSE). The former is responsible for ECD, primary, and secondary education, while the latter is in charge of secondary specialized and higher education. The Cabinet of Ministers, an authority overseeing those two Ministries, manages the whole education system in Uzbekistan.

A three-layer structure consisting of the MoPE, district education departments, and education institutions is set for the management of ECD, primary, and secondary education institutions. Education departments in each district oversee the education institutions in the areas under their charge. The district level departments used to manage educational budget, but the budget management function was shifted to the district departments under the Ministry of Finance in 2007¹⁰⁹.

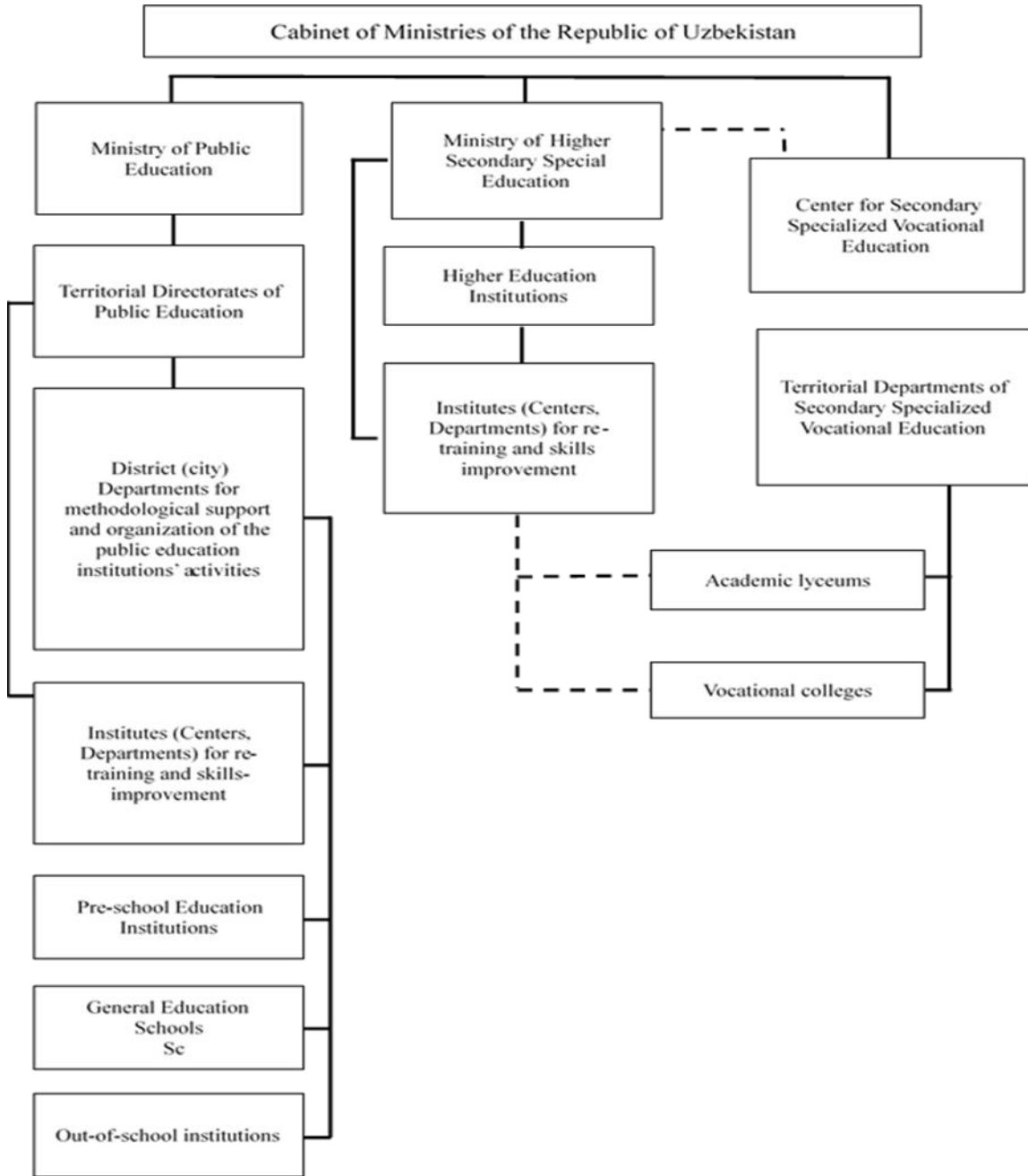
The management of higher education is organized as a two-layer structure in which MoHSSE supervises all of the HEIs. In secondary specialized education, the Center for Secondary, Specialized Vocational Education is responsible for the management of TVET institutions. Departments operated by the Center in each province manage the schools in their areas.

¹⁰⁷ In the current education system, students can only obtain Doctor of Science degrees through postgraduate study. From July 2017, Philosophy Doctor (PhD) or Doctor of Science degrees could be obtained in some fields of research.

¹⁰⁸ Education, Audiovisual and Culture Executive Agency, "Higher Education in Uzbekistan," http://eacea.ec.europa.eu/tempus/participating_countries/overview/Uzbekistan.pdf (accessed March 25, 2017)

¹⁰⁹ Republic of Uzbekistan, *Education Sector Plan for 2013-2017*, 2013, p.61.

The figure below shows the organizational structure of the education sector in Uzbekistan.



Reference : Education Sector Plan for 2013-2017

Figure 3-1 Organizational Structure of the Education Sector in Uzbekistan

3.2.5. Issues in the Education Sector for Industrial Human Resources Development

(1) Lack of Industry-Academia Collaboration

An Action Strategy for the Further Development of Uzbekistan has just been formulated and

educational organizations are launching plans to modify their roadmaps in accordance with the national policy, vision, and priority. The newly drafted Education Sector Plan for 2017-2021 is also awaiting approval as another step to align the development plan with the new sector plan.

No system of Industry-Academia Collaboration has been established and many challenges to the development of industrial human resources in vocational and higher education remain. The curriculum of TVET schools is outdated and incompatible with new industrial trends. Some promising examples are observed, such as Tashkent Polytechnic Professional College, an institution working with a Korean company to formulate a curriculum and lesson plans.

(2) Adaptation to International Standards

Many students and lecturers have had opportunities to study in European countries and conduct joint research with European universities. They face challenges, however, in adapting their knowledge to the country's education system. Qualifications obtained in other countries cannot be approved within Uzbekistan.¹¹⁰

(3) Lack of Capacity of the Universities

The competition to enroll in universities is increasing due to the small number of universities and low capacity of their faculties. According to the 2011 data of the National Statistic Committee, 766 students applied to 100 quotas on average. The acceptance rate is extremely high, especially in the fields of education, health and economics. Some universities say that the Government plans to construct and establish new universities but fails to keep up with the demands. As a result, industrial human resources are insufficient to meet the needs of the labor market. People concerned also point out the problem of corruption during the processes of entrance and promotion¹¹¹.

(4) Low Quality and Quantity of Teachers

A reformed system for teacher training and re-training will be key to catching up with European modern methodology, although some schemes, such as Erasmus + Program, have furnished teachers with opportunities to study new methodologies.

The Government recognizes the importance of teacher training to improve the education sector. The Data Collection Survey Team observed that the quota for faculty at the Tashkent Educational University had been decreased by government decision. The curriculum development of TOT to

¹¹⁰ JETRO, Uzbekistan BOP Fact Finding Survey Report • Education, JETRO, January 2015, pp.10.

https://www.jetro.go.jp/ext_images/theme/bop/precedents/pdf/lifestyle_education_20150107_uz.pdf, (accessed March 20, 2017)

¹¹¹ Ibid., pp.10.

improve the quality of education is another issue. In some IT faculties, lecturers were invited from the private sector. The capacity development of teachers and lecturers is a major precondition for the development of industrial human resources in Uzbekistan.

(5) Lack of a Career Guidance System

The university enrollment rate is 10% of the population. Graduates, however, have difficulty finding jobs. Most graduates find employment in the capital city, as job opportunities in local cities are far scarcer. According to the situation analysis of the Education Sector Plan, only 50% of university graduates are employed¹¹². The job placement services and career guidance system are not developed to match highly educated people with suitable employers.

In vocational education, a lack of follow-up of graduates has been pointed out¹¹³. In the Survey, we observed good practices at Tashkent Polytechnic Professional College, an institution that directly introduces graduates to sponsored companies.

3.2.6. Vision for Educational Reform

Since the demise of the former President, drastic political reforms have introduced under the new President in Uzbekistan. The Government has declared five priority areas¹¹⁴ for development in its “Strategy for Action in Five Priority Areas for Development by Presidential Decree” of February 2017. MoHSSE and the other ministries are formulating five year plans in accordance with the strategy. MoHSSE is now writing a draft plan that is to be discussed and appraised by related persons.

The chapter on Education and Science under priority IV. Social sphere development in the Strategy mentions the following eight activities as future directions for the Government.

- Improve the system for continuous education in accordance with modern labor market needs.
- Strengthen the infrastructure, facilities, and equipment of educational institutions.
- Expand the network of preschool educational institutions and improve the quality of the education they provide.
- Improve the quality of general secondary education – foreign languages, computer science, mathematics, physics, chemistry and biology.

¹¹² *Education Sector Plan for 2013-2017*, Republic of Uzbekistan, 2013, pp. 47.

¹¹³ JETRO, Uzbekistan BOP Fact Finding Survey Report • Education, JETRO, January 2015, pp.10.
https://www.jetro.go.jp/ext_images/theme/bop/precedents/pdf/lifestyle_education_20150107_uz.pdf, (accessed March 20, 2017).

¹¹⁴ Five priority areas: I. Improvement of the system for state and public construction, II. Ensuring the rule of law, III. Development and liberalization of the economy, IV. Social sphere development, V. Sphere of security

- Construct and reconstruct children's sport facilities and music art schools.
- Improve the work and employment prospects for students of professional colleges.
- Improve the quality and effectiveness of higher educational institutions by introducing international standards.
- Stimulate research and innovation activities and create specialized laboratories, high-tech centers, and industrial parks.

The following are the directions of educational reform in Uzbekistan, as determined through an analysis of information from the interviewees, mainly international organizations.

- Human resource development aligned with industrial needs
- Human resource development aligned with innovation
- Industry-academia collaboration
- Entrepreneurship development
- Vocational training for rural businesses
- Youth employability
- Inclusive business
- IT education
- Quality assurance with international standards
- Language education for economic development (English, Korean, etc.)

3.3. Higher Education Institutions in the Fields of Science and Engineering

3.3.1. Current Situation and Issues of in Higher Education Institutions in the Fields of Science and Engineering

(1) Research Equipment and Facilities

Industries prioritized in Uzbekistan are textile, agriculture, automobile, natural resources and Energy. With the exception of some universities, equipment for experiments/research has become outdated, so it seems difficult to supply human resources that satisfy industrial needs. Regarding the automobile industry, universities that sponsorship from companies have substantial facilities. With regard to the textile field, educational equipment has become outdated, and management software is especially a problem. Updating software is one of the most urgent issues for this field since the current systems cannot be used when old software does not work even if the condition of the equipment is good.

In other industries, institutions related to IT technology often have sponsor companies, and the price of computers is relatively inexpensive, so it seems that training of IT specialists is progressing smoothly.

(2) Insufficient University Acceptance Ratio due to Population Increase

Uzbekistan has the largest population among the five Central Asian countries. According to a report by United Nations Population Division, as of 2015, the population approaches 30 million, and there is a population increase of around 1.5% per year. The population reaching university age is increasing every year, which causes the situation that the number of applicants who want to enter university is much larger than admission capacity. Hence it is difficult to be enrolled in the faculty/department in which students would like to enter¹¹⁵.

During the USSR years, movement of persons was free within the USSR. Since 2003, working permission issued by the Labor and Immigration Bureau has

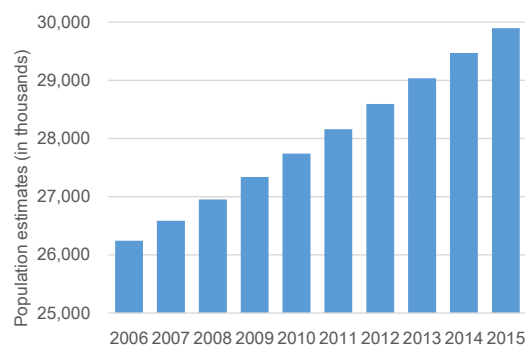


Figure 3-2 Population Changes

become compulsory for Uzbek people who want to be employed in other countries. Since it is expensive to obtain this permission, and its procedure is complicated, there are not many students aiming for employment abroad compared with other Central Asian countries.

¹¹⁵ United Nations Department of Economic and Social Affairs, "2015 Revision of World Population Prospects", <https://esa.un.org/unpd/wpp/>, (accessed June 8, 2017)

(3) Language and Notation System

In higher education institutions, some lectures are conducted in English, but mainly seem to be conducted in Russian or Uzbek. The notation of the Uzbek language has two methods, one is to use the Cyrillic alphabet such as that in Russian, while another method is to use the Latin characters such as that in English.

In Uzbekistan, after independence from the USSR, law named as “On the Introduction of the Uzbek Alphabet Based on the Latin Script” was enacted. After that, the Latin alphabet became the official notation of Uzbek. However, Uzbek written in Cyrillic is still used everywhere, not only in classrooms.¹¹⁶

In addition, some Russian words (or those borrowed from the Russian language) are heard in Uzbek conversation. It may be difficult for some to write only in the Latin alphabet, if they are not familiar with the letters. However, there is one more problem for orthography, in that some Cyrillic letters are difficult to be expressed in the Latin alphabet, and vice versa.

The process of transliteration from the Cyrillic alphabet into the Latin alphabet is a complex one. There are issues not only of notation, but also of pronunciation. Recent words, such as “innovation”, are borrowed from foreign languages, even if they are notated in Cyrillic.

Although orthography is clearly a difficult problem, it seems that at least academic papers should be written in one notation system. Considering that issues of orthography has not become evident, notation methods for academic papers should be standardized.

3.3.2. Information on Major Higher Education Institutions in the Fields of Science and Engineering

The names of the institutions with science/engineering faculties in Tashkent, Samarkand, and Bukhara listed below were retrieved from websites. After approval from JICA headquarters, the Survey Team visited these institutions with support from the JICA Uzbekistan Office.

¹¹⁶ Lex.uz (National Database of Legislation of the Republic of Uzbekistan), “О введении узбекского алфавита, основанного на латинской графике (On the introduction of the Uzbek alphabet based on the Latin script)”, http://lex.uz/pages/getpage.aspx?lact_id=112283, http://www.lex.uz/pages/GetAct.aspx?lact_id=125412, (accessed June 8, 2017)

Table 3-14 List of Major Higher Education Institutions in the Fields of Science and Engineering

Visit Day	Location	Name of Institution
March 4	Tashkent	Tashkent State Agrarian University
March 4	Tashkent	Tashkent Institute of Textile and Light Industry
March 6	Tashkent	Moscow State University in Tashkent named for M. V. Lomonosov
March 6	Tashkent	Tashkent University of Information Technology
March 7	Tashkent	Tashkent State Technical University Named after A.R.Beruni
March 9	Tashkent	Tashkent Chemical Technological Institute
March 10	Tashkent	Turin Polytechnic University in Tashkent
March 10	Tashkent	National University of Uzbekistan named by after Mirza Ulugbek
March 10	Tashkent	Center for High Technologies
March 13	Bukhara	Bukhara Engineering Institute of High Technology
March 13	Bukhara	Bukhara State University
March 14	Samarkand	Samarkand State University
March 15	Samarkand	Samarkand branch of Tashkent University of Information Technologies

In comparing facilities/equipment in universities among these cities, no significant gap between institutions in Tashkent (capital city), Samarkand and Bukhara, could be observed during the visits.

The outline of the institutions are described below:

(1) Tashkent State Agrarian University

Name of Institution	Tashkent State Agrarian University (TSAU)
Name in Russian	Ташкентский государственный аграрный университет
URL	http://agrar.uz/ (accessed: June 18, 2017)
Languages used	Uzbek, Russian, English

TSAU was established in 1991, based on the Tashkent Institute of Agriculture, established in 1930. It became the only agricultural education and research institution in Central Asia.

Seven faculties are available in the university as follows: the Faculty of Agronomy, the Faculty of Agro-engineering, the Faculty of Management in Agriculture, the Faculty of Forestry and Medicinal Plants, the Faculty of Zoo-techniques and Silkworm-breeding, the Faculty of Selection, Seedbreeding and Plant Protection, and the Faculty of Horticulture and Viticulture.

Also, there are four centers: the Information Resource Center, the Information Technology Center, the Information and Counseling Center, and the Personnel Training and Re-training Center.

TSAU prioritized some research activities such as Agricultural Economy, and Plant Protection. Other research activities, such as that on Cotton Fiber, Dairy Products, Quality Control of Wool, and Soil Erosion have been also conducted.

As a relationship with Japan, the JICA technical cooperation project (regional proposal type) named “Enhancement of Uzbekistan’s Farmer’s Income through applying Modern Apple Growing Technology” was implemented from March 2015 to March 2017. At the farms of TSAU, Samarkand Agriculture Institute and Scientific Research Institute named after M. Mirzaev, technical cooperation on modern cultivation of the popular Japanese variety of “Fuji” apples was implemented in collaboration with Hirosaki University in Aomori Prefecture. Also, equipment for agricultural education was provided in the project.

Other than Japan, various donors also support TSAU, such the Korea International Cooperation Agency (KOICA), International Center for Agricultural Research in the Dry Areas (CARDIA), MASHAV (Israel’s Agency for International Development Cooperation), GIZ, Erasmus+, Food and Agriculture Organization of the United Nations (FAO).

(2) Tashkent State Institute of Textile and Light Industry

Name of Institution	Tashkent State Institute of Textile and Light Industry (TITLI)
Name in Russian	Ташкентский институт текстильной и легкой промышленности
URL	http://www.titli.uz/ (accessed: June 18, 2017)
Languages used	Uzbek, Russian, English

TITLI was established in Tashkent in 1932 as Central Asia’s only textile research institute. There are four faculties in the institute: the Technological Faculty of Textile Industry, the Faculty of Light Industry Technology, the Faculty of Automation, Management and Printing, and the Faculty of Technology of Cotton Industry.

TITLI is a member of international organizations: the International Textile Academy, the International Printing Education Association, and the International Silk Association. TITLI also has international relationships with textile organizations in German, England, Belgium, USA, Japan, Greece, Poland, Switzerland, Czech Republic, India, Israel, and other countries.

Third year students practice for about 4 weeks as interns at major domestic textile manufacturing

companies that have student acceptance agreements with universities.

The Institute is sometimes requested by some domestic textile manufacturers for quality checks of their productions and quality checks are conducted in the analysis room of TITLI. Most of the equipment used for these quality checks were granted from JICA in 2001. Other educational training equipment for cotton processing, sewing processing, etc., was also granted by that project. TITLI has been utilizing and maintaining this equipment very carefully. However, some operation software cannot be installed to new computers due to incompatibility with the Operation System (OS). This is a critical issue for the analysis room¹¹⁷. Besides JICA Grant Aid, Toyota Tsusho provided air jet waving machine in 2014.

Other foreign donors: GIZ granted wool processing equipment, and KOICA granted spinning equipment.

In Uzbekistan, currently 60% of cotton collected in the country is used for domestic production, the remaining 40% is exported as a raw material to foreign countries. As a policy of Uzbekistan, it is aimed that 100% of cotton is produced in Uzbekistan and fibers and clothing produced in the country are exported by 2020. Therefore, TITLI will increase its significance of existence to foster more trained specialists.

(3) Moscow State University in Tashkent named after M. V. Lomonosov

Name of Institution	Moscow State University in Tashkent named after M. V. Lomonosov (MSU)
Name in Russian	Филиал Московского государственного университета имени М. В. Ломоносова в г. Ташкенте
URL	http://msu.uz/ (accessed: June 18, 2017)
Languages used	Russian

MSU in Tashkent was established in 2006. Currently they have two faculties: the Faculty of Computer Science and Applied Mathematics, and the Faculty of Social Psychology. There is one research center and two computer rooms. Third year students are trained in companies for about 3 to 4 weeks, during summer vacation. Graduates work in various fields such as programming for enterprises (including local mobile companies), software creators, family psychologists, children's psychologists, etc. Some students go to graduate school in Moscow State University, and other

¹¹⁷ The project for improvement of equipment for the Tashkent Institute of Textile and Light Industry in the Republic of Uzbekistan.

students go to graduate school in Germany, Japan, Korea and other foreign countries.

The curriculum of MSU in Tashkent is prepared by MSU in Moscow and is being implemented with the approval of MoHSSE in Uzbekistan. All international cooperation is decided by MSU in Moscow. Currently, there is no foreign partner for research institutions other than Russia. In Uzbekistan, there is cooperation between the Academy of Sciences and Uzbekistan National University.

The diploma of MSU in Tashkent is recognized by USU throughout the CIS.

(4) Tashkent University of Information Technologies named after Muhammad al-Khwarizmi

Name of Institution	Tashkent University of Information Technologies named after Muhammad al-Khwarizmi (TUIT)
Name in Russian	Ташкентский университет информационных технологий имени Мухаммада ал-Хоразмий
URL	https://tuit.uz/ (accessed: June 18, 2017)
Languages used	Uzbek, Russian, English

TUIT has obtained the current name in 2002 from the former Tashkent Electro-technical Institute of Communications, established in 1955. TUIT is unlike other governmental universities in that it is not under the MoHSSE, but under the Ministry of Information and Communication Technologies. TUIT has five branches in Samarkand, Karshi, Nukus, Urgench, and Fergana. There are about 10,000 students throughout the university (including all branches).

Undergraduate departments are the Faculty of software engineering, the Faculty of computer engineering, the Faculty of information security, the Faculty of telecommunication technologies, the Faculty of television technology), the Faculty of economics and management, and the Faculty of professional education.

Seven faculties are available in the university: the Faculty of Software Engineering, the Faculty of Computer Engineering, the Faculty of Information Security, the Faculty of Telecommunication Technologies, the Faculty of Television Technology, the Faculty of Economics and Management, and the Faculty of Professional Education.

In addition to partner companies in Uzbekistan, international partners are: Erasmus+ (implementing 7 project), KOICA, Chinese mobile phone companies Huawei and ZTE, Japanese Electronics Company NEC, and Oracle. Both Huawei and ZTE have established research facilities in the university.

TUIT has a plan to establish a media center in the university. As cooperation with Japan, a provision of educational equipment in the field of television technology is planned in the media center. It was approved by the Government of Japan in February 2017.

Also, students in the Master Degree program participate in internships in Germany and Korea.

(5) Tashkent State Technical University named after A.R. Beruni (After June 2017; Tashkent State Technical University named after Islam Karimov)

Name of Institution	Tashkent State Technical University named after A.R. Beruni (TSTU)
Name in Russian	Ташкентский Государственный Технический Университет имени Абу Райхана Беруни
Name of Institution (Current Name)	Tashkent State Technical University named after A.R. Beruni (TSTU)
Name in Russian (Current Name)	Ташкентский Государственный Технический Университет имени Ислама Каримова
URL	http://tdtu.uz/ (accessed: June 18, 2017)
Languages used	Uzbek, Russian, English

TSTU has a long history and its origins date back to the Engineering Faculty established in Turkestan People's University in 1918. In 1933, it was reorganized and changed its name to Central Asian Industrial Institute. In 1991, after the independence of Uzbekistan, the university was renamed again to its current name.

Science/Engineering faculties which are available at the University are: Power Engineering Faculty, Engineering Geology and Mining Faculty, Mechanical Engineering Technology Faculty, Engineering Systems Faculty, and Engineering and Physics Faculty. Currently there are about 11,000 students, and about 1,000 professors.

There are international relationships with Japanese partner universities, such as Kyushu University, Tsukuba University, Nagoya University, Keio University, and others. Students of TSTU can study at these Japanese universities, and there are also doctoral students being trained in Japanese companies. In addition, TSTU conducts joint research with Nagoya University in the field of earthquake management as well as around 20 technicians from Kyoto University in the field of preservation of historical buildings.

(6) Tashkent Chemical Technology Institute

Name of Institution	Tashkent Chemical Technology Institute
Name in Russian	Ташкентский химико-технологический институт
URL	http://tkti.uz/ (accessed: June 18, 2017)
Languages used	Uzbek, Russian, English

Tashkent Chemical Technology Institute was founded in 1991 based on the Faculties of Chemical Technology and Engineering Technology of the Tashkent Polytechnical Institute (currently, “Tashkent State Technical University named after A.R. Beruni”).

There are four faculties available in the institute: the Faculty of Management and Professional Education, the Faculty of Technology of Production of Inorganic Substances, the Faculty of Technology of Foodstuff Products, and the Faculty of Chemical Technology of Fuel and Organic Substances. There are about 4,000 students and 460 professors. Many graduates choose to work in the food industry, or in the oil/gas refining industry.

Collaboration with foreign institutions include EU and Erasmus+ as well as universities in the UK, France, Spain, Korea, China, etc.

The curriculum is reviewed annually by the MoHSSE, and the institute can reflect industrial needs in the curriculum from self-conducted surveys. Up to 10% of the curriculum can be changed by the institute.

Laboratory equipment has become outdated and it is desirable to update much of the equipment, but there are no plans currently due to budget constraints. Teachers are conducting their own research by using other organizations’ facilities such as that of the Academy of Sciences.

(7) Turin Polytechnic University in Tashkent

Name of Institution	Turin Polytechnic University in Tashkent (TTPU)
Name in Russian	Туринский политехнический университет в городе Ташкенте.
URL	https://polito.uz/ (accessed: June 18, 2017)
Languages used	Uzbek, Russian, English

TTPU was founded in 2009 by the UzAvtoSanoat initiative. TTPU has a cooperation agreement with Turin Technical University in Italy¹¹⁸. The main purpose of TTPU is to train experts to lead the

¹¹⁸ Politecnico di Torino (*Polytechnic of Turin*), Internationalization, <http://www.polito.it/ateneo/internazionalizzazione/?lang=en>

automobile industry in Uzbekistan, but also to develop experts in the fields of construction and IT.

67% of faculty members are Italians and the rest are Uzbek. TTPU plans to change the current ratio in four years to 20% Italian and 80% Uzbek. TTPU operates a 4 year bachelor's degree program, a 2 year master's degree program, and a short-term vocational training course for private companies' staff.

With the cooperation of JICA, a shaking table (earthquake simulator) was granted in 2012. Besides, TTPU has partnerships with three universities in Germany, one in Japan (Gifu University), and one in Korea (Hashi University).

(8) National University of Uzbekistan named after Mirza Ulugbek

Name of Institution	National University of Uzbekistan named after Mirza Ulugbek
Name in Russian	Национальный университет Узбекистана имени Мирзо Улугбека
URL	http://nuu.uz/ (accessed: June 18, 2017)
Languages used	Uzbek, Russian, English

National University of Uzbekistan named after Mirza Ulugbek was established in 1960. Undergraduate faculties in the fields of science/engineering are: the Faculties of Mechanics and Mathematics, the Faculties of Geography, the Faculties of Physics, and the Faculties of Biology and Soil Sciences. The university produces theoretical experts with outstanding IT knowledge, and graduates work mainly for Ministries. The university has established a good relationship with SMEs, which enables the university to send interns to those companies and to reflect needs from the industry on the curriculum.

With the cooperation of JICA, the university publishes textbooks in Uzbek titled "Global Economy and International Economic Relations"¹¹⁹.

(accessed June 9, 2017)

¹¹⁹ JICA, "JICA Uzbekistan chronicle "Education is a fundamental building block of human capital", (December 2016) , https://www.jica.go.jp/uzbekistan/english/office/others/chronicle_201612_en.htm, (accessed May 31, 2017) .

(9) Center for High Technologies

Name of Institution	Center for High Technologies (CHT)
Name in Russian	Центр высоких технологий Узбекистана
URL	http://www.cht-tashkent.uz/ (accessed: June 6, 2017)
Languages used	English

CHT was founded in 2011 by the Uzbekistan Academy of Sciences and MoHSSE with support from the University of Cambridge.

The latest equipment (scanning electron microscope, laser technology related equipment, chemical analysis equipment, biochemistry equipment, etc.) for undergraduate/graduate students and researchers dispatched from private companies are installed in the CHT. While CHT charges fee for using such equipment, many researchers receive research grants.

The main research fields at CHT are chemistry, physics, geography/ geophysics, biology, biophysics, biochemistry, biotechnology, development of medical supplies, and agriculture including food safety and genetically modified organisms (GMO). It is expected that research on such fields eventually lead to the innovating activities in industrial sectors.

(10) Bukhara Engineering Institute of High Technology

Name of Institution	Bukhara Engineering Institute of High Technology (BMTI)
Name in Russian	Бухарский технологический институт
URL	http://bmti.uz/ (accessed: June 18, 2017)
Languages used	Uzbek

Bukhara Engineering Institute of High Technology (in Uzbek, Buxoro Muhandislik-Texnologiya Institute: BMTI) was transformed in 2012, from the Bukhara Technological Institute Food and Light Industry which was established in 1977. There are three faculties at the institute: the Faculty of Chemical Technology, the Faculty of Engineering and Technology, and the Faculty of Electrical Engineering and Information-Communication Technologies in the Production Process.

The school has 5,110 students, including 130 in the master's course, and 6 in the PhD course, and there are 380 professors. Students are mainly from Bukhara, Kashkadarya, Khorezm, Navoiy, the Republic of Karakalpakstan, Surkhandarya, and Samarkand. About 90% of graduates find employment in the industrial sector, while the remaining 10% work as teachers at secondary schools.

Major job placements are at the Navoiy Free Industrial Economic Zone, Kandym Gas Field

Development Project, Gijduvan Free Economic Zone, Shortan Gas Factory, Mubarak Pump Project (Mubarak Project), and Jizzah Industry Zones (oil and gas, chemical products, engineering, light industry, and automobile industry). In general, students find occupations in the fields of electricity generation, oil and gas, chemical technology, management, etc.

Given that the rector of BMTI had participated in the Invitation Program in Japan held by JICA in 2016, it seems that the government of Uzbekistan has high expectations for BMTI in the area of industrial human resource development. However, BMTI website is only in Uzbek, while other universities have those in English and Russian, which makes it difficult for people to access important/necessary information.

(11) Bukhara State University

Name of Institution	Bukhara State University (BSU)
Name in Russian	Бухарский государственный университет
URL	http://www.buxdu.uz (accessed: June 18, 2017)
Languages used	Uzbek, Russian, English

BSU was established as Bukhara Pedagogical Institute in 1922, and changed to its present name in 1992. BSU is a medium sized higher education institution in Uzbekistan with about 6,700 students and about 500 professors. BSU provides academic programs of all levels from vocational training to PhD courses.

In the field of science and engineering, BSU has faculties including the Faculty of Physics and Mathematics, and the Faculty of Natural Sciences. Also, BSU has a Faculty of Tourism because Bukhara is a famous sightseeing spot.

Approximately 50% of students in the science/engineering faculty receive scholarships, while only 25-30% of students in other departments receive those.

In the third year, students participate in internship at schools and companies which BSU built partnership with. Approximately 85% of graduates become teachers, and about 15% of graduates proceed to their own particular field. It is said that many IT specialists working in governmental agencies are from BSU.

Major implementing projects are Erasmus + and Horizon 2020 (Research Framework Program for Research and Innovation), UzWater Project (Water Management Project by Erasmus +), and UzHealth (Public Health Learning and teaching in the Higher Education Structures to Enhance

Republic of Uzbekistan) project. BSU also has a project for automatic translation machine with Asia Trans Gaz Inc., and Beeline JV.

The Uzbekistan-Japan Center office in Bukhara, supported by JICA, is set inside of the campus of BSU. They offer seminars for learning Japanese language, business, etc.

(12) Samarkand State University

Name of Institution	Samarkand State University (SamSU)
Name in Russian	Самаркандский государственный университет
URL	www.samdu.uz (accessed: June 18, 2017)
Languages used	Uzbek, Russian, English

SamSU was officially established in 1927, but its origins can be traced back to the 14th - 15th centuries. SamSU has some additional facilities such as the Academic Lyceum, the Business School, the Zoology Museum, etc.

Languages of instruction in SamSU are Uzbek, Russian, and Tajik. There are about 9,700 students and about 900 professors. After graduation, 65 to 75% become teachers, and the remaining 25 to 35% go into other research institutions, government agencies, or private enterprises.

Faculties in the fields of science/engineering available are: the Faculty of Physics, the Faculty of Natural Sciences, and the Faculty of Mathematics.

There are student exchange programs with German universities (currently, 10 BA and 10 MA students are studying in Germany) and Japanese universities such as Nagoya University and Waseda University in the field of law as well as Osaka University's faculty of linguistics.

Major areas of research in SamSU are mathematics, chemistry, biology, agriculture (agricultural production, honey, flower and seed culture, essential oil, fruit cultivation, medicinal herbs). SamSU has introduced online system with German universities and they exchange their opinion by video conferencing.

(13) Samarkand Branch of Tashkent University of Information Technologies named after Muhammad al-Khwarizmi

Name of Institution	Samarkand Branch of Tashkent University of Information Technologies named after Muhammad al-Khwarizmi (TUIT Samarkand)
Name in Russian	Самаркандский филиал Ташкентского университета информационных технологий имени Мухаммада ал-Хоразмий
URL	http://www.samtuit.uz/ (accessed: June 18, 2017)
Languages used	Uzbek, Russian, English

TUIT Samarkand was established in 2005. There are about 320 new students enter the university every year and approximately 100 professors are working at TUIT. There are several faculties in TUIT Samarkand including the Faculty of Information Technologies, the Faculty of Electric Communications, the Faculty of electric and computer machinery services, the Faculty of Computer Engineering and Application Programming, and the Faculty of Professional Education (Information Technology and Multimedia Technology).

The third/fourth year students of TUIT Samarkand work as interns at companies. Main research themes at TUIT Samarkand are related to the establishment of a model for processing products and medical engineering. TUIT Samarkand has partnerships with four universities in the EU, two universities in Nepal, and three universities in Uzbekistan.

The curriculum is developed by TUIT (main campus in Tashkent). There are five components of the curriculum and the 5th one reflects industrial needs of local companies (Uzbektelecom, UZIN - Samarkand, banks, and tax management companies), but is done at TUIT's Tashkent campus.

Professors are trained in Germany, France, Spain, India, Russia, Korea, Czech, etc., to catch up with rapidly evolving IT technology. There are students who speak Japanese in Tashkent school, but there is no program of cooperation with Japanese universities yet.

3.4. Technical Vocational Education and Training (TVET)

3.4.1. History of TVET

In the Communist area, including the Soviet Union, teaching of industrial practice dubbed the polytechnics of Educational Thought, which targets all-round development of students in during academic education by combining education and production labor, has been practiced for years. Accordingly, vocational technical education and training subjects are taught, starting from primary education to higher education. Uzbekistan fought for independence from the then Soviet Union in September 1991, then under its first president, since promoted the transition to a market economy as a republic. In 1997, the National Program for Personnel Training (NPPT) to improve national strength by securing human resources comparable to developed countries was enacted. The program aims to fundamentally review the educational system; initiating major changes in management policy and creating a national education system that trains advanced experts on a level comparable to an advanced democratic nation, since which time Uzbekistan has promoted this program over three stages under the responsible MoHSSE¹²⁰. The TVET system handed over when Uzbekistan gained its independence used to be commensurate to the socialist economy and industry but has been completely transformed to fit the market economy under this program.

The first stage of the program (1997-2001) saw the foundation for legal, personnel administration, methodology and finance modified and the educational system was developed, whereupon it became vital to implement NPPT for administrative, educational, industrial and private fields. A series of new educational systems, including colleges and lyceums as secondary specialized educational institutions and higher education institutions such as universities, also actively went into operation. Following the revision of the educational system and the restructuring of existing educational institutions, 1,100 colleges and lyceums and 65 higher education institutions, including universities, were set up and a total of 1,220,000 students are currently enrolled. Meanwhile, secondary specialized vocational education centers have been organized in MoHSSE as a promotion aggregation agency to consolidate the secondary specialized education reform.

During the second stage (2001-2005), targeting full NPPT implementation, Uzbekistan worked to improve education and the level of teachers and monitoring.

The third stage (2005 - present) is still focused on further developing and revising the program and adheres to this policy¹²¹.

¹²⁰ Higher Education in Uzbekistan (2012, EACA)

¹²¹ Ibid

3.4.2. Outline of TVET

As mentioned in 3.2.3 Education System, after completing basic education for nine years, students proceed to secondary specialized education, either at a Lyceum, which is a general educational course as preparation for university, or college, which is a vocational technical education and training course in readiness for employment after graduation. Students are enrolled in September and have a two-semester system that ends at the close of the school year in June, including a winter holiday and lessons five days a week, with four subjects daily.

For the entrance, there is no unified examination system and admission is mainly decided by application and interview. There is also cooperation between schools, whereby students having applied for a popular lyceum and been unable to enter can be redirected to enter college. In college, when establishing the number of enrollees for the year, the school surveys the anticipated scope of hiring by companies on graduation. Graduation after an internship sees students on each course receive professional qualifications and paves their way to employment. Jobs in local enterprises, for example, are based on having corresponding qualifications. In terms of positions taken, they are considered to be workers' or craftsmen's jobs as part of routine tasks following instructions and they cannot fill positions requiring the "thinking skills" needed in industries targeted by Uzbekistan, to understand the mechanism and functions of new machines or note changes in quality parameters, for the introduction of new technology or a quality boost. In addition, about 10% of college graduates go to university.

(1) Development

The abovementioned secondary vocational professional education center comprehensively promotes the development of secondary specialized education in general, the purpose of which is as follows:

- To provide education in expertise and work knowledge commensurate with the circumstances of the industry and government policy;
- The methods and priority items for achieving the goals of secondary specialized education in NPPT are education and training using new IT teaching methods at lyceums and colleges, cultivation of public awareness and ambition;
- To improve the curriculum of secondary specialized education and the quality of teaching and create a reasonable textbook;
- Boosting the level of teachers and other educators.

(2) Course

The course established by the secondary professional vocational education center climbed to 140 as of 2015. In accordance with industry requests, they are dressmaking, childcare, pottery painting, car maintenance, automobile painting, machining, railway facility maintenance, computer maintenance,

telephone exchange, bookkeeping, welding and so on. As for the school-wise setting tendency, requests from industry are prioritized in this respect, such as establishing courses and curriculums proposed by local partner companies etc. In a study field with unification, like the manufacturing sector, there is no construction sector. The number of courses per school is about five to ten and there are around 30 to 40 students in each class.

(3) Curriculum

A national standard curriculum for each course is set by the curriculum committee under MoHSSE and then used by each school for their operations. There is a limited scope to modify the curriculum based on ideas by each school and suggestions from sponsor companies and each school reviews the material once every few years. In addition to theoretical and practical subjects, internships at companies lasting about one month are incorporated into the curriculum in the second and third years.

(4) Teaching staff

Most of teachers are at university graduation level, including around 20% with master's degrees. Apart from theoretical study there is also instructors tasked solely with overseeing practical skills and many female appointments, comprising more than half the school staff in some cases. There are cases in which company specialists are assigned on a part-time basis depending on the need for lesson content. Retraining to maintain and improve the educational ability of instructors is also operated nationwide and schools dispatch their teachers systematically to train at specialized facilities every few years. Feedback from teachers included no major dissatisfaction with treatment, considering the additional income earned from supplementary training.

(5) Facilities and teaching materials

It was observed that the teaching materials and equipment supplied by the government are at a relatively low level, despite the fact there is no need for them to be state-of-the-art. Conversely, many of the facilities such as site buildings, although simplified and old-fashioned after being inherited from the former Soviet era, are well maintained and with a secure educational environment.

(6) Industry Collaboration

To meet the industrial needs set out in government policy; schools collaborate with the industrial sector in various aspects such as revision / abolition of courses, curriculums, internships and employment etc. However, as concerned companies are limited in local areas and the number of enterprises is limited to 20 to 30 companies per school, intensive cooperation is planned.

3.4.3. Survey Visit Results

(1) Turin Polytechnic University in Tashkent

This school was founded in 2009 in cooperation with Turin Polytechnic University of Italy, under the initiative of the UzAvtoSanoat state automobile corporation. The main purpose is to train professionals in the automotive industry and building and IT fields. Currently, although 67% of the educational staff are Italian, in future, there are plans to change this ratio to 20% and operate with in-house staff.

Here are four-year courses for bachelor's degrees and a two-year master's degree course, as well as a short-term vocational training course for enterprises. Because the university is private, it is self-sustaining and its income depends on levying tuition fees on students of around 5000 US dollars a year. Last year, 150 people entered from 1,200 applicants.

Apart from the above, the university maintains cooperative relations with energy, mining and construction-related companies and some graduates are finding employment at Isuzu car companies in Samarkand.

The curriculum is established in cooperation with Turin Polytechnic University, the original drafting made together; proposed incorporating proposals from affiliated companies and approved by the Ministry of Higher and Secondary Specialized Professional Education.

For support from overseas, receiving cooperation from JICA, Mr. Nakamura stationed as a volunteer for two years on a seismology course and set up experimental equipment. It has a student exchange program with Gifu University as well as a cooperative relationship with Korea for IT.

There are also expectations that JICA will provide support with practical training equipment etc.

(2) Tashkent Polytechnic Professional College

The college was established in 1999; inheriting the preceding vocational training school. The school is in the city area and has a traditional appearance, which continues from the latter half of the 1880s in the Soviet Empire era. The school program comprises eight courses, including cooking, dressmaking, bookkeeping and car repair, etc. Students graduating from the general school at ninth grade level enter school in September and learn education and training for three years. Graduation gives them a diploma that then allows them to find employment. Currently more than 1,120 people (including 650 girls) are enrolled, at the time of graduation, nearly 90% find employment in companies and the rest go on to university.

In terms of the curriculum, secondary vocational education, under the umbrella of the Ministry of

Higher and Secondary Specialized Professional Education, has a team of experts to organize the general curriculum, where a curriculum for colleges nationwide is created. Each college then has the authority to change 10 to 15% of it, although the school then keeps its own unique curriculum in consultation with the local company.

Students are sent to company internships in the second and third grades, dispatched in April for internships of ten weeks in the second year and eight weeks in the third year respectively.

Teaching materials and most of the equipment is supplied from the abovementioned center.

There are 55 teaching staff in the college, 44 of whom are women and the average age is 40 to 45. Many of them have a bachelor's degree, while the school also accepts part-time teachers from companies and universities.

Issues facing the school include its old-fashioned equipment.

(3) Samarkand Professional Industrial College

This school, in the Samarkand city area, is relatively new and founded in 2004. There are nine courses including course of sewing, welding transportation, community service. Students receive a diploma after 3 years of education and training. Currently 777 students are studying and 300 students were enrolled as of 2016.

67 teachers have an average age of 40 to 45 and many are university graduates.

In terms of collaboration with companies, It has contracts with 22 local companies to cooperate, whereby students are dispatched to internships for two and three years respectively and often also for employment after graduation.

In terms of overseas support, we have deployed community service course training equipment with cooperation from Switzerland.

There are not currently believed to be any major problems facing the schools.

The hope was expressed that JICA would cooperate in fields of general culture and technology in Japan.

(4) No. 1 Academic Lyceum named after Shirodinov

Named after Shirodinov, Uzbekistan's Historical Mathematician, this school focuses focusing on math and physics; directing general educational graduates to university and educating them in liberal arts rather than vocational training. This school is the best in the country, where you can learn about math and physics in depth and currently offers four courses: economic science, social humanities, natural science, chemistry and biology. 1453 students are studying, 389 of whom girls. Past graduates have included 40 professors and 500 PhD students in math and physics fields.

There are 114 teachers, 45 of whom are women. The average age is relatively young, at around 30 and over 80% have master's degrees. To raise their motivation, a bonus corresponding to the performance of students for which they are responsible is distributed from the campus budget, which amounts to 50% of their salary.

The curriculum is prepared by the school and assessed by the committee of the Ministry of higher and specialized secondary education. The principal currently serves as chairman of the math subcommittee of the committee and the Activation activation of student exchange was proposed as an expectation of JICA.

3.4.4. Issues and Prospects of TVET

(1) Boosting the Position of Vocational Technical Education and Training

Compared to general education, the position of vocational technical education and training at college is low, reflecting the mindset of students and parents seeking higher education through lyceum. In addition to the level and quality of education and training at school, the level of instructors and other educators, qualifications obtained at the time graduation and corresponding occupations, the degree of fulfillment of facilities and equipment in the school are also synergistically affected. Comprehensive changes to boost the value of vocational training education and training are necessary.

(2) Level of Vocational Technical Education and Training

As previously mentioned, graduates who enter the company remain in the class of workers or craftsmen and the contents of education and training are in accordance with the same. Although largely dependent on human resource needs from the industrial side, it seems motivation to raise the level of practical competency of graduates is lacking among the parties concerned. There is a need to discuss the future image required for vocational technical education and training.

(3) Level of Teachers

Many of the achievements in terms of the degree of education and training, which depend on the ability and motivation of educators, including teachers, are considered insufficient at present. The

situation of education and training at each school, particularly in the most essential practical training portion, learning by touching and handling materials and equipment is shown as generally lacking, as well as a lack of educational ability of educators. Feedback from management at the school site revealed cases where educators are often dissatisfied with the status of work itself and compensation, both of which need improvement.

(4) Lack of Equipment

In vocational technical education and training, it emerged that training in practical skills is in short supply, particularly machines for practical training and improvement is desirable.

3.5. Donor Assistance in the industrial Human Resource Development Field

3.5.1. Overview of Donors in the Education Sector

In higher education, Erasmus+ produced achievements in joint research projects with EU universities and short-term exchanges with EU universities. The World Bank is just launching the modernization of a Higher Education Project in line with government education reform policy and working to strengthen management, improve the educational environment, establish the Academic Innovation Fund and develop monitoring and evaluation systems.

In the TVET area, ADB has long supported development and has started new projects to develop human resources appropriate for the local economy by revising the curriculum and establishing a qualification and certification framework. The EU will roll out a major rural development project in 2019, which will include local TVET development as one of the components. The British Council has developed a curriculum and OS for the tourism sector.

3.5.2. Overview of Donors in the Industrial and Private Sectors

The coming EU rural development project will include an SME development component, including entrepreneurship and micro finance assistance. ADB is currently implementing the Small Business Finance Project and providing loans to SMEs, particularly female entrepreneurs, with technical assistance.

GIZ has a regional project on trade called the Support to Regional trade in Central Asia, excluding Turkmenistan.

3.5.3. Donor's Current Information

The fields of support from each donor in Uzbekistan can be found on the following donor map.

Table 3-15 Donar Map

Donor	Industry sector	Education sector		Other Priority Sectors
		Higher education	Technical training education	
ADB	<ul style="list-style-type: none"> Small Business Finance Project (2016-2022) Central Asia Regional Economic Cooperation (CAREC) Program 		<ul style="list-style-type: none"> Current TVET project in progress (2017-2019) Skills and Strategies for Industrial Modernization and Inclusive Growth During the preparation of the project; human resource development commensurate with industry needs; Japan's poverty reduction fund 	<ul style="list-style-type: none"> Country Operations Business Plan, 2017-2019 Agriculture Rural development Regional infrastructure Energy Finance Health Transportation Water
British Council		<ul style="list-style-type: none"> Policy advice to the Ministry of Education, etc.; roundtable conference (guarantee of quality of education, industry-university cooperation, etc. 	<ul style="list-style-type: none"> Curriculum development for vocational training in the tourism field Development of NOS in the tourism field; English education Policy consultation with UK, seminar held Entrepreneur training Competition Promote employment of youth (planned cooperation with rural development project of the EU) 	
Erasmus+		<ul style="list-style-type: none"> Collaborative research project with EU universities International Unit Movement Project, EU Short-Term Study Abroad Jean Monnet, Grant aid for EU research 		
EU	<p>Scheduled to set up a large rural development project from 2019, including SME and TVET development. Curriculum development.</p> <p>From TOT to employment support. Entrepreneur training, microfinance training</p>		<p>Scheduled to set up a large rural development project from 2019, including SME and TVET development. From curriculum development,</p> <p>TOT to employment support. Entrepreneur training, microfinance training</p>	<ul style="list-style-type: none"> Multi-annual Indicative Programme 2014-2020 Regional Central Asia Sustainable regional development Regional security assurance Water resources Reduction of natural disasters Education for children with disabilities
GIZ	Support to regional trade in Central Asia (2014-2019) Strengthen regional trade promotion for Central Asian countries			<ul style="list-style-type: none"> Public health Environmental protection Private Sector Development Water resources Medical
UNESCO		<ul style="list-style-type: none"> Building a national framework for TVET and higher education Teacher training and educational facility development Evidence-based policy planning Improvement of ICT education Online course development, etc. 		<ul style="list-style-type: none"> Culture Historical heritage
World Bank		<p>Modernization of Higher Education Project started this year.</p> <ul style="list-style-type: none"> Strengthened university management Improvement of the educational environment Academic Innovation Fund Monitoring evaluation 		<ul style="list-style-type: none"> Primary and Secondary Education Water Energy Power Law, violence against women

(1) Asian Development Bank

The ADB had educational projects for student scholarships until 2010 and has suspended support in the Education Sector since then. This year, the ADB starts preparing the TVET project in alignment with the new government strategy of Actions on Further Development of Uzbekistan; emphasizing human resource development to meet industry and market needs. The draft program document of “Skills Strategies for Industrial Modernization and Inclusive Growth”¹²², financed by the Japan Fund for Poverty Reduction, awaits approval. This program aims to develop human resources to boost national economic development and local industries by reforming the TVET system, including revising the curriculum and establishing a qualification and certification framework. The program plans to target Navoiy, Tashkent and Andijan regions to promote youth employability in both urban and rural areas.

Title: Skills Strategies for Industrial Modernization and Inclusive Growth

- Partner: Ministry of Labor
- Budget: Education sector 0.5 million US dollars, TVET sector: 0.4 million US dollars
- Strategic agenda: Inclusive economic development; Access to economic opportunities, Inclusive employment, Elimination of disparity, Social protection

In the area of SMEs and finance assistance, a Small Business Finance Project (2016-2022, Budget: 100.5 million US dollars) is underway to facilitate finance inclusion. The Project provides loans and technical assistance to SMEs and female entrepreneurs who lack access to financial organizations. Under these projects, 50% of credits should be issued to women as an ADB condition.

The priority areas for ADB assistance are: energy, transport, SME development, horticulture and primary healthcare.

(2) British Council

The mission of the British Council is to disseminate English education and IELTS certifications, as well as focusing on educational development as an activity to reduce poverty on the following levels:

1) Primary and Secondary Education

- Development of English language textbooks for grades I-IV

¹²² Asian Development Bank, Skills Strategies for Industrial Modernization and Inclusive Growth, https://www.adb.org/projects/documents/uzb-skills-strategies-industrial-modernization-and-inclusive-growth-tar_ (Accessed June 1, 2017)

- English teacher training for secondary schools

2) TVET

- Develop a CBT curriculum on tourism in partnership with the UK
- Develop NQF in all sectors of the economy for vocational colleges
- Create Sector Skills Councils in tourism
- Address mutually agreed interests of Uzbek and UK partners through policy discussions at senior level, study visits, training sessions and seminars
- Conduct entrepreneurship training and competitions
- Train English language for tourism

3) Higher Education

In partnership with the Ministry of Higher and Secondary Specialized Education, international policy dialog events are held twice yearly on issues concerning the quality of higher education. Topics for discussion include quality assurance, management and monitoring and industry academia collaboration among others. It provides good opportunities to share and exchange information between Uzbekistan and UK in a round table format.

At all levels, the British Council emphasized TVET development from a job creation perspective for youth. The British Council will also corroborate with the EU Project on Rural Development (see EU), which combines TVET and SME development to boost employment among rural young people. They assume that the approach of the EU project is effective to target the huge young population as beneficiaries and ultimately reduce poverty in Uzbekistan.

(3) Erasmus+

The Erasmus+ Program¹²³ is the EU program for education, training, youth and sport for the period 2014-2020, which offers a number of opportunities for higher education students, doctoral candidates, staff and institutes (Budget: 16.5 billion Euros). In Uzbekistan, the program comprises the following activities:

1) Capacity Building of Higher Education Institutes

It supports the joint research project between European and Uzbek universities and the system development of the latter. In 2015 and 2016 respectively, seven projects were selected each year for

¹²³ Erasmus+ Programme, https://ec.europa.eu/programmes/erasmus-plus/node_en. (Accessed June 1, 2017).

funding¹²⁴. The research themes were as follows:

- Curriculum development
- Modernization of the education system
- Development of a quality assurance system
- Development of NQF

2) International Credit Mobility

It supports the short-term exchange of students between universities within and outside the EU. The unit acquisition of EU universities are certificated in the Uzbek universities. Two months' training abroad are prepared for university lecturers and more than 200 EU students and teachers have been accepted in Uzbek universities. Conversely, more than 300 Uzbek students and teachers have studied in EU countries since 2014.

3) Jean Monet

It supports and promotes education and research concerning the EU. Individual research on the EU and the establishment of an EU research center are also subsidized¹²⁵. One project is underway in Uzbekistan.

(4) The EU

The EU is preparing a large -scale Rural Development Project with a budget of 168,000,000 Euros in the coming year, including a TVET and SME development component targeting six national regions. The rural development interventions may also include sustainable energy, improvement in rural areas of water/sanitation and irrigation systems, as well as climate change resilience actions or disaster risk -reduction measures

In the TVET component, the EU is planning to develop a curriculum as well as teaching and training materials and encourage employment and entrepreneurship to meet the needs of the rural economy and industry. For SME development, the experience of the Management Training Program¹²⁶ is to be extended to train entrepreneurs and provide micro finance to the rural poor. The result of the baseline survey was analyzed and discussions are underway with ministries and related organizations. Approval and commencement are scheduled for the start of 2019 and the draft project design will be shared during the donor coordination meeting.

¹²⁴ Erasmus+ Programme of the European Union, The second Generation of Erasmus+ Capacity Building in Higher Education (CBHE) Projects in Uzbekistan: The 2nd Erasmus+ Call for Proposals of 2016, 2016

¹²⁵ Jean Monet,

https://ec.europa.eu/programmes/erasmus-plus/programme-guide/part-b/three-key-actions/jean-monnet-activities/aims-of-jean-monnet_en. (Accessed June 1, 2017)

¹²⁶ Management Training Programme <http://mtpeu.uz/en>. (Accessed June 1, 2017).

(5) GIZ

The GIZ priority in Uzbekistan is public health, environmental protection, economic development and water resource management¹²⁷. As things stand, 11 projects are being implemented, seven of which regional projects. Around 2003- 2010, GIZ implemented improvement of vocational training projects on telecommunications in partnership with the secondary professional education center, but nowadays, there are no education and TVET projects in Uzbekistan.

In the economic development field, the project to “Support Regional trade in Central Asia”¹²⁸ (2014~2019) is ongoing to target four countries (excluding Turkmenistan) in Central Asia. Three approaches taken by this project are as follows: i) Single Window or One -Stop Shops, ii) Reform of the quality management infrastructure for foreign trade and iii) Development of regional consultation and coordination mechanisms.

(6) UNESCO

UNESCO Uzbekistan is supporting the concept of Education for Sustainable Development (ESD) and higher quality education. In higher education and TVET, UNESCO will focus on higher education and TVET by developing the curriculum and training teachers. According to feedback from the staff in charge of education at the UNESCO office, the following activities are underway:

- Building a national framework on technical and vocational education and higher education
- Evidence-based policy planning – construction of an Educational Management and Information System
- Teacher training
- Educational facilities
- ICT maintenance
- Research on access to higher education
- Promotion of adult education
- A development application for mobile learning
- Development of On-line course on vocational and higher education
- Media literacy for youth

(7) The World Bank

The World Bank has been supporting the Ministry of Public Education for years in areas of primary

¹²⁷ GIZ Uzbekistan, <https://www.giz.de/en/worldwide/364.html> (Accessed June 1, 2017)

¹²⁸ GIZ Uzbekistan, Support for Regional trade in Central Asia, <https://www.giz.de/en/worldwide/14062.html> (Accessed June 1, 2017)

and secondary education. This year, the World Bank launched an initiative to support higher education with the Ministry of Higher and Secondary Special Education (MHSSE) on "Modernization of Higher Education Project" because the Government prioritizes highly educated and skilled human resource development in its Strategy of Actions for the Further Development of Uzbekistan. Details of the project are as follows:

Title: Modernization of the Higher Education Project

Objectives: to strengthen the managerial capacity of the higher education system and improve both labor market relevance and the learning environment of selected higher education institutions.

Budget: 42.2 million US dollars

Project period: 2016 – 2022 Implementation to start in April 2017

The project comprises four components:

1) Strengthening Higher Education Management

The project will support efforts to enhance the managerial capacity of the Uzbek higher education system by: (a) strengthening the capacity of the MHSSE to manage the sector, (b) supporting the State Testing Center to develop and implement the external quality assurance system and (c) supporting the Higher Education Institutions to strengthen their internal quality assurance systems.

2) Improving the learning environment in Higher Education Institutes

The project will support the government in improving laboratories and research systems, to help better prepare higher education graduates to contribute to scientific progress in an effort to increase economic growth. At least 100 basic teaching labs will be established at 20-30 universities, including up to ten research labs and two million USD will be set aside for an e-library.

3) Academic Innovation Fund

Totaling four million US dollars and covering 20-30 projects. Its purpose is to promote close cooperation between Uzbek universities, overseas academic institutions and industry.

4) Project Management, Monitoring and Evaluation

The component will support incremental operating costs for the project, including a core team of consultants to coordinate the project, ensure fiduciary compliance and monitor it. The project will also finance technical experts to support implementation, as required as well as studies and evaluations.

The Country Partnership Framework 2016-2020¹²⁹ shows that the priority areas with which the World Bank assists are private sector growth, agricultural competitiveness and cotton sub-sector modernization. Energy, water, electricity, law and violence against women are also priority areas in Uzbekistan.

¹²⁹ World Bank, Country Partnership Framework 2016-2020, <http://documents.worldbank.org/curated/en/537091467993490904/Uzbekistan-Country-partnership-framework-for-the-period-FY-16-20>, (Accessed June 1, 2017).

3.6. Analysis of Contents of Support by Japan

This chapter confirms "development policy" by Uzbekistan, Japan and other donors. In addition, "Industrial Human Resources Needs", "Outline of Education Sector", "Science and Engineering Higher Education Organization", "Vocational Technical Education and Training (TVET)", "Support by Other Donors" and the development policy are examined. Among these tasks, we examined what is to be prioritized and the resources of Japan that contribute to solving the problem, and summarized it as a solution approach.

3.6.1. Uzbekistan Policy

3.6.1.1. Uzbekistan's National Development Strategy

The Uzbekistan Development Activity Strategy shows five priority areas.

Table 3-16 Table Priority Areas in Uzbekistan Development Activity Strategy

<ol style="list-style-type: none">1) Improve state and public construction.2) Secure control by law and further reform the justice system and legal system.3) Economic development and liberalization.4) Develop the social realm.5) Implement a mutually beneficial and constructive balanced foreign policy to ensure security, inter-state harmonization, and religious tolerance.

Source: "Action Strategy for the Development of the Republic of Uzbekistan 2017-2021"

Among these, the modernization and diversification of existing industries, restructuring of the financial system, protection of individual business owners and entrepreneurs, expansion of diplomacy, invitation of overseas investment, tourism development, and structural reform of agriculture are shown. From the same strategy, it can be said that the priority industrial fields in Uzbekistan are the automobile industry, financial system, agriculture, tourism industry, etc.

Table 3-17 Table National Strategy Program for Development of the Manufacturing Industry (2015)

Focus on manufacturing industry	1) Oil and gas industry 2) Chemical industry 3) Construction and Construction Material Industry 4) Medical and medical equipment industry 5) Machinery industry 6) Electric industry 7) Automobile industry 8) Food industry
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3.6.1.2. Participants of Invitation to Japan

The following table shows the affiliations of the participants from Uzbekistan invited to Japan.

Table 3-18 Table Name of Organization Invited

1st invitation to Japan (February 2016)	2nd invitation to Japan (March 2017)
Ministerial Conference Social Policy Division	Ministry of Higher and Secondary Professional Education
Bukhara Engineering Institute of High Technology	Ferghana Polytechnic Institute
Tashkent State Technical University named after A.R. Beruni	Maymanoq Industrial Vocational College of Kasbi

3.6.2. Assistance Policy to Uzbekistan

3.6.2.1. Japan's Country Assistance Policy

The content of Japan's assistance is based on the country-specific assistance policy stipulated by the Ministry of Foreign Affairs (Uzbekistan country-specific aid policy formulated in April 2012) and the five regional cooperation issues "Central Asia + Japan" dialogue "Trade and Investment Considering the five fields of "environment (including agriculture)", "environment, energy saving / renewable energy", "achievement of Millennium Development Goals (MDGs) and disparities", "cooperation for stabilizing Afghanistan" and "disaster prevention cooperation"

Table 3-19 Table: Uzbekistan Country Assistance Policy (formulated in April 2012)¹³⁰

Basic policy (large goal)	Promotion of economic growth and support for correcting disparities	
Priority field (medium target)	1) Update and maintenance of economic infrastructure (Transportation · Energy)	2) Promotion of market economy, human resource development, and institution building for economic and industrial promotion
Development issue (Small target)	Improve the management of public works and promote the efficient use of infrastructure	Development of administrative and legal infrastructure that will contribute to the revitalization of the private sector, training of private sector practitioners
Current situation and issues	Infrastructure developed in the former Soviet era are becoming impossible to maintain and forming a bottleneck of economic growth. The updating of infrastructure (transportation/energy) and improvement of technical capacity related to management and administration are problems. It will be necessary to develop and construct international transport networks such as trunk roads, railways, airports, etc. in order to revitalize the regional economy.	Lack of transparency, impartiality, and reliability in areas of judicial, administrative, legislative governance, etc. are major obstacles to the creation of a framework for sustainable economic growth through the revitalization of the private sector. It will also be important to foster talented civilian human resources who are to be responsible for industries under the market economic system after the reforms, together with the administrative officials responsible for the economic reforms.
Japan's policy for responding to development issues	Consider financial cooperation for the renewal of infrastructure. Technical cooperation in management and operation. Keep an eye on cooperation in the fields of transportation and logistics (the theme of "Central Asia + Japan" dialogue).	Emphasis is placed on the strengthened capacity of human resources responsible for economic growth. Economic structural reform, reviewing the legal system, promoting the creation of new institutions. Provide assistance leading to results such as liberalization and the opening of the

¹³⁰ Ministry of Foreign Affairs "Uzbekistan Country Assistance Policy to Uzbekistan"
<http://www.mofa.go.jp/mofaj/files/000072279.pdf>, (accessed: June 1, 2017)

		economy (improved legal system, training of administrative officials and private personnel).
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Priority field (medium target)	3) Support restructuring of the social sector	
Development issue (Small target)	3-1) Agricultural reform · Regional development	3-2) Healthcare
Current situation and issues	Given that more than 60% of the population lives in rural areas and agriculture accounts for about 25% of the GDP, agricultural reform support combines institutional-building elements for the market economy. There is a need for initiatives aimed at resolving the disparity between urban and rural areas. A change of mindset (former Soviet type → market economy type) through a strengthening of the capacity of residents is also necessary.	The reduced size of the national budget, declining technical level of healthcare workers, and deterioration of medical quality accompanying the deterioration of medical equipment all became problems after independence. Quality conversion from former Soviet-type services to services based on economic rationality and cost reduction are required. Support for the independence of socially vulnerable groups is another important issue.
Japan's policy for responding to development issues	Support regional development, agriculture promotion, training of irrigation associations, etc. with the goal of agriculture/rural development and the income improvement of farmers. The need to develop practical cooperation in agricultural was pointed out at the 5th Foreign Ministers' Meeting (2014) "Central Asia + Japan" Dialogue.	Keeping in mind the Japanese government's "Basic Policy for Peace and Health," assistance will be extended to technical support and system improvement aimed at improving the quality of medical care and provision of preventive medical care. Promote the social participation of people with disabilities by strengthening social welfare services such as support services for persons with disabilities.

Priority field (medium target)	4)Support restructuring of the social sector	
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Development issue (Small target)	Education	Environmental conservation, disaster prevention management
Current situation and issues	<p>Problems such as the following are taking their tolls in the educational environment: (1) lack of new technologies/information at educational sites, skilled teachers, high-quality teaching materials; (2) aging of school buildings and equipment; (3) difficulties in finding employment in workplaces that can make use of professional skills.</p> <p>It will also be necessary to expand middle and high school educational institutions and train and re-teach teachers in order to counter the outflow of Russian engineers after the collapse of the Soviet Union.</p>	<p>Disaster prevention and environmental conservation are important not only to the safety of Uzbekistan citizens, but also neighboring Central Asian residents. It has nonetheless been difficult to maintain former levels due to the outflow of Russian engineers, etc. after the collapse of the Soviet Union.</p>
Japan's policy for responding to development issues	<p>Improve the quality of education and the educational environment according to the Japanese government's 'strategy of learning for peace and growth' vis-a-vis the need to facilitate educational quality against the backdrop of aging public education facilities, outflow of outstanding human resources, and disparity between the rich and poor.</p>	<p>Disaster prevention and environmental conservation are cross-cutting issues that directly affect Central Asia as a whole and related to other priority areas. Improve energy efficiency through renewal and maintenance of infrastructure, reduce environmental burden, strengthen capacity for technological improvement for engineers, and promote data exchange with neighboring countries.</p>

3.6.2.2. Support Policies and Strategies of Other Donors¹³¹

In Uzbekistan, EU's rural development project with combine SME support and TVET support will start providing job creation for local youth. ADB is also preparing a skill strategy project for industrialization with inclusive growth as a target theme. Meanwhile, the British Council supports TVET development specialized in the tourism sector. The World Bank launched a university education modernization project.

¹³¹ See Table 3-15, Uzbekistan Donor Mapping

3.6.3. Analyzing Issues related to Advanced Industrial Human Resource Development

3.6.3.1. Problem Analysis

The problems are extracted based on the information described in previous sections and compiled in the table below:

Table 3-20 Problem Analysis of Advanced Industrial Human Resource Development in Uzbekistan

Field		Problem		Cause	Solution
Industry sector	Policy · institution	Industry-academia collaboration	· Human resources suited to the needs of the industry are not supplied.	· There is little exchange of information between the Ministry of Finance and the Ministry of Education. · There are few opportunities for industry-university collaboration.	· Implement industry-university collaboration effectively.
		Energy	No countermeasures are in place against increased electricity consumption due to the increased population. Facility renewals are not progressing.	· Lack of human resources with expertise in policy and institutional development.	· Develop human resources with expert knowledge. · Strengthen alternative energy development.
		Agriculture	No concrete measures are in place to cope with increased food consumption caused by the increased population.	· Lack of human resources with expertise in policy and institutional development.	· Develop human resources with expert knowledge. · Adopt modern agricultural management and introduce efficient production

			Government subsidies systems are not well developed		<p>techniques and technologies.</p> <ul style="list-style-type: none"> · Introduce and improve government subsidy measures to introduce new equipment. · Do preferential treatment of bank lending rates.
		Manufacturing industry	There is no planned or concrete policies for priority industries.	Human resources with expertise is lacking on priority industries/policies and institutional development.	<ul style="list-style-type: none"> · Develop human resources with expert knowledge. · Accumulate new facilities, technologies, and methods by attracting foreign companies to the special characteristics of a free economy. · Develop a government subsidy system to introduce new equipment. · Do preferential treatment of bank lending rates.
		Textile industry	<ul style="list-style-type: none"> · Currently, 40% of the cotton collected in Uzbekistan is exported as raw material. Although the country advocates a plan to use 100% cotton in domestic production by 2020 	<ul style="list-style-type: none"> · The facilities of related organizations that produce human resources for the textile industry are weak. 	<ul style="list-style-type: none"> · Strengthen the facilities of related organizations that produce human resources for the textile industry. · Accelerate the development of human resources engaged in the textile industry.

			while exporting domestically produced fibers and clothing, the measures necessary to realize this plan are insufficient.		
		Free Industry Economic Zone	<ul style="list-style-type: none"> · Korea, Russia, China, Switzerland, the Netherlands, etc. advance into Uzbekistan, but there are still only 18 Japanese companies in the whole country. 	<ul style="list-style-type: none"> · Transportation costs are high. · Japan cannot offer superior price competitiveness compared with multinational corporations that have already entered. 	<ul style="list-style-type: none"> · Strengthen a competitive management structure.
	Industry human resource needs	Human resource management	<ul style="list-style-type: none"> · Welfare benefits and safe working environment for employees are lacking. 	<ul style="list-style-type: none"> · Business managers lack awareness that human resources are one of the components of monozukuri. 	<ul style="list-style-type: none"> · Establish a technical level certification system for instructors and administrative supervisors common to educational institutions such as technical colleges. · Train core human resources capable of judging the technical level of human resources within company.
		Marketing	<ul style="list-style-type: none"> · Basic knowledge and information on overseas markets is lacking. 	<ul style="list-style-type: none"> · Business manager do not understand the global competitive environment of 	<ul style="list-style-type: none"> · Corporate personnel can utilize ICT technology.

				products.	
		Production control	Product development and the service environment activities make little use of IT technology	· Knowledge on improvement of production environment such as quality, cost, and delivery dates is weak.	· Foster core human resources who can judge the technical level of human resources within the company (production time, production type, production volume, production direction, processing flow, production method, etc.)
		Financial management	Manufacturing industries have disadvantages requiring long-term borrowing due to capital investment.	· The total funds from loans, banks, etc. are small.	· Increase loan amounts by increasing long-term interest rates by increasing loan funds.
		Maintenance of production facilities	Production lines mix aged production equipment with advanced equipment IT	· Corporate managers is lacking awareness of the transition of production facilities in globalization. Electro-mechanical (mechatronics) engineers are short.	· In-house training, inspections, adjustment / maintenance, cleaning, refueling, safety inspections (such as retightening), management of operating conditions, etc. will all be possible.
Education sector	Policy · institution	Compliance with European and US standards	Adaptation to Western standards pursuant to the Bologna declaration is delayed.	· The strengthening of the education system varies among educational institutions. · The implementation of a	· Educate human resources who use scholarships such as Erasmus + to construct educational systems based on

				national educational policy is delayed.	European standards. · Reflect this issue in the next policy document action plan.
		Industry-academia collaboration	Industry-academia collaboration is not progressing systematically.	<ul style="list-style-type: none"> · Coordination between the Ministry of Education and Ministry of Economy in vertically divided administration is lacking. · Industry-academia collaboration is left to the self-help efforts of educational institutions. · Educational institutions fail to fully analyze industrial needs. · No mechanism is in place to promote collaborative research between educational institutions and companies. 	<ul style="list-style-type: none"> · Strengthen implementation of industry-university collaboration policy and strengthen collaboration among ministries and agencies. · Certify universities and vocational training schools that are undertaking advanced initiatives as good practice model schools. Also promote information exchange between institutions. · Research industrial needs and labor market needs. · Promote the creation of mechanisms to encourage collaborative research.
		IT education	Many educational institutions lack IT infrastructure and equipment.	· Old and deteriorating and maintenance is not done.	· Improve and thoroughly maintain IT infrastructure and equipment.
		Mechanism for employment support	The employment rate of graduates from higher	· No system of employment support has been established.	<ul style="list-style-type: none"> · Promote policy implementation. · Reflect this issue in the next policy

Higher Education			education is around 50%.		document action plan.
		Globalization	Few educational institutions conduct classes in English. The cultivation of global human resources is delayed.	<ul style="list-style-type: none"> Uzbek language education is promoted by national policy. Few human resources can provide education in English. 	<ul style="list-style-type: none"> Strengthen English language education. Strengthen English language training for educators.
		Curriculum development	Discretionary curriculum development at individual institutions is limited.	<ul style="list-style-type: none"> The education system is centralized, so the majority of curriculum development is done by central ministries. 	<ul style="list-style-type: none"> Advance the creation of a system that enables individual educational institutions to develop more curriculum.
		Shortage of universities	As the competition rate of universities increases, it is becoming difficult to enroll in the department of one's choice.	<ul style="list-style-type: none"> The number of universities is small relative to the growth of the population. Teachers are in short supply. Procedures necessary for going abroad are cumbersome and few students aim to study abroad. 	<ul style="list-style-type: none"> Construct universities. Train more teachers. <p>Increase the number of university students accepted.</p> <ul style="list-style-type: none"> Simplify the procedures for studying abroad.
		Teachers' abilities	Quality of teachers is low.	<ul style="list-style-type: none"> There are few opportunities for retraining. Education to meet global needs is difficult. 	<ul style="list-style-type: none"> Strengthen faculty training institutions. Encourage teachers to study abroad. Construct a reeducation system for educators.
		Educational Infrastructure	The facilities and equipment of universities and research institutions are	<ul style="list-style-type: none"> The equipment is not well maintained. 	<ul style="list-style-type: none"> Maintain infrastructure and equipment thoroughly. Investigate how research should

			not fully utilized.		respond to industry needs.
	Inclusive business	Job openings are limited even for university graduates.		· The employment support policy of the state is functioning poorly.	· Give training and opportunities to start self-employment and entrepreneurship after graduation. · Strengthen employment support functions.
	Curriculum development	The curriculum does not match the needs of the labor market		· There are no data on matching.	· Survey human resource needs commensurate with the labor market.
	Education content	Education to meet industrial needs are not provided. There is a gap between industry and educational needs.		· Most of the curriculum development is done by central government agencies and there is little room for universities to develop independently. · Collaboration between universities and companies has stalled.	· Advance the creation of a system that enables individual educational institutions to further develop curriculums · Encourage creation of a mechanism to promote collaboration between universities and companies.
	Elective subjects	There is no freedom in selecting subjects; students cannot attend lectures according to individual interests.		· There is no system for elective subjects.	· Revise the curriculum and develop subjects in a wide range of specialized and educational fields. · Provide elective subject.
	Educational language and written	The mixed usage of Russian and Uzbek languages		· Both Russian and Uzbek language are used for	· Abide by the law (for the introduction of the Uzbek lettering system based on

		letters	impedes the memorization of formal names, etc.	educational without any uniform overarching plan. · The Uzbek language is written out in both Cyrillic and Latin scripts without any uniform overarching plan.	Latin letters), which stipulates that Uzbek language is to be officially written in Latin letters.
Higher education institution in Science and engineering		Research Equipment and Facility	Suitable educational experiment/research equipment/facilities are insubstantial. Knowledge and skills to utilize these resources are weak.	· The equipment is aging. · Financing for new procurement is difficult. · Institutions cannot afford expenses for equipment renewal. · Operation software fails to run on the PCs currently on the market.	· Establish appropriate equipment plans, and procure necessary equipment accordingly.
		Technical level	Knowledge and skills to utilize appropriate experimental and research equipment for education are lacking.	· Equipment/facilities for experiments and research are obsolete and cannot receive appropriate technical guidance.	· Establish appropriate equipment plans, and procure necessary equipment accordingly.
	Technical vocational education and training (TVET)	Low popularity of vocational training	Compared with regular education, TVET are relatively low. Popularity of TVET among parents and	· The social evaluation of qualifications obtained by graduation is relatively low. · The curriculum often does not	· Set and review missing departments and curricula. · Review the content of the re-education of instructors based on industry trends.

			students.	<ul style="list-style-type: none"> · correspond to changes in industry. · The knowledge, skills and motivation of instructors are not keeping up with changes in industry. · Equipment and facilities are often not renewed or updated. · The value of vocational training is not correctly recognized by society in general. 	<ul style="list-style-type: none"> · Update and renew obsolete facilities and equipment. · PR will be conducted on vocational training.
		Educator level	The current education and training programs have reached the third grade only. The position a graduate can take after entering a company remains at the worker or craftsman level.	<ul style="list-style-type: none"> · There is weak recognition of the need for education and training in schools equivalent to the level of the fourth year or higher in the educational community. · The knowledge and skills necessary for technical personnel in the industrial world have not been determined. 	<ul style="list-style-type: none"> · Set up a new vocational training course that will take the next several years after graduation from college and start the pilot.
		Educator level	Motivations of the	<ul style="list-style-type: none"> · Influenced by the low 	<ul style="list-style-type: none"> · Set and review missing departments

			educators, including the instructors is insufficient.	<p>popularity of the above-mentioned.</p> <ul style="list-style-type: none"> · Treatment is not commensurate with efforts 	<p>and curricula.</p> <ul style="list-style-type: none"> · Review the content of the re-education of instructors based on industry trends. · Update and renew obsolete facilities and equipment. · PR will be conducted on vocational training. · Review the introduction of outcome compensation
		Lack of practical training education	<p>The accumulation of training in practical skills is in short supply in vocational education and training.</p> <p>The equipment varies by department, but the quality and quantity are both lacking.</p>	<ul style="list-style-type: none"> · The instructor's capacity to use the equipment is insufficient. · The equipment itself is in short supply. 	<ul style="list-style-type: none"> · Re-instruct instructors on the use of equipment in re-education. · Upgrade old facilities and equipment. · Add new equipment.

3.6.3.2. Priority Issues for Training Highly Advanced Industrial Human Resources in Uzbekistan

Of the issues extracted in 3.6.3.1 above, the issues to be prioritized are summarized in the table below:

Table 3-21 Priority issues

Item Number	Issue	Specific content	Solution(draft)	Utilization of Japanese resources (draft)
1	Textile industry	<ul style="list-style-type: none"> Currently, 40% of the cotton collected in Uzbekistan is exported as raw material. Although the country advocates a plan to use 100% cotton in domestic production by 2020 while exporting domestically produced fibers and clothing, the measures necessary to realize this plan are insufficient. 	<ul style="list-style-type: none"> The facilities of related organizations that produce human resources for the textile industry are weak. 	<ul style="list-style-type: none"> Interaction with the Japanese textile university Procurement of education equipment related to textiles
2	Human resource management	<ul style="list-style-type: none"> Safe and safe working environment for employees and welfare benefits are poor. 	<ul style="list-style-type: none"> Establish a technical level certification system (instructor, administrative supervisor) common to educational institutions such as technical colleges. Developing core human resources capable of judging the technical level of human resources (worker education, work training, skill management, attendance rate management etc) within the company 	<ul style="list-style-type: none"> Training on technical and business training at the Japan Center
3	Marketing	<ul style="list-style-type: none"> There is a lack of basic knowledge and information on foreign markets. 	<ul style="list-style-type: none"> Corporate personnel can utilize ICT technology. 	<ul style="list-style-type: none"> Training on technical and business training at the Japan Center
4	Production control	<ul style="list-style-type: none"> Product development and service environment utilizing IT technology are not in place. 	<ul style="list-style-type: none"> Cultivate core human resources (production time, production type, production quantity, production instructions, processing flow, production method, etc.) that can judge the technical 	<ul style="list-style-type: none"> Training on technical and business training at the Japan Center

			level of human resources within the company	
5	Educational Infrastructure	<ul style="list-style-type: none"> Facilities and equipment of universities and research institutions are not fully utilized. 	<ul style="list-style-type: none"> Maintain infrastructure and equipment and thorough maintenance. Investigate how research should respond to industry needs 	<ul style="list-style-type: none"> Implementation of technical cooperation projects related to teacher re-education
6	Inclusive business	<ul style="list-style-type: none"> Even graduate from university, difficult to find a job. 	<ul style="list-style-type: none"> After graduation, give training and opportunity to start self-employed and entrepreneurship. Strengthen employment support functions 	<ul style="list-style-type: none"> Implementation of technical cooperation project related to strengthening of instructors training function Training on technical and business training at the Japan Center
7	Research Equipment / Facility	<ul style="list-style-type: none"> Experimental / research equipment / facilities suitable for education are not substantial. Also. Knowledge and skills to utilize these equipment are short. 	<ul style="list-style-type: none"> Establish appropriate equipment plans and procure necessary equipment accordingly. 	<ul style="list-style-type: none"> Implementation of technical cooperation project related to strengthening of instructors training function
8	Low popularity of vocational training	<ul style="list-style-type: none"> TVET is less popular from parents and students than ordinary education 	<ul style="list-style-type: none"> Set and review missing departments / curriculums. Review the content of re-education of instructors / instructors based on industry trends. Update and renew facilities and equipment that have become obsolete / obsolete. PR will be conducted on vocational training based on the above 	<ul style="list-style-type: none"> Dispatch of education policy advisor Implementation of technical cooperation project (curriculum development method) related to strengthening instructor training function Procurement of equipment through grant aid
9	TVET level	<ul style="list-style-type: none"> Current education and training has reached the third grade only, and the positions that graduates can work after entering a company are limited to workers or craftsmen's classes 	<ul style="list-style-type: none"> Set up a new vocational training course that will take the next few years after college graduation. 	<ul style="list-style-type: none"> Dispatch of education policy advisor Implementation of technical cooperation project (curriculum development method) related to strengthening instructor training function
10	Educator level	<ul style="list-style-type: none"> Educators involved in education and training are 	<ul style="list-style-type: none"> Set and review missing departments / curriculums. 	<ul style="list-style-type: none"> Implementation of technical cooperation project (curriculum development method)

		less motivated.	<ul style="list-style-type: none"> · Review the content of re-education of instructors / instructors based on industry trends. · Update and renew facilities and equipment that have become obsolete / obsolete. · PR will be conducted on vocational training based on the above. . · Introduce / revise outcome remuneration 	related to strengthening instructor training function
11	Practical education training	<ul style="list-style-type: none"> · Practical training is lacking on TVET. · Equipment has variability from department, but both quality and quantity are short. 	<ul style="list-style-type: none"> · Re - instruct the use of equipment in teacher re - education. · Refresh / renew facilities / equipment that has become obsolete / obsolete, and add shortfalls 	<ul style="list-style-type: none"> · Implementation of technical cooperation project (curriculum development method) related to strengthening instructor training function

3.6.4. Selected Approaches to Solve Priority Issues in Advanced Industrial Human Resource Development in Uzbekistan

As described in 3.6.3.2, the following four approaches to contribute to the priority issue of developing advanced industrial human resources in Uzbekistan can be proposed. However, the needs, order of priority and feasibility of the proposed approaches need to be further reviewed within JICA. Hence, the approaches below are shown rigidly as ideas. In this case, we did not address the project at the Japan Center which its operation has already been transferred to the Uzbekistan side. In addition, project that mainly focus on equipment procurement has not been taken up, as it is difficult for Uzbekistan to be eligible for grant aid.

In order to contribute to 3, 4, 5, 10, 11, 12, 13, 14 described in "Table 3 - 21 Priority Issues", we propose the following approach utilizing Japanese resources:

Table 3-22 Approach 1:

Training industrial human resources in the tourism field at the Japan Center Bukhara branch office

Approach 1	Training industrial human resources in the tourism field at the Japan Center Bukhara branch office
Objective	➤ Industrial human resources who contribute to the tourism industry in Bukhara and surrounding provinces are developed.
Output	➤ Tourist industry personnel imbued with a Japanese-style hospitality culture is cultivated.
Activity	➤ Implement talent / business etiquette training based on a Japanese-style hospitality culture that can be utilized in the tourism industry. ➤ Practical on the job training in sightseeing spots.
Assumed C / P organization	➤ Japan Center Bukhara branch office
Beneficiary	➤ Corporations and entrepreneurs (hotels, guesthouses, restaurants, souvenir shops, drivers, tour guides, etc.) related to sightseeing in Uzbekistan (Bukhara area)
Input	➤ Japanese experts in the tourism field

The tourism sectors supported by British Council, British donor, have direct support for funding and skills targeting mountain guesthouses owner and trekking tour guide for mountaineers, but Japan's support is to mountain sightseeing We are assuming the operation of a training course aiming to convey the skills related to hospitality of Japanese style without limitation.

In order to contribute to 3, 4, 5, 10, 11, 12, 13, 14 described in "Table 3 - 21 Priority Issues ", we propose the following approach utilizing Japanese resources:

Table 3-23 Approach 2:

Acquisition of fundamental technology related to machine control in Japan Center Bukhara branch office

Approach 2	Acquisition of fundamental technology related to machine control in Japan Center Bukhara branch office
Objective	<ul style="list-style-type: none"> ➤ Basic skills related to machine control of human resources related to the machine and automobile industry in Bukhara and surrounding areas are acquired.
Output	<ul style="list-style-type: none"> ➤ The need for engineers equipped with practical skills is understood. ➤ Machine control is performed using PLC (Programmable Logic Controllers).
Activity	<ul style="list-style-type: none"> ➤ Perform PR on the need for engineers equipped with practical skills. ➤ Implement training related to machine control. ➤ Implement machine control practice using PLC. ➤ Implement mechanical control training using experimental equipment at Bukhara Technical University.
Assumed C / P organization	<ul style="list-style-type: none"> ➤ Japan Center Bukhara branch office ➤ Bukhara Technical University
Beneficiary	<ul style="list-style-type: none"> ➤ Uzbekistan (Bukhara area) university teachers and students ➤ Engineers involved in the machinery and automobile industry in Uzbekistan (Bukhara area)
Input	<ul style="list-style-type: none"> ➤ Machine control engineer ➤ PLC training kit

In order to contribute to 3, 4, 5, 10, 11, 12, 13, 14 described in "Table 3 - 21 Priority Issues ", we propose the following approach utilizing Japanese resources:.

Table 3-24 Approach 3:

Improvement of spinning technology and quality management abilities necessary for textile light industry through academic exchanges

Approach 3	Improvement of spinning technology and quality management abilities necessary for textile light industry through academic exchanges
Objective	➤ The quality of textile products produced in Uzbekistan is secured.
Output	<ul style="list-style-type: none"> ➤ Spinning technology is improved. ➤ Quality management technology is improved.
Activity	<ul style="list-style-type: none"> ➤ Conduct academic exchanges with Japanese universities (e.g., Kyoto Institute of Technology). ➤ Maintain the equipment as necessary.
Assumed C / P organization	<ul style="list-style-type: none"> ➤ Ministry of Higher Education ➤ Tashkent Textile Light Industry University
Beneficiary	<ul style="list-style-type: none"> ➤ Students and teachers at the Tashkent Textile Light Industry University ➤ Enterprises related to the textile industry in Uzbekistan
Input	<ul style="list-style-type: none"> ➤ Textile-related instructors from Japanese universities ➤ Mechanical engineers ➤ Required equipment

In order to contribute to 3, 4, 5, 10, 11, 12, 13, 14 described in "Table 3 - 21 Priority Issues ", we propose the following approach utilizing Japanese resources:

Table 3-25 Approach 4:

Establishment of a College Electronic Mechanics Faculty for nurturing industrial human resources engaged in the automobile industry around Samarkand

Approach 4	Establishment of a College Electronic Mechanics Faculty for nurturing industrial human resources engaged in the automobile industry around Samarkand (Technical Cooperation Project)
Objective	<ul style="list-style-type: none"> ➤ Practical technicians with skills related to electronic machinery are produced as persons who can contribute to the automobile industry in the current environment of advancing electronics technology.
Output	<ul style="list-style-type: none"> ➤ A curriculum is developed for practical engineers in the electro-mechanical engineering field. ➤ The need for practical engineers is recognized. ➤ A Faculty of Electro-mechanics is newly established in the College of Samarkand, where the automotive industry is popular.
Activity	<ul style="list-style-type: none"> ➤ Maintain training equipment for the establishment of the Faculty of Electro-mechanical Engineering. ➤ Develop necessary curriculum for the Department of Electro-mechanical Engineering. ➤ Train teachers who can conduct training on electro- mechanics (ToT).
Assumed C / P organization	<ul style="list-style-type: none"> ➤ Ministry of Higher Education ➤ Samarkand's existing vocational school (college)
Beneficiary	<ul style="list-style-type: none"> ➤ Students and teachers from the Samarkand vocational training school ➤ Automobile-related companies in Uzbekistan (Samarkand area)
Input	<ul style="list-style-type: none"> ➤ Electro-mechanical engineers ➤ Japanese experts ➤ Required equipment

4. Turkmenistan

4.1. Needs for Industry Human Resources

4.1.1. Present status of the Economy

4.1.1.1. Economy and Industrial Structure

Turkmenistan has the world's fourth largest natural gas reserves and its steady economic growth has been supported by the production and export of natural gas. In 2007, an impartation contract for Bagtyýarlyk mine was concluded with the China National Petroleum Corporation, since which time China has become its main export market for natural gas and for China, the largest supplier of natural gas replacing Russia.¹

The export revenue has brought living standards up to "Mid-Level" on the World Bank scale. However, there are signs that the depressed price of crude oil is putting pressure on its economy. In 2015, the local currency (Turkmen Manat: TMM) declined by 19%; regulations were imposed to limit automotive loans and the price of gasoline was increased (from TMM0.6 to TMM1 per liter).²

In the domestic consumer market, the government is encouraging the establishment of private businesses in order to have a lower dependency on imports. However, the basic economic structure and industrial structure as well, it is basically relying on the export of natural gas and its relating industry. There is no obvious structure change up to the present line since Turkmenistan independent.

4.1.1.2. Overview of the Economy

The following tables indicate the current state of the basic economy and an industry overview.

¹ Ministry of Foreign Affairs: The basic data of Turkmenistan,
<http://www.mofa.go.jp/mofaj/area/kyrgyz/data.html><http://www.mofa.go.jp/mofaj/area/kyrgyz/data.html>, (Accessed May 25, 2017)

² JETRO, "Turkmenistan Overview September, 2016",
https://www.jetro.go.jp/ext_images/world/russia_cis/outline/turkmenistan_201609.pdf, (Accessed. March 31, 2017).

Table 4-1 Trend of the Turkmen Economy³

	2012	2013	2014	2015	2016
Real GDP (in billions)					
Manat	37.28511	41.086	45.312	48.257	50.846
USD ⁴		12	13	14	15
Nominal GDP (Billions of USD)	35	42	46	36	37
Per-capita GNI ⁵ (USD)	5,660	6,690	7,530	7,380	-----
Financial balance (% of GDP)	6.3	1.2	0.8	▲ 0.7	▲ 0.8
Economic growth rate (%)	11.1	10.2	10.3	6.5	5.4

Table 4-2 Trend of Industry (% of GDP)⁶

	2012	2016	Principal products
Primary industry	7.6	13.2	Cotton, grain, melons; livestock
Secondary industry	24.4	47.7	Natural gas, oil, petroleum products, textiles, food processing
Tertiary Industry	68.0	39.2	-----
Industrial Production growth rate ⁷	7.3	1.0	-----

³ IMF, World Economic Outlook Database, <https://www.imf.org/>, (Accessed March 31, 2017)

⁴ Ex quick cross rate, <http://www.xe.com/>, (Accessed May 13, 2017) 1 US dollar=3.46556 Manat

⁵ World Bank, <http://data.worldbank.org/>, (Accessed March 31, 2017)

⁶ CIA, The World Fact Book, <https://www.cia.gov/library/publications/the-world-factbook/geos/xx.html>, (Accessed March 31, 2017)

⁷ Industrial growth rate follows the definition of CIA, The World Fact Book, <https://www.cia.gov/library/publications/the-world-factbook/geos/xx.html>, (Accessed March 31, 2017)

Table 4-3 Trade Indicators (Billions of USD)

	2012	2013	2014	2015	2016
Exports	16.50	16.80	17.50	14.00	-----
Import ⁹	9.90	10.00	10.30	7.80	-----
Principal trade items ¹⁰	Export	Gas, crude oil, petrochemicals, textiles, cotton fiber			
	Import	Machinery and equipment, chemicals, foodstuffs			
Principal trade counterparts ¹¹	Export	China 68.7%, Turkey 4.9%			
	Import	Turkey: 25.1%, Russia: 12.3%, China: 11%, UAE: 9.1%, Kazakhstan: 5.2%, Germany: 4.6%, Iran: 4.5%			

4.1.2. Industrial Promotion and Prioritized Industrial Areas of Turkmenistan

4.1.2.1. National Policy

The Turkmenistan government adopted the “National Programme of Turkmenistan on Socio-Economic Development for the Period of 2011-2030” in May 2010. The following five objectives are indicated in this plan.

1. Promotion of rapid economic growth
2. Diversification of the domestic economic structure
3. Improvement of economic stability for the nations.
4. Development of the market economy and organizational restructuring
5. Rectification of regional inequalities

The “National Programme of Turkmenistan on Socio-Economic Development for the Period of 2011-2030” is divided into three phases. Each objective and plan is as follows:

First Phase (2011~2015)

- To establish an economic model that improves productivity and enhances sustainable trade and services.

Second Phase (2016~2020)

- To establish an organization to promote the market economy
- To reform economic structures and industrial sectors

⁸ United Nations Conference on Trade and Development, <http://unctad.org/>, (Accessed March 31, 2017)

⁹ Ibid.

¹⁰ JETRO, “Overview of countries in Central Asia” https://www.jetro.go.jp/ext_images/world/russia_cis/outline/centasia_20160411.pdf, (Accessed March 31, 2017).

¹¹ CIA, The World Fact book, <https://www.cia.gov/library/publications/the-world-factbook/geos/xx.html>, (Accessed March 31, 2017)

- To foster private sectors
- To introduce new technologies for each sector
- To establish product sectors that are environmentally friendly
- To follow international standards
- To maintain the infrastructures of developing regions.

Third Phase (2021~2030)

- To achieve a truly developed nation, both socially and economically
- To create an appropriate business environment through reform.
- To foster political and economic cooperation with other nations.

For the Second Phase of the “National Programme of Turkmenistan on Socio-Economic Development for the Period 2011-2030”, an action plan was improvised together with the United Nations and announced in 2016. With regard to industrial development, the following are some of the issues outlined in the “Employment, Economic Diversification, Trade” section¹².

Problems to be solved

- Shortage of labor with technical skills necessary for industrial development.
- There is a gap between the varying technical needs and the technical ability of the labor force and the educational system.
- Labor productivity improvement as a key factor underpinning economic growth.

Proposal

- Foster the roles of Small- and Medium-Sized Enterprises for stable economic growth.
- Foster the agriculture sectors
- It is necessary to provide foundations for the financial sector that are easy for private companies to utilize.
- Diversification of the economy will require human resources with appropriate technology and capabilities and it will be imperative to secure a labor force to organize the technology/vocational education and training systems.

4.1.2.2. Industry Promotion Policy

In the “National Programme of Turkmenistan on Socio-Economic Development for the Period 2011-2030”, priority industries are designated state by state to resolve regional disparities. In the city of Ashkhabad, the priority lies with the special economic zone, new technology, engineering,

¹² United Nation- Turkmenistan Partnership Framework for Development 2016-2020. PP. 32-33.

biotechnology, textiles, techno-parks, transportation and tourism¹³. This plan sets out the need to strengthen government support to entrepreneurs and private companies. Agriculture is included as a private sector industry.

Natural gas, crude oil, petrochemical raw materials, fiber products, cotton fibers, machinery, chemical products and foodstuffs are priority industries because they are the main Turkmen exports.

From looking at the foreign investment promotion policy that will be mentioned later, it is assumed that the Turkmenistan government is going to foster the agriculture sector, which includes food processing.

4.1.3. Current status of SMEs (small and medium-sized enterprises) in the Manufacturing Industry

4.1.3.1. Union of Industrialists and Entrepreneurs of Turkmenistan (UIET)

The President of Turkmenistan aimed to further develop the private sector of the national economy, and established UIET in 2008. The share of the member enterprises in the national economy at the time of establishment was 0.1%, but now, it has grown to 62% (2016). Sector wise, 95% share is in trade, 80% in the construction sector, 60% in the agricultural sector, and 90% in the service sector. Also, as of 2016, there are 16,000 affiliated members, and the number is still increasing.

Main activities and objectives are:

- To foster and support the private sector and enlarge the share of private sector in the GDP,
- To provide legal advice, training, and loans to start-ups and existing members,
- To implement the import substitution program adopted by the government.

4.1.3.2. SMEs

In Turkmenistan, agriculture is the main product of cotton cultivation, exports of the priority industries, petroleum products and total crude oil, are close to 30.2%. The total trade import amount in 2015 is 7.8 billion dollars and the total export value is 1.40 billion dollars, importing 50% as a daily necessity. Furthermore, as emphasis is placed on corporate support relating to the importation of daily goods, domestic small and medium enterprises cannot grow.

Within this context, the Ministry of Trade and Foreign Economic Relations of Turkmenistan focuses on training small and medium-sized enterprises and supports entrepreneurs according to

¹³ "Review of National Program of Turkmenistan Socio-Economic Development of the Period of 2011-2030" pp. 14-15.

government's priority industrial fields. This support area is as follows:

- 1) Agriculture (dairy farming, poultry, greenhouse cultivation)
- 2) Fishery (aquaculture in the Ural Sea, fish processing)
- 3) Manufacture of chemical fertilizer
- 4) Development of energy conservation technology
- 5) Light industry
- 6) Food Processing

4.1.3.3. Overviews of Interviewed Companies

From UIAE, the Survey Team interviewed four SMEs at the office of UIET in Ashgabad City. The Survey Team has request UIET to nominate 10 respondents, however, there were only four available for the interview, as an interview survey was strictly restricted in Turkmenistan. Moreover, the direct interview at companies requires government's permission, which was unavailable during the period of field survey. The list of the respondents is shown in the table below:

Table4-4 List of Interviewed Companies

	Company Name	Field	Products/Service
(1)	Poultry Breeder	Agriculture	Turkey farm
(2)	Jamila Textile Factory	Garment industry	Manufacturing men's garments
(3)	Berkarar-hyzmat	Real estate agent	Office lease, Large-scale supermarket
(4)	Awtoyoly Group of Companies	Transportation, Agriculture	Automobile maintenance, Vocational training

(1) Poultry Breeder (Turkey Farm)

Started in 2016 with technical support of UIET, now has 350 employees. Currently they have production goal of 3,500 animals per year. Turkey farm facilities are able to breed 4700 birds per year, but turkey breeding is very difficult and it takes time to rear up to adulthood.

As production work, we are producing and breeding turkeys, reusing turkey baits, and manufacturing new products. Therefore, the company regularly invites poultry farming expert from Germany in order to achieve stable production. They are looking forward to exporting to European countries, which will start in October 2017.

Also, if poultry farms do not thoroughly control hygiene, there will be severe damage by bird flu, etc. We are trying to ship products according to HACCP and ISO standards.

(2) Jamila Textile Factory

Although the founder first started a clothing store in the town, she utilized UIET's SME support and her own funds to begin a garment factory that her father was running. She is currently manufacturing men's clothes. She inherited sewing techniques and facilities from her father and uses JUKI (Japanese brand) sewing machines.

To meet the daily market needs, production systems operate on small variety small-lot production basis, aiming to establish a brand. The founder intends to apply a semi-automatic production system on an assembly line. The company employs 130 workers, 5 management staff, and 2 mechanical technicians currently.

(3) Berkarar-hyzmat

In 2003, the owner began to lease buildings in Ashgabat City, with technical support of UIET. Currently, he employs 200 people and provides office space for foreign business and other enterprises. The owner also operates a shopping center on the lower floor of the building. In the future, with urban improvement and industrial support policy implemented by the government and the local government, it is expected that foreign entrepreneurs will open their offices. Therefore, to meet their demand, the owner thinks that the building and its facilities should be enhanced as a hub for their business.

(4) Awtoyoly Group of Companies

Awtoyoly has over 14 years of experience in international trade to foreign markets, and is one of the four most promising enterprises groups in Turkmenistan. As a division of a group, in 1998 a service business had started for liquefied natural gas transportation with the support of UIET.

Specific services are as follows: 1) tire change at each relay station; 2) vehicle technical maintenance; 3) battery change; 4) oil change; 5) filter replacement; 6) vehicle washing service; 7) auto maintenance training, etc. The company currently employs 40 people including qualified auto mechanics. In the future, the company plans to participate in transportation of agricultural products.

4.1.3.4. Observation of Suburban Factory Complex of Ashgabat City

In Turkmenistan, an interview to private enterprises was severely restricted. The UIET was asked to introduce 10 companies for interview, but only 4 were introduced, and directly visiting the companies was not permitted as the government permission was unavailable during the field survey.

Therefore, because photography is forbidden in industrial-parks where companies operate, it was decided to visually observe as much as possible, such as the external overview (power supply

situation, environment of access to the industrial-park, park site conditions, etc.) of the factory complex of Ashgabat city in order to have a quick understanding of the current situation of local industry.

(1) Industrial-Park Located on the West Side of Ashgabat City

The Industrial-Park has a freight warehouse, government offices that manage import and export permission, and a state-owned railway facility maintenance company is located ahead on the right-hand side of the main road. The company was also carrying out scrap processing of aircrafts and large industrial machinery. It is generally a quiet industrial park.

(2) Industrial Area Located on the East Side of Ashgabat City

In this furniture manufacturing complex, there are 4-5 furniture manufacturing factories lining the premises, which are jointly managed by Turkish companies and local companies. It implies that Turkish companies are entering into Turkmenistan in many industrial sectors. In addition, the sales headquarters of these companies were operating in the center of the city.

(3) Estimation of Electric Power Transmission Amount to Industrial-Parks

In the former Soviet Union era, facility construction was promoted in anticipation of a large electric power demand of 1150KV¹⁴. In 1991, the former Soviet Union collapsed and enterprises stopped operating, creating a decline in electricity demand.¹⁵

In the Ashgabat area, the industrial area are limited to the east and west sides. Currently, imports of living goods from neighboring countries are significantly higher than exports, and secondary industries are few, so the electricity consumption used by the industrial sector is 200 - 300 KVA/month. It is assumed that the demand in electricity in this industrial area is small.

4.1.4. Japanese Companies' Presence and the Fields of Investment

4.1.4.1. Policies to Attract Foreign Investment

Promotion and policy reform to pave the way for the inflow of direct foreign investment have lagged behind due to strict government control. Further, visa controls mean the general perception is of an unsatisfactory situation. Foreign direct investments are almost restricted to and concentrated on crude oil and natural gas industries.¹⁶ In January 2017, the local labor quota was tightened to nine

¹⁴ Yoshio Nagashima, "Countries of Central Asia (Kyrgyz, Uzbekistan, etc.) adopting 500KV voltage" (Original in Japanese), May 2015, Engineering Meteorology Institution [<http://overhead-tml.net/teigi.html#maddleaseia>] (accessed June 1st, 2017)

¹⁵ Ibid.

¹⁶ JETRO, "Turkmenistan Overview September, 2016" https://www.jetro.go.jp/ext_images/world/russia_cis/outline/turkmenistan_201609.pdf, (accessed June 3, 2017).

(9) for every one (1) foreign laborer (as opposed to four previously).¹⁷

The function of the Ministry of Trade and Foreign Economic Relations of Turkmenistan is to revitalize the domestic economy by providing products for the domestic market. The objectives include inviting foreign investments and enabling the domestic industry to manufacture exportable products. Currently most of the development is concentrated in the foodstuff-related sector.

Development is sought in areas such as the grain-related industry, management of broiler (fowl)-breeding farms, greenhouse farming (greenhouse-grown vegetables) and the production of pasta and canned vegetables.

The most desirable investments are by foreign companies capable of modernizing these areas and ready to develop the businesses in joint ventures with domestic companies.¹⁸ Research based on interviews indicates an inclination toward developing dairy product production and poultry farms.

Turkmenistan has ten (10) FEZs,¹⁹ within which both domestic and foreign companies can engage in business with no cap on company profit. However, low economic performance is possible due to the lack of government support and infrastructures.²⁰

4.1.4.2. Japanese Companies' Presence and the Fields of Investment

A Business Forum was held in the city of Ashkhabad in Turkmenistan on 23 October, 2015 and attended by the Japanese Prime Minister Abe. At this Forum, the following agreements on various projects were concluded:

¹⁷ From interview (ITOCHU Corporation)

¹⁸ "Information on investments projects related to industrial production plants/units from Ministry of Trade and Foreign Economic Relations of Turkmenistan", "Ministry of Trade and Foreign Economic Relations of Turkmenistan"

¹⁹ JETRO, "Turkmenistan Overview September, 2016"

https://www.jetro.go.jp/ext_images/world/russia_cis/outline/turkmenistan_201609.pdf, (accessed June 3, 2017).

²⁰ JETRO, "Turkmenistan Overview September, 2016"

https://www.jetro.go.jp/ext_images/world/russia_cis/outline/turkmenistan_201609.pdf, (accessed June 3, 2017).

Table4-5 Signed Agreement at Business Forum²¹

	Contents	Organization
Finance	Memorandum about cooperation in the financial field	Sumitomo Mitsui Banking Corporation
Gas	Gas treating plant construction for GARUKWINUISHI gas field 3rd period development projects Framework Agreement	JGC Group, Sojitz Corporation, ITOCHU Corporation, Chiyoda Corporation, Mitsubishi Corporation
Chemical	Polyethylene production plant construction MOU	JGC Group
Fertilizer	The phosphoric acid and the phosphorus system fertilizer manufacturing plant construction Framework Agreement	Sojitz Corporation
Water resources	Seawater desalination plant	Marubeni Corporation Plant Division
Chemical	Polymer manufacturing plant in a KYANRUI area	Mitsubishi Corporation
Gas	Cooperation memorandum for JAPAN-GTL (Technology make the liquid fuel of the natural gas) project implementation in Turkmenistan	Japan Oil, Gas and Metals National Corporation
Fertilizer	One of the state-operated combines, "torque Monch Miya"s Comprehensive Framework Agreement about cooperation	Mitsubishi Corporation
Generation of electricity	Turkmenistan ZERUGERU simple cycle gas turbine Thermal power plant newly-established item: EPC ²² contract	SUMITOMO CORPORATION

The only Japanese trading firm with an office in Turkmenistan is ITOCHU Corporation. Other trading firms maintain offices in other countries and expand their operational areas to Turkmenistan through frequent business trips.

ITOCHU Corporation once withdrew from Turkmenistan in 2012 but recently opened a new office

²¹ "Japan, Turkmenistan Invest Environment Network", <http://www.jp-tr.org/mission/shomei.pdf>, (accessed May 20, 2017)

²² EPC Stand for Engineering, Procurement and Construction

there. In 2002, ITOCHU Corporation concluded a contract with Komatsu Ltd. (through a Turkish joint venture company with Güneykaya Group) to supply 200 sets of heavy machinery to repair pipelines through to 2010. In 2003, it also opened a training center, which remains in operation today.²³

The Japanese population in Turkmenistan as of June 2016 was 38.²⁴

4.1.4.3. Presence of Foreign Countries Other than Japan and Their Investment Fields

²⁵

There are approximately 140 foreign companies from 25 countries actively doing business in Turkmenistan. China, Russia, France, Kazakhstan, Britain, Iran and Ukraine are some examples. The number of Chinese companies in particular stands out.

China

A state-owned enterprise, China National Petroleum Corporation is currently operating in Turkmenistan.

Turkey

The Turkish companies undertake projects of the Government of Turkmenistan for urban development and infrastructure construction. Turkish companies have a long history of doing businesses in Turkmenistan, ever since the era of the first President. For example, Calik Holding created a network of close contacts in Turkmenistan and developed the textile industry there.

In recent years, construction companies such as Gap Insaat, an affiliate of Calik Holdings, Renaissance Construction and Polimeks Construction have been actively securing major project deals.

In the private sector, Coca Cola Turkey is in production and sales.

France

A heavy electric manufacturer, Schneider Electric, is forging its way into the Turkmenistan market through its subsidiary in Turkey.

²³ From interview with ITOCHU Corporation

²⁴ Ministry of Foreign Affairs: The basic data of Turkmenistan
<http://www.mofa.go.jp/mofaj/area/kyrgyz/data.html>
(accessed March 31, 2017)

²⁵ JETRO, "Turkmenistan Overview September, 2016"
https://www.jetro.go.jp/ext_images/world/russia_cis/outline/turkmenistan_201609.pdf, (accessed June 3, 2017).

4.1.5. Industrial Human Resources Needs of Local Industry ²⁶

It was found that the state-owned enterprises monopolize the major industries of Turkmenistan, and the activities of private companies are still limited. For private SMEs and entrepreneurs to do business, the issue remains as aggressive support of the government, domestic and foreign financial support, and deregulation of procedures.

In addition, all industrial products (excluding the petroleum and gas) are imported from neighboring countries, and the problem is that fundamental technology used in production sites is lacking as well.

²⁶ JETRO - Istanbul Office September 2016 "Overview of Turkmenistan", September 2016. (Original in Japanese)
https://www.jetro.go.jp/ext_images/world/russia_cis/outline/turkmenistan_201609.pdf, (Accessed May 31st, 2017)

Table4-6 List of Local Industry and Industrial Human Resources Needs

Field	Condition	Industry human resources needs
1) Oil and natural gas production	Oil and gas revenues, generally paid to the Hydrocarbon Resources Management Utilities Agency; with 80% being the president and 20% being contributed to the national treasury.	Production management engineer with business experience
2) Petroleum / natural gas refining industry	Consortium of two Korean construction companies (Hyundai Construction and LG International), and Toyo Engineering commissioned to build a large gas chemistry complex for Turkmenistan's national gas company in May 2014.	Production management engineer with business experience
3) Electrical supply industry	In the electricity business, state-owned enterprises aim to increase not only domestic demand but also export of electricity to neighboring countries through restoration of existing power plants and construction of new power plants.	Engineers with expertise
4) Chemical industry	Japanese companies like Sojitz, and Kawasaki Plant Systems (Kawasaki Heavy Industries Group) received orders for the country's largest fertilizer manufacturing facility from Turkmenhimiya, a state company of Turkmenistan, in 2009. Also, in 2014 Mitsubishi Corporation and GAP Insaat, a Turkish construction company began construction of a carbamide (urea) production plant in Galabogaz, Balkan Province.	Mid-level engineers with specialized expertise in the chemical fields
5) Construction industry	The government has ordered billions of dollar projects to domestic private companies, Turkish companies, and French companies. Especially, about 85% of construction projects are being implemented by Turkish companies. In the field of engineering, a plan to establish a cement factory and a brick factory is anticipated by German and British companies in order to supply building materials accompanying the project.	Engineers with expertise specialized in construction and civil engineering design
6) Textile industry	About 20 of the textile factories in the 74 domestic companies are joint ventures with Turkish companies. Turkish enterprises are engaged in 70-80% of Turkmenistan's textile exports; the main destinations are the US, Russia, and China. The Government plans to raise the processing capacity of cotton to 500,000 tons annually in the 2020 Development Strategy, with the goal of diversifying cotton products.	Mid-level engineers who can operate and maintain equipment
7) Agriculture	The agriculture industry aims to improve productivity	Mid-level engineers

industry	by strengthening production process technology and reforming the agricultural production system. Especially, domestic production of meat, wheat, and dairy products are positioned as an urgent task. Major exporters to Turkmenistan are Russia, Ukraine, Belarus, Kazakhstan, Iran, Turkey, Azerbaijan, India, Pakistan, and other neighboring countries.	with cultivation techniques such as cotton and vegetable cultivation
8) Medical supply industry	IT system introduction in the medical field is regarded as important to allow easy access to medical care.	Mid-level engineers who can operate and maintain medical equipment
9) Telecommunications / IT business	One of the government's priority investment fields, and is emphasized as the Internet is growing. However, access restrictions are still applied to social network services and video sites.	Mid-level engineers who can operate and program IT equipment
10) Logistics industry	Logistic industry depends on truck transportation, so Uzbek border road and Dasogs - Ashgabat road plan are regarded as important. The government has also announced plans for an international rail and high-speed rail. In the shipping sector, the 2013-2017 construction project of the Turkmenbashi International Port Facility of the Caspian Sea was initiated. This includes passenger ferries, container transportation, and dock construction. In the airline network, the state-run Turkmenistan Airlines (THY) is trying to expand. In addition, construction of Turkmenbashi, Mary New Airport, Ashgabat, and Turkmenabad New Airport was completed.	Experienced engineers in machine operation and car maintenance
11) Tourism industry	Awaza Tourism Zone (ATZ) was set up the in 2007 to promote tourism and the development of the Caspian Sea coast. Although there are sightseeing spots registered as World Heritage sites, there is no active advertising.	Specialists with experience of planning and business in the tourism industry

4.1.6. Sectors to be Intervened for Further Human Resource Development for Industrial Promotion

4.1.6.1. Industrial Human Resource Development of Next Generation

As neighboring countries become globalized, Turkmenistan still has a unique industrial structure monopolized by state-owned enterprises. The situation where the domestic economy continues to depend on exporting only rich underground resources as raw materials has been continued. Unless the government agencies aggressively promote private enterprises by formulating and implementing

the policies, it will not likely change.

Meanwhile, Turkmenistan has technology and data collection capacity in agricultural processing, textile and sewing, energy and mineral resource development, etc. These technologies and capacity should be broadly utilized, and exported to neighboring countries with added value. Construction of the industrial processes that enables such an approach is most important.

Fostering next generation of industrial human resources what the Turkmenistan government cannot miss out on. Training younger engineers and providing enthusiastic support to entrepreneurs are promising in that sense.

4.1.6.2. Focus Industrial Areas by Japan

As mentioned earlier, the relationship between Japan and Turkmenistan is strongly linked economically. In 2002, Komatsu Ltd. and Itochu Corporation have signed a contract until 2020 to supply 200 heavy machinery per year for pipeline maintenance, and in 2011 a training center was established in Ashgabat.

Furthermore, in 2010, JBIC agreed with the Turkmenistan government to finance a total of up to 45 billion yen for construction of ammonia and urea fertilizer manufacturing plant, of which construction was ordered to Sojitz and Kawasaki Heavy Industry. Following, in March 2013, "Japan-Turkmenistan Network for Investment Environment Improvement (called JTIEDN)" was established, and in May 2013 the Turkmenistan embassy in Japan was established. Further strengthening of bilateral relations is expected.

President of Turkmenistan, Mr. Berdimuhamedow made a second visit to Japan from 11th to 13th of September, 2013. At the summit talks, six agreement documents, including "Joint Statement between Japan and Turkmenistan on the New Partnership" and "Technical Cooperation Agreement", were signed. In the private sector, about 20 billion yen project of chemical plants of sulfuric acid production was ordered to Sojitz and Mitsui Engineering & Construction with financial support of JBIC.

Thus, unlike in the president Niyazov era, in which the summit between the two countries was not held, it can be said that the relationship between Japan and Turkmenistan has entered a new stage due to changes in foreign policy and domestic policy of the Berdimuhamedow regime²⁷.

²⁷ INAGAKI, Fumiaki, "Turkmenistan: A Neutral Country of Natural Gas and Desert", 6th feature of "Central Asia and Japan" serial, September 2013, Institute for International Studies and Training. (Original in Japanese)
<http://www.iist.or.jp/jp-m/2013/0223-0905/>, (Accessed June 1st, 2017)

4.2. Overview of the Education Sector

4.2.1. Basic Data for Education

The following table shows the basic data of education in Turkmenistan.

Table4-7 Basic Data of Education in Turkmenistan

	Figure	Year
Number of Schools		
General Primary and Secondary Education	1,741	2011
Primary Vocational Education	62	2017
Secondary Vocational Education	42	2017
Higher Education	24	2017
Number of Students		
General Primary and Secondary Education	9,004,000	2011
Primary Vocational Education	511,000	2011
Secondary Vocational Education	83,000	2011
Higher Education	256,000	2011
Literacy Rate (15-24 years old)	99.84%	2015
Expenditure for Education (as a percentage of GDP)	3.04%	2012

Reference: Ministry of Education of the Republic of Turkmenistan²⁸, World Bank²⁹,
 State Committee of Statistics of Turkmenistan³⁰

4.2.2. Education Policy and Law

4.2.2.1. Education Policy

The State Program for the Development of the Educational System of Turkmenistan for the period of 2012-2016 was approved by the President of Turkmenistan in 2012. The content of the program, however, is described in highly abstract terms and includes no situation analysis using accurate data. The program also lacks a fully established action plan or definitive indicators for the outputs. The program document is very brief, taking up only 8 pages, and is far less comprehensive than a typical

²⁸ Data of 2017 was provided by the Ministry of Education at the interview.

²⁹ World Bank, World Bank Open Data, <http://data.worldbank.org/>, (accessed June 1, 2017).

³⁰ State Committee of Statistics of Turkmenistan, *Statistical Yearbook of Turkmenistan 2012*, Ashgabat: State committee of statistics of Turkmenistan, 2012, p.219.

policy paper of another country. It seems more like a vision statement of the President than an education program of the Government.

The next five-year program for educational development is already drafted and awaiting government approval. The survey team was unable to obtain a draft of the program during the survey, as the draft paper had not yet been publicized.

The State Program 2012-2016 enumerates the tasks of education:

“...to bring up well-educated, industrious young people, well-intentioned people who are faithful to the Motherland, and people with wider world views, high spirituality, modern thinking, and national spirit, and to train talented specialists skilled at operating up-to date equipment.

The following seven activities are carried out to accomplish these tasks.

- 1) Professional improvement
 - Conduct teacher training satisfying modern requirements using modern educational technical equipment, including multimedia, audio, and up-to-date laboratory devices
 - Develop criteria for determining the professional competence of teachers and educators
 - Assess the quality of education
 - Open advanced training facilities
 - Improve the scientific-methodological activities of the National Institute of Education of Turkmenistan
- 2) Improvement of textbooks and manuals
 - Develop academic curriculum
 - Develop innovative textbooks and teaching materials
 - Establish centers compiling educational visual aids, video-audio materials, electronic textbooks, and academic-methodological manuals
 - Establish electronic libraries and publishing centers
- 3) Further improvement of legal documents regulating the work of the educational system
 - Regulate legal documents pertaining to types of ownership in the educational system
 - Regulate legal documents pertaining to the admission of foreign citizens to primary and secondary professional schools on the basis of payment
 - Regulate the meals provided at comprehensive schools
 - Regulate activities to decrease the weekly workloads of educators
 - Regulate activities related to the admission of youth to primary and secondary professional schools on the basis of a single test

- Regulate the number of students admitted to educational establishments

- 4) Activities necessary to increase the number of talented children in our country
 - Teaching foreign languages, beginning from kindergarten
 - Establish boarding schools for talented children
 - Create a state mechanism for inspiring children
 - Conduct international competitions for students
 -

- 5) Creation of an electronic system for information exchange
 - Replace computers with up-to-date hardware
 - Increase the number of secondary schools connected to the internet– electronic textbooks, diaries, teacher’s notebooks, reports, monitoring, etc.
 - Create an internet portal and national center of information and innovation technology at MOE

- 6) Construction of educational establishments and strengthening of material-technical foundations
 - Construct 168 preschools
 - Construct 228 secondary schools
 - Increase the number of secondary professional school admissions by 1.7 times and the number of undergraduate students by 2.6 times in 2016

- 7) International cooperation
 - Promote study abroad in famous higher education establishments abroad
 - Review the primary professional educational system in accordance with related programs of the EU
 - Cooperate with higher educational establishments abroad
 - Align the standards of education with international requirements
 - Review and compare the academic curricula, programs, textbooks, and manuals of Turkmenistan with those of foreign countries.

The higher education institutes and international organizations we interviewed anticipate that the concepts of global education, digital learning, and linguistic education will be prioritized in the next state program starting in 2017.

4.2.2.2. Education Law

The educational Law of Turkmenistan enforced from August 2009 declared the direction of educational reform of the country. The role of education in the law is strengthened as a priority and a basis for the economic and social growth and cultural development of the society.

4.2.3. Education System

4.2.3.1. Compulsory Education

According to the educational law revised in 2009, education in Turkmenistan is divided into the following levels: ECD, primary, secondary, professional, and higher education. The primary and secondary levels are defined as compulsory education³¹.

The duration of compulsory education was extended from 9 to 10 years under a legislation entitled “On Improvement of the Educational System” from March 2007, but a newer legislation enacted in March 2013 calls for a transition to 12 years of compulsory education. The transition has been underway since 2013. The table below compares the former education system and current system.

Table4-8 Comparison between the Former Education System and Current System

	Grade		Age	
	Previous	Current	Previous	Current
Primary	1 - 4	1 - 4	7 - 10	6 - 10
Secondary (Basic)	5 - 10	5 - 10	11 - 16	11 - 16
Secondary (Upper)		11 - 12		17 - 18

Compulsory education at state educational institutions is free of charge. Under the Government of Turkmenistan’s policy to promote the Turkmen language and encourage citizens to use it, most of the state schools use Turkmen as a language of instruction.

After completing 12 years of compulsory education, some students go on to study at lyceums or colleges offering TVET. The courses provided by these schools vary from 3 months to 4 years in duration, but a student must complete a course of at least 1 year in order to obtain a diploma in any given field.

4.2.3.2. Higher Education

Higher education in Turkmenistan generally consists of a 5-year program, although some courses, such as medical courses, take 6 year to complete. Four types of higher education institution (HEI) operate in Turkmenistan: university, academy, institute, and conservatoire³². Students can obtain diplomas in their fields by completing 5-year courses. At the postgraduate level, students can obtain

³¹ European Training Foundation, Turkmenistan Overview of Vocational Education and Training and the Labour Market, [https://www.etf.europa.eu/webatt.nsf/0/583B60A279487F5FC1257EF9004334C6/\\$file/Turkmenistan%20VET%20&%20labour%20market%20Update%202015.pdf](https://www.etf.europa.eu/webatt.nsf/0/583B60A279487F5FC1257EF9004334C6/$file/Turkmenistan%20VET%20&%20labour%20market%20Update%202015.pdf) (accessed May 23, 2017)

³² EACEA, “Higher Education in Turkmenistan,” http://eacea.ec.europa.eu/tempus/participating_countries/overview/Turkmenistan.pdf (accessed May 23, 2017)

Candidate of Science degrees after 3 years of study and Doctor of Science degrees after an additional 3 years of study and thesis defense.

While most of the state HEIs offer education for free, the educational law revised in 2009 states that state universities can collect fees from students who are not sponsored by the government and from students who attend evening classes³³. In fact, the International University for Humanities and Development, one of the universities the Survey Team visited, collects tuition fees from its students.

4.2.4. Education Administration

While education administration is managed by the Ministry of Education of the Republic of Turkmenistan, the Law on Education stipulates that the Cabinet of Ministers, the upper authority overseeing the Ministry of Education, has the final word on decisions on any kind of educational matter, including policy. According to the Law on Education revised in 2009, the Cabinet of Ministers has the following authorities and responsibilities:

- Development of education policy
- Management of the education system
- Implementation of education reform based on international standards
- Management of the activities of education institutions
- Implementation of programs for the development and improvement of the education system
- Establishment of a quality assurance system and accreditation system
- Licensing of the establishment of education institutions
- Budget management for education
- Development of international cooperation with foreign countries and international organizations

The Ministry of Education, meanwhile, sets standards for school curricula and decides upon the duration of the school year and starting and finishing dates³⁴. At the local level, education departments set up in each province, district, and city direct the management of schools in their areas. The Ministry of Education is responsible for managing and instructing those education departments.

4.2.5. Issues in Education Sector for Industrial Human Resources Development

The Data Collection Survey in Turkmenistan could have been more comprehensive. Only a limited number of visits were paid to educational institutes and international organization, and comments

³³ Ibid.

³⁴ Ibid.

from the interviewees tended to conform to the official view. The data and information were not fully publicized in the country. Because of those limitations, there were difficulties in analyzing the situation and challenges of the education sector as a rule. Following is a list of issues examined based on more limited data resources:

(1) Adaptation to International Standards

In order to adapt the current education system to European standards in accordance with the Bologna Process, the government aims to establish an internationally recognized higher educational system through joint scientific research, human resource exchanges, and studying abroad programs. The Oguz Han Engineering and Technology University established in 2016 has put emphasis on the development of human resources who learn engineering and technology with a highly industrial focus in international languages such as English and Japanese. The university is modeling parts of its system after the educational system of Japan in collaboration with Tsukuba University. The university is expected to produce global human resources in the fields of chemistry, nano technology, biotechnology, ecology, and IT to meet current industrial demands.

According to a hearing with the USAID, the traditional method of education in Turkmenistan from earlier times was to convey knowledge from teacher to student. Students obediently filled their notebooks with what the teacher wrote. The mentality and attitudes of the traditional learning style remains even in modern society, though student-oriented teaching methodologies have been introduced and developed in order to cultivate human resources who are adept at critical thinking and meet international standards.

(2) Training and Re-training of Teachers

The capacity development of teachers skilled in student-oriented teaching methodologies, critical thinking, and international standards is an urgent task. Training and re-training of teachers who can handle IT and multimedia devices is also required, as the government is promoting digital education. Turkmen State University required strengthened capacity as one of Turkmenistan's best state universities responsible for training future educators in the country.

The International University for the Humanities and Development is newly established as a leading university that meets the regulation of the Bologna Process. It has a master program, invites foreign professors, and conducts all classes in English. It plans to build a research laboratory and Social Innovation and Entrepreneurship Center in order to promote Industry-academia collaboration.

Qualified trainers and specialists are crucially needed for these new universities to support their plans for innovative education and research.

(3) Delay of Curriculum Development

According to the hearing with USAID, curricula, textbooks, and teaching materials are not adequately updated in all levels of education. Labor market needs are not reflected in curriculum development. The languages of the official textbooks are mainly Russian and Turkmen and have not been modified with modernized methodology for many years.

As the government plans innovative curriculum development in the State Program, the review and revision of existing curricula and materials are urgently needed. Visual and audio educational material and equipment need to be developed.

(4) Utilization of Educational Infrastructure

The government promised to construct a large number of educational facilities such as pre-schools, primary schools, and secondary schools and planned to equip them with the latest computers and internet connections to launch digital education and management. During the visits to the interviewed universities, the survey team observed highly modernized buildings and newly installed equipment in many cases. There seem to be no solid plans, however, for the development of human resources to operate and maintain the facilities and equipment. A plan for strengthening the quality of education should be formulated for implementation in parallel with the infrastructure development plan by the Ministry of Education.

4.2.6. Vision for Educational Reform

As mentioned in 4.2.2, the next state program on education reform has yet to be announced. In February, 2017, the government singled out the development of a digital learning environment as a future direction for education. The following items describe the direction of educational reform in Turkmenistan, based on information learned from interviewees, mainly from international organizations.

- Global human resource development
- Development of a digital learning environment
- Industry-academia collaboration
- Reform of the TVET system
- Entrepreneurship development
- Integration of European standards into the education system
- Language education -English, Chinese, Korean, and Japanese

4.3. Higher Education Institutions in the Fields of Science and Engineering

4.3.1. Outline of Institutions of Higher Education

As mentioned in Section 4.2.3 Education System, higher education is mainly provided by universities, Institutes and Academies. Education at universities is normally a 5-year program, except for medical institutions. University course loads are divided into full-time, part-time (evening), and distance learning systems. The number of university entrants is decided by the Presidential Decree (as of 2012)³⁵.

In order to enter the graduate school, it is necessary to pass an academic examination and a foreign language examination. In order to complete the graduate school, it is necessary to pass four examinations: 1) Foreign Languages, 2) Philosophy of Science, 3) Information and Communication Technologies, and 4) Specialized Subjects. Additionally, at least three theses in scientific journals must be published.

4.3.2. Current Situation and Issues in Higher Education Institutions in the Fields of Science and Engineering

(1) Well-developed Practical Training

Practical training facilities, such as trains and rigs for oil extraction, are installed in the International Oil and Gas University and Turkmen National Transportation and Communications University. This type of training is useful for students who wish to work in such industrial sectors during the internship period, or after graduation. A curriculum for enhancing students' own value by practical skills is prepared. On the other hand, the academic-based research is being conducted at the Academy of Sciences; it could not be confirmed within the university's campus.

The educational content of Turkmenistan's universities appeared to be very close to that of the vocational training school in Japan which cultivates a more practical industrial talent. Meanwhile, students of the Turkmen National Transportation and Communications University won the Excellence Award in the "Best Project and Breakthrough in Robotics" category at the International Student Competition sponsored by the Ministry of Education of Turkey, which also shows the high academic achievement.

(2) Research Equipment and Facilities

³⁵ Tempus, "Higher Education in Turkmenistan", http://eacea.ec.europa.eu/tempus/participating_countries/overview/Turkmenistan.pdf, (accessed June 6, 2017).

The latest type of analytical equipment was installed to prepare analysis in academic institutions such as the Centre of Technologies of Academy of Sciences, but it seems that the equipment is being underutilized at the moment. It is possible that logical reasoning is prioritized rather than doing actual experiments using the equipment; however, it seems that there is little matching of prioritized research themes with the equipment. On the other hand, general research equipment and educational/experimental equipment were fully organized and being used consistently.

4.3.3. Information on Major Higher Education Institutions in the Fields of Science and Engineering

The name of institutions (mainly governmental) with science/engineering faculties in Turkmenistan listed below was retrieved from websites. The list of the institutions for survey was revised according to advice from the Embassy of Turkmenistan in Japan. Then we could made appointments with these institutions through the strong support of the Embassy of Turkmenistan in Japan, which resulted in interview survey with the institutions.

Table4-9 List of Respondents for the Field Survey of Higher Education Institutions in the Fields of Science and Engineering

Visit Day	Location	Name of Institution
April 14	Ashgabat	Institute of Chemistry
April 14	Ashgabat	Centre of Technologies of Academy of Sciences
April 14	Ashgabat	“Sun” Energy Institute, Academy of Sciences
April 17	Ashgabat	International Oil and Gas University
April 17	Ashgabat	Turkmen Agricultural University, named after S.A. Niyazov
April 18	Ashgabat	Academy of Sciences
April 18	Ashgabat	University of Engineering Technologies of Turkmenistan named after Oguz Khan
April 18	Ashgabat	Turkmen State Institute of Transport and Communications
April 18	Ashgabat	Turkmen State Institute of Architecture and Construction
April 19	Ashgabat	Institute of Seismology and Atmospheric Physics of the Academy of Sciences
No meeting	Mary	Turkmen State Power Engineering Institute
No meeting	Ashgabat	Turkmen State University, named after Magtymguly
No meeting	Ashgabat	(Young Scientists Centre)

* Note:

- (1) With regard to Turkmen State Power Engineering Institute located in Mary, it was difficult to visit due to the short time allocated in the survey schedule.
- (2) With regard to Turkmen State University named after Magtymguly, we canceled the visit because there was no engineering department, basically no scientific research/development was being carried out, and activities linked with the industry were not carried out.
- (3) The Young Scientists Center was excluded from the list because it was found that it is only under planning.

The outlines of the institutions are described below:

(1) Institute of Chemistry

Name of Institution	Institute of Chemistry
Name in Russian	Институт химии
URL	http://www.science.gov.tm/organisations/chemical_institute/ (accessed: June 18, 2017)
Languages used	Turkmen, Russian, English

The Institute of Chemistry was established in 1957. Basic physical and chemical research, mainly on groundwater, gas, petroleum, minerals and iodine, is carried out. Other research themes are

desulfurization of gas, effective utilization of the sand of the Karakum desert, extraction of minerals from the water of the Caspian Sea. In principle, graduate students who wish to study in the institute are all accepted, and the students are conducting researches for thesis.

Overseas collaboration is available with Russia, Belarus, Israel, etc. In addition, consignment studies from Coca-Cola Company have been ongoing. Also, Korean company Hyundai requested a consignment study, but it was canceled due to budget constraints.

(2) Centre of Technologies of Academy of Sciences of Turkmenistan

Name of Institution	Centre of Technologies of Academy of Sciences of Turkmenistan
Name in Russian	Центр Технологий Академии наук Туркменистана
URL	http://www.science.gov.tm/organisations/technocenter/ (accessed: June 18, 2017)
Languages used	Turkmen, Russian, English

Centre of Technologies of Academy of Sciences of Turkmenistan was established in 2014 by presidential decree. Its purpose is to research and solve complex theoretical problems that are needed by diverse range of state organizations and companies in the country.

Major divisions are indicated below:

- Laboratory of Medicine Production Technologies
- Laboratory of the Environmental Protection Technologies
- Nanotechnology Laboratory
- Laboratory of GIS Technologies
- Laboratory of Synthesis of New Materials Technologies
- Laboratory of Biotechnologies
- Laboratory of Information and Communication Technologies
- Laboratory of Food Processing Technologies
- Financial and Economic Department
- Department of Introducing of Technology into Production
- Department of Design, Assembly and Maintenance of Experimental Equipment

One of the main research themes is the field of nanotechnology. Others are new materials and the biotechnology field, especially on the regeneration of herbs, methods for adjusting herbal medicine, and methods for dealing with pests. In the ecology field, there has been active research of purification and extraction of harmful substances and ecological effects.

There are 60 young scientists (about 60% of total is in their thirties) in the center. Collaboration with foreign research institutions is active with Russia, Belarus, Turkey, Korea, etc. Additionally, there is a cooperative relationship with the University of Tsukuba, and Hirosaki University.

(3) “Sun” Energy Institute, Academy of Sciences of Turkmenistan

Name of Institution	“Sun” Energy Institute, Academy of Sciences of Turkmenistan
Name in Russian	Институт солнечной энергии
URL	http://www.science.gov.tm/organisations/gun/ (accessed: June 18, 2017)
Languages used	Turkmen, Russian, English

The “Sun” Energy Institute under the umbrella of the Academy of Science was established by presidential decree. The objective research themes are the use of solar energy and wind power, environmental protection, effective use of water resources (water boiler, desalination of calcified water, etc.) under unique climatic conditions in Turkmenistan, extraction, processing and application of silicon.

Activities of research about extracting silicon from quartz sand are introduced in a science report published by UNESCO, and future development on this field is expected.³⁶

One of the cooperation projects, with the assistance of Korea, is about wind power generation. These experiments also must consider how to deal with wind that comes from more than one direction, which is unique to Turkmenistan.

Currently space for office and research laboratories are borrowed from Turkmen State University, named after Magtymguly, but there is a plan to relocate to another facility of its own.

(4) International Oil and Gas University

Name of Institution	International Oil and Gas University
Name in Russian	Международный университет нефти и газа (МУНиГ)
URL	-
Languages used	-

Seven faculties are available in the university: 1) the Faculty of Geology, 2) the Faculty of Exploration and Development of Mineral Resources, 3) the Faculty of Chemical Engineering, 4) the Faculty of Computer Technology, 5) the Faculty of Engineering and Architecture, 6) the Faculty of

³⁶ UNESCO, “UNESCO Science Report: towards 2030” (2015, p.383),[<http://en.unesco.org/USR-contents>], (accessed June 6, 2017)

Technological Machinery and Equipment, 7) the Faculty of Energy, and 8) the Faculty of Economics and Management in the Industry, the Faculty of Management.

There are fruitful practical training facilities related to oil and gas excavation, pipeline design and construction, operation, surveying, exploration, excavation and pipeline management, etc., where useful practical training for internship and employment are conducted. Focused research themes are related to oil and gas safety.

(5) Turkmen Agricultural University, named after S.A. Niyazov

Name of Institution	Turkmen Agricultural University named after S.A. Niyazov
Name in Russian	Туркменский сельскохозяйственный университет имени С. А. Ниязова
URL	http://www.science.gov.tm/organisations/agroculture_institut/ (accessed: June 18, 2017)
Languages used	Turkmen, Russian

Turkmen Agricultural University named after S.A. Niyazov, an exclusive higher education institution that fosters agricultural experts in Turkmenistan, was established in 1930.

Six faculties are available in the university: the Faculty of Agricultural Engineering, the Faculty of Irrigation and Hydraulic Engineering, the Faculty of Cotton Growing, the Faculty of Grain Growing, the Faculty of Livestock, and the Faculty of Processing of Agricultural Products.

Foreign companies such as Caterpillar (USA) and CLASS (Germany) are providing training on knowledge and operation skills of agricultural equipment. Some students study in Germany under the cooperation of Erasmus+ and GIZ. Some other students also study abroad via exchange programs with Thailand, India, Korea, and China.

(6) The Academy of Sciences of Turkmenistan

Name of Institution	The Academy of Sciences of Turkmenistan
Name in Russian	Академия наук Туркменистана
URL	http://science.gov.tm/ (accessed: June 18, 2017)
Languages used	Turkmen, Russian, English

The Academy of Sciences of Turkmenistan is an institution that implements basic research in various fields such as science, sociology, economics, industry, etc. The main activities are international and intergovernmental agreements on science and technology cooperation, acceptance of programs from international organization, management of scientific projects, analysis of textbooks and school

curricula, etc.

In order to foster the scientists/specialists that contribute to the development of science and economy of the nation, the academy provides graduate programs in the affiliated institutions listed below.

There are nine research institutions under the umbrella of the Academy, and other technical centers are active. Research institutions under the umbrella are indicated below:

Institute of Archeology and Ethnography

Institute of Chemistry

“Sun” Energy Institute

Institute of History

Institute of Language and Literature named after Magtymguly

National Manuscripts Institute

Research Institute of Animal Husbandry and Veterinary Medicine

Institute of Seismology and Atmospheric Physics

In order to develop talented young scientists, a scholarly competition for college students is also held.

(7) University of Engineering Technologies of Turkmenistan named after Oguz Khan

Name of Institution	University of Engineering Technologies of Turkmenistan named after Oguz Khan
Name in Russian	Университет инженерных технологий имени Огуз хана
URL	-
Languages used	-

The University Of Engineering Technologies Of Turkmenistan named after Oguz Khan was established in September 2016 with the aim of fostering imaginative competent engineers. Its education systems are reflections of the Japanese style engineering education. Starting in the first year, classes are conducted in English and Japanese.

The excellent students of fourth year in Oguz Khan University are given the opportunity to study abroad at Tsukuba University, their Japanese partner. At the time of graduation, they will be awarded diplomas from both Tsukuba University and Oguz Khan University.

Another goal is to develop entrepreneurial spirit like that in Silicon Valley in the United States.

Five faculties are available in the university: the Faculty of Chemistry and Nanotechnology, the Faculty of Biotechnology and Ecology, the Faculty of Computer Sciences and Information Technology, the Faculty of Automatics and Electronics, and the Faculty of Innovative Economics.

As the university has just opened last year, there are only first and second year students at the moment. Currently there are 450 students. There are no professors who can teach engineering classes in Japanese, so the university should soon recruit or foster such a professor.

(8) Turkmen State Institute of Transport and Communications

Name of Institution	Turkmen State Institute of Transport and Communications
Name in Russian	Туркменский государственный институт транспорта и связи (ТГИТнС)
URL	http://science.gov.tm/organisations/transport_institute/ (accessed: June 18, 2017)
Languages used	Turkmen, Russian, English

Turkmen State Institute of Transport and Communications was established in 1992 to foster experts in railway transport and telecommunications fields. There is much vocational training equipment, which contributes to improving the skills of students.

Four faculties are available in the university: the Faculty of Transport Constructions and Buildings, the Faculty of Communication and TV and Radio Communication Systems, the Faculty of Economics and Management at Enterprises, and the Faculty of Computer Technologies.

Besides practical emphasis on education for students, research aims at economics and improvement of transportation and communication systems in Turkmenistan.

(9) Turkmen State Institute of Architecture and Construction

Name of Institution	Turkmen State Institute of Architecture and Construction
Name in Russian	Туркменский государственный архитектурно-строительный институт
URL	-
Languages used	-

Turkmen State Institute of Architecture and Construction was established in 2012, based on its predecessor, Turkmen State Polytechnic Institute established in 1963, to foster engineers and technicians.

Six faculties are available in the university: the Faculty of Architecture and Construction, the Faculty

of Road Construction, the Faculty of IT and Automatization, the Faculty of Engineering and Mechanical Works, the Faculty of Chemical, and the Faculty of Economic Management. The language of instruction is Turkmen.

There are about 3,000 students in the university, and there are about 300 teachers/staff, including 49 with PhD. holders. Tuition is free. After graduation, students are qualified as "Specialists". Students need to work for two years in the government enterprises before graduation, and many students find employment from the same places that they worked during this period as student.

The main research theme concerns ecology, water purification, and construction.

(10) Institute of Seismology and Atmospheric Physics of the Academy of Sciences of Turkmenistan

Name of Institution	Institute of Seismology and Atmospheric Physics of the Academy of Sciences of Turkmenistan
Name in Russian	Институт сейсмологии и физики атмосферы Академии наук Туркменистана
URL	http://science.gov.tm/organisations/seismic_institute/ (accessed: June 18, 2017)
Languages used	Turkmen, Russian, English

The Institute of Seismology and Atmospheric Physics, conducts research for earthquake observation method development, earthquake monitoring, geological survey and comprehensive research of earthquake activity according to geological conditions, and atmospheric physics.

JICA's technical cooperation project named "The Project for Improvement of the Earthquake Monitoring System in and around the Ashgabat City" will be launched from June 2017 with the institute as a C/P. Currently, there are no activities with other donors.

4.4. Technical Vocational Education and Training (TVET)

4.4.1. History of TVET

In Turkmenistan, starting with the collapse of the Soviet Union and independence, there has been an ongoing movement to establish a new educational system, shifting away from the old-fashioned educational system and including vocational training. The overall educational framework, including vocational education and training, was established by the educational law approved by the president in 1993 and has since been revised in 2008 and 2013 and underpinned subsequent efforts³⁷.

Like other central Asian countries, during the Soviet era, the entire educational system was controlled from central Moscow, including the curriculum, teaching materials and faculty deployment etc. When the Soviet Union collapsed, the required educational resources were shut down and many vocational training schools followed suit. Even for those that survived, the quality of subsequent education and training was below par³⁸.

In many cases, vocational training schools were established as an adjunct to major companies during the 1950s to 1970s in the Soviet era and have continued to advance following the rise and fall of local industries.

4.4.2. Outline of TVET

According to the presidential decree of 2013, the educational period for general secondary education was set by the 12th grade. Elementary education for five years is followed by five years of basic secondary education and up to two years of general secondary education. Students attend school from the age of 7 and graduate at the age of 18, whereupon they proceed to primary vocational education, secondary vocational education, university or go straight to work³⁹. According to 2012 statistics, a total of 1741 schools offered general secondary education to over 900,000 students in total. There were 129 primary vocational education schools accommodating 51,000 students and 27 vocational secondary schools housing 8,000 students⁴⁰.

Primary vocational education is intended to train beginner-level professionals and teaches on a one-to-one basis, offering five-year courses directly related to occupational fields such as sewing, machinery repair and computer operation within the scope of a primary vocational school.

³⁷ UNESCO - World data of education 7th edition 2010/2011 p. 1

³⁸ EUROPEAID - MULTIANNUL INDICATIVE PROGRAMME (MIP) FOR TURKMENISTAN FOR THE PERIOD 2014-2017 p. 5

³⁹ ETF - Turkmenistan VET & labour market Update 2015 p. 19

⁴⁰ Statistical Yearbook of Turkmenistan 2012 p. 219 13.2.1 Main indices of education

Graduation allows the corresponding professional qualifications to be acquired and paves the way to employment. Secondary vocational training education schools, meanwhile, are known as secondary professional schools or sometimes as colleges and are intended to train technicians or junior engineers. The education period basically lasts three years and can encompass specialist qualifications on each course graduation. Both schools are mostly national and under the jurisdiction of the Ministry of Education, but many are also established under ministries and agencies with jurisdiction over individual fields, such as construction and textiles, approved by the Ministry of Education. An institution of higher vocational education that teaches five years university-level education is known as an 'institute' apart from the university. Within this institution, courses corresponding to the profession of each field are set up and specialist certificates issued when the relevant education and training, comprising class study, practices and internships, are completed.

(1) Courses

Courses are established, revised and abolished in cooperation with the local industry and since courses are established in accordance with demands from industry, internships are subsequently carried out and graduates sent. Accordingly, the courses themselves strongly reflect duties in the industry. For example, the scope includes railroad train operation courses, railway signal control courses, road construction courses, textile machine operation courses and dressmaking courses etc.

(2) Curriculum

The curriculum on which education and training is based is divided into the standard nationally prescribed portion and the portion individually defined by each school.

Curriculums in general knowledge subjects, meanwhile, like mathematics or technology theory, are standardized nationwide and set out by the Ministry of Education. Each school has specialized knowledge and skills related to each specific course and the curriculum is mainly assembled by schools based on information from collaborating companies. The course instructors are at the core of work to formulate the curriculum and a meeting equivalent to the organization committee is to be convened to revise this material once every few years.

(3) Instructor and teaching method

In many schools, the average age of instructors is said to be 30 to 40 and there are many veterans. The retraining of instructors is also said to be conducted according to the national system. However, based on the poor practical implementation observed during the visit, even if the curriculum is in line with demands of industry, the contents of the education and training, centering on the knowledge and skills of instructors, raise the question of whether the required knowledge and skills

are actually being provided or not on site.

(4) Facilities and teaching machinery

Many of the buildings and facilities are old; most were built in the 1950s and 1970s, but maintenance appeared proper, which meant no major hindrance to education and training. Equipment used for practical skills, however, was old and in insufficient supply. Also, many machines are not in use, which often rendered training involving contact and actual handling impossible.

(5) Industry collaboration

There has been a long history of cooperation with industry since the former Soviet Union era. Although wide-ranging activities such as offering opinions from industry when revising the curriculum, accepting internships and participating in employment exams are being developed, the outdated curriculum and inefficient internships noted hint at sub-optimal cooperation.

4.4.3. Survey Results

(1) Turkmen State Institute of Transport and Communications

This is a higher vocational school, equivalent to university level and under the jurisdiction of the Ministry of Education, which trains transport and communication professionals as its name suggests. It occupies a relatively new school building in the city of Ashgabat, with well-maintained classrooms and workshops and up-to-date teaching materials like engine resin models and train driving simulators. The school is generously sponsored by the government, as the director explained.

It has five faculties, including railway transport and communication departments and 2000 students are currently studying there. After five years of education and training, including internships, a graduation diploma is awarded after two years of work at a public company such as Turkmenistan Airlines, the Ministry of Communications or the State Railway, etc. Employment is also managed with strong guidance from the school and no research study is performed.

In addition, primary schools for vocational education are established as institutions attached to vocational schools and conduct vocational education and training at a basic level in the rail transportation field. Approximately 100 students are enrolled there, each of whom receive 1.5 years of education and training.

As for assistance from donors, students from the IT department and teachers are participating in Erasmus + overseas exchange programs, as well as cooperation with overseas schools in the Ukraine,

Belarus, Malaysia and Germany

(2) Mechanical-technological secondary vocational school under the Ministry of Textiles

These are secondary and primary vocational training schools established by the Ministry of Textile Industry and approved by the Ministry of Education and were first established in 1933 with one of the first public vocational schools nationwide within the state-run gin factory. Through reconstruction after a major earthquake in 1953, it has proved its durability as a vocational training school related to the textile industry.

There are currently 11 courses such as sewing production/process and textile weaving etc. as part of secondary vocational training to prepare professional staff and seven courses such as sewing technician/tailor and technician for equipment in the primary vocational training sector to raise workers, with over 1000 students enrolled. At the secondary vocational training level, following three years of education and training, including internships, students gain a specialist graduation diploma, while during primary vocational training, students receive either ten months or 18 months of education and training respectively.

The school site is in the old city of Ashgabat, in a well-maintained old building adjacent to a textile factory which was a former parent enterprise and is in good cooperation. Training equipment has not been updated for a long time and seems generally obsolete.

Regarding the curriculum, as well as being periodically revised every three years, it is also revised during certain periods in response to proposals made by students and companies.

Support from overseas donors is now handled by UNDP; developing vocational training programs for students with disabilities.

The school director raised the following points as issues currently facing the school: 1. The need to improve the curriculum and teaching method through exchanges with developed countries 2. Response of vocational education and training to electronization and automation of production machinery, 3. Enrichment of facilities for instructor re-education.

According to information from the school principal, the textile industry has 75 factories nationwide, employing a total of 300,000 people and although previously, domestic processing of cotton only comprised 3% of the entire collection, the figure has now improved to 60%. 90% of textile products, including raw materials, are exported.

(3) The School of Construction of the Ministry of Construction and Architecture

Founded in 1949, this is a secondary vocational training school under the jurisdiction of the Ministry of Construction and architecture. It is located in the area surrounding Ashgabat City and conducts education and training at a well-maintained site and building facility, which has been around since the Soviet era. It comprises 13 courses related to the construction industry, including industrial and civil construction, construction materials / concrete manufacturing, power supply, open mining operations and so on. After graduating from the 12th grade, students are enrolled through entrance examination selection and then receive 2.5 years of education and training. There are currently around 2,600 students enrolled, with a roughly equal gender balance. After graduation, although most will get a job, around 15% of students go on to higher education. Apart from this, it also operates a short-term training course for in-service employees.

Expectations of JICA include schools boosting students' and instructors' exchanges with Japan, introducing new construction-related techniques and providing technical cooperation and funding.

(4) Turkmen State Institute of Architecture and Construction

This is a university-level higher vocational training school that trains human resources for the construction industry, which was founded in 1963 and reorganized from the previous National Polytechnic Institute in 2012. It houses six faculties, including those of architecture and construction, road construction, IT and automation and so on and a total of 31 specialties under them.

A total of 3000 students are enrolled and receive five years of free education and training. On graduation, a specialist's diploma is obtained in each specialty on completion of two years' state enterprise work. After graduation employment places have been provided by the school. PhD courses are set up, in which 45 people are currently enrolled. To participate, five years' company experience is required. It is conducting research activities in new areas, namely fields of ecology, water quality purification and new architectural technology, etc. on themes such as smart house and the effective utilization of water resources. A joint business division with companies has been set up in school and eight cases are now underway. Students who participate in this business practice once every five days.

As future expectation, the opportunity to exchange students and faculty members dispatching to Japan was raised.

4.4.4. Issues and Prospects of TVET

(1) Level of vocational technical education and training

During school visits, it was observed that they lack a response to the industrial technology which

underpins education and training and despite long-term and wide-ranging cooperation between industry and schools, ongoing changes in industry are not reflected in education and training. It is considered inevitable that cooperation will become more skeleton-like. For example, in many industries that focus on machinery and equipment, most cases are shifting from manual to automatic operation by a pre-decided program and education and training should also respond to those changes.

(2) International exchange

Most schools had the same proposals for exchange with overseas schools. Although the country imposes entry and exit restrictions, it seems human interaction with foreign countries has been discontinued except for a small portion of government-led international exchange. Under current global circumstances, obtaining technical knowledge, education and training methods and cultural knowledge through exchanges are key elements of education and training, hence the need for efforts to revitalize the same.

4.5. Donor Assistance in the Industrial Human Resource Development Field

4.5.1. Overview of Donors in the Education Sector

Few donors support the education sector in Turkmenistan. The EU is the only donor to provide ongoing assistance to TVET development. Working in partnership with the Ministry of Education, National Institute of Education, and Ministry of Labor and the Social Protection of the Population, the EU has also just started a new initiative, the Project on Support to the Education Sector in Turkmenistan, to contribute to the ongoing education reform process by facilitating the introduction of educational standards and adapting professional education programs to labor market needs. USAID is also implementing youth development projects to encourage employment and entrepreneurs by providing vocational training and business training.

4.5.2. Overview of Donors in the Industrial and Private Sectors

In the area of economic development, UNDP is implementing a project to improve the national accounting system together with the Ministry of Economy and Finance. It also supports activities by the Ministry of Labor and Social Protection to improve labor policy and activities by the Ministry of Statistics to collect and analyze foreign trade statistics data. The World Bank supports the Central Bank of Turkmenistan by developing business models and reforming corporate governance and the country's credit reporting system. EBRD provides consultation services for MSMEs through international and local consultants in all of the countries of central Asia.

4.5.3. Current Donor's Information

The fields of support from each donor in Turkmenistan can be found on the following donor map.

Table4-10 Donor Map

donor	Industry sector	Education sector		Other Priority Sectors
		Higher education	Technical training and education	
EBRD	<ul style="list-style-type: none"> Conducted a consultation service for SMEs 		<ul style="list-style-type: none"> Introduced education levels and educational programs commensurate with labor market needs 	
EU			<ul style="list-style-type: none"> Introduced educational standards and educational programs commensurate with labor market needs 	
UNDP	<ul style="list-style-type: none"> National Accounting System Improvement Project Improvement of export and import statistics Improvement of labor policy Advice to ministries and officials on achieving SDG goals 			<ul style="list-style-type: none"> Law Governance Human rights Tuberculosis (TB) prevention and treatment Statistical maintenance Disaster risk Management
USAID			<ul style="list-style-type: none"> Junior Achievement Project (2015-2019) Enriching Youth for Tomorrow (2017 - 2021 schedule, budget: 3, 175,000 US dollars) 	<ul style="list-style-type: none"> Economic development, promotion of employment Democratization Governance Health Youth support Climate change Environmental protection Natural resource management
World Bank	<ul style="list-style-type: none"> Reform of business model and corporate governance support Support for a strengthened credit reporting system Support for the implementation of national risk assessment to cope with financial terrorism 			<ul style="list-style-type: none"> Water management Climate change, Welfare monitoring system

(1) EBRD

EBRD Turkmenistan is implementing consultation services for MSMEs with funding from the EU under an internationally common EBRD scheme.

There are two types of consultants, one local and the other international. The scope of work of the local consultants includes business administration, finance, and marketing, over a 3-month period. The international consultants are responsible for highly specialized areas such as ISO and conduct consultation for a period of around 18 months.

(2) The EU

The EU has been conducting projects on secondary education and vocational education since 2007. The tourism, construction, and agriculture sectors receive support to strengthen the contents of their training in the area of TVET development. A new project on TVET formulated and started in January 2017 is utilizing the achievements and lessons learnt from former projects. Following table shows the key details on this project:

Table4-11 Outline of EU Project

Project Name	Support to Education Sector in Turkmenistan
Project Duration	2017 – 2020
Overall Objective and Purpose of the Project	<ul style="list-style-type: none"> • To further support the Government of Turkmenistan in the creation of a modern education system in line with international educational standards. • To contribute to the ongoing education reform process by facilitating the introduction of educational standards and adapting professional education programs to labor market needs.
Project Partners	Ministry of Education, National Institute of Education, Ministry of Labor and Social Protection of Population, Academy of Science, other government agencies, non-governmental organizations, universities, and general education and TVET schools
Main Work Directions of the Project	<ol style="list-style-type: none"> a) Providing input for the development of education strategies and concepts for general and vocational education; b) Involvement in the development and modernization of education programs and occupational standards; c) Promotion of the development of a career guidance system; d) Training seminars for teachers and managers; development of learning and methodological materials; e) Providing input for the development of Internet Education Portals and Education Management Information Systems (EMIS); f) Implementation of well-targeted study visits to EU countries

The Project adopts a bottom-up and demand-driven approach to formulate sustainable Mini-Projects (Budget: 2~4,000 Euro each) based on plans and proposals from TVET educational institutions. NQFs in the transportation and textile sectors will be supported.

(3) UNDP

UNDP Turkmenistan is implementing the following projects in the area of social and economic development.

- 1) Project on improving the national accounting system – Ministry of Economy and Finance
- 2) Project on foreign trade statistics data – Ministry of Statistics
- 3) Project on improving labor policy – Ministry of Labor and Social Protection
 - Employment policy and labor safety
 - Labor market analysis
 - Market needs for vulnerable groups

- 4) Advisory for achieving SDGs Goals – Ministry of Foreign Affairs, Ministry of Economy, and others
- 5) National Forum on Vocational Training for People with Disability⁴¹
 - Collaboration with textile colleges

UNDP is working to promote disaster risk management and is exchanging information with JICA's new project on technical assistance in a similar area of expertise. Related projects in the fields of environment, resources and energy are as follows:

Project on improvement of the Building Code - Ministry of Construction

- 1) Project on energy auditing methodology – Ministry of Communal Services
- 2) Project on energy consumption – Institute of Architecture and Construction
- 3) Project on improvement of energy efficiency for sustainable water and land resources management
- 4) Project on environmental reporting and monitoring systems
- 5) Project on disaster risk management– Ministry of Trade

UNDP Country Programme of Socio-economic Development for Five Years (2016-2020) indicates four prioritized areas in Turkmenistan:

- 1) Data quality and progress monitoring; improvement of access to data
- 2) Rule of law governance and economic diversification⁴²
- 3) Improvement of access to justice; Implement National Human Rights Action Plan⁴³
- 4) Prevention and treatment of TB⁴⁴

(4) USAID

USAID has operated in Turkmenistan since the 1992, the year of independence, working out of a regional head office in Almaty, Kazakhstan. The annual budget for projects is relatively small, at around 7 million US dollars. The priority areas for assistance are economic growth⁴⁵, enhancement

⁴¹ UNDP, National Forum on Vocational Training for People with Disabilities, <http://www.tm.undp.org/content/turkmenistan/en/home/presscenter/pressreleases/2016/03/07/national-forum-on-vocational-training-for-people-with-disabilities/>. (accessed, May 30, 2017)

⁴² Cooperation in implementation of the NHRAP for 2016-2020 in the area of rule of law and the access to justice, http://www.tm.undp.org/content/turkmenistan/en/home/operations/projects/democratic_governance/cooperation-in-implementation-NHRAP--in-the-area-of-rule-of-law-and-access-to-justice.html. (accessed, May 30, 2017)

⁴³ Assistance in implementation of the National Human Rights Action Plan of Turkmenistan 2016-2020, http://www.tm.undp.org/content/turkmenistan/en/home/operations/projects/democratic_governance/implementation-of-the-national-human-rights-action-plan.html. (accessed, May 30, 2017)

⁴⁴ Ensuring universal access to high-quality diagnosis and treatment of drug resistant tuberculosis (DR-TB) in Turkmenistan, http://www.tm.undp.org/content/turkmenistan/en/home/operations/projects/human_development/universal-access-to-high-quality-diagnosis-and-treatment-of-drug-DR-TB.html. (accessed, May 30, 2017)

⁴⁵ Energy Links Project (2015-2019) Promotion of energy trade in the region, effective energy supply

of employment, democracy, governance⁴⁶, health⁴⁷ and youth development⁴⁸. In the area of education, USAID has supported higher education systems, distance learning, and IT education in the past. The direction of support has recently moved to youth development, including life skill and business skill attainment to contribute to industrial human resource development. Two notable youth development projects are now underway:

1) Junior Achievement Project (2015-2019)

Young people are assisted to enter a market economy as skilled employees, employers, or entrepreneurs. They are encouraged to participate in youth-oriented activities, contests, and alumni networking. Project activities include curriculum development, training of teachers, exchange and conferences in the area of vocational training, and a course on starting business and entrepreneurship. The counterpart is the Ministry of Education and Ministry of Economy.

2) Enriching Youth for Tomorrow (2017~2021, Budget: 3,175,000 US dollars)

This project aims to improve the capacity of Turkmen youth aged 14-30 to contribute to their local economy and community. It will seek to equip youth with the skills necessary to participate in the labor market, contribute to society in a productive manner through civic engagement and community service, and improve the enabling environment through youth-sensitive policies, processes, and services.

(5) The World Bank

The World Bank started operations in Turkmenistan in 1996. So far it has acted chiefly as a liaison office, which has limited its scope of work and required no formulation of a Country Partnership Strategy. The areas of assistance are banking, macroeconomic statistics with the Ministry of Finance, and other specific sectors unrelated to education. The major World Bank programs are as follows:

- 1) Business model reform and corporate governance working with the Central Bank
- 2) Credit reporting system working with the Central Bank and the Committee of Statistics
- 3) National risk assessment for the Ministry of Finance to combat the financing of terrorism

The World Bank is also engaged in projects to promote the capacity development of regional staff in the field of climate change, water management, and a welfare monitoring system. The future direction of the Turkmenistan office will turn toward public finance management, though specific

⁴⁶ Governance Support Program (2015-2019) Capacity development of civil servants

⁴⁷ Together for Health Project (2009-2017) Prevention of HIV/AIDS and TB, peer education, drop-in Center

⁴⁸ USAID Turkmenistan, <https://www.usaid.gov/turkmenistan> (accessed, May 30, 2017)

actions and projects are still in the planning stage.

4.6. Analysis of Contents of Support by Japan

This chapter confirms the "development policy" by Turkmenistan, Japan and other donors. Also, "Industrial Human Resources Needs", "Outline of Education Sector", "Science and Technology Higher Education Organization", "Vocational Technical Education and Training (TVET)", "Support by Other Donors" And the development policy will be extracted. Among these issues, we examined what is to be prioritized and the resources of Japan that contribute to solving the problem, and summarized it as a solution approach.

4.6.1. Turkmenistan Policy

4.6.1.1. Turkmenistan's National Development Strategy

As mentioned in "4.1.2. Industrial Promotion and Prioritized Industrial Areas of Turkmenistan", the plan for "Turkmenistan Socio Economic Development 2011-2030" sets the following five targets.

Table4-12 Table Socio-economic Development Goals in Turkmenistan

1) Promptly grow the economy. 2) Diversify the domestic economic structure. 3) Improve the economic stability of the people. 4) Develop a market economy and implement organizational reforms necessary for that purpose. 5) Correct regional disparities.
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Reference: Turkmenistan Socio Economic Development 2011-2030

4.6.1.2. Participants of Invitation to Japan

The following table shows the affiliation of participants from Turkmenistan.

Table4-13 Name of the Organization Invited

1st invitation to Japan (February 2016)	2nd invitation to Japan (March 2017)
Science Academy annexed to a Techno Park	Ministry of Education
	University of Engineering Technologies of Turkmenistan named after Oguz Khan
	Mechanical & Engineer-technological Educational School of Ashgabat

4.6.2. Assistance Policy to Turkmenistan

4.6.2.1. Japan's Country Assistance Policy

As support of Japan, it has not seen any assistance since the "Railway Transportation Modernization Project," an ODA loan project of 1997. In June, 2017, "Ashgabat City area Earthquake Monitoring System Improvement Project" is to be implemented. However, the Japan's Country

Assistance Policy for Turkmenistan is not formulated yet. The following is a summary of Japan's ODA to Turkmenistan as described in Turkmenistan's country data book published by the Ministry of Foreign Affairs⁴⁹. Under the regional development framework of the development policy (plan) and "Central Asia + Japan" dialogue⁵⁰ The following issues common to Central Asia cooperation are considered: "Trade and Investment (Including Agriculture)," "Environment, Energy Saving / Renewable Energy," "Millennium Development Goals (MDGs) Achievement and Disparity Correction," "Afghanistan towards Stabilization Cooperation," and "cooperation for disaster prevention."

Table4-14 Outline of Japanese ODA to Turkmenistan

Basic policy	The basic policy is to support political stability, sustainable development, and development plans that will contribute to regional cooperation between Turkmenistan and Central Asia, while encouraging the Turkmenistan to open up to the outside world.		
Priority area	Basic Social Services	Environment	Agriculture
Japan's response policy	Carry out technical cooperation and human resource development that contribute to the provision of basic social services such as education, medical care, and disaster prevention.	Support measures to cope with environmental problems by promoting the development of renewable and next-generation energies, preventing desertification, etc.	Support technical cooperation and human resource development to promote the modernization of agriculture aiming for the sustainable use of water resources and productivity improvements.

4.6.2.2. Support Policies and Strategies of Other Donors⁵¹

In the education sector, the EU is continuing its support in the TVET field and promoting the reform of the educational system together with the Ministry of Education and Ministry of Labor and Social Protection as partners. In the industrial sector, a national accounting system improvement project is being implemented by UNDP for the Ministry of Economy and the Ministry of Finance. UNDP also supports employment policies and capacity building in occupational safety and labor market analysis for the Ministry of Labor and Social Protection.

⁴⁹ Ministry of Foreign Affairs 'Country Data Book (Turkmenistan)' <http://www.mofa.go.jp/mofaj/gaiko/oda/files/000142198.pdf> (accessed: June 1, 2017)

⁵⁰ Ministry of Foreign Affairs "Central Asia + Japan" Dialogue - Decade Road (2014) , <http://www.mofa.go.jp/mofaj/press/pr/wakaru/topics/vol117/index.html> (accessed: Sunday, June 1, 2017)

⁵¹ See Table 4-10 Turkmenistan Donor Map

4.6.3. Analyzing Issues related to Advanced Industrial Human Resource Development

4.6.3.1. Problem Analysis

The problems are extracted based on the information described in previous sections and compiled in the table below:

Table4-15 Problem Analysis of Advanced Industrial Human Resource Development in Turkmenistan

Field		Problem		Cause	solution
Industry sector	Policy · institution	Private Enterprise promotion	Private Enterprise promotion has not been pursued.	<ul style="list-style-type: none"> · Human resources adept at private enterprise promotion policies are lacking. · Collaboration of ministries and agencies is weak. 	<ul style="list-style-type: none"> · Allocate advisors for institutional and policy formulation.
		Financial system	Entrepreneurial/private loan policy in cooperation with commercial banks is lacking.	<ul style="list-style-type: none"> · Open discussion at the Ministry of Finance, Ministry of Economy, private banks, and corporate support organizations is lacking. 	<ul style="list-style-type: none"> · Establish a collaboration council to deepen the discussion and reflect it in policies and institutions.
	Industry human resources needs	Enter new business	Entrepreneurs and private small and medium enterprises have difficulty entering.	<ul style="list-style-type: none"> · Government regulations are severe. · State-owned enterprises dominate the major industries. 	<ul style="list-style-type: none"> · Work on deregulation.
		Financing	Investment and funding for entrepreneurs are not smoothly provided.	<ul style="list-style-type: none"> · Funding, financing, and investment procedures cannot be easily carried out for suppliers. 	<ul style="list-style-type: none"> · Build a mechanism to promote investment · Study financing
		Industrial human resources	Education for young engineers has not been smoothly provided.	<ul style="list-style-type: none"> · Less young engineers are growing up. · Less mid-level engineers are growing up. 	<ul style="list-style-type: none"> · Build system to educate Engineers.

Education sector	Policy · institution	Compliance with international standards	Adapting the education system to modern European and international standards is on process.	<ul style="list-style-type: none"> · The implementation of a national educational policy is delayed. · No system for cooperation between educational institutions has been established. The exchange of information and opinions among educational institutions is not progressing. · Education in English is not spreading adequately or uniformly in all educational institutions. 	<ul style="list-style-type: none"> · Educate talented persons who use scholarships such as Erasmus + to construct education systems that meet Western standards. · Reflect this issue in the next policy document action plan. · Establish a forum for exchange of opinions among educational institutions. Share good practices of model schools. · Strengthen English language education for educators.
		Curriculum development	Curriculum development aligned with the needs of the labor market and modern society is delayed.	<ul style="list-style-type: none"> · No system for curriculum development is in place. 	<ul style="list-style-type: none"> · Create a system that enables individual educational institutions to develop more curriculum.
		IT education / digital learning	Abundant equipment has been installed but is not fully utilized.	<ul style="list-style-type: none"> · Training of human resources to manage and operate IT facilities is delayed. 	<ul style="list-style-type: none"> · Train IT human resources. · Strengthen the operation and maintenance of equipment.
		Lack of teaching materials	Due to a lack of language teaching materials in Turkmenistan, the teaching language is Turkmen while the learning material is Russian language. This creates a divergence phenomenon that interferes with the students' understanding of the learning content.	<ul style="list-style-type: none"> · The development of teaching materials is delayed. 	<ul style="list-style-type: none"> · Promote teaching material development in Turkmenistan language.
	Higher education in general	Employment of university graduates	Few employment openings are available to university graduates.	<ul style="list-style-type: none"> · Job openings are difficult to find in Turkmenistan. · Education and training are not aligned with local economic needs. 	<ul style="list-style-type: none"> · Strengthen the career guidance function of the universities. · Develop professional standards that match the needs of the local labor market. · Collaborate with local companies to promote local workers. · Train entrepreneurs.

		Teacher training	Teachers have low status and lack the ability to satisfy the latest needs.	<ul style="list-style-type: none"> · Opportunities for retraining are few. 	<ul style="list-style-type: none"> · Strengthen teacher training institutions. · Build a reeducation system for teachers
		Educational Infrastructure	Facilities and equipment are in place at universities and research institutions, but they are underutilized as a rule.	<ul style="list-style-type: none"> · Human resources capable of managing and operating facilities and equipment are not promptly trained. 	<ul style="list-style-type: none"> · Train personnel for maintenance management. · Develop an action plan on the quality of education.
		Textbooks / teaching materials	Old textbooks and teaching materials are used at school.	<ul style="list-style-type: none"> · Curriculum development according to modern needs is delayed. 	<ul style="list-style-type: none"> · Promote the creation of a system that enables individual educational institutions to develop curriculum.
	Higher education institutions in science and engineering	Research Equipment/Facilities	Substantial experiment/research equipment/facilities are in place, but they are underutilized.	<ul style="list-style-type: none"> · No equipment suitable for research subjects is procured. · Effective methods for utilizing equipment are being studied. 	<ul style="list-style-type: none"> · Establish appropriate equipment plans, and procure necessary equipment accordingly. · Teachers thoroughly understand the equipment on hand.
		Establish a cutting-edge research system	The expensive machinery in the universities/laboratories does not seem to get much use.	<ul style="list-style-type: none"> · Opportunity to learn about the research process is less. · The research system seems somewhat unformed. 	<ul style="list-style-type: none"> · Learn about collaborative research with overseas universities / research institutes. Introduce an exchange study abroad system and learn about creating a system that enables cutting-edge research.
		Introduction of Japanese education system	Few teachers can teach science and engineering in foreign language such as Japanese.	<ul style="list-style-type: none"> · There are less teachers who can speak Japanese language. · Lack of information on Japanese education system. i 	<ul style="list-style-type: none"> · Promote Japanese education in the area of science and engineering. · Dispatch Japanese professors in the field of science and engineering · Study Japanese curriculum. · . · .
	vocational education and training	Level of TVET	Cooperation with industry is not reflected in the ongoing changes.	<ul style="list-style-type: none"> · Understanding of changes in industry to guide processes such as department setting, curriculum setting, etc. · Cooperation with industry is somewhat lost as a factor. 	<ul style="list-style-type: none"> · Select partner in cooperation with industry. · Review procedures and viewpoints on information acquisition analysis.

		International exchange	International exchange opportunities are lacking.	· Human interaction with other countries is thought to have been discontinued beyond the remnants of a government-led international exchange.	· Relax the procedures and conditions for international exchange and increase opportunities.
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4.6.3.2. Priority Issues in Training Advanced Industrial Human Resources in Turkmenistan

Of the issues extracted in 4.6.3.1 above, priority issues are summarized in the table below:

Table4-16 Priority Issues

Item Number	issue	Specific content	Solution(draft)	Utilization of Japanese resources (draft)
1	Compliance with international standards	<ul style="list-style-type: none"> Under process of adapting the educational system to modern European and international standards 	<ul style="list-style-type: none"> Establish a forum for exchange of opinions among educational institutions. Share good practices of model schools. Strengthen English language education for teachers. 	<ul style="list-style-type: none"> Implementation of technical cooperation projects based on the Japanese Scientific/Engineering Education System as a good practice in the University of Engineering Technologies of Turkmenistan named after Oguz Khan.
2	Curriculum development	<ul style="list-style-type: none"> Curriculum development according to the needs of labor market and modern society is delayed. 	<ul style="list-style-type: none"> Advance the creation of a system that enables individual educational institutions to develop more curriculum. 	<ul style="list-style-type: none"> Implementation of technical cooperation projects of training on mechatronics engineers for textile industry at the Mechanical & Engineer-technological educational school of Ashgabat.
3	Educational Infrastructure	<ul style="list-style-type: none"> Facilities and equipment of universities and research institutions are in place, but they are not fully utilized. 	<ul style="list-style-type: none"> Train personnel for maintenance management. Develop an action plan on the quality of education. 	<ul style="list-style-type: none"> Implementation of technical cooperation projects based on the Japanese Scientific/Engineering Education System as a good practice in the University of Engineering Technologies of Turkmenistan named after Oguz Khan. Dispatching visiting professors specializing in agriculture, renewable energy development, water resource management which is prioritized as Japanese ODA.
4	Textbooks teaching materials	<ul style="list-style-type: none"> Old textbooks and teaching materials are used at school. 	<ul style="list-style-type: none"> Promote the creation of a system that enables individual educational institutions to develop more curriculum 	<ul style="list-style-type: none"> Implementation of technical cooperation projects of training on mechatronics engineers for textile industry at the Mechanical & Engineer-technological educational school of Ashgabat who participated to invitation of Japan.

5	Research Equipment / Equipment	<ul style="list-style-type: none"> Experiment / research equipment / facilities are substantial, but the degree of utilization of these equipment is low 	<ul style="list-style-type: none"> Establish appropriate equipment plans and procure necessary equipment accordingly. Faculty and researchers understand deeply about equipment 	<ul style="list-style-type: none"> Implementation of technical cooperation project related to capacity building of educators including operation and maintenance of equipment. Implementation of training in Japan (Science and Engineering Research Institute, Higher Education Organization) Dispatching visiting professors specializing in agriculture, renewable energy development, water resource management,
6	Establish cutting-edge research system	<ul style="list-style-type: none"> Utilization of new equipment installed in university / laboratory seems to be low. 	<ul style="list-style-type: none"> Learn collaborative research with overseas universities / research institutions and introduce exchange study abroad system and learn about creating a structure capable of cutting-edge research 	<ul style="list-style-type: none"> Implementation of technical cooperation project of training on mechatronics engineers for textile industry at the Mechanical & Engineer-technological educational school of Ashgabat. Dispatching visiting professors specializing in agriculture, renewable energy development, water resource management.
7	Introduction of Japanese style education system	<ul style="list-style-type: none"> Teachers who can implement science and engineering lectures in Japanese in the university are not trained 	<ul style="list-style-type: none"> Promote Japanese language education for science and engineering professors. Dispatch science and engineering professors from Japan. Learn about Japanese curriculum 	<ul style="list-style-type: none"> Implementation of technical cooperation project based on the Japanese Scientific/Engineering Education System as a good practice in the University of Engineering Technologies of Turkmenistan named after Oguz Khan. Dispatching visiting professors specializing in agriculture, renewable energy development, water resource management.
8	TVET level	<ul style="list-style-type: none"> Poor response to the evolution of industrial technology which is the basis of education and training 	<ul style="list-style-type: none"> Partner selection by collaboration with industry, review procedure and viewpoint of information acquisition analysis. Respond to the transition from operation of the machine to automatic operation by conventional manual operation 	<ul style="list-style-type: none"> Implementation of technical cooperation project of training on mechatronics engineers for textile industry at the Mechanical & Engineer-technological educational school of Ashgabat who participated to invitation of Japan.
9	International exchange	<ul style="list-style-type: none"> Propose the necessity to exchange with overseas 	<ul style="list-style-type: none"> In terms of the current world situation, obtaining technical knowledge, education and 	<ul style="list-style-type: none"> Implementation of training in Japan (Science and Engineering Research

		schools uniformly at each school. Personal exchanges with foreign countries are considered to be discontinued except for a small part of government-led international exchange	training law, and international cultural knowledge through exchanges is an important education and training element and it is considered necessary to activate it	Institute, Higher Education Organization)
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4.6.4. Selected Approaches to Solve Priority Issues in Advanced Industrial Human Resource Development in Turkmenistan

As described in 4.6.3.2, result of extracting the priority issues for developing advanced industrial human resources in Turkmenistan, it was confirmed that the needs of human and intellectual support are greater than physical support. To this end, in order to contribute to Turkmenistan's leading regions, we propose the following three approaches. However, the needs, order of priority and feasibility of the proposed approaches need to be further reviewed within JICA. Hence, the approaches below are shown rigidly as ideas.

In order to contribute to 4, 6, 7, 8, 10 described in "Table 4-16 Priority Issues", we propose the following approach utilizing Japanese resources:

Table4-17 Approach 1

Approach 1	Dispatch visiting professors in soil (agriculture) / water resources / renewable energy fields
Purpose	➤ Using the research results on soil (agriculture) / water resources / renewable energy, the plan for smart city development on the desert is examined.
Achievement	<ul style="list-style-type: none"> ➤ Research subjects are examined and implemented in the soil (agriculture) field. ➤ Research subjects are examined and implemented in the field of water resources. ➤ Research themes in the renewable energy field are examined and implemented.
Activity	<ul style="list-style-type: none"> ➤ Conduct a baseline survey on each research field. ➤ Confirm the R&D policy of the Academy of Sciences. ➤ Consider the priority of the research themes. ➤ Procure necessary materials for research. ➤ Implement the research.
Assumed C / P institution	➤ The Academy of Science
Beneficiary	<ul style="list-style-type: none"> ➤ Researchers (including graduate students) at The Academy of Science ➤ Farmers
Input	<ul style="list-style-type: none"> ➤ Researcher (Visiting Professor) in the field of soil (agriculture) ➤ Researcher in the field of water resources (Visiting Professor). ➤ Researcher in the field of Renewable Energy (Visiting Professor) ➤ Equipment necessary for research

In order to contribute 2, 3, 4, 5, 6, 8, 10 stated in "Table 4-16 Priority Issues", we propose the following approach utilizing Japanese resources:

Table4-18 Approach 2

Approach 2	Dispatch a visiting professor capable of lecturing in science and engineering courses in Japanese at Ogz · Han Memorial Turkmenistan Institute of Technology
Purpose	➤ To train teachers qualified to lecture on science and engineering subjects in Japanese at the Ogz · Han Memorial Turkmenistan Institute of Technology.
Achievement	➤ Japanese language proficiency of university faculty members is enhanced. ➤ Japanese language proficiency of students studying at the university is enhanced.
Activity	➤ Lecture on academic terms in Japanese. ➤ Introduce the curriculum used at science and engineering universities in Japan. ➤ Do ToT for teachers. ➤ Teachers and staff participate in training in Japan.
Assumed C / P institution	➤ Ministry of Education ➤ Oggs Han Memorial Turkmenistan Institute of Technology
Beneficiary	➤ Teachers and students of Ogg's Han Memorial Turkmenistan Institute of Technology
Input	➤ Japanese teacher of science and engineering (university lecturer or technical college teacher) ➤ Training in Japan (staff of the Ministry of Education, university teachers, students)

In order to contribute to 7 and 9 listed in "Table 4-16 Priority Issues", we propose the following approach utilizing Japanese resources:

Table4-19 Approach 3

Approach 3	Provide practical training for mechatronics engineers in the textile industry (technical cooperation project)
Purpose	➤ To cultivate practical mechatronic engineers in the textile industry
Achievement	➤ The mechatronics department is newly established in existing vocational training schools. ➤ Teachers who can conduct mechatronics-related training are trained.
Activity	➤ Perform a baseline survey of textile enterprises. ➤ Procure materials and equipment necessary for establishing faculties related to mechatronics. ➤ Develop a curriculum necessary for mechatronics-related training. ➤ Conduct ToT for teachers for mechatronics-related classes.
Assumed C / P institution	➤ Ministry of Textile Industry ➤ Ministry of Education ➤ Ashgabat Machine Engineers Education School
Beneficiary	➤ Ashgabat Machine Engineers Education School ➤ Textile industry engineers in Turkmenistan
Input	➤ Training equipment necessary for new faculty of mechatronics ➤ Japanese experts in mechatronics

5. Tajikistan

5.1. Needs for Industry Human Resources

5.1.1. Present Status of the Economy

5.1.1.1. Economy and Industrial Structure

Although Tajikistan suffered a decline in overall national living standards due to the civil war for five years after independence, the situation improved after a peace treaty was made on 1997. The economic growth rate is currently positive and it is cooperating with the IMF and World Bank for economic development.

Its main activities center on agriculture, cotton growing and livestock farming, as well as textiles in the industrial sector. Mineral resources such as gold, silver, copper, molybdenum and antimony, and, despite limited business and aquatic resources, are also abundant in Tajikistan⁵².

Following the global financial crisis of October 2008, remittances from overseas migrants declined; affected by the economic recession in Russia and Kazakhstan, which have close links to the Tajik economy⁵³.

The unemployment rate in Tajikistan is high and economic conditions are severe.

5.1.1.2. Overview of the Economy

The following tables show the current basic economy and an industry overview.

⁵² Ministry of Foreign Affairs of Japan: The basic data of Tajikistan, <http://www.mofa.go.jp/mofaj/area/tajikistan/data.html#section4>, (accessed March 31, 2017)

⁵³ Ministry of Foreign Affairs of Japan: The basic data of Tajikistan, <http://www.mofa.go.jp/mofaj/area/tajikistan/data.html#section4>, (accessed March 31, 2017)

Table5-1 Trends of Tajikistan⁵⁴

	2012	2013	2014	2015	2016
Real GDP (in billions)					
Somoni	1.9	2.0	2.1	2.3	2.4
USD ⁵⁵	0.22	0.24	0.25	0.27	0.28
Nominal GDP (Billions of USD)	7.59	8.51	9.42	7.82	6.61
Per-capita GNI ⁵⁶ (USD)	1,150	1,320	1,370	1,280	-----
Fiscal balance (% of GDP)	0.6	▲0.8	0.0	▲2.3	▲4.0
Economic growth rate (%)	7.5	7.4	6.7	6.0	0.6

Table5-2 Trend of Industry (% of GDP)⁵⁷

	2012	2016	Principal products
Primary industry	19.3	29.3	Cotton, grain, fruit, grapes, vegetables; cattle, sheep, goats
Secondary industry	20.1	21.6	Aluminum, cement, vegetable oil
Tertiary industry	60.1	49.2	-----
Industrial production growth rate ⁵⁸	7.5	0.8	-----

⁵⁴ IMF, World Economic Outlook Database, <https://www.imf.org/>, (accessed March 31, 2017)

⁵⁵ Ex quick cross rate, <http://www.xe.com/>, (accessed May 13, 2017) 1 US dollar=8.95548 Somoni

⁵⁶ World Bank, <http://data.worldbank.org/>, (accessed March 31, 2017)

⁵⁷ CIA, The World Factbook, <https://www.cia.gov/library/publications/the-world-factbook/>, (accessed March 31, 2017)

⁵⁸ Industrial growth rate follows the definition of CIA, The World Factbook, <https://www.cia.gov/library/publications/the-world-factbook/geos/xx.html>, (accessed March 31, 2017)

Table5-3 Trade Indicators (Billions us USD)

	2012	2013	2014	2015	2016
Export ⁵⁹	1,360	1,162	977	891	-----
Import ⁶⁰	3,778	4,151	4,297	3,885	-----
Principal trade items ⁶¹	Exports	Aluminum, electricity, cotton fiber/textile products, fruit, vegetable oil			
	Imports	Petroleum products, aluminum oxide, machinery equipment, food items			
Principal trade counterparts ⁶²	Exports	Turkey: 19.7%, Kazakhstan: 17.6%, Switzerland: 13.7%, Iran: 8.7%, Afghanistan: 7.5%, Russia: 5.1%, China :4.9%, Italy: 4.8%			
	Imports	China: 42.3%, Russia: 17.9%, Kazakhstan: 13.1%, Iran :4.7%			

5.1.2. Industrial Promotion and Prioritized Industrial Areas of Tajikistan

5.1.2.1. National Policy

Tajikistan is formulating a national development strategy called the “National Development Strategy of Tajikistan for the period to 2030”. The main objectives for the following 15 years are to improve the efficiency, diversification and competitiveness of enterprises and organizations, the natural resources industry (e.g. water), the energy industry, the transportation industry, and ICT related industries. Other strategies to foster personnel training reinforce and maintain social security and regional development are also listed.

The “Medium-term Development Strategy (MTDS) 2016-2020”, which is the middle plan of the National Development Strategy of Tajikistan for the period to 2030, aims to help Tajikistan shift to a new business model. This strategy will specifically include the Tajik government promoting exports and substituting domestic goods for imported goods. It is essential that Tajikistan shifts to the new business model in order to strengthen the education of human resources to meet industrial demands and accelerate investments to economic markets and infrastructures.

This document says that the above activities Tajikistan enables rapid growth of the economic market, agriculture, financial market; improve the productivity of the labor market and create the new market.

⁵⁹ United Nations Conference on Trade and Development, <http://unctad.org/>, (accessed March 31, 2017)

⁶⁰ Ibid.

⁶¹ JETRO, “Overview of countries in Central Asia”, https://www.jetro.go.jp/ext_images/world/russia_cis/outline/centasia_20160411.pdf, (accessed March 31, 2017).

⁶² CIA, The World Factbook, <https://www.cia.gov/library/publications/the-world-factbook/>, (accessed March 31, 2017).

Tajikistan is expecting to change their industrial structure which relies on the remittances from overseas migrants.

The Ministry of Industry and New Technologies is collaborating with other ministries to identify the new technologies required in each industry and then promoting the provision of them. At meetings with them, they were informed that the industries requiring new technologies are food processing, heavy industries (rehabilitation of equipment), technology to mine rare metals, agrarian (boosting productivity with new technology) and textiles.

5.1.2.2. Industry Promotion Policy

Considering principal trade items, the priority sectors are cotton and textile, agriculture (fruit and vegetable oil).

According to the “National Development Strategy of Tajikistan for the period until 2030”, priority sectors are transportation, communication, agriculture (including food processing) and SMEs. According to a research basis with Ministry of Industry and New Technologies inquiry, food processing, agriculture and textiles are recognized as priority sectors.

5.1.3. Current status of SMEs (small and medium-sized enterprises) in the Manufacturing Industry

5.1.3.1. Chamber of Commerce and Industry of Republic of Tajikistan (CCI TJ)⁶³

The CCI TJ was founded in 1960 and now has a membership of 700 encompassing all industrial sectors. It is tasked with promoting exports of Tajikistan enterprises, attracting foreign investment, protecting private sector interests, entering the country, job certificates for companies as part of the local production process and product imports and coordinating with foreign companies and government agencies etc. As well as these activities, the human resource development project involves numerous training sessions, seminars and forums and industrial companies are upskilling and supporting methods that spawn business improvement.

In addition, the staff reaffirms the role of supporting such companies and the environment surrounding private enterprises. There is scope to drastically improve and promote investment in overseas companies as was reaffirmed.

⁶³ CCI TJ, Tajikistan Business Guide 2014, <http://tpp.tj/put2013>, (accessed May 31,2017)

5.1.3.2. Interviewed Company Overview

In this survey, the Study Team asked CCI TJ to introduce ten or more private small- and medium-sized enterprises, but we were eventually able to conduct an interview survey of eleven companies shown in the table below:

Table5-4 List of Interviewed Companies

	Company Name	Field	Products/Service
(1)	FERDOWS-E-BARTAR	Agriculture	Management of chicken farms, Sales of eggs in domestic markets
(2)	Tajik Hydro Electric Montage	Power facility construction	A subsidiary of a major government enterprise, mainly engaged in constructing transmission stations
(3)	Production Cooperative Iskich	Animal husbandry and agricultural warehouse	A company that stores harvested grapefruit in warehouses with air-cooled storage facilities and overseas sales management and shipping services
(4)	Rukhom Company	Processing of stone materials	Manufacturing and selling artificial decorations on homes and offices by processing local ores
(5)	LLC Avesta	Sales of residential building materials	Main supply material is ϕ 25 - ϕ 100 mm PVC pipe etc. ϕ 25mm- ϕ 100mm PVC
(6)	LLC Comfort Plast	Sales of residential building materials	Processing and sales of high class plates for ceiling for ornament use
(7)	Vahdat Textile LLC	Processing sales of clothing production	Production processing of socks
(8)	Saodat	Food Processing	Production and sales of dairy products
(9)	OJSKShirin	Food Processing	Production and sales of sweets with dry fruits
(10)	JointStock Company Tajikcable	Power facility construction	A subsidiary of a major government enterprise, mainly engaged in constructing transmission stations
(11)	Japan Tajikistan Commerce Surpoort Ltd.	Car rental company	This company arranges car rental for European and Japanese travelers and/or business partners

(1) FERDOWS-E-BARTAR

FERDOWS-E-BARTAR is an Iranian company established in 2011. There are 2,000 staff and 7

management staff and conduct diversified business listed as below.

- Poultry of 50,000 chickens in Sughd region
- Flower growing in Dushanbe
- Growing and export of cottons to Iran
- Management of the supermarkets and merchandise trade center

Regarding the field of agriculture, they make use of renewable energy to reduce the dependency on underground resources.

It was mentioned in the interview that they face logistic challenges in winter when provision of eggs from rural areas are delayed due to bad road conditions.

(2) Tajik Hydro Electric Montage

A Power Relationship Construction Company established as a Russian state enterprise in 1959 during the former Soviet era. The business division comprises facility design and construction divisions, which were subsequently operated as state-owned enterprises of Tajikistan under the Ministry of Energy and are now part of a power facility construction company with 2,300 employees; still operating as a joint-stock company and 100% in the private sector. The major business involves undertaking the renovation of the substation (equipment) of 500 KV from domestic transmission and a distribution cable of 0.4 KV.

In July 2016, the Tajikistan government concluded a comprehensive agreement to construct a power plant with the Italian construction minister Saline ImPregillo, and it is scheduled to enter this construction as a local company.

In terms of human resource development, 30 to 40 engineers who have received higher education from each university every year are recruited as executive candidates of the enterprise. The selected interns who have passed three years of internal training are eligible to join the technical training in Russia and Turkey, etc. For this purpose, they have a technical electrical engineering college to train engineers within the enterprise and expert engineers from Russia, Turkey etc., including CCI TJ, are invited to instruct on advanced technology.

(3) Production Cooperative Iskich

The president is an animal husbandry farmer and one of the entrepreneurs who participated in training in the 2003 JICA training in Hokkaido, Japan. Currently, in rural areas of Tajikistan, there are around 2000 farmers cultivating grapes. These harvested grapes are marketed by the poor

transportation environment, which cause loss of 40% and 45% of the total harvest. They are otherwise bought by an intermediary with the cheapest price.

In 2007, the founder built a refrigerated warehouse on a 2000-ton scale, purchased and stored products harvested from farmers and introduced a shipping system to take changes in market prices into consideration, based around a successful demonstration project. On this occasion, the company is planning to set up a cargo warehouse to reduce the production loss of grapes and launch an air-cooled storage warehouse company to improve the shipping method.

When it is completed, 10-15 staff will be employed including warehouse managers, grape loading / unloading staff, security guards and transport managers etc.

(4) Rukhom Company

The president has acquired stone material techniques in Moscow in former Soviet era. In 1994, he worked as an entrepreneur in Tajikistan's Dushanbe city using techniques acquired, followed in 2005 by a local art exhibit from Tajikistan at the Japan International Expo (Aichi Expo). At the time, he was taught about traditional Japanese design by the president of Mimaki pottery.

At the ore processing plant, old-fashioned Russian machines are used with five to eight stone workers as local employees with over 20 years of service. The work of this stage of processing affects quality of the final products. Then the cut stones go through processing, polishing, and decorating processes to become ornamental and decoration goods. In total, 83 local female craft persons are working, where three to four of them are arranged to take care of each process.

In Tajikistan, a folk craft field without any competitive enterprise targets an international exhibition held each February in Frankfurt, Germany, and if the design is approved, bulk sales in Dubai etc. are anticipated.

(5) LLC Avesta

The enterprise constructs houses on behalf of a major real estate company by contract. They are also engaged in distribution and retail sales of pipes of heating equipment. In addition, they run a cafeteria. Future business development may include troubleshooting services and those for repairing facility piping in Dushanbe city. Conversely, since the government is managing gas, water, etc., it is unclear whether implementing the project is feasible in terms of maintenance service.

As most construction materials are made in China and cheap, the president intends to expand business relationship with China. In addition, he thinks that the processing technology of construction materials is more advanced in China than in Russia. Currently they are negotiating an

application procedure via the CCI TJ to receive a 40 million USD loan from the government of Tajikistan and Chinese government's loan bank.

(6) LLC Comfort Plast

The founder of LLC Comfort Plast, Mr. Aliev graduated from the International Economic Faculty of Tajik State University of Commerce and went abroad as a migrant worker. Then he established the company in 2014. Main products of the company are ceiling plates for ornament use made of expandable polystyrene. The machine for forming processing was purchased from China by making use of the fund from Entrepreneurship Development Fund.

Materials of the products are imported from Porland, Turkey and Russia and products with adhesion bond are sold at domestic shops for house building materials and building companies as well as in neighboring country, Kyrgyz. At the moment, 30 staff for making molding products is employed while the operation of the machine is total automation. They invite experts from China for maintenance on a regular basis and the staffs take training for maintenance management and operation from them.

Regarding custom-order from customers, the company accepts an order by using seven types of sample molding products. The selling price ranges from 400 to 500 US dollars per 10 meters. For the cases which need new metallic molds (1 form: 15,000 US dollars), it usually takes four months for preparation.

(7) Vahdat - Textile LLC

In 2014, he launched a sock manufacturing company with his own fund that includes loans from Russian banks, and corporate promotion fund financed by the Tajikistan government. The workforce is 195, (women 95%, men 5%).

The raw export destinations for products are the Ukraine, Russia (60%), Kazakhstan (15-17%), Kyrgyz, Belarus (8-9%), where only 1% of the total volume of the products is for the domestic sales (domestic sales are mainly for a French supermarket, "Hypermarket". They produce socks by spinning machines from China, with a coloring process. The capacity of machine production is 300 tons/month, sock production, 1 million unit/month; and painting yarn, 20 ton/month.

(8) Saodat

Saodat is a company which process and sell dairy products. Their main markets are supermarkets and retail shops in Dushanbe city.

Their emphasis during the processing of the products is on committed quality control. Since temperature management decides the quality of products during the transportation from farms to the factory, temperature is carefully controlled.

The representative of the company, Mr. Hotamov Rahimjon Davlatalievich thinks the important challenge of the company is to reduce as much loss as possible during the shipping of the products since damage caused during transportation on the road directory leads to the loss of production and quality.

(9) OJSKShirin

OJSK Shirin is a joint stock company which produces candies and chocolates with dried fruits and its factory was established in 1964. They continued producing sweets even during the internal conflict from 1992 to 1995.

Mr. Current, the General Manager, learned food technology in Moscow University and then joined JICA Training in Hokkaido to learn producing technology for one month.

20 management staff and 130 staff are employed and around 30 – 35 kinds of sweets are produced at 6 factories. Market is not only in Tajikistan, but the products are also exported to Kazakhstan and Russia.

(10) Joint Stock Company Tajikcable

This wire maker was founded in 1959 and production encompassed aluminum and copper transmission cables and transformers 0.65 to 15 mm in diameter, exported to Russia, Kazakhstan and Uzbekistan and so on. Over a five-hectare site, it has one office, three manufacturing factories, one warehouse, two material places, one lodging facility and a plant substation of 1,200 kV. During the peak season, electric wires manufactured with 700 workers.

After the collapse of the former Soviet Union in 1997, Russian engineers and capitalists withdrew and the production volume decreased sharply. After that, we continued production according to demand finely until 2014. On the other hand, 80% or more of the manufacturing equipment is a machine of the Soviet era, and it is stopped because it is mainly necessary for overhaul. German small diameter transformer wire processing machine has been in operation for about 3 months after procurement but has not been used after that.

Canceled operations in 2015, some facilities were lent to Chinese companies. Also, some storage bins are available for local metal welding companies.

Now only 27 people oversee facility maintenance and facility guards. The owner has also submitted a reconstruction plan to help the government, but there is no concrete activity yet.

(11) Japan Tajikistan Commerce Support Ltd.

In 2012, the president got a tourism business license and joined the tourism industry. Initially he planned to organize a sightseeing trip for Japanese people. However, it was not successful due to the difficulty in establishing liaison with travel agencies in Japan, as well as security restrictions that banned the Japanese tourists traveling to the Pamir Plateau and the rural areas that were most popular.

Currently, their business focuses on arranging cars, hotels and apartments for Japanese businessmen. The owner of this company is Japanese, with three employees, three persons in operation, accounting, IT engineers, and two drivers. They have two 4WD business vehicles (purchased five years ago from Dubai) and two sedans (purchased locally), but the maintenance are outsourced due to the lack of repair technicians.

In other projects, they also aim to diversify for IT-related projects in educational fields by winning orders such as UNCEF and World Bank. In terms of developing in-house talent, the owner attended the NGO-sponsored training "Business Service Capacity Enhancement" and was instructed by Japanese resource person on Japanese-style business.

5.1.4. Japanese Companies' Presence and the Fields of Investment

5.1.4.1. Policies to Attract Foreign Investment

There is no clear policy yet for the "National Development Strategy of Tajikistan for the period until 2030" in terms of investment from overseas but it is mentioned that promoting investment from overseas companies into the Free Economic Zone will be means for a domestic company to accumulate the new technologies.

5.1.4.2. Japanese Companies' Presence and the Fields of Investment

COKEY Co. Ltd. has been confirmed as a Japanese company that operates in Tajikistan⁶⁴. COKEY Co. Ltd. has established a Joint Venture with a local company - so-called AVALIN - on 2011. COKEY Co. Ltd. has a factory at the Hatlon region. Their activity is based on licorice, which grows naturally in Tajikistan.

⁶⁴ COKEY Co. Ltd., <http://www.cokey.co.jp/outline/> (accessed May 31, 2017)

5.1.4.3. Presence of Foreign Countries Other than Japan and Their Investment Fields

According to a meeting at the Ministry of Economic Development and Trade of Tajikistan, companies from 14 countries such as Iran, China, Poland, Turkey, and Kazakhstan are engaging in business within the Free Economic Zone. The Free Economic Zones in Tajikistan are in Sugudo, Pianji, Dangara and Ishkashim. The Tajik government offers incentives to companies such as reeducating on corporation tax, export/import tax and so on. The companies in Sugha, for example, manufacture aluminum plates for construction, polychlorinated vinyl pipes, wooden doors and window frames and packaging goods for agricultural products, then export their products. The companies at Dangara companies, for example, produce crude oil and steel goods for construction, then export them.

The Tajik government produces paint for construction with companies from Turkey. Russia has shown interest in entering into the Free Economic Zone with the manufacture of medical products⁶⁵.

Outside of the Free Economic Zones, Russian and Iran are establishing hydraulic power generation plants that the Tajikistan government is also focusing. The establishment of roads and high voltage cables are under construction by China.

5.1.5. Industrial Human Resources Needs of Local Industry

In Tajikistan, under circumstances where sufficient information on the local situation, such as bureaucracy procedures and business customs influenced by the former Soviet Union was unavailable, a lack of human resources of entrepreneurs and managers in the private sector as well as engineers engaged in production activities in the industrial field was confirmed.

In addition, although Tajikistan is finally stabilizing the economy, many young people are currently going to work in Russia and elsewhere. Human resource development that helps underpin economic development and domestic industrial promotion is the major issues not only for national development but also for reducing the social cost associated with the shift to the market economy.

5.1.6. Sectors to be Intervened for Further Human Resource Development for Industrial Promotion

Given that Tajikistan is providing cheap labor in neighboring countries and the Tajik workers' remittance is becoming a major income source, it is important to develop professional engineers and

⁶⁵ Information was given by the meeting with Ministry of Economic Development and Trade of Tajikistan.

technicians who acquire advanced technologies and can earn high incomes.

In the agricultural field, agricultural reform paves the way to choose agricultural crops freely and instead of cotton cultivation that can be exported to Middle Eastern countries, stable year-round harvest can be obtained, whereupon fruit and vegetables utilizing high quality greenhouse cultivation technique, trained farmers and entrepreneurs with production technology are all indispensable.

In foreign investment projects, the construction of hydropower plants by Russia and Iran is underway in the field of power generation prioritized by the Tajikistan government; the construction of roads and high-voltage transmission lines by China is proceeding, therefore, recently domestic demand for mid-level engineers has tended to grow. Training and raising mid-level engineers in fields including construction, civil engineering and electric power and so on will be important.

5.2. Overview of the Education Sector

5.2.1. Basic Data for Education

The following table shows the basic data of education in Tajikistan.

Table5-5 Basic Data of Education in Tajikistan

	Figure	Year
Enrolment Rate		
Primary Education	97.3%	2015
Secondary Education	83.2%	2011
Number of Schools		
General Primary and Secondary Education	3,855	2015
Primary Vocational Education	61	2015
Secondary Vocational Education	65	2015
Higher Education	38	
Number of Students		
General Primary and Secondary Education	17,858,000	2015
Primary Vocational Education	263,000	2015
Secondary Vocational Education	689,000	2015
Higher Education	1,765,000	2015
Number of Teachers		
General Primary and Secondary Education	1,099,000	2015
Expenditure for Education (as a percentage of GDP)	5.23%	2015

Reference: TAJSTAT⁶⁶, World Bank⁶⁷

5.2.2. Education Policy and Education Law

5.2.2.1. Education Policy

Human resource development in Tajikistan aims to contribute to the socio-economic development of the nation based on the “National Strategy of Education Development of the Republic of Tajikistan until 2020” (approved in June 2012), within the framework of directions prioritized as follows:

⁶⁶ TAJSTAT, *Tajikistan in Figures*, Dushanbe: Department of Economic Analysis and International Relations, 2016, pp.32-33.

⁶⁷ World Bank, World Bank Open Data, <http://data.worldbank.org/>, (accessed June 1, 2017).

(1) Modernization of the Education System

Educational reform aims to transform the previous Soviet system into the international system based on the Western standard. At all levels, from pre-school, primary, secondary, vocational, to higher education, transformation from knowledge-based to competence-based education model is pursued, along with activity plans.

With an orientation on labor market demands in and out of the country, activity plans for basic specialized vocational education include: development of programs designed on the basis of professional standards and competency-based approach with mandatory involvement of employers; development of flexible and alternative educational programs; inclusion of the components on management and business in training programs; and, expanding short-term courses for youth and adults.

In accordance with labor market demands and social development, the activity plans for secondary specialized vocational education include: development of new occupational standards; entrepreneurship development; introduction of teaching materials and equipment; development of flexible training forms including distance learning, and evening courses; introduction of new teaching methodologies and technologies; and, autonomous administration of educational institutions.

Modernization of higher vocational education will be implemented with the objective of forming of the brainpower of the country for economic development. The activity plans include: improvement of teaching staff through Master's and Ph.D. programs; development of innovative educational programs and technologies; development of electronic training aids and inclusion of ICT; transition to a new style of education, based on competency; arranging mandatory involvement of employers in education; education by active learning rather than knowledge-transmission from teachers, etc.

(2) Structural Adjustment of the Educational System

Structural adjustment of the education system covers education from pre-school education development to five-year primary education (six years), lower-secondary education (four years), secondary education (two years), TVET, and continuing to higher education.

Priority in vocational education is given to restructuring the existing stakeholders' network for training according to the needs of local economy. Therein, existing primary and secondary vocational education institutions will be utilized in search of any forms of academic-industrial collaboration or networking, so that multi-level and multi-specialty programs become available. In

addition, development of various types of training courses including short, advanced, or special courses should be done with a wide network of training centers of not only state regulatory authorities, but also such service providers as private enterprises, NGOs, and agricultural enterprises with financial contribution of both employers and employees who wish to acquire a professional skill.

An objective of higher vocational education is defined to build the bases for scientific research and development of business incubators. Primarily, it is planned that higher vocational education institutions will participate in regional and national development planning, and to give consultation to science and engineering based on extended networks. Moreover, there are plans for technological parks to be established within higher education institutions in order to provide a basis of networking for universities, colleges, and lyceums. The role of the technological park is to be an integrated educational network for joint projects of various educational institutions and national core industries of energy, mines, and non-ferrous metals. Particularly, the joint scientific research by Academy of Science of the Republic of Tajikistan and Academy of Education of Tajikistan is the most promising.

(3) Ensuring Accessibility to Quality Education

Education for girls, children of ethnic minorities, and socially vulnerable families will be strengthened by improving their access to primary and secondary education in rural area. Inclusive education will be pursued by various means, such as the provision of school lunch, supplying schoolbooks, awareness raising of communities, and teacher training/retraining.

There are activity plans have been made for vocational education, allocation of educational facilities according to the regional population distribution, capacity development of the instructors, extensive short courses, distance education by using IT, enhancing the access of women and girls to vocational training, and education portal service, etc.

Implementation mechanisms of “National Strategy of Education Development 2020” are identified in the strategy as follows:

- 1) Development of material and technical base
- 2) New educational technologies
- 3) Strengthening staff capacity
- 4) Modernization of educational management system
- 5) Use of new financing mechanism
- 6) Social partnership in education

5.2.2.2. Education Law

Numerous education laws were enacted from 2000 to 2010 with the aim of educational reform. These laws are mainly targeted to the reform of the education system, equal access to education, reduction of gender gaps, improvement of education quality and abilities, and poverty reduction.

First, “The Law of the Republic of Tajikistan on Education” was enacted in April 2004. The articles include the right to education, education system, administration, and social protection. Subsequently, “Higher Education Act”, “Inclusive Education Act”, “National School Construction Program”, “Scientific Research Program”, “TVET Development Program”, “Act of Educational IT”, “Russian and English Education Act”, and so on are established.

5.2.3. Education System

5.2.3.1. Compulsory Education

The education system of Tajikistan can be divided into the following levels: early childhood development (ECD), primary, secondary, vocational education and training (VET), and higher education. Nine years of primary to secondary basic-level education are compulsory. After completing compulsory education, students can proceed to the secondary upper level or study at lyceums or colleges offering VET. VET institutions could be an option for students upon completing the secondary upper level as well⁶⁸. Table 5-6 shows the grade/duration of study and age for each education level.

Table5-6 Primary and Secondary Education in Tajikistan

	Grade/Duration of Study	Age
Primary	1 - 4	7 - 10
Secondary (Basic)	5 - 9	11 - 15
Secondary (Upper)	10 - 11	16 - 17
Vocational Education and Training (VET)		
· Primary VET	1 - 3 years	16 - 18 or 18 - 19
· Secondary VET	1 - 4 years	16 - 19 or 18 - 20

The Law on Education in Tajikistan regulates free compulsory education at state education institutions. While the main language of instruction is Tajik, some schools teach subjects in Russian or Uzbek⁶⁹.

⁶⁸ World Bank, “Tajikistan: Higher Education Sector Study,” <http://documents.worldbank.org/curated/en/154891468114540289/pdf/ACS103830WP0P100sector0study0final.pdf> (accessed May 30, 2017).

⁶⁹ Ministry of Foreign Affairs of the Government of Japan, “Country and Region profiles on Schools,” http://www.mofa.go.jp/mofaj/toko/world_school/05europe/infoC52700.html (accessed May 29, 2017).

5.2.3.2. Higher Education

After completion of secondary upper level education or VET, students have the option of studying at higher education institutions (HEIs)⁷⁰. Three types of HEI operate in Tajikistan: universities, academies, and institutes. The table below compares the characteristics of the tree types.

Table5-7 Characteristics of the Main Types of Higher Education Institution

	Characteristics
University	<ul style="list-style-type: none"> • HEIs with faculties in various fields. • Basic and applied research.
Academy	<ul style="list-style-type: none"> • Specialty schools offering education in specific fields. • Research in the fields of education offered.
Institute	<ul style="list-style-type: none"> • Specialty schools offering education in one or several fields.

Although Tajikistan has not become a member of the Bologna Process, the country is introducing a three-level structure of Bachelor, Master, and PhD programs. While students earning Master degrees in Tajikistan used to have the option of proceeding toward Candidate of Science and Doctor of Science degrees, a PhD program was officially introduced in September 2014⁷¹.

Tajik is used as a teaching language at most of the HEIs. According to the Asian Development Bank, 81 percent of HEI students take their courses in Tajik, versus only 17.5 and 1.5 percent who study in Russian and Uzbek, respectively. Recognition of English as a global language is also growing, which could encourage more universities to offer courses in English in the future⁷².

5.2.4. Education Administration

The Ministry of Education and Science of the Republic of Tajikistan is in charge of education administration and takes responsibility for wide-ranging aspects of the education system, from policy to practical levels. The “Law on Higher and Postgraduate Professional Education” prescribes the main roles of the Ministry in higher education, as follows⁷³.

- Development and introduction of education standards
- Development and approval of standard curricula

⁷⁰ According to the World Bank, the number of graduates from VET institutions who proceed to higher education is very limited.

⁷¹ Asian Development Bank, “Assessment of Higher Education: Tajikistan,” <https://www.adb.org/sites/default/files/institutional-document/175952/higher-education-taj.pdf> (accessed May 29, 2017).

⁷² Ibid.

⁷³ World Bank, “Tajikistan: Higher Education Sector Study,” <http://documents.worldbank.org/curated/en/154891468114540289/pdf/ACS103830WP0P100sector0study0final.pdf> (accessed May 30, 2017).

- Licensing of the operation of education institutions and organization of an accreditation system
- Coordination of HEI activities and the higher education system in each sector and province
- Legislation regarding the administration of students pursuing BA, MA, and PhD degrees
- Establishment of international agreements in conjunction with laws in Tajikistan
- Clarification of the needs in each specialized field of education

The “National Strategy for Education Development of the Republic of Tajikistan 2006-2015” points out the excessive centralization of the system for education administration, the need for decentralization, and the need for expanded autonomy and independence for each type of education institution. While the Government of Tajikistan has expressed its intention to work on these issues on paper, some international organizations have observed that the actual action to decentralize administration and expand the autonomy of education institutions has been slow. Hence, they have concluded that the centralized education system of Tajikistan has not been extensively changed⁷⁴.

5.2.5. Issues in Education Sector for Industrial Human Resource Development

(1) Immature System of Industry-Academia Collaboration

There are a few successful cases of industry-academia collaboration in IT sector. For example, joint research carried out by universities and Babylon Phone and T-cell, and collaboration with young entrepreneurs. However, in other sectors, more cases are expected through a viable system to promote active industry-academia collaboration.

Particularly, collaboration of an agricultural university with an agribusiness is expected as agriculture is an important industrial sector in Tajikistan. According to the interview with UNDP, there are some cases in which experts/engineers from Germany or Turkey provide professional advice on agriculture or management in collaboration with a university or an academy. It would be important to strengthen collaboration with agribusinesses so that the employment of young people in rural areas can be improved.

(2) Adaptation to the European Standard

The Government of Tajikistan puts much focus on quality control of education in preparation of integration into the Bologna Process. To implement that, an effective system for qualification should be established via collaboration between the Ministry of Education and the Ministry of Economics. The system is expected to contribute to produce enough specialists and engineers to satisfy occupational demands prioritized in industrial development. Matching the needs of the two

⁷⁴ Ibid.

ministries is necessary, while the Ministry of Economics is not satisfied with the current NQF⁷⁵.

(3) Drain of Industrial Human Resources from the Country

Due to economic deterioration, it is difficult to find jobs within Tajikistan. Therefore, many of the graduates of higher education or TVET are going to other countries such as Russia, Kazakhstan, and Germany, to seek employment. According to SDC, roughly 1.2 million Tajiks are working in Russia, as the salary of Tajikistan is generally low. Therefore, careful coordination of economic policy, immigration policy, and education policy is recommended for developing industrial human resources domestically.

(4) Educational Infrastructure and Quality of Education

In Tajikistan, preparation of sufficient educational infrastructure is a big challenge when the population of younger generation is rapidly growing. Particularly, equal access to education for boys and girls in rural areas should be secured in terms of “Education for All”.

Usable infrastructure and equipment is urgently needed at TVET institutions in rural areas. In addition, competent instructors who can teach practical and employable skills that matches the local labor market are especially scarce.

5.2.6. Visions for Educational Reforms

As written in 5.2.2 Education Policy, a structural reform of the education system is the primary agenda for the government’s vision toward 2020. Moreover, the following principles regarding “Education and Science” are shown in the chapter “Human Development” in “Tajikistan National Development Strategy 2030”:

- Quality education
- Early childhood education
- Development of innovative thinking
- Vocational education for competitive national economy
- Collaboration of education and labor market
- Joint research with industry
- Environment and sustainable development

The following are aims of the educational reforms in Tajikistan made by analyzing information of

⁷⁵ According to the World Bank, qualifications of 503 occupations have already been developed.

interviewees (mainly international organizations):

- Global human resources development
- Human resource development to meet the needs of industry and economic trends
- Industry-academia collaboration
- Innovation of TVET system
- Business incubation
- Integration into the European standard education system
- English education
- Establishment of technological parks
- Socially inclusive education

5.3. Higher Education Institutions in the Fields of Science and Engineering

5.3.1. Outline of Institutions of Higher Education

As mentioned above in Section 5.2.3 Education System, higher education institutions in Tajikistan are divided into three categories: Academies, Universities, and Institutes. At the academy and university level, bachelor degrees (over 4 years), master's degree (over 2 years), and specialist degrees (over 5 years) can be acquired.

5.3.2. Current Situation and Issues in Higher Education Institutions in the Fields of Science and Engineering

(1) Research Equipment/Facilities

As a result of visiting education institutions, it is found that experimental/research equipment for education was not substantial except for equipment provided by donors. Although the institutions recognize that much equipment is outdated, it is currently difficult to renovate or procure new equipment because of financial constraints. Even for those provided by donors, some equipment did not be effectively utilized for education and research due to lack of equipment knowledge.

(2) Limited Technical Skills Training

Since only old research equipment is available at institutions, content of education/research tends to be limited, and it is difficult to produce quality research results. Particularly, it is challenging to secure experimental accuracy when using old equipment and the research/experiment process is time consuming. It seems that efforts to acquire information about modern equipment are also lacking as there is little possibility to introduce such equipment.

(3) Lack of Consistency between Institutions and Industrial Sector

Under the circumstances mentioned above (utilization of old equipment, less opportunity to operate equipment), it is very difficult to improve the technical skills of students.

Some staff told at the interview that not many students could find the employment opportunities which match their areas of study. This problem is not only caused by a lack of companies in these fields, but also by insufficient students' skills which do not satisfy industrial needs. Creating an environment that enables students to acquire enough skills is an urgent issue in Tajikistan.

5.3.3. Information on major Higher Education Institutions in the Fields of Science and Engineering

The Survey Team retrieved the names of institutions which have science/engineering faculties in Dushanbe from websites as listed below and conduct interviews.

Table5-8 List of Major Higher Education Institutions in the Fields of Science and Engineering

Visit Day	Location	Name of Institution
April 24	Dushanbe	Academy of Science
April 25	Dushanbe	Tajik Technical University of Tajikistan named after academic Osimi
April 26	Dushanbe	Technological University of Tajikistan
April 27	Dushanbe	S.U. Umarov Physical-Technical Institute
April 27	Dushanbe	Russian Centre for Science and Culture
April 28	Dushanbe	Russian-Tajik Slavonic University
April 28	Dushanbe	Tajik Institute of Entrepreneurship and Service
April 28	Dushanbe	Tajik National University
April 29	Dushanbe	Agricultural University of Tajikistan

The outlines of the institutions are described below:

(1) Academy of Science Republic of Tajikistan

Name of Institution	Academy of Science Republic of Tajikistan
Name in Russian	Академия наук республики Таджикистан
URL	http://www.anrt.tj/index.php/ (accessed: June 6, 2017)
Languages used	Tajik, Russian, English

Under the supervision of the Soviet Academy of Sciences, this Tajik base was established to implement basic research such as geology, botany, zoology, and soil science in 1933. After that, it renamed as the Tajik Branch of the Soviet Academy of Sciences in 1940. After the collapse of the USSR, it became the “Academy of Science of Tajikistan” in 2002 under the “Law of Tajikistan Academy of Science”, and the academy’s activities are still ongoing.

The Academy is divided into four divisions: 1) the Division of Physical Mathematical, Chemical, Geological and Technical Sciences; 2) the Division of Biological and Medical Sciences; 3) the Department of Social Sciences; and 4) the Branches and Scientific Centers.

The research institutes of science and engineering under the umbrella of “Division of Physical Mathematical, Chemical, Geological and Technical Sciences” are as follows;

- Institute of Mathematics
- Institute of Astrophysics
- S.U. Umarov Physical and Technical Institute
- V.I. Nikitin Institute of Chemistry

- Institute of Geology, Seismological Construction and Seismology
- Institute of Water Problems, Hydropower Engineering and Ecology
- Agency on Nuclear and Radiation Safety
- State Scientific Experimental and Industrial Institution

(2) Tajik Technical University named after academic Osimi

Name of Institution	Tajik Technical University named after academic Osimi (TTU)
Name in Russian	Таджикский технический университет имени академика М.С.ОСИМИ
URL	http://www.ttu.tj (accessed: June 6, 2017)
Languages used	Tajik, Russian, English

TTU was originally the Stalinabad Polytechnic Institute, which was established in 1956 as the first high-tech educational institution in Tajikistan. It was renamed Tajik Polytechnic Institute in 1961, Tajik Technical University in 1992, and became Tajik Technical University in 1997. TTU has produced more than 60,000 graduates until now⁷⁶.

There are seven faculties: the Faculty of Electric Power Engineering, the Faculty of Information and Communication Technologies, the Faculty of Innovation Technologies, the Faculty of Construction and Architecture, the Faculty of Transport, the Faculty of Management and Transport Communications, and the Joint Engineering Technical Faculty. Khujand Polytechnic Institute and Dushanbe Technical College are under the management of TTU.

The main fields of research are energy, water resources, transportation, and construction industry.

While some educational equipment related to the field of communication has become outdated, that for metal working made in Japan was newly installed by India's "Indo-Tajik Modern Engineering Workshop" project⁷⁷.

(3) Technological University of Tajikistan

Name of Institution	Technological University of Tajikistan (TUT)
Name in Russian	Технологический университет Таджикистана
URL	http://tut.tj/ (accessed: June 6, 2017)
Languages used	Tajik, Russian, English

TUT was established in 1991. Currently, the main campus is located in Dushanbe while there are two branches in Kulyab City and Isfara City. In addition, Dushanbe main campus has a lyceum.

⁷⁶ The name of Dushanbe was "Stalinabad" (Russian spelling- Сталинобод) from 1929 to 1961.

⁷⁷ In case of problems with this equipment, TTU will not contact the equipment manufacturer in Japan directly. TTU should contact the supplier in India.

There are nine faculties: the Faculty of Engineering and Technology, the Faculty of Technology and Design, the Joint Tajik-Ukraine Faculty of Computer Systems and Internet Technologies, the Faculty of Information Technology Industry, the Faculty of Telecommunications and Vocational Education, the Financial Management and Innovation Faculty, the Faculty of International and Investment Management, the Faculty of World Economy and Marketing, and the Faculty of Distance and Distance Learning.

TUT has an international agreement with universities in Russia, China, Germany, Belarus, Kazakhstan, Kyrgyz, Uzbekistan and other countries. Joint research projects on food technology are conducted with universities in Kyrgyz, Uzbekistan, Kazakhstan, and Germany.

The main research theme of the Faculty of Engineering and Technology are the development of new technologies and products related to food processing and food safety. Practical educational equipment in the field of food processing is well equipped.

(4) S.U. Umarov Physical-Technical Institute

Name of Institution	S.U. Umarov Physical-Technical Institute
Name in Russian	Физико-технический институт Академии наук Республики Таджикистан им. С. У. Умарова
URL	http://www.phti.tj/ (accessed: June 6, 2017)
Languages used	Tajik, Russian, English

S.U. Umarov Physical-Technical Institute was established in 1964. The institute has following departments and facilities: Department of Nanomaterials, Department of Theoretical Physics, Laboratory of Physics of Crystals, Laboratory of Acoustical Physics, International Center for Nuclear Physical Research, Laboratory of Renewable Energy Sources and Materials Science, Laboratory of Atmosphere Physics, Laboratory of Cryogenic Physics, Laboratory of Quantum Electronics, Laboratory of Molecular Spectroscopy, Group Exploration of Cosmic Rays, etc.

Graduate school students are also accepted and MA and PhD students conduct research in the fields of theoretical physics, mathematical models, condensed physics, nuclear physics, and renewable energy devices.

According to the interview, the institute wishes to conduct research about nuclear materials and spacecraft with the support from Japan.

(5) Russian Centre for Science and Culture in Dushanbe

Name of Institution	Russian Centre for Science and Culture in Dushanbe
Name in Russian	Российский центр науки и культуры в Душанбе
URL	http://tjk.rs.gov.ru/ (accessed: June 6, 2017)
Languages used	Tajik, Russian

The Russian Centre for Science and Culture in Dushanbe was founded in 2011 following the intergovernmental agreement between Tajikistan and Russia. The administration is managed by the Russian Federal Agency for the Commonwealth of Independent States (Rossotrudnichestvo, in Russian Россотрудничество) ⁷⁸.

Main activities include science education, information dissemination and support relating to study abroad programs in Russia, promotion of Russian culture, strengthening of Russian language ability, and care for Russians living in Tajikistan.

Support for science education is in the forms of study abroad programs in Russia, scholarships, etc. Fields of research for students who study in Russia are energy, space exploration, laser physics, etc. Tajik students who have studied in Russia often do not return back to Tajikistan because of poor job opportunities. Tajik students studying in Russia first obtain a student visa, but can later get a visa to live/work in Russia relatively easily. This is a one of the reasons that students do not return home after they complete their studies in Russia.

(6) Russian-Tajik Slavonic University

Name of Institution	Russian-Tajik Slavonic University (RTSU)
Name in Russian	Российско-Таджикский (славянский) университет
URL	http://www.rtsu.tj/ (accessed: June 6, 2017)
Languages used	Russian, English

RTSU was established in 1996, and is a high status public university in both Tajikistan and Russia. Therefore, students who graduate from RTSU obtain a diploma which is valid both in Tajikistan and in Russia.

Costs for management of RTSU are shared between the two countries. Russia covers about 65%, which goes to salary of professors and staff, and scholarships for students, and Tajikistan covers about 35%, which goes to operation expenses and equipment renewal.

There are five faculties at RTSU: the Faculty of History and International Relations, the Faculty of

⁷⁸ Rossotrudnichestvo, "О Россотрудничестве (About Rossotrudnichestvo)", <http://rs.gov.ru/ru/about>, (accessed: June11, 2017)

Management and Information Technologies, the Faculty of Philology, the Faculty of Economics, and the Faculty of Law.

The only faculty in a science/ engineering related field is the Faculty of Management and Information Technologies. The faculty is divided into four departments: the Management and Tourism Department, the Department of Computer Science and Information Technology, the Mathematics Department, and the Natural Science Department.

RTSU has partnership with universities in Russia, Belarus, China, and Japan (University of Tsukuba). In order to contribute to the development of Tajikistan, RTSU focuses on training students including their mental factors to develop human resources who will eventually become entrepreneurs or managers.

(7) Tajik Institute of Entrepreneurship and Service

Name of Institution	Tajik Institute of Entrepreneurship and Service
Name in Russian	Таджикский институт предпринимательства и сервиса
URL	www.dsx.tj (accessed: June 6, 2017)
Languages used	Tajik, Russian, English

Tajik Institute of Entrepreneurship and Service was established in 1991 to train professionals in the fields of services, tourism, hospitality, information technology, etc. The institute also has a graduate school offering master's and PhD courses as well as a lyceum inside of its campus.

There are five undergraduate departments: Accounting-Economic, Entrepreneurship and the World Economy, Information Technology, Tourism and Customs Services, and Financial Services.

The institute has partnership with Ural State University of Economics in Russia, Shanghai Cooperation Organization (SCO), Erasmus +, etc. They hope to build relationship with the Japanese manufacturing industry which has modern technology and facilities.

(8) Tajik National University

Name of Institution	Tajik National University
Name in Russian	Таджикский национальный университет
URL	http://www.tnu.tj/ (accessed: June 6, 2017)
Languages used	Tajik, Russian

Tajik National University was opened in 1948 at the campus of the Dushanbe Pedagogical Institute

named after TG Shevchenko⁷⁹.

Currently, the university has 18 faculties. There are seven faculties in the fields of science and engineering: the Faculty of Mechanics and Mathematics, the Faculty of Physics, the Faculty of Chemistry, the Faculty of Biology, the Faculty of Medicine, the Faculty of Pharmacy, and the Faculty of Geology.

The main research fields are hydroelectric power generation, recycling, genetic engineering of grapes, mining, safety of nuclear reactors, medicinal herbs, earthquakes, etc.

The university has built partnerships with 192 foreign universities, with the University of Belarus being one of the strongest.

(9) Tajik Agrarian University named after Shirinsho Shotemur

Name of Institution	Tajik Agrarian University named after Shirinsho Shotemur (TAU)
Name in Russian	Таджикский аграрный университет имени Шириншо Шотемур
URL	www.tajagroun.tj (accessed: June 6, 2017)
Languages used	Tajik, Russian, English

In 1933, TAU was established as the Tajik Agricultural Institute, which was independent from the Faculty of Agriculture of the National Central Asian University, for the purpose of fostering agricultural experts. TAU became a university in 1992 in order to cultivate qualified experts in the field of agribusiness.

Nine faculties are available in TAU: the Faculty of Agronomy, the Faculty of Agribusiness, the Faculty of Accounting and Finance, the Faculty of Horticulture and Agricultural Biotechnology, the Faculty of Economics, the Faculty of Hydromeliorative, the Faculty of Zoo-engineering, the Faculty of Veterinary, and the Faculty of Mechanization of Agriculture.

Currently, the university is focusing on the research of soil analysis. The idea is that soil improvement will increase agricultural production, and that determination of soil environment standards to ensure food safety can contribute to the development of Tajikistan's agriculture. Simple water quality test kits, thermometers and microscopes were provided in 2015 by JICA. In order to carry out the research about soil improvement and soil monitoring, it is necessary to introduce equipment to measure nitrogen, phosphorus, salt, etc.

⁷⁹ The current name is "Tajik State Pedagogical University named after S. Aini",

5.4. Technical Vocational Education and Training (TVET)

5.4.1. History of TVET

The civil war in Tajikistan continued after independence, following the collapse of the former Soviet Union in 1991 until 1997, as did domestic confusion, but the system gradually settled once the war came to an end. Since early 2010, the legal system, including the Education Law, was in place and vocational technical education and training, which had been under the full control of the Soviet central government, which once faced serious disorder after independence, is gaining stability.

According to the Ministry of Education and Science, which has jurisdiction over education, including vocational technical education and training, it is currently advancing policies, centering on the “National Strategy of Education Development of the Republic of Tajikistan till 2020”, established in 2012⁸⁰. Among them, human resource development is particularly indispensable to secure socioeconomic development, particularly in priority areas of energy, manufacturing, agriculture and infrastructure.

5.4.2. Outline of TVET (program, curriculum, student, teaching staff, facilities and equipment)

The Ministry of Education and Science and the Ministry of Labor and Social Protection are under its jurisdiction.

There are 62 colleges and lyceums nationwide as schools offering vocational technical education and training. Students from the 9th grade of general education study for two years and 0.3 to 1 year for students from the 11th grade of general education, covering a total of 108 courses.

There are also 20 in-service training centers, while short-term education and training is also provided for in-service workers and job seekers. Approximately 15,000 students are enrolled and graduate every year; trained and educated by about 1,500 teachers and over 1,000 practical instructors⁸¹.

(1) Course and curriculum setting and revision

When setting the course, an annual revision is made based on industry needs in a manner of collaboration, as the Ministry of Labor and Social Protection identifies regional and local HR needs, then the Ministry of Economic Development and Trade compiles industry trends basing on the identified information and the Ministry of Education and Science shows the policy of course setting

⁸⁰ National Strategy of Education Development of the Republic of Tajikistan till 2020

⁸¹ Ministry of Labor and Social Protection April 25, 2017 interview

and revision following this information. The curriculum is divided into basic and specialized parts, with the former, such as drafting and mechanical engineering, prepared by the Ministry of Education and Science for all schools nationwide. In colleges, however, for specialized portions of courses corresponding directly to detailed fields of industry, the college consults with companies to create a draft, which is later approved by the Ministry of Education and Science.

(2) Teaching materials and equipment

Although some old equipment from the Soviet era is deployed, the quantity is lacking and the machinery is not properly maintained, they are thought not to be used frequently with touching and handling in training practice.

(3) Employment

Students graduate by passing graduation examinations, after engaging in classroom study and laboratory practice as well as several internships and are usually nominated by companies who attend graduation examination and get employed. According to colleges, about 50% of government-funded students, half of the overall total, gain employment, 20% proceed to university and 20 to 30% seek jobs in Russia and Kazakhstan etc. The Ministry of Labor and Social Protection was positive about the overseas job seeking, stating that it had contributed a certain amount of GDP under current circumstances.

(4) Donor support

As assistance received from overseas donors, the Ministry of Labor and Social Protection is receiving cooperation from GIZ on the re-education of instructors, deploying instructors to Kazakhstan for three months and Germany for eight months, respectively. The Ministry of Education and Science showed examples of the framework of dialog among Central Asian countries on improving the level of technical vocational education and training supported by the EU.

Expectations of JICA include for training equipment, particularly vehicle maintenance and agricultural machinery support, from the Ministry of Labor and Social Protection and updating and adding training equipment including textile machines and support for instructor retraining program from colleges.

5.4.3. Survey Visit Results

(1) Technical industrial College

This school originates from one established in 1963 by uniting nine schools attached to textile

factories. At the time, it was appointed to train professional skills for state-owned textiles and sock manufacturing factories but after independence, the role changed to cooperate with human resource requests from industry. Currently it is operated under the jurisdiction of the Ministry of Education and Science and the Ministry of Industry and New Technologies.

There are nine courses such as weaving, textile, sewing, etc. and students have two years of education and training on admission from 9th grade of general school, one year of education and training for 11th grade graduates and take an internship for about a month in the second half of the year. Currently, 425 students are studying, under a total of 36 teachers overseeing classroom studies and 22 practical instructors in charge of practice. The school site is located in the periphery of the city of Doshanbe and set up in part of the premises of a major textile factory, which has been a partner right from the start. Building facilities were presumably continued from the time the school was first established and were observed as barely functional.

Most of the collaboration with the industrial sector is occupied by interaction with the textile factory. The factory used to hold 9000 employees, and even now, 2,500 still work there. Many of the graduates gain employment, while school and the factory maintain close relationships, such as officers attending graduation examination. Conversely, the school also cooperates with 28 textile companies in Tajikistan.

About 200 students graduate each year, of whom 50 to 60% get employed, 20% proceed to higher education and 20 to 30% go outside the country seeking jobs, in Russia, Kazakhstan, Germany, Italy, Korea etc.

(2) Dushanbe Polytechnical College

This school was established in 1997; integrating the then three technical colleges and now trains technical and sales specialists in classroom study, practical skills training and internships. It is blessed with relatively old but steady building facilities in the educational district. A total of 35 courses are provided in five faculties covering sectors such as construction, power and communication, machine manufacturing, furniture, IT, radio TV maintenance. Students are enrolled after graduating from the 9th or 11th grade of general education and take training courses of four or two years, respectively. There are currently 1,717 students.

The school staff is 302, including 124 teaching staff, 40 of whom female. The average age of the teaching staff is between 35 and 40, but somewhat older people are also seen in classrooms at times. Instructor retraining is performed intensively by the Ministry of Education and Science and compulsory every five years.

A small-scale manufacturing and sales business division called Techno Park was founded in the school to develop business in the furniture field, with students observed as very active in this division during the site visit. China has supported efforts to equip this division.

Expectations for JICA included those related to the practical skill structure of 1) Techno Park expansion, 2) exchange program for students and instructors, 3) preparation of the chemistry course, car diagnosis service course, road construction technology course and furniture design manufacturing course.

5.4.4. Issues and Prospects of TVET

(1) Poor practical training education

Though cases involving observation of equipment and its storage at school were limited, a relatively clear trend of poor practical training education emerged. Although schools themselves recognized the importance of such practical training, there was very little touching and handling of equipment in the actual class rooms and laboratories except for textile courses. The equipment was very old and much of it was used in the 1960s and 1970s, making it difficult to find at current company sites and rendering it unsuitable for training. Under these circumstances, it cannot be said that teachers or practical instructors have sufficient knowledge and skills to train. Remedial efforts are required.

(2) Unsettled system of vocational technical education and training

Through visit surveys and related literature surveys of relevant parties, it was still felt that the system of vocational technical education and training and its implementation remained unsettled. There are cases involving fluctuation of school names, learning periods, etc. and a lack of unification for those basic items. Further efforts are required to assess the clarity and thoroughness of the system.

(3) Lack of human resource needs

In the days following the collapse of the Soviet Union and independence and also throughout the process of a long civil war, the size of the domestic industry has shrunk, HR needs have declined and the supply from the education sector has become excessive. For students engaged in education and training, it is difficult to see the bigger picture of goals ahead of efforts at school and difficult to retain motivation for studying. Despite the lack of any short-term solution, efforts must continue.

5.5. Donor Assistance in the Industrial Human Resource Development Field

5.5.1. Overview of Donors in the Education Sector

The World Bank just started its High Education Project, an initiative to support education reform and the capacity development of higher educational institutions. The Aga Khan Development Network and USAID have been supporting the establishment of the University of Central Asia in Tajikistan, Kyrgyz, and Kazakhstan.

ADB and GIZ have both been providing support for a long period in TVET development, though GIZ completed its project in Tajikistan in 2016. ADB runs a “Strengthening TVET Project” in partnership with the Ministry of Labour in order to achieve a demand-driven, quality-assured, flexible TVET system that responds to labor market needs while strengthening CBT curriculum, TOT, infrastructure, and industry-academia collaboration. The Aga Khan Development Network is operating a vocational training center in Khorog city and promoting employment and entrepreneurship in mountain regions.

5.5.2. Overview of Donors in the Industrial and Private Sectors

Many donors are supporting agriculture in Tajikistan, one of the major sectors in the country. UNDP conducts a comprehensive rural development project with an integrated approach focusing assistance to rural infrastructure, agricultural value chains, vocational training, SMEs, micro finance, health, OVOP, and community mobilization from the viewpoint of poverty reduction. The Aga Khan Development Network and USAID are implementing a sustainable rural development project at the border communities of Afghanistan. USAID also conducts an agri-economic development project targeting rural farmers and entrepreneurs.

In private sector development, SDC has supported local enterprises in textile and clothing sectors to find potential markets in Europe, while GIZ continues to support local private sectors in the Project on Framework and Finance for Private Sector Development in Tajikistan. EBRD provides consultation services for MSMEs through international and local consultants in all of the countries of central Asia.

5.5.3. Current Donors' Information

The fields of support from each donor in Tajikistan can be found on the following donor map.

Table5-9 Donor Map

Donor	Industry sector	Education sector		Other Priority Sectors
		Higher education	Technical training education	
Aga Khan Development Network	<ul style="list-style-type: none"> Tourism - Improve service of the Serena Hotel Microfinance provided in mountainous areas 	University of Central Asia Support (Global Environmental Science, Economics, Cultural Heritage, Development Studies)	<ul style="list-style-type: none"> Vocational training center support (Koguro) Learning Center (Bijuku, Kolog) Business training English training IT training 	<ul style="list-style-type: none"> Primary and Secondary Education Village development Health Residence Emergency humanitarian assistance Tourism Energy Microfinance Cultural protection Civil society
ADB			<ul style="list-style-type: none"> Development of CBT curriculum and textbooks ToT Collaboration with industry Clean Energy 	<ul style="list-style-type: none"> Transportation Energy Agriculture Finance
EBRD	Conduct consultation service for MSMEs			
GIZ	Regional private sector support (Framework and Finance for Private Sector Development)	Professional education and vocational training in Central Asia (2010-2018) Agricultural food processing and job training support for Kazakh, Kyrgyz, Tajik		<ul style="list-style-type: none"> Health Economic development Water resources Governance Environment and climate change
SDC	<ul style="list-style-type: none"> Fiber / clothing export support project Private sector support 			<ul style="list-style-type: none"> Health Private Sector Finance Economic development
UNDP	<ul style="list-style-type: none"> Comprehensive development project on agriculture · rural areas (poverty reduction) Rural economy Value chain Rural infrastructure Job training Microfinance Health 			<ul style="list-style-type: none"> Governance HIV / AIDS Medical Disaster prevention Environment and sustainable development
USAID	Agricultural entrepreneurs and entrepreneurs Agricultural economic development targeting Support	<ul style="list-style-type: none"> Funding for the University of Central Asia 		<ul style="list-style-type: none"> Primary and Secondary Education Agriculture Food security Democratization Human rights, governance Health Water resources
World Bank		Strengthening of university organizations, educational reform, evaluation / monitoring (Higher Education Project)		<ul style="list-style-type: none"> Energy Environment Water resources Finance

(1) Aga Khan Development Network (AKDN)

The Aga Khan Development Network (AKDN) has been stationed in Tajikistan since 1993 and has implemented assistance for the education sector since 1998. Its major areas of assistance are primary and secondary education and early childhood education. In primary and secondary education, AKDN has promoted participatory school management by encouraging teachers, parents, and communities to take part in school management committees in order to strengthen the quality of education in rural communities. The approach was approved as a model case by the Government and extended to other regions. In the area of early childhood education development, AKDN helped increase the rate of pre-school enrollment by conducting awareness-raising activities in the targeted areas⁸².

In the field of higher education, AKDN has supported the establishment of the University of Central Asia (UCA), a school that started operating in Khorog city, Tajikistan in 2016. UCA's mission is to promote the social and economic development of Central Asia, particularly its mountain societies, while helping different peoples of the region preserve their rich cultural traditions and heritages as assets for the future. New UCA campuses are or will be located in Khorog city, Tajikistan, and Naryn city, Kyrgyz (from 2017) and Tekeli city, Kazakhstan (from 2019). The areas of study are comprehensive, covering computer sciences, media, economic, engineering, etc. New Bachelor courses on Cultural Heritage and Social Resilience, Economic Livelihoods, Natural Resource Management, and Land Management are established at the Khorog campus, with plans to launch and Master and PhD courses going forward.

An AKDN vocational training school operated at the Khorog campus provides one year apprenticeship training courses on construction, carpentry, bricklaying-masonry, plastering, plumbing, and automotive electronics. It also conducts short-term courses on computer operation, tour guiding, gardening, and English language to meet the needs of local economies in the mountainous region.

UCA also operates Learning Centers for continuing education in Dushanbe and Khorog city, with a present enrollment totally of 1,200 trainees. Short-term courses on starting businesses, entrepreneurship, computers, TOEFL, and TOEIC are offered in both daytime and evenings classes for job-seekers, students, and person currently in service. The JICA Japan Human Resource Development Center of Kyrgyz has supported SME Management Courses at the Dushanbe Learning Center, as well as a program to help youth write out their own business plans.

⁸² The enrollment rate in the target areas of the AKDN Early Childhood Development Project increased from 9% to 53%.

In addition, AKDN provides scholarships for Tajikistan students to study in Russia, Kazakhstan, and other countries. Two hundred bachelor students have received scholarship funds under the program since 1998.

(2) Asian Development Bank

According to the ADB Country Partnership Strategy till 2020, 80% of the current portfolio focuses on infrastructure in the transport and energy sectors and the remaining 20% focuses on the agriculture and finance sectors. ADB Tajikistan has continued to support TVET reform in education sector development.

The Strengthening TVET Project⁸³ conducted in partnership with the Ministry of Labour continues to pursue a demand-driven, quality-assured, flexible TVET system responsive to labor market needs (Budget: 4 million US dollars). The following are the outcomes of the project:

- 1) The project will develop competency-based standards (CBT) and assessment tools aligned to an adapted European qualification framework. CBT curricula and gender-sensitive learning materials will be developed, and competency assessors for 17 occupations will be trained.
- 2) Upgraded physical learning facilities of selected TVET institutions. The project will also incorporate energy-efficient features such as renewable energy generation equipment and energy-efficient lighting in selected institutions.
- 3) Improved access to quality programs. The project will develop an in-service TVET teacher training plan, cultivate competencies in student-centered training delivery, and impart practical skills in technology areas through internships.
- 4) Strengthened governance and management. The project will help establish industry advisory committees and working groups in the five priority sectors.

To expand the outcome and contribute to increase employability, an ADB plan to continue TVET assistance in the year of 2019/2020 with 50 million US dollars is under appraisal. ADB is also planning the “Inclusive Education for Good Jobs” project, a new project that might include higher education institutions, for the year 2019. A labour market survey covering all regions will soon be published as baseline data.

(3) EBRD

EBRD Tajikistan is implementing consultation services for MSMEs with funding from the European

⁸³ Asian Development Bank, Strengthening TVET Project, <https://www.adb.org/sites/default/files/publication/214621/taj-strengthening-tvet.pdf>, (accessed June 1, 2017).

Union under an internationally common scheme for EBRD.

There are two types of consultants, one local and the other international. The scope of work of the local consultants includes business administration, finance, and marketing, over a 3-month period. The international consultants are responsible for highly specialized areas such as ISO and conduct consultation for a period of around 18 months.

(4) GIZ

GIZ has been assisting TVET development since the independence of Tajikistan in the early 90's. Starting with women's training in sewing and gardening, GIZ began launching TVET system reforms from 2008⁸⁴. Up to its completion in 2016, the project promoted the development of NQF, OS, and corresponding curriculum with help from the Ministry of Labour, Ministry of Education, instructors, a taskforce team from industries, and others. The project developed and operated standards for graduate qualification certification and supported the adaptation of international occupational qualification standards in the country.

Meanwhile, a Project on Professional Education and Vocational Training in Central Asia (2010-2018)⁸⁵ has been operating on a regional basis for the development of agricultural food processing and vocational training in Kazakhstan, Kyrgyz, and Tajikistan.

In the field of economic development, a project on Framework and Finance for Private Sector Development in Tajikistan (2011-2020)⁸⁶ continues to support private sectors in local areas in partnership with Ministry of Economy Development and Trade. In addition, a project to "Support to Regional trade in Central Asia"⁸⁷ (2014~2019) is ongoing in four target countries (excluding Turkmenistan) in Central Asia. The project takes three core approaches: i) Single Window or One Stop Shops, ii) Reform of the quality management infrastructure for foreign trade, iii) Development of regional consultation and coordination mechanisms.

(5) Swiss Agency for Development and Cooperation (SDC)

SDC began extending assistance to Tajikistan in 2003. Recently it has been intervening in Tajikistan in four main domains: health, water supply, legal reform, and private sector development.

⁸⁴ GIZ, Supporting Reform of the TVET System, <https://www.giz.de/en/worldwide/15436.html>, (accessed June 1, 2017)

⁸⁵ GIZ, Professional education and vocational training in Central Asia, <https://www.giz.de/en/worldwide/14054.html>, (accessed June 1, 2017).

⁸⁶ GIZ, Framework and Finance for Private Sector Development in Tajikistan, <https://www.giz.de/en/worldwide/15139.html> (accessed June 1, 2017).

⁸⁷ GIZ, Support to Regional Trade in Central Asia, <https://www.giz.de/en/worldwide/14062.html>, (accessed June 1, 2017).

SDC Tajikistan supports MSMEs both with their finances and administration. SDC supports capacity development of the public financial sector in partnership with IFC, EBRD, and the World Bank in the area of micro finance. It also supports business administration capacity development in financial management and export promotion.

In the Strengthening of Export Competitiveness in the Textile and Clothing Sector Project (2013-2016, Budget: CHF 2,140,000), supports are extended to help local enterprises in the textile and clothing sectors find potential markets in Europe. The project provides training in manufacturing and design, along with opportunities to set up shops for exhibition in the European market.

SDC hunts for export potential in the tourism, handicrafts, and organic cotton sectors and finds ways to support these sectors with soft skills such as marketing and the development of sale channels. Another current program, the Private Sector Development Program (2016-2020), is focusing on the same sectors, with the following expected outcomes:

- Strengthen collaboration between the textile and clothing sectors
- Develop markets for textiles and clothing with products with strong export competitiveness
- Grasp market needs in the tourism and handicraft sectors

Under its Cooperation Strategy over the next four years, Switzerland will continue its activities in the same areas of finance and SME development with a focus on supporting the private sector – including competitive MSMEs – through Swiss cooperation, and diversification to create quality jobs, inclusive and sustainable economic growth, and ultimately help reduce poverty. The key interventions to achieve this goal are: i) creating conducive business environments; ii) establishing well-regulated financial/microfinance sectors; iii) facilitating know-how, capital, and access to international and regional markets; iv) supporting local economic development and value chains, including those in energy-efficient areas.

(6) UNDP

In the field of poverty reduction, UNDP has implemented “Livelihood Improvement of the Rural Population in Nine Districts of Tajikistan” (2014-2017, Budget: 6.7 million US dollars) and taken an integrated approach with assistance to rural infrastructure, agricultural value chains, vocational training, SMEs, micro finance, health, OVOP, and community mobilization. Concepts of inclusive business, the economic empowerment of women, and TVET for rural youth are also considered. The UNDP projects on poverty reduction have had the following outcomes:

- The Community Project now reaches 2/3 of the country;

- Helped elaborate the National Development Strategy of the Republic of Tajikistan for the period 2016-2030 and Mid-term Development Program of the Republic of Tajikistan for the period 2016-2020;
- 42 out of 67 districts have elaborated their District Development Programs;
- The concept of a Trust Fund Mechanism was introduced as a means for channeling various resources to address local priorities.
- Improved access to microcredits gave more than 160,000 (40% women) members of the rural population opportunities to start up businesses;
- More than 1,257 (53% women) unemployed members of the rural population (youth, women, and people with disabilities) attended vocational training.

The “Project on the promotion of the Agenda 2030 and operationalization of the SDGs at the national and sub-national levels in Tajikistan” (2016-2017, Budget: 112,110 US dollars) is a policy intervention focused on the Ministry of Economic Development and Trade, Ministry of Education, and other ministries to provide advice on how to implement the State Development Strategy 2030. UNDP also gives advice on the National Action Plan for SDGs to make an integrated development policy for Tajikistan.

“Wider Europe: Aid for Trade for Central Asia, Phase III “(2014-2020, Budget: 2.9 million US dollars), an initiative to support regional trade in Central Asia with collaboration from Finland, is ongoing in the field of economic development.

Besides poverty reduction, the prioritized areas of assistance of UNDP Tajikistan are governance, HIV/AIDS, health, disaster risk management, and environmental protection⁸⁸.

(7) USAID

USAID is mainly working to promote primary education and improve illiteracy. USAID is currently implementing a “Read With Me Project” (2016-2020, Budget: 19,447,483 US dollars) aligned with the Ministry of Education and Science to reform the education sector as outlined in the National Strategy for Education Development (2012-2020) and the Mid-Term Development Strategy (2016-2020). Over the five years of programming, the project will work with 75% of schools nationwide to improve reading comprehension outcomes while supporting out-of-school reading activities by engaging families, communities, and the private sector. The project will prioritize gender integration and inclusive education for children with disabilities in all of its activities.

⁸⁸ UNDP in Tajikistan, Overview, <http://www.tj.undp.org/content/tajikistan/en/home/operations/projects/overview.html>, (accessed June 1, 2017).

In the area of higher education, USAID is financially supporting the University of Central Asia with Aga Khan Development Network. (For details, see (1) Aga Khan Development Network).

USAID is also working with the Aga Khan Development Network on the Economic and Social Connections (2014-2019, Budget 12,069,642 US dollars)⁸⁹. This global development alliance, with 50/50 financing from USAID and the Aga Khan Foundation, strengthens regional stability and growth by promoting sustained improvements in the quality of life for people living along the Tajik border with Afghanistan. It works across sectors such as economic growth, improved governance, and improved access to health and education services.

Since USAID has identified Tajikistan mainly as an agricultural country, it focuses most closely on agriculture and economic development projects in Tajikistan and supports small and middle enterprises in the agriculture sector⁹⁰. In the Competitiveness, Trade, and Jobs in Central Asia – Facilitation of Agricultural Exports and Employment Project (2016 – 2021), a market-oriented approach is applied to support agro-business, food processing, marketing, rural finance, and export strategy.

In the field of agriculture development, the Feed the Future Tajikistan Agriculture and Water Project (2015-2018, Budget: 11,235,625 US dollars) is designed to improve the nutrition of children under two years and women of childbearing age by increasing the production of nutritious foods. Key components include activities to improve: agricultural extension services, extended-season vegetables, orchards, dairy, and irrigation water management. Efforts focus on increasing the production and consumption of crops and livestock products high in vitamin A, iron, zinc, and animal proteins to address the problems of stunting and wasting in children of the target region.

(8) The World Bank

The World Bank just launched a “Higher Education Project”⁹¹ in 2017, an initiative targeting the capacity development of higher education institutions and reform of the educational system in Tajikistan. This is the World Bank’s first step to support higher education in Central Asia, both in Tajikistan and Uzbekistan. The project encompasses three components:

- Goal: Capacity development of higher education institutions and reform of the educational system

⁸⁹ Outcomes: TOT on CTB was conducted at 836 primary and secondary schools; 15 cooperatives received technical and financial assistance; 17 financial service centers were set up; and potential dairy and fruit processors were identified.

⁹⁰ USAID, Agriculture and food security, <https://www.usaid.gov/tajikistan/agriculture-and-food-security> (accessed June 1, 2017).

⁹¹ World Bank, Detailed Project Description TAJIKISTAN: Higher Education Project, 2017.

- Budget: 15 million US dollars
- Duration: 2017~2022

Component 1: Institutional-level Improvements (12.7 million US dollars)

Sub-component 1.1: Just-in-Time Grants to Re-/Up-Skill Workforce

Sub-component 1.2: Competitive Grant Program for Universities

Component 2: System-Level Interventions (1.7 million US dollars equivalent)

Sub-component 2.1: Quality Assurance Enhancements

Sub-component 2.2: System-wide Higher Education Curriculum Reform

Sub-component 2.3: Assessment of Higher Education Financing

Component 3: Project Management, Monitoring, and Evaluation (0.5 million US dollars equivalent)

Besides higher education, the prioritized areas of World Bank assistance for Tajikistan are energy, environment, finance and water management⁹². In the education sector, early childhood education is also considered a focal point for future assistance.

⁹² World Bank Tajikistan, All Projects, <http://www.worldbank.org/en/country/tajikistan/projects/all>, (Accessed June 1, 2017).

5.6. Analysis of Contents of Support by Japan

This chapter confirms the "development policy" by Tajikistan, Japan and other donors. Also, "Industrial Human Resources Needs", "Outline of Education Sector", "Science and Technology Higher Education Organization", "Vocational Technical Education and Training (TVET)", "Support by Other Donors " and the development policy will be extracted. Among these issues, we examined what is to be prioritized and the resources of Japan that contribute to solving the problem, and summarized it as a solution approach.

5.6.1. Tajikistan Policy

5.6.1.1. Tajikistan's National Development Strategy

As stated in "5.1.2 Industrial Promotion and Prioritized Industrial Areas of Tajikistan", Tajikistan's policy from 2016 to 2030 "National Development Strategy of Tajikistan for the period to 2030" shows the priority areas to achieve as the following table.

Table5-10 Priority Areas in Tajikistan Development Plan

1) Ensure energy security and the efficient use of electricity
2) Overcome communication bottlenecks and turn country into a transit hub
3) Ensure food security and people's access to good quality nutrition
4) Expand productive employment

Reference: National Development Strategy of Tajikistan for the period to 2030

In addition, the transportation industry, telecommunications industry, agriculture, water-related industry, and SMEs are all cited as the promotion industry.

5.6.1.2. Participants invited from Japan to Tajikistan

The following table shows the affiliation of participants from Tajikistan.

Table5-11 Name of the Organization Invited

1st invitation to Japan (February 2016)	2nd invitation to Japan (March 2017)
Presidential office, Infrastructure development department	Ministry of Industry and New Technology
Energy Water Resources Power Engineering Bureau	Tajik Technical University named after academic Osimi
Industry New Technology Ministry Ministry of Construction and Industry	Technological University of Tajikistan

5.6.2. Assistance Policy to Tajikistan

5.6.2.1. Japan's Country Assistance Policy

The content of support in Japan is based on the framework of the country-specific aid policy (Tajikistan Country Assistance Policy was formulated in May 2012), the development policy (plan) set by each country and “Central Asia + Japan” dialogue⁹³. In the dialogue, five issues were extracted which were common to Central Asia regional cooperation, which are “Trade and Investment (including agriculture)”, “Environment, Energy Conservation and Renewable Energy”, “Millennium Development Goals (MDGs) Achievement and Disparity Correction”, “Afghanistan for Stabilization Cooperation”, “Cooperation for Disaster Prevention “ and “ Disaster Prevention Cooperation”.

Table5-12 Tajikistan Country Assistance Policy (formulated in December 2012)⁹⁴

Basic policy (large goal)	Support for nation-building allowing sustainable economic and social development		
Priority field (medium target)	Rural development		
Development issue (Small target)	Improvement of the water supply	Improvement of the healthcare system	Rural development / industry promotion
Current situation and issues	The water supply rate in rural villages is only about 60%. In addition, there is no proper water treatment, even in areas where the water supply system is maintained, and the water supply situation is poor. There is an urgent need to develop a water supply system to support people's lives and safety.	Mortality rates of infants and pregnant women are remarkably high (Infant mortality rate 34 / 1,000, Mortality rate of children under 5, Infant mortality rate 43 / 1,000, Maternal mortality rate 65 / 100,000). In the Tajikistan national healthcare policy, the task improvement program, the following items are emphasized: 1. Reducing the infant mortality rate 2. Reducing the maternal mortality rate 3. Taking measures against infectious diseases.	Although agriculture accounts for 20% of GDP and about two thirds of the working population, there is a brain drain of rural residents overseas due to the lack of employment opportunities and low income. Therefore, revitalization of rural areas is a challenge directly linked to poverty measures. Industry promotion is expected to stimulate economic growth, hence the need to focus on training small and medium enterprises and promote foreign investment.
Japan's response policy to development	In the provinces of Tajikistan, focusing on areas where access to safe water is restricted.	Improving health services by constructing medical facilities in rural areas, strengthening	To promote the private sector centered on agriculture, while cooperating with

93 Ministry of Foreign Affairs “Central Asia + Japan” Dialogue - Decade Road (2014) ,<http://www.mofa.go.jp/mofaj/press/pr/wakaru/topics/vol117/index.html> (accessed June 1, 2017).

94 Ministry of Foreign Affairs ‘Tajikistan Country Assistance Policy’ <http://www.mofa.go.jp/mofaj/gaiko/oda/files/000072288.pdf>, (accessed: June 1, 2017).

issues		health-related educational activities, improving healthcare workers' capacity and supporting measures to reduce the mortality rate among pregnant women and infants.	neighboring countries, it will help revitalize the domestic economy from rural areas centering on agricultural infrastructure development.
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Priority field (medium target)	Improving the economic infrastructure		
Development issue (Small target)	Harmony with the environment Energy countermeasures	Transportation sector maintenance	
Current situation and issues	Although Tajikistan has abundant water resources, it cannot optimally exploit the potential of hydroelectric power generation, while in winter, the daily electrical supply lasts about four to six hours, particularly in rural areas. In addition, significant power is lost due to the deterioration of transmission networks / facilities.	Tajikistan is located at the nodal point of Central and Southern Asia and the Middle East region, but the transport network connecting these regions remains undeveloped. Also, for inland Central Asian countries, it is important to facilitate access to the Indian Ocean via Tajikistan and a priority regional economic revitalization task. Accordingly, there is a need to improve repair and maintenance capability centering on roads.	
Japan's response to development issues	Consider formulating cooperation projects in small hydropower generation and other renewable energy fields while focusing on the relationship with neighboring countries.	Continue cooperating with efforts to improve the logistics network, which is currently being repaired with the Kurgan Tyube - Dusti - Nizhniy Pyandzh Road as the core and also focusing on maintenance and refurbishment. Also consider cooperation through collaboration with ADB.	

Priority field (medium target)	Other		
Development issue (Small target)	Capacity-Building	Measures against Terrorism and Narcotics	Reconstruction assistance
Current situation and issues	During the civil war in the 1990s, since many of the talented people who took over at the center of public and private sectors have already left the country, there is a shortage of human resources responsible for nation-building. Accordingly, Tajikistan needs human resource development to promote initiative-oriented nation-building	Tajikistan borders Afghanistan and border control was transferred from the Russian border guard in 2005 but the present system is weak and seeking support for capacity-building related to the following priority issues: 1. Create barriers to criminal society and provide a suitable environment for people and	Tajikistan has ratified the Ottawa Treaty, under which it has a duty to promptly complete the removal of 10 to 200 thousand domestic buried landmines laid down during the civil war by 2010, but the deadline imposed by the mine removal obligation led to 360 casualties by 2010, hence the deadline for the treaty extension was extended to 2019.

		goods traversing immigration offices 2. Strengthen management related to drug smuggling 3. Prevent intrusion of armed groups (terrorists) 4. Prevent the invasion of illegal immigrants	Also, in distant and mountainous areas of Tajikistan, there are many inaccessible areas, where no support from any donor or any more than a few is possible
Japan's response policy to development issues	Enhance administrative organizations through grant aid and capacity-building of administrative officials through training projects	Also in the joint statement released at the time of Prime Minister Shinzo Abe's visit in 2015, the importance of cooperation in the fields of border control and drug abatement was highlighted. In particular, to strengthen customs functions etc. at the border with Afghanistan and strengthen capacity-building on measures against narcotics	Support grassroots and human security grant aid that will contribute to human security. In particular, from the perspective basic human life and human security, there are considerable benefits at grassroots level and activities, supporting particularly those boosting the high aid effect of small-scale support, should also be supported

5.6.2.2. Support Policies and Strategies of Other Donors⁹⁵

In the higher education field, the World Bank will start a project to support a university organization strengthening and promoting educational system reform. The Aga Khan Development Network also supports the establishment of the University of Central Asia (UCA) to promote socioeconomic development in the mountainous regions of Central Asia and preserve the rich cultural heritage of Tajikistan, Kyrgyz and Kazakhstan. In the TVET field, ADB, which has long supported education, is implementing "TVET Enhancement Project". GIZ ended up supporting TVET reform in 2016.

Regarding the industrial sector, UNDP is implementing agricultural and rural development projects from a poverty reduction perspective. The USAID also supports agricultural economic development for agricultural and other entrepreneurs.

⁹⁵ See Table 5-9 Tajikistan Donor Map

5.6.3. Analyzing Issues related to Advanced Industrial Human Resource Development

5.6.3.1. Problem Analysis

The problems are extracted based on the information described in previous sections and compiled in the table below:

Table5-13 Problem Analysis of Advanced Industrial Human Resource Development in Tajikistan

Field		Problem		Cause	Solution
Industry sector	Policy · institution	Infrastructure maintenance	Abundant water resources are not effectively exploit.	<ul style="list-style-type: none"> · Delivery electricity network and equipment are aging. · Resources are scarce to finance infrastructure development. 	<ul style="list-style-type: none"> · Utilize new technology to boost efficiency. · Train personnel with skills.
		Tax system monetary policy	Lack of substantive monetary policy prevents appropriate taxation measures.	<ul style="list-style-type: none"> · The country is in financial difficulties. 	<ul style="list-style-type: none"> · Strengthen national monetary policy. · Build system for preferential treatment on financing
	Industry human resources needs	Industrial human resources	In private sector, talented individuals with managing skill are lacking. Engineers who entrusted with direct production activities are lacking.	<ul style="list-style-type: none"> · State-owned enterprises occupy major domestic industries. · Private companies are not nurtured industry-wide. · Little access to loans and investment institutions. 	<ul style="list-style-type: none"> · Train farmers in technology to produce fruit and vegetables utilizing high-quality greenhouse cultivation techniques. · Train entrepreneurs with technology and skills and management and financial expertise.
		Technicians and professional engineers with basic knowledge	Many young engineers went to work in Russia and elsewhere and domestic effort has slowed.	<ul style="list-style-type: none"> · No domestic industries sought by young people. · No opportunity to pass on technology and skills. 	<ul style="list-style-type: none"> · Train mid-level engineers in fields such as construction, civil engineering and electric power with basic engineering knowledge.
Education sector	Policy · institution	Compliance with international standards	The Soviet-style traditional education system remains and is a process that conforms to modern European and international	<ul style="list-style-type: none"> · The implementation of national educational policy is delayed. · No cooperation system between educational institutions has been established and the exchange of 	<ul style="list-style-type: none"> · Educate talented persons using scholarships such as Erasmus + to construct education systems to Western standards. · Reflect this issue in the next policy

			standards.	information and opinions among educational institutions has stalled. <ul style="list-style-type: none"> The spread of English education is not advanced in all educational institutions. 	document action plan. <ul style="list-style-type: none"> Establish a forum to exchange opinions among educational institutions. Strengthen English language education for educators.
		Industry-academia collaboration	Industry-academic collaboration is not progressing systematically.	<ul style="list-style-type: none"> There is a lack of cooperation between the Ministry of Education and Science and the Ministry of Economy in a vertically-divided administration. Industry-academia collaboration is left to the self-help efforts of educational institutions. Educational institutions cannot fully analyze industrial needs. 	<ul style="list-style-type: none"> Strengthen the implementation of industry-university collaboration policy and strengthen collaboration among ministries and agencies. Certify universities and vocational training schools that are undertaking advanced initiatives as good practice model schools. Also promote the exchange of information among institutions. Research industrial and labor market needs.
		Business incubation	The university technology park concept has not yet been realized.	<ul style="list-style-type: none"> There is no mechanism to promote collaborative research between educational institutions and companies. There are few venues for official discussion between industry and higher education institutions. 	<ul style="list-style-type: none"> Spearhead the creation of mechanisms to promote collaborative research with industry. Establish regular councils and working groups.
		IT education	Within rural areas in particular, many educational institutions lack IT infrastructure and equipment.	<ul style="list-style-type: none"> No maintenance of old equipment. 	<ul style="list-style-type: none"> Develop and thoroughly maintain IT infrastructure and equipment at local educational institutions. Use them for distance education.
		Equal access to education	Within rural areas in particular, educational opportunities such as for girls and ethnic minorities remain unfair. There are few opportunities to retrain young people who drop	<ul style="list-style-type: none"> Education commensurate with actual on-site circumstances is not provided. There is a lack of awareness of the importance of education and a lack of information on educational institutions. Educational institutions corresponding to the local population remain undeveloped. 	<ul style="list-style-type: none"> Develop and certify various training courses such as short and night courses. Strengthen community publicity and educational activities. (Recognition of vocational training schools, awareness raising of primary and secondary education). Maintain and expand schools and

			out.		vocational training schools in rural areas.
		Centralized management system	The system for public management of education is overly centralized and the progress of educational reform is delayed.	<ul style="list-style-type: none"> Decentralization is stalling. The autonomy of individual educational institutions is small. 	<ul style="list-style-type: none"> Expand the responsibility of education departments at each state and district level to promote decentralization. Advance the creation of a system to expand the autonomy of educational institutions.
Higher education in general		Overseas leakage of human resources	After graduating from university, many young people go to work abroad.	<ul style="list-style-type: none"> Difficult to find domestic job vacancies. Salaries are higher for those moving abroad. Education and training in line with local economic needs are not being done. 	<ul style="list-style-type: none"> Strengthen the career guidance function of the university. Develop professional standards that match local labor market needs. Collaborate with local companies so that local workers can be promoted. Train entrepreneurs.
		Lack of expertise	Even those having received higher education, sufficient expertise is lacking	<ul style="list-style-type: none"> The contents of the curriculum are insufficient to master expertise. Professors and faculties lack sufficient abilities. 	<ul style="list-style-type: none"> Revise the curriculum and course content. Strengthen the capacity of teacher training agencies. Build a reeducation system for educators.
		Teacher's position and ability	Teachers' status is low and their ability insufficient with new needs in mind.	<ul style="list-style-type: none"> Few retraining opportunities. Salaries are low. 	<ul style="list-style-type: none"> Strengthen faculty training institutions. Build a reeducation system for educators.
		Educational Infrastructure	Facilities and equipment of universities and research institutions are poorly developed.	<ul style="list-style-type: none"> Facilities and equipment are not prepared according to industry needs. 	<ul style="list-style-type: none"> Investigate how research should respond to industry needs.
Higher education institutions in Science and engineering		Research Equipment / Facility	Suitable educational experiment / research equipment / facilities are not substantial. There is a lack of knowledge and skills to utilize such equipment.	<ul style="list-style-type: none"> Equipment is increasingly aging. Financing for new procurement is difficult. Lack of funding available to renew equipment. Knowledge of equipment / facilities remains insufficient. 	<ul style="list-style-type: none"> Establish appropriate equipment plans and procure necessary equipment accordingly.
		Technical level	Research contents are limited and it is difficult to achieve research results.	<ul style="list-style-type: none"> Equipment / facilities are aging and it is difficult to conduct adequate experiments. It is difficult to secure experimental accuracy. 	<ul style="list-style-type: none"> Secure a budget for each research theme and formulate an appropriate equipment plan.

	Technical vocational education and training (TVET)	Practical Education	Researchers lack practical skills.	<ul style="list-style-type: none"> · Unreliable student interns restrict opportunities to undergo training on actual equipment. · Since training uses traditional educational equipment / facilities 	<ul style="list-style-type: none"> · Review the curriculum and update the equipment so that the training content can correspond to the equipment actually used in the company.
		Practical Training education	Instructors lack the practical skill and knowledge.	<ul style="list-style-type: none"> · Insufficient awareness of the need for practical training · Lack of a budget to maintain equipment. · In training, to touch and operate the equipment is limited. · The equipment is also very old (dating back to the 1960s and 1970s). 	<ul style="list-style-type: none"> · Review the budget structure such as grants from the country and school expenses, Revision of the practical curriculum · Retraining of instructors.
		System of vocational technical education and training	TVET system is fluctuating.	<ul style="list-style-type: none"> · System of TVET is not established among relevant organizations. 	<ul style="list-style-type: none"> · Conduct PR on TVET. · Ensure a system of TVET to relevant organizations.
		Human resource needs	The domestic industry scale has shrunk, human resource needs are declining and the supply from the educational sector is excessively imbalanced.	<ul style="list-style-type: none"> · Undeveloped domestic industry scale. · Lack of human resource needs. 	<ul style="list-style-type: none"> · Educate and train personnel who create new companies · Develop a system to promote entrepreneurship.

5.6.3.2. Priority Issues in Training Advanced Industrial Human Resources in Tajikistan

Of the issues extracted in 5.6.3.1 above, priority issues are summarized in the table below:

Table5-14 Priority Issues

Item Number	issue	Specific content	Solution(draft)	Utilization of Japanese resources (draft)
1	Lack of industrial human resources	<ul style="list-style-type: none"> Private enterprises are short of human resources who are entrusted with companies as well as engineers who are entrusted with direct production activities 	<ul style="list-style-type: none"> Train farmers with production technology of fruits and vegetables utilizing high-quality greenhouse culture techniques. Train entrepreneurs who have technology and skills and have management and financial knowledge 	<ul style="list-style-type: none"> Implementation of technical cooperation project at agricultural university. Implementation of seminars for engineers held at the Japan Center (newly established).
2	Industry-academia collaboration	<ul style="list-style-type: none"> Industry-academia collaboration is not progressing systematically. 	<ul style="list-style-type: none"> Strengthen implementation of industry-university collaboration policy and strengthen collaboration among ministries and agencies. Certify universities and vocational training schools that are undertaking advanced initiatives as good practice model schools. Also promote information exchange between institutions. Research industrial needs and labor market needs 	<ul style="list-style-type: none"> Implementation of Japanese experts to conduct academic-industry cooperation confirmation survey (information collection and analysis) Curriculum development with industrial sector Implementation of technical cooperation projects to make advanced efforts at universities / research institutes
3	Lack of expertise	<ul style="list-style-type: none"> Even receive higher education can not acquire enough expertise 	<ul style="list-style-type: none"> Revise curriculum and course content. Strengthen the capacity of teacher training agencies. Build a reeducation system for educators 	<ul style="list-style-type: none"> Implementation of technical cooperation projects related to capacity building of educators
4	Teacher's position and ability	<ul style="list-style-type: none"> The teacher's status is low, and the ability according to new needs is insufficient. 	<ul style="list-style-type: none"> Strengthen faculty training institutions. Build a reeducation system for educators 	<ul style="list-style-type: none"> Implementation of technical cooperation projects related to capacity building of education workers.
5	Research Equipment / Equipment	<ul style="list-style-type: none"> Experimental / research equipment / facilities suitable 	<ul style="list-style-type: none"> Establish appropriate equipment plans and procure necessary equipment accordingly. 	<ul style="list-style-type: none"> Implementation of technical cooperation projects to make advanced efforts at

		<p>for education are not substantial.</p> <ul style="list-style-type: none"> · Knowledge and skills to utilize equipment are insufficient 		<p>universities / research institutes.</p> <ul style="list-style-type: none"> · Procurement of equipment for the Japan Center (newly established).
6	Technical level	<ul style="list-style-type: none"> · Research content is limited, making research results difficult. 	<ul style="list-style-type: none"> · Secure budget for each research theme and formulate appropriate equipment plan. 	<ul style="list-style-type: none"> · Implementation of technical cooperation project
7	Practical education	<ul style="list-style-type: none"> · Few opportunities to receive training by actual equipment. 	<ul style="list-style-type: none"> · Review the curriculum so that the content of the training actually corresponds to the equipment used in the company. · Update educational equipment 	<ul style="list-style-type: none"> · Implementation of technical cooperation projects related to capacity building of educators · Implementation of seminars for engineers held at the Japan Center (newly established).
8	Poor practical training education	<ul style="list-style-type: none"> · It can hardly be said that the instructor or practical instructor who teaches practical skills has adequate teaching knowledge and skills 	<ul style="list-style-type: none"> · Review the budget structure such as delivery from the country and school expenses. · Revise the practical curriculum. · Train the instructor 	<ul style="list-style-type: none"> · Implementation of technical cooperation projects related to capacity building of educators · Implementation of seminars for engineers held at the Japan Center (newly established).
9	Lack of human resources needs	<ul style="list-style-type: none"> · The supply from the education sector to human resources needs is too much relative unbalance 	<ul style="list-style-type: none"> · Educate and train personnel who start a business. · Develop a system to promote entrepreneurship 	<ul style="list-style-type: none"> · Implementation of a business course to be held at the Japan Center (newly established). · Implementation of Japanese experts to conduct industry-university cooperation confirmation surveys (information gathering and analysis).

5.6.4. Selected Approaches to Solve Priority Issues in Advanced Industrial Human Resource Development in Tajikistan

As described in 5.6.3.2, result of extracting the priority issues for developing advanced industrial human resources in Tajikistan, there is a great need for improvement of the environment for entrepreneurs' support, raising of basic industry related technology, and raising of academic ability to foster industrial human resources confirmed. In order to contribute to these cases, we propose the following three approaches. However, the needs, order of priority and feasibility of the proposed approaches need to be further reviewed within JICA. Hence, the approaches below are shown rigidly as ideas.

In order to contribute to 1, 2, 5, 6, 8, 9 stated in "Table 5-14 Priority Issues", we propose the following approach utilizing Japanese resources:

Table5-15 Approach 1

Approach 1	Establishment of Japan Center aiming to train industrial human resources
Objective	➤ Diploma of mini-MBA and PLC engineers issued by Japan Center is certified
Output	<ul style="list-style-type: none"> ➤ Business graduates (Mini-MBA) is fostered. ➤ Graduates from a technical school (PLC engineers) are fostered. ➤ Graduates receive preferential treatment for loans from entrepreneurial funds
Activity	<ul style="list-style-type: none"> ➤ Establish a Japan Center ➤ Procure the necessary materials for the technical school ➤ Create a mini-MBA curriculum ➤ Create a curriculum for PLC engineers ➤ Publicize the Japan Center ➤ Do classes at a business school (Mini-MBA) ➤ Do classes at a technical school (PLC engineer) ➤ Establishes a coordination system with entrepreneurial funds
Assumed C / P organization	<ul style="list-style-type: none"> ➤ Ministry of Education ➤ Ministry of Industry and New Technology ➤ Entrepreneurial Fund
Beneficiary	➤ Tajik incumbents, college students, youth
Input	<ul style="list-style-type: none"> ➤ Japan Center ➤ Educational equipment for training PLC engineers ➤ Japanese experts

In order to contribute to 3, 4, 5, 6 and 7 described in "Table 5-14 Priority Issues", we propose the following approach utilizing Japanese resources:

Table5-16 Approach 2

Approach 2	Agricultural product increase production and supply chain capacity improvement project (for technical cooperation)
Objective	<ul style="list-style-type: none"> ➤ Soil improvement to boost agricultural yield is achieved. ➤ Harvested agricultural products are distributed on the market while maintaining quality
Output	<ul style="list-style-type: none"> ➤ Analytical instruments and agricultural equipment necessary to improve the soil is developed ➤ Soil analysis results are used to improve the soil ➤ A cooling system is introduced in the supply chain
Activity	<ul style="list-style-type: none"> ➤ Perform soil analysis using existing analytical equipment. ➤ Procure the necessary analytical equipment to improve the soil. ➤ Procure equipment for agriculture required to improve the soil. ➤ Provide training to maintain the accuracy of analytical equipment. ➤ Provide the necessary training to improve the soil. ➤ Train in logistics (transportation / storage) of agricultural products. ➤ Provide training on supply chains. ➤ Procure the materials and equipment necessary for the transport cooling system.
Assumed C / P organization	<ul style="list-style-type: none"> ➤ Ministry of Education ➤ Tajikistan Agricultural University
Beneficiary	<ul style="list-style-type: none"> ➤ Teachers and students of Tajikistan Agricultural University ➤ Farmers in Tajikistan
Input	<ul style="list-style-type: none"> ➤ Equipment for soil analysis ➤ Equipment necessary to improve the soil ➤ Equipment necessary for the cooling system ➤ Agriculture-related Japanese experts

In order to contribute to 4, 5, 8, and 9 listed in "Table 5-14 Priority Issues", we propose the following approach utilizing Japanese resources:

Table5-17 Approach 3

Approach 3	TSPU Faculty Development Teacher Training of Science and engineering Project (Technical Cooperation Project)
Objective	<ul style="list-style-type: none"> ➤ The level of science and engineering teachers trained at Tajik State Pedagogical University (TSPU) is improved. ➤ The number of students learning science and engineering has increased, enriching the body of science and engineering workers active in the nation's major industries
Output	<ul style="list-style-type: none"> ➤ Training courses for science and engineering teachers is strengthened in TSPU, reflecting industrial HR development needs
Activity	<ul style="list-style-type: none"> ➤ Revise the curriculum and training course for science and the engineering teachers ➤ Revise the teaching method used in teaching process of science and engineering ➤ Implement ToT when implementing practical lectures for TSPU teachers ➤ Implement training to develop lesson plans using new training for TSPU teachers ➤ Develop experimental and IT equipment for use in lessons ➤ Based on this revised curriculum, develop a distance education IT program to train and retrain local teachers ➤ Establish a science-based teacher training task force invited from industry
Assumed C / P organization	<ul style="list-style-type: none"> ➤ Ministry of Education ➤ Tajik State Pedagogical University (TSPU)
Beneficiary	<ul style="list-style-type: none"> ➤ Secondary and higher education institutions in Tajikistan ➤ Students of secondary and higher education institutions in Tajikistan ➤ TSPU teachers ➤ TSPU students
Input	<ul style="list-style-type: none"> ➤ Japanese experts ➤ Training equipment ➤ Training in Japan

6. Kyrgyz

6.1. Needs for Industry Human Resources

6.1.1. Present Status of Kyrgyz

6.1.1.1. Economy and Industrial Structure

Kyrgyz executed price liberalization in 1992 and also promoted radical market reform in accordance with the IMF's recommendation for fiscal consolidation. Although GDP grew in 1996 for the first time since Kyrgyz became independent, the country experienced a brief fiscal crisis in 1998, affected by the Russian financial crisis⁹⁶.

Kyrgyz's major industries are mining; centering on gold and agriculture and including animal husbandry and food processing of crops and livestock. The economy shrank in 2002, 2005, 2010 and 2012 when gold production from the Kumtor gold mine decreased.⁹⁷ Although Kyrgyz's economy grew more than 10% in 2013, the rate of growth has slowed since 2014⁹⁸.

The country is said to be largely reliant on remittances from migrant Kyrgyz workers in Russia and Kazakhstan. The country is said to be largely reliant on remittances from migrant Kyrgyz workers in Russia and Kazakhstan⁹⁹.

6.1.1.2. Overview of the Economy

The following tables show overviews of the current basic economy and industries.

Table6-1 Trend of the Kyrgyz Economy¹⁰⁰

	2012	2013	2014	2015	2016
Real GDP (in billions)					
Som	33.04	36.65	38.12	30.44	40.32
USD ¹⁰¹	0.49	0.54	0.56	0.45	0.59
Nominal GDP (Billions of USD)	6.61	7.33	7.47	6.65	5.79
Per- capita GNI ¹⁰² (USD)	1,040	1,220	1,260	1,170	-----
Fiscal balance (% of GDP)	▲5.86	▲3.70	1.87	▲1.17	▲4.51
Economic growth rate (%)	▲0.90	10.92	4.02	3.47	2.21

⁹⁶ Ministry of Foreign Affairs: The basic data of Kyrgyz, <http://www.mofa.go.jp/mofaj/area/kyrgyz/data.html>, (accessed June 1, 2017)

⁹⁷ The factors of decrease in amount of production at Kumtor gold mine are accident and labour dispute.

⁹⁸ The slowdown after 2014 relates with the slowdown of China economy.

JETRO, <https://www.jetro.go.jp/biznews/2013/03/5152b16c088b8.html>, (accessed May 31, 2017)

⁹⁹ Ministry of Foreign Affairs: The basic data of Kyrgyz, <http://www.mofa.go.jp/mofaj/area/kyrgyz/data.html>, (accessed June 1, 2017)

¹⁰⁰ IMF, World Economic Database, <https://www.imf.org/>, (accessed March 31, 2017)

¹⁰¹ XE quick cross rate, <http://www.xe.com/>, (accessed May 13, 2017), 1 US dollar= 67.8289 Som

¹⁰² World Bank, <http://data.worldbank.org/>, (accessed March 31, 2017)

Table6-2 Trend of Industry (% of GDP) ¹⁰³

	2012	2016	Principal products
Primary industry	20.2	17.9	Cotton, potatoes, vegetables, grapes, fruit, wool
Secondary industry	27.3	25.9	Small machinery, apparel, food processing, cement, shoes, textile products, furniture, electric motors, gold, rare earth metals
Tertiary industry	52.5	56.2	-----
Industrial production growth rate ¹⁰⁴	10.0	0.0	-----

Table6-3 Trade Indicators (Billions of USD)

	2012	2013	2014	2015	2016
Export ¹⁰⁵	1.89	2.01	1.88	1.68	-----
Import ¹⁰⁶	5.37	6.07	5.73	4.07	-----
Principal trade items ¹⁰⁷	Export	Gold, cotton, apparel, wool, meat, mercury, uranium, electricity, machinery, shoes			
	Import	Oil, gas, machinery and equipment, chemical products, food			
Principal trade counterparts ¹⁰⁸	Export	Switzerland: 26%, Uzbekistan: 22.6%, Kazakhstan: 20.8%, UAE: 4.9%, Turkey: 4.5%, Afghanistan: 4.5%, Russia: 4.2%			
	Import	China: 56.4%, Russia :17.1%, Kazakhstan: 9.9%			

6.1.2. Industrial Promotion and Prioritized Industrial Areas of Kyrgyz

6.1.2.1. National Policy

Kyrgyz formulated a new mid-term plan for 2012 onward following the establishment of a new government in 2011 and since 2013; the government has been implementing policies in accordance with the “National Sustainable Development Strategy 2013-2017”.

6.1.2.2. Industry Promotion Policy

Under the “National Sustainable Development Strategy 2013-2017”, the agriculture, energy, mining, transportation, communication, tourism and service sectors are listed as priority sectors.

¹⁰³ CIA, The World Factbook, <https://www.cia.gov/library/publications/the-world-factbook/geos/xx.html>, (accessed March 31, 2017)

¹⁰⁴ Industrial growth rate follows the definition of CIA, The World Factbook, <https://www.cia.gov/library/publications/the-world-factbook/geos/xx.html>, (accessed March 31, 2017)

¹⁰⁵ United Nations Conference on Trade and Development, <http://unctad.org/>, (accessed March 31, 2017)

¹⁰⁶ Ibid.

¹⁰⁷ JETRO, “Overview of countries in Central Asia”, https://www.jetro.go.jp/ext_images/world/russia_cis/outline/centasia_20160411.pdf, (accessed: March 31, 2017).

¹⁰⁸ CIA, The World Factbook, <https://www.cia.gov/library/publications/the-world-factbook/geos/xx.html>, (accessed March 31, 2017)

In the document, the “Governmental Plan for Export Development of the Kyrgyz Republic for 2015–2017”, the export potential of industries is analyzed as follows. It shows that the Kyrgyz government places a focus on industrial development of the industries that have a high export potential.

Table6-4 Export Analysis

Socio Economic Impact	Export potential		
	Low	Medium	High
High	-----	• Tourism	• Articles of apparel
Medium–high	• Handicrafts	• Edible fruits, nuts and vegetables • Dairy products	• Processed fruits and vegetables • Bottle of Mineral waters
Medium	-----	• Information technology services	• Cotton
Low–medium	• Wool and animal hair	• Raw hides and skins and live animals	• Mineral fuels and metals
Low	--	--	--

Reference: Governmental Plan for Export Development of the Kyrgyz Republic for 2015–2017

6.1.2.3. Priority Sectors

When considering principal trade items, the priority sectors are the textile (cotton, apparel, wool), and the foodstuffs (meat) industries.

However, according to the “National Sustainable Development Strategy 2013-2017”, the priority sectors are the agricultural and energy sectors, as well as the mining, transportation, communication, tourism and service sectors.

According to the “6.1.4.1 Policies to Attract Foreign Investment”, which will be mentioned later, the service industries are recognized as priority industries.

6.1.3. Current status of SMEs (small and medium-sized enterprises) in the Manufacturing Industry

In 2011, the total number of SMEs in Kyrgyz is 256,684 including 10,987 small enterprises, 797 medium enterprises, and 236,684 individual entrepreneurs Furthermore, if the number of enterprise

farmers that are run by individuals or families without legal registration (331,594) is included, the total number will be 568,278.

In terms of the number of employees, 50,200 people are employed for small companies, 38,600 for medium-sized enterprises, and 244,900 as individual entrepreneurs. In total, 333,700 people are employed by the SMEs. However, there are many companies that have been inactive or suspending business. Moreover, nationwide surveys on SMEs have not been conducted, thus, there is currently no precise data on the number and size of SMEs in Kyrgyz¹⁰⁹.

6.1.3.1. Chamber of Commerce and Industry of Kyrgyz (CCI-KR)

In Kyrgyz, the Chamber of Commerce and Industry (CCI-KR) systematically performs substantive SME support activities using the central and local networks, but the activities of CCI - KR are not very active. It is distinctive that promotion organizations and management organizations of the sectors are providing information, seminars and training to support each member.

CCI-KR was established in 1959, providing various kinds of support to private enterprises for the improvement of business environment, and coordinating government and enterprises. The number of staff of CCI-KR is about 60 people (including 20 headquarters), including headquarters and 7 domestic branches, and the number of affiliated companies is approximately 520 companies from large companies to small companies. The activities of CCI-KR are small compared to Uzbekistan, but holding a trade fair for promoting trade of member companies, hosting seminars abroad, hosting business training, holding seminars and workshops, holding business forums, Issuing a certificate of origin, providing industrial property rights services, etc.

6.1.3.2. Business Association JIA

Business Association JIA is an organization similar to CCI. It is a federal union of national organizations such as International Business Association, Kyrgyz Entrepreneur Association, Kyrgyz Board Association, and Business Association, etc.

Its purpose is to study the business environment of Kyrgyz and to provide indirect support to private enterprises in terms of management as well as technology in accordance with "National Sustainable Development Strategy 2013-2017." Sometimes it also makes recommendations to the administrative organizations. In addition, they provide clear explanations and interpretation of domestic business laws; they support entrepreneurs to strengthen business directions and know-how. They also support

¹⁰⁹ Refer to National Statistical Committee of Kyrgyz Republic (2011), "Small and Medium Entrepreneurship in the Kyrgyz Republic 2006-2010, Bishkek 2011"

the business projects by promoting negotiations with relevant ministries and agencies.

Their activities include:

- 1) Organizing International Business Forum,
- 2) Organizing regular seminars on successful business for university students,
- 3) Cooperation with international organizations such as the World Bank, USAID, and JICA.

They also have supported the JICA project "Cost Estimation Guidelines (2013-2014)".

6.1.3.3. The State Committee for Industry, Energy and Subsoil use of the Kyrgyz Republic

SCEIS of the Kyrgyz Republic is responsible for the following tasks under the national authority of the Republic of Kyrgyz that is in charge of regulating the use of underground resources.

- 1) In charge of geotechnical engineering and development of underground resources, issuance of permission of geological survey based on direct negotiation with the applicant and bidding.
- 2) Execution of the geological exploration plan every two to five years, and issuance of permitted exploration rights
- 3) Accepting application and extension of exploration/prospecting license with charges
- 4) Management of mineral resource reserves assessed by the State Mineral Resources Committee (GKZ)
- 5) Geological report on the exploration of mineral deposits for GKZ evaluation and examination of calculation conditions (mineable or equilibrium) for commercial reserves.

6.1.3.4. The State Agency for Investment and Export Promotion under the Ministry of Economy of the Kyrgyz Republic

On March 18, 2014, the Agency was established based on the national strategy of Kyrgyz. It was established jointly with government agencies, local governments, business communities and non-governmental organizations aiming at promotion of foreign investment and providing foreign investors with such services as consulting, support, and follow-up, etc. The Agency consists of four departments: Information Analysis Department, Investment Project Promotion Department, Investment Support Department, PPP (Public-Private Partnership) Development Department. There is excellent 21 staff with average age of 28 years old, all English speakers¹¹⁰.

Meanwhile, there is not enough capacity in finance, technology and human resources for domestic private-sector projects, with very limited national budget for revitalizing the private economy.

¹¹⁰ Mr. Ichiro Kumagiri, an investment adviser who is dispatched from the Japan International Cooperation Agency (JICA) to the agency.

Therefore, Kyrgyz is aiming for sustainable development by direct foreign investment. Their project selection criterion is subject to international standards and consistency with Kyrgyz National Sustainable Development Strategy.

Presidential Decree, "National Sustainable Development Strategy 2013-2017" has listed agriculture-related sectors, energy, mineral resource development, transportation communication, tourism and services are the priority sectors for development. Currently, 79 projects are screened out, of which 7 have been receiving support. There are officers in charge by region; the officers in charge of East Asia and Southeast Asia are in charge of Japan.

6.1.3.5. Kyrgyz Republic - Japan Center for Human Development (KRJC)

KRJC offers business course of mini MBA program (practical management course) on review of previous training content and operation system. A new phase has started for human resource development for economic diversification. KRJC has consolidated its function as a basis for personnel exchanges between Japan and Kyrgyz through collaborative projects with Japanese universities, etc.

The Study Team interviewed some of the graduates of KRJC who accomplished mini MBA courses such as business planning, marketing, financial management, accounting/quality control and human resource management as a field survey of local companies.

6.1.3.6. Interviewed Company Overview

In this Survey, the Survey Team visited 5 companies introduced by KRJC, 4 companies introduced by CCI-KR and 1 company introduced by an interpreter whom the Team employed during the Survey and conducted interviews. The names of the visiting companies and their fields are listed on the following table.

Table6-5 Lists of Interviewed Companies

	Company Name	Field	Products/Service	Industrial Human Resource Needs
(1)	Agroholding Jashyl Charba	agriculture	Vegetable cultivation by greenhouse	Greenhouse cultivation expert
(2)	Kulikovsky Confectionery house	Confectionery manufacturing industry	Luxury confectionery manufacturing and sales	Food hygiene management Specialist
(3)	LLC Detskiimir	Retail Sales	Major toy sales for children	Sales Manager
(4)	Ardamina Ltd	Sewing industry	Sewing of high-class clothes for children and ladies	Clothing planer and design Specialist
(5)	Aigul Tecstyle Company	Sewing industry	Fashion clothing manufacture	Sewing machine maintenance engineer
(6)	LLC Waikiki	Sewing industry	Sales shop of clothes	Sales manager
(7)	KIM's Restaurant	Restaurant business	Restaurant industry	Management specialist
(8)	Goldmark	Logistics	Import agent of daily commodities by train transport between China-Kyrgyz	Import procedure proxy (lawyer, counselor)
(9)	Kyrgyz Concept	Tourism	Tour operation of overseas tourists	Tourism expert and Management staff
(10)	Kaindy Cable Factory	Machine manufacturing	Production of power transmission wire	Product Development Engineer

(1) Agroholding Jashyl Charba

The main cultivated crops are gardening vegetables at Organic Agriculture and they grow cucumbers in the greenhouse. Technical assistance for agriculture is a European NGO such as Germany. In the future, owner would like to expand the cultivated areas and cultivars. The company is also looking for an expert who can teach vegetable greenhouse cultivation.

(2) Kulikovsky Confectionery House

The founder of the company in 1991, started making and selling homemade cakes. Currently they produce and sell 150 varieties of biscuits, cakes and chocolate confectionery. The employees are nearly 700 including direct sales shops.

From 2012 to 2013, the owner has expanded their business as branch offices in Kazakhstan, developing products and developing overseas markets, and all production facilities imported from Europe countries.

Also, since it is food production, quality control is particularly important and in the laboratory bacterial examination. This department also it is necessary to bring up new analytical skills. Factory's doing ISO 202000 certification (Food Safety).

In the technical department responsible for equipment maintenance, there is a shortage of young specialists and workers who maintain air-conditioning systems, water supply systems, waterway (drainage) systems, and eve electrical supply systems, etc., as well as specialists who can deal with the examination of food quality control as well as various kind of certification. They are expecting product development engineers who received higher education with knowledge of ITC.

(3) LLC Detskiimir

The founder of LLC Detskiimir is one of the promising young entrepreneurs in Kyrgyz. The company imports toys for children from China and Russia and sell those at the major supermarket. The company deals with more than 2,000 kinds of toys and it also manage amusement arches. After graduation from the faculty of Arts of the university, the founder could not find employment opportunities in Kyrgyz, which made him. Leave the country for job and also encouraged him to become an entrepreneur.

Fortunately, he could borrow the second floor of the newly opened supermarket from the owner, which enabled him to start the business for toys. Currently, the company is developing its business and it has a plan to open the second shop in another city.

(4) Ardamina Ltd.

Ardamina Ltd. is a sewing company that established a company, imported chemical fiber (polyester yarn) from Turkey, added it, manufactured and exported ladies' wear in line with orders from Russia, Turkey and Kazakhstan sales companies.

This company has about 30 employees and a relatively stable business performance. Employees are recruited by the president in person based on interviewing, technical ability, personal ability and behavior as employees etc. regardless of their academic background.

In-house training is carried out over a period of about 3 months to 6 months at OJT, and job workers capable of maintaining and maintaining equipment are particularly important. The challenge for the company is the lack of sewing technicians and a business operation manager.

(5) Aigul Tecstyle Company

Established in 1958, this factory was sold after the collapse of the Soviet Union by the government. Owner's family purchased the factory.

They plan to construct new factories and facilities by using loans to develop unique products and sell them in online store.

There are 5 staff; 1 for technician, 1 for Product Quality Control, 1 for designer and 1 for chute, 1 for mechanical engineer, and when committing a large quantity, it consigns to an external craft worker.

The challenge for the company is a lack of sewing technicians. In addition, the owner is seeking professionals who can specialize in planning and design of clothing.

(6) LLC Waikiki

The Bishkek branch of the Turkish clothing manufacturer, LLC Waikiki was opened in 2014 along with another branch in Osh. They sell clothes for both men and women with ages from zero to 77.

They have hired five managerial staff, 40 sales assistants (average age 19-24 regardless of higher educational background), cashier, and storehouse manager. The company use the Online Training Program prepared by the headquarters for in-house staff training on sales or client service. They are seeking some managers who can take over the necessary business operation and sales management at regional business extension.

(7) Restoran Kim

The restaurant was opened in 2009. The manager regards human resources development as the most important, and in restaurant management, he invites Russian instructors for employees, learns how to serving himself and instructs employees. In addition, he participates in seminars and training as much as possible and improves their abilities. For example, it is a mini MBA marketing course at the Japan Center under the guidance of the Japanese experts, etc.

The owner believes that the employees are the most important and reliable partners for the company. He would like to recruit the applicants with good ability of restaurant management along with fortitude.

(8) Goldmark

Goldmark currently has offices in China and Bishkek, employing four in China office and two in Kyrgyz office. The company is an agent for importing daily commodities from China via railway

transportation between China and Kyrgyz Republic once a month. Imports includes from large goods such as vehicles to medicines. They are seeking lawyers, counselors, etc. who are university graduates and interested in business.

(9) Kyrgyz Concept

Kyrgyz Concept was founded in 1990 and has been offering tour operation service in Bishkek. Since nearly 70% of tourists are from Kazakhstan and European countries for skiing and hiking, English is an important skill for doing business.

The total number of full time staff is around 115 and the annual amount of sales is approximately 200 million US dollars. 80% of the staff is female and most of the managers are female as well. The condition of employment is English ability as well as business skills.

There is many female staff, and return rate after the maternity leave is high due to the enhanced welfare system in the company. In particular, they are focusing on in-house education. They are looking for female managers who are highly educated, and are interested in tourism industry.

(10) Kaindy Cable Factory

In the era of Soviet Union, electric industry was the peak in order to focus on electric power selling to European countries. After the collapse of Soviet Union in 1997, it became important to maintain each 5 Central Asian country's electric industry, which dramatically decreases the production of electric wires. Under such circumstances, Kaindy Cable Factory currently produces electric power cables to Kyrgyz and Kazakhstan as a main product. In the past, the company used to hire 1,500 technicians, but currently they has shifted their activities to technical innovation and there are 20-25 workers at the present mainly for research and the development of cables which have effective heat insulation. They expect engineers for product development who know ICT with higher educational background.

6.1.4. Japanese Companies' Presence and the Fields of Investment

6.1.4.1. Policies to Attract Foreign Investment ¹¹¹

There are currently five free economic zones in Kyrgyz: the Bishkek FEZ, the Karakol FEZ, the Naryn FEZ, the Maimak FEZ and Leilek FEZ. There are 234 enterprises from 30 countries operating in FEZs, including Afghanistan, India, Iran, Kazakhstan, China, Russia and Turkey. About 3,000 people work in FEZs, which means they boost employment by creating employment opportunities.

¹¹¹ Information is being provided by the local advisor for promoting investment dispatched by JICA

Companies operating in FEZs enjoy benefits and preferential treatment on tax and tariffs. They are exempt from import taxes on merchandise, raw materials and products imported to FEZs and from taxes and tariffs for the export of goods developed and produced within FEZs.

However, activities to attract foreign enterprises are currently on hold. This is because sales of goods to Russia, and Belarus are no longer treated as exports as a result of Kyrgyz's membership of the EEU. No tax is charged if raw materials imported from a country outside the EEU are processed and exported as products to a country outside the EEU. Conversely, customs charges, FEZ usage fees, VAT and sales tax, etc. are levied if raw materials imported from a country outside the EEU are resold to a country within it or products processed from such raw materials are sold to a country within the EEU.

A provisional measure is applied to companies registered in FEZs as of December 31, 2015 until 2017 but any companies subsequently registered in FEZs will be ineligible for preferential treatment. The Ministry of Economy is examining the positioning of FEZs from July 2017 onward.

6.1.4.2. Japanese Companies' Presence and the Fields of Investment

At present, eight Japanese companies are operating in Kyrgyz, including a textile company, a transportation service provider, a used car sales company, a consulting firm, a language school and a car dealer. Some Japanese companies are considering moves to establish call centers within FEZs. As they are operated under the rules of the EEU, only products are being considered export. In other words, in the case of services are not being considered export¹¹².

The Ministry of Land, Infrastructure, Transport and Tourism (MLITT) of Japan¹¹³ held a joint public-private sector seminar in Bishkek, titled Japan-Kyrgyz High-quality Infrastructure Seminar, on April 19, 2017. There were around 20 participants from Japan from four companies, including a general construction company and a manufacturer. The Ministry of Economy and the State Agency for Investment and Export Promotion are the Kyrgyz counterparts to MLITT. There were about 80 participants from Kyrgyz, including government officials and others from state-owned enterprises.

In this seminar, Japanese companies introduced traffic signals using the latest technology, a mobile phone-based emergency warning system, etc. The Japanese and Kyrgyz governments also agreed to promote proposals made by Japanese companies as flagship businesses.

¹¹² Information is being provided by the local advisor for promoting investment dispatched by JICA

¹¹³ Ministry of Land, Infrastructure, Transport and Tourism, http://www.mlitt.go.jp/report/press/sogo07_hh_000445.html, (accessed June 5, 2017)

6.1.4.3. Presence of Foreign Countries Other than Japan and Their Investment Fields¹¹⁴

According to a questionnaire survey from the local advisor for promoting investment dispatched by JICA, enterprises from Korea, China, Russia, the Czech Republic, Iran, United Arab Emirates, Turkey, Belarus, United Kingdom, Canada, Qatar and Kazakhstan are operating in Kyrgyz.

The relevant sectors of each country are listed below, compiled by the local advisor for promoting investment dispatched by JICA. The data was collected from meetings with ministries and newspapers. The priority sectors are from the “National Sustainable Development Strategy 2013-2017”.

¹¹⁴ Information is being provided by the local advisor for promoting investment dispatched by JICA

Table6-6 Preference Sector by Each Investor Except for Japan

Countries	Prioritized sectors	Other sectors
Korea	Agriculture (greenhouses) Textile and light industry Energy Tourism Metallurgy (construction of armature plant)	Medicine Airport (modernization of Airport) Trade promotion, digital broadcasting
China	Agriculture processing Irrigation system Textile Energy Manufacturing (replacement some manufactures from China to Kyrgyz) Tourism Construction (road, railway)	Custom and border control Trade – logistic centers Financial and banking sector Cooperation in science and technology Trade
Russia	Agriculture Energy Construction,	Creation of Logistic centers ICT technologies
Czech	Energy	
Iran	Energy (export of technical and engineering services) Agriculture processing Construction (social facilities, hospitals and diagnostic centers) Tourism Transportation (construction of railway)	Banking sector Exchange of experience in the field of science and modern technology Supply of oil Aviation sector Trade
United Arabian Emirate	Agriculture Livestock Construction Tourism (Hotel Business) Energy,	Infrastructure Airlines network Trade -logistic centers Trade centers
Turkey	Fish farm Tourism Construction Textile and light industry Agriculture processing Manufacturing, transport and communication,	Construction of Trade center Construction of stock exchange market Finance sector
Belorussia	Agriculture processing (Dairy production) Breeding livestock	
United Kingdom		Professional, scientific and technical activities
Canada	Mining	
Qatar	Agriculture Livestock (construction of a logistics center, slaughtering, meat plants and building storage facilities for agricultural products, veterinary laboratories.)	
Kazakhstan	Tourism Mining	Banking

Reference: Preference sector by each investor (countries)

6.1.5. Industrial Human Resources Needs of Local Industry

Improvements in areas such as bureaucratic procedures and business customs impacted by the former Soviet Union as measures to develop private small- and medium-sized enterprises have been accumulated by the government. However, the field survey found that there is still a lack of executive managers/managers of private enterprises, specialized engineers, and technicians.

Moreover, although the economy is finally stabilizing, many young people in the Kyrgyz Republic still leave to work in Russia and Kazakhstan, etc., where job opportunities of university graduates, e.g., even a law graduate, are hardly available at the moment. As one of the responding business founder told, it is indispensable for the national development for the young generations start up business to create a new field of industry.

Similar to Turkmenistan, human resource development, domestic industrial promotion and economic development, in order to help underpin national economic development remain major issues. It also contributes to reducing the social cost associated with the shift to the market economy.

6.1.6. Sectors to be Intervened for Further Human Resource Development for Industrial Promotion

The Kyrgyz Republic provides cheap labor to Russia and Kazakhstan, as a major source of national foreign income. In future, to improve this situation, the domestic economy will have to grow rapidly. Conversely, considering that this situation will continue for a while, higher income of overseas remittance by the engineers and technicians who have acquired advanced technology will be beneficial for the government.

A stable year-round domestic power supply by developing clean energy as well as the sale of power to neighboring countries via electric power development is important. At the same time, as road improvement and the construction of dams and Ultra-High-Voltage (UHV) transmission lines is planned, domestic demand of young mid-level engineers/technicians would also be expected to increase.

Training and raising mid-level engineers/technicians of power, civil engineering and construction fields as well as planning advisors of the tourism industry for European tourists would be also important.

6.2. Overview of the Education Sector

6.2.1. Basic Data for Education

The following table shows the basic data of education in Kyrgyz.

Table6-7 Basic Data of Education in Kyrgyz

	Figure	Year
Enrolment Rate		
Primary Education	89.6%	2014
Secondary Education	80.1%	2014
Number of Schools		
Primary Education	317 (State: 295 Private: 22)	2014
Secondary Education	1,871 (State: 1,828 Private: 43)	2014
Higher Education	53 (State: 34 Private: 19)	2014
Number of Students		
Primary Education	42,113 (State: 39,843 Private: 2,270)	2014
Secondary Education	982,167 (State: 967,471 Private: 14,696)	2014
Higher Education	214,410 (State: 188,794 Private: 25,616)	2014
Number of Teachers		
Primary Education	17,175 ¹¹⁵	2014
Secondary Education	41,809 ¹¹⁶	2014
Expenditure for Education (as a percentage of GDP)	5.5%	2014

Reference: National Statistical Committee of the Kyrgyz Republic¹¹⁷, World Bank¹¹⁸, EACEA¹¹⁹

¹¹⁵ Except for Managers, teachers for special subjects such as music and Physical Education

¹¹⁶ Ibid.

¹¹⁷ National Statistical Committee of the Kyrgyz Republic, Children of Kyrgyz, Bishkek: Printing Division of Main Computing Center of Natstatcom of the Kyrgyz Republic, 2015, pp.184-185, p.200.

¹¹⁸ World Bank, World Bank Open Data, <http://data.worldbank.org/>, (accessed June 1, 2017)

¹¹⁹ Education, Audiovisual & Culture Executive Agency, Overview of the Higher Education System: Kyrgyz, 2017, p.3.

6.2.2. Education Policy

6.2.2.1. Education Policy

In March 2012, the Government of the Kyrgyz Republic adopted the Education Development Concept and the Education Development Strategy, both until 2020, which reinforce the value and priority of educational reform. As the first stage is 2012-2014, the second 2015-2017 and the third 2018-2020, the second state is in progress. Implementing the Education Development Strategy will help the educational system nurture citizens with:

- strong skills;
- the ability to act independently, openly express their views and use creative and innovative approaches;
- shared values of human rights and freedom and gender equality; respecting cultural, ethnic and political diversity;
- The ability to handle general and specialized knowledge and skills that will underpin their success in life and the labor market.

The educational system in 2020 will be the main tool for promoting Kyrgyz's social and political development as well as consolidating its competitiveness in regional and international processes. Implementation of the following policy measures and main indicators is proposed within primary and secondary vocational education and higher professional education.

(1) Primary Vocational Education

- Optimizing and modernizing TVET infrastructure.
- Improving training and making it more relevant to labor market needs.
- Improving the management and financing of educational institutions; introducing programs for monitoring, reporting and evaluation.
- Improving access to the TVET system.
- Providing conditions to strengthen the role of social partners.
- Developing a NQF for priority vocational training areas.
- Introducing ICT to analyze the labor market, study process and management of educational institutions.
- Disseminating independent accreditation, assessment and certification mechanisms throughout all areas of TVET.
- Integrating NQF of TVET into the general qualification system.
- Providing the operation of Primary Vocational Education as a flexible and open structure to develop manpower responsive to the needs of economy, business and society as a whole.

Table6-8 Main Indicators for Primary Vocational Education

Indicators	Baseline	Midterm Forecast (2014)	Benchmark (2020)
Percentage of strengthened and modernized Primary Vocational Schools (PVSs)	40%	60%	80%
Percentage of optimized PVSs	-	10%	25%
Short-term training participants as a proportion of total enrollment	40%	50%	75%
Number of occupational standards developed in partnership with employers	7	49	60
Number of registered and accredited curricula		20	40
Percentage of increase of library fund of PVSs with new books	10%	35%	60%
Numbers of PVSs having introduced per-capita financing		5	110
Number of inclusive programs developed for out-of-school youth and disabled	3	8	25
Increase in share of women, recruited in PVSs	30%	+5%	+10%
Percentage of graduates employed based on contracts signed between a PVS and employers' organizations	10%	30%	45%
Percentage of educational institutions accepting orders for training of specialists from employers	5%	10%	30%
Number of established competence certification centers		2	9

Reference: Education Development Strategy until 2020

(2) Secondary Vocational Education

- Bridging the gap between the program structure and labor market requirements, focusing on regional differences.
- Ensuring employers are involved in the graduates' qualification evaluation process.
- Boosting the prestige of Secondary Vocational Education among all segments of the population.
- Optimizing the management system.
- Improving the human resource capacity and introducing a system to assess the performance of individual teachers.

Table6-9 Main Indicators for Secondary Vocational Education

Indicators	Baseline	Midterm Forecast (2014)	Benchmark (2020)
Percent of budget-funded studying seats allocated for occupations in line with national priorities and economic strategies by region	20%	40%	60%
Percentage increase in the number of those interested in and admitted to SVE organizations	3%	15%	25%
Portion of professional standards designed jointly with employers	2%	30%	60%
Portion of graduates employed on contracts between educational institutions and employers' organizations	10%		
Portion of educational institutions commissioned by employers to train specialists	3%	50%	100%
Portion of teachers having participated in in-service training programs	3%	30%	50%

Reference: Education Development Strategy until 2020

(3) Higher Professional Education

- Improving higher education quality assurance systems.
- Optimizing the structure and levels of higher education.
- Bridging the gap between higher education and labor market requirements, focusing on regional differences.
- Reforming the in-service training system.
- Reviewing existing higher education financing mechanisms, taking into consideration the shift in state Higher Education Institutes to self-financing.
- Developing university science.

Table6-10 Main Indicators for Higher Professional Education

Indicators	Baseline	Midterm Forecast (2014)	Benchmark (2020)
Percentage of Higher Educational Institutions (HEIs) having introduced the two-tier system among the total nationwide	30%	92%	92%
Number of HEIs:	52		
Portion of qualified graduates with:			
▪ Bachelor's degrees	7%	40%	70%
▪ Master's degrees	3%	20%	20%
▪ Specialist degrees	90%	50%	10%
Number of independently accredited academic programs	2	20	50
▪ Qualitative composition of HEIs:			
▪ Bachelor's / Specialist	59%	30%	0%
▪ Master's	15%	25%	40%
▪ Kandidat nauk (candidate of sciences)	20%	30%	40%
▪ PhD	1%	5%	10%
▪ Doctor nauk (doctor of sciences)	5%	10%	10%
Norms (standards) for licensing of infrastructure and equipment for HEI			
▪ Libraries	80%	100%	100%
▪ Textbooks	50%	80%	100%
▪ Computers per student	1/25	1/12	1/6
Percent of employment of HEI graduates; taking into account those continuing education and self-employed	30%	50%	80%

6.2.2.2. Education Law

Under Article 45 of the Constitution of the Kyrgyz Republic, the right to education for all citizens is stipulated. The Law on Education was established in 2003 as well as enacting the Law on Primary Vocational Education (1999), Law on Status of Teachers (2001) and the Law on Pre-primary Education (2009).

Table6-11 Major Laws on Education

Name of the Law	Website
Law on Education	http://cdb.minjust.gov.kg/act/view/ru-ru/1216?cl=ru-ru
Resolution No.496 of the Government of the Kyrgyz Republic "On establishing a two-level structure of the higher professional education"	http://cdb.minjust.gov.kg/act/view/ru-ru/92802
Education Development Concept and Strategy in the Kyrgyz Republic until 2020	http://cdb.minjust.gov.kg/media/upload/files/2020_rus.pdf
Regulations on higher education institution of the Kyrgyz Republic	http://cdb.minjust.gov.kg/act/view/ru-ru/55077?cl=ru-ru
Regulations on the Department of Higher Education of the Kyrgyz Republic	http://cdb.minjust.gov.kg/act/view/ru-ru/96044
Regulations on Faculty of Higher Education of the Kyrgyz Republic	http://cdb.minjust.gov.kg/act/view/ru-ru/96045/10?mode=tekst
Regulations on the National Accreditation Board under authorized body in the field of education	http://cdb.minjust.gov.kg/act/view/ru-ru/96715

Extracted from "Overview of the Higher Education System", Erasmus+, 2017

According to feedback from Erasmus+, a law on quality assurance will be adopted the following year; including the establishment of a certification system by an independent organization.

6.2.3. Education System

6.2.3.1. Compulsory Education

The education system of Kyrgyz can be divided into the following levels: ECD, primary, secondary, vocational education, and higher education. Compulsory education continues for 9 years, from the beginning of primary school to the completion of secondary school. After completing compulsory education, students can proceed to the secondary upper level or study at professional lyceums or vocational technical colleges offering vocational education. Lyceums and colleges offer three types of courses with three durations: 3 years, 2 years, and 10 months. Only students who complete a 3-year course can obtain qualification to go on to higher education institutions (HEIs)¹²⁰. Table 6-12 shows the grade/duration of study and age for each education level.

¹²⁰ UNESCO, "World TVET Database: Kyrgyz," http://www.unevoc.unesco.org/wtdb/worldtvtdatabase_kgz_en.pdf (access May 26, 2017).

Table6-12 Primary and Secondary Education in Kyrgyz

	Grade/ Duration of Study	Age
Primary	1~4	7~10
Secondary (Basic)	5~9	11~15
Secondary (Upper)	10~11	16~17
Vocational Education	2~3 years	16~17 or 16~19

Compulsory education and secondary upper level education at state educational institutions are free of charge.

Kyrgyz and Russian are the main languages of instruction, but some schools in Jalal-Abad and Osh, regions populated by many citizens of Uzbek origin, teach classes in Uzbek¹²¹. “The National Strategy for Sustainable Development of the Kyrgyz Republic for 2013-2017” announced a policy to promote Kyrgyz as a state language¹²², which led to the development of the “Kyrgyztest”¹²³. According to an interview with the National Testing Center under the Ministry of Education and Science, the test is compulsory for students from grade 9 to 11. It appears likely that the Government is attempting to strengthen Kyrgyz language for compulsory education.

6.2.3.2. Higher Education

After completing secondary upper level education or vocational education, students are entitled to enter higher education institutions (HEIs). Four types of HEI operate in Kyrgyz: university, academy, institute, and specialized HEI (e.g., a conservatoire or army school)¹²⁴. The characteristics of each type are summarized in the table below:

Table6-13 Characteristics of the Main types of Higher Education Institutions

	Characteristics
University	<ul style="list-style-type: none"> • HEI with faculties in various fields. • Offers education for undergraduate and postgraduate students.
Academy	<ul style="list-style-type: none"> • Specialty schools focused on education in the sciences for undergraduate and postgraduate students.
Institute	<ul style="list-style-type: none"> • Specialty schools offering education in one or several fields. • Some schools are established as branches of universities or academies.

Although Kyrgyz has not become a member of the Bologna Process, the country has introduced a two-level degree system of Bachelor (4 years) and Master (2 years) degrees in accordance with a

¹²¹ Ministry of Foreign Affairs of the Government of Japan, “Country and Region’s profiles on Schools,” http://www.mofa.go.jp/mofaj/toko/world_school/05europe/infoC51700.html, (accessed May 26, 2017).

¹²² Kyrgyz language is defined as the “State Language” and Russian is set as the “Official Language.”

¹²³ The test was developed with reference to the Japanese Language Proficiency Test by the National Testing Center under the Ministry of Education and Science.

¹²⁴ Education, Audiovisual & Culture Executive Agency, Overview of the Higher Education System: Kyrgyz, 2017, p.8.

Governmental Resolution “On establishing a two-level structure for higher professional education in the Kyrgyz Republic” issued in 2011¹²⁵. PhD programs have also been introduced on a trial basis at the following seven pilot universities (according to information from the Erasmus+ Program) since 2013:

- Kyrgyz National University named after Jusup Balasagyn
- International University of Kyrgyzstan
- International Medical School
- Kyrgyz National Agrarian University
- Kyrgyz State University of Construction, Architecture and Transport
- Adam University (Bishkek Finance and Economics Academy)
- Kyrgyz - Turkish University Manas

In addition to the above universities, Kyrgyz State University named after Arabaev is obtaining a license to initiate a PhD program from the Ministry of Education and Science.

Kyrgyz and Russian are the main languages of instruction in higher education. The number of universities offering courses in English, such as the American University of Central Asia, is very limited.

6.2.4. Education Administration

While education administration is managed by the Ministry of Education and Science of the Kyrgyz Republic, primary vocational education (lyceums) is managed by the Agency of Primary Vocational Education under the Ministry of Education and Science. The main responsibilities of the Ministry of Education and Science are listed below¹²⁶.

- Development and implementation of education policy
- Development of education strategy and education standard
- Assurance of the right to education and equal educational development among regions
- Curriculum development
- Development of an admission system
- Education and training for teachers

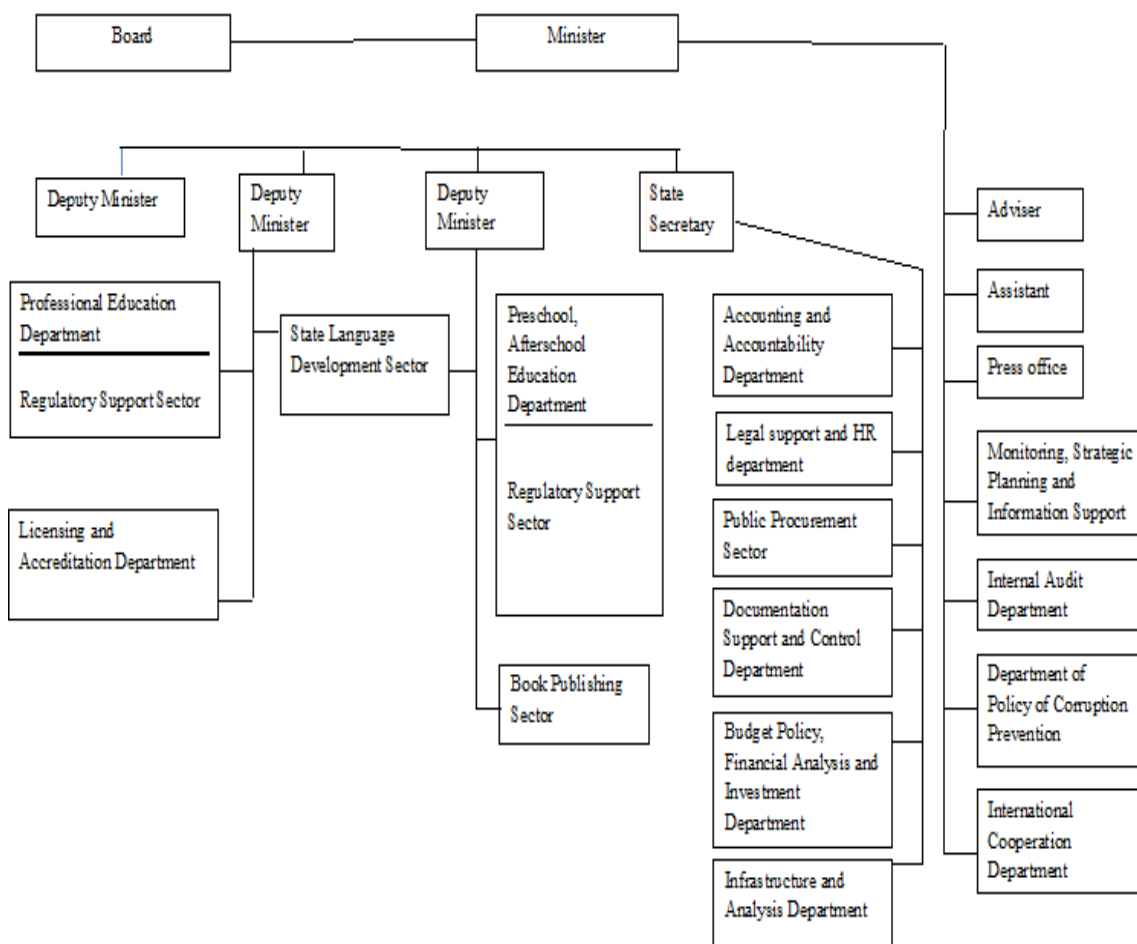
¹²⁵ Ibid., p.7.

¹²⁶ UNESCO, “World Data on Education: Kyrgyz,” http://www.ibe.unesco.org/fileadmin/user_upload/Publications/WDE/2010/pdf-versions/Kyrgyz.pdf, (access May 25, 2017).

- Promotion of international cooperation in the field of education

Kyrgyz is divided into 2 cities (Bishkek and Osh) and 5 provinces, which can be further divided into 40 districts. Each city, province and district has an education department. The provincial and city departments are responsible for secondary education and manage the administration of both vocational education and higher education institutions. The district level departments, meanwhile, are responsible for ECD and primary education in addition to the management of secondary education institutions¹²⁷.

The figure below shows the organizational structure of the Ministry of Education and Science.



Reference: The Ministry of Education and Science of the Kyrgyz Republic

Figure 6-1 Organizational Structure of the Ministry of Education and Science

¹²⁷ Ibid.

6.2.5. Issues in Education Sector for Industrial Human Resources Development

(1) Delay in Educational Reform in Accordance with the European Standard

Kyrgyz has not participated in the Bologna Process and remains in transition from the traditional Soviet system to a modern educational system meeting European standards, with the implementation of a two-tier higher education system, incorporating bachelor's and master's degrees, urgently needed. Seven state universities have recently set up PhD courses and master's and PhD courses are set to further expand. The Ministry of Education has launched efforts to establish a system to ensure quality assurance in education.

Mobility of students and teachers is another major issue, with limited opportunities to study abroad or transfer study to other state universities and thereby enrich knowledge and skills. The Ministry of Education is striving to increase mobility by planning exchange programs with Russia, Kazakhstan, Turkey, India, China, Germany and Japan etc.

(2) A Higher Education Level not Commensurate with Industrial Demands

The employability of university graduates 6 months after graduation is only 20% based on recent ADB survey data. According to the World Bank, although many universities are focusing on the youth population, there is a severe lack of skilled specialists such as engineers and scientific researchers, as required by major industrial sectors, in fields such as mining, construction and IT development, because most faculties are related to humanities, rather than science and engineering. The capacity and professional ability of graduates is not at the level required by industry.

In response, industry-academia collaboration is being strengthened; encouraging curriculums developed in collaboration with industry and inviting lecturers from the private sector to educational institutes. According to an officer from the Erasmus+ Program, some examples of best practice in the field of industry-academia collaboration do exist, such as AKNET, Coca Cola Company and Innolabs (Innovation Laboratory). For example, AKNET developed an optical-fiber network with higher education institutions and the Coca Cola Company joined forces with Kyrgyz State Technical University to plan and implement skills training for specialists. The Kyrgyz State University of Construction, Transport and Architecture have established a strong relationship with the energy sector. However, these cases are exceptional and depend on independent efforts made by the universities and the industries themselves. According to USAID feedback, industries seek and hire manpower on an immediate as-required basis and are not interested in providing education and nurturing human resources, which takes considerable time and money.

(3) Needs to Expand TVET Schools

The employment rate among college graduates is 75%, far exceeding the 20% for of university graduates, which is why some university graduates re-enroll into colleges and lyceums to get work. Development occupational standards to meet regional labor market needs are required to solve national youth unemployment. Many international organizations such as ADB are advising the Ministry of Education to develop occupational standards and NQF.

Although the government has prioritized infrastructure development and plans to strengthen the operation of 20 regional centers on economic development and construct more than 200 local IT schools, the educational level must be improved still further to meet industrial demands.

(4) Developing Teachers' Capacity

In Kyrgyz, teachers are severely underpaid and have a correspondingly low social status. The teaching occupation is not valued and respected in society. They lack opportunities for training and retraining, which means low-level skills and knowledge of teachers in primary, secondary and higher education. The issue of substandard teaching quality is critical, particularly in rural areas, whereupon the government plans to establish the Republican Science and Methodology Center to organize ToTs to nurture master trainers and develop teaching methodology. At the Kyrgyz state university, named after I. Arabaev, the Data Survey Team observes that distance learning courses are provided to retrain teachers in rural areas as well as online teaching courses and exams for remote learners. An alternative ToT approach, such as the Kyrgyz state university named after I. Arabaev, should also be developed to re-educate local teachers within a reconfigured system.

(5) Lack of Science Research at Universities

According to donors who work to develop education in Kyrgyz such as USAID and UNESCO, the Academy of Science is the authority having spearheaded and controlled national scientific research since the former Soviet Union. Currently, the academy plays the role of countering educational reform and damaged autonomy of research activities of universities, while reorganization of academies is acknowledged as an urgent issue when developing research at higher education institutes. Universities should not simply engage in scientific research to disseminate knowledge. Given the need to develop young scientists for innovative research with industries, the government encourages international exchanges and joint research at universities.

6.2.6. Vision for Educational Reform

According to feedback from the World Bank, the government will establish a national development

strategy for Digital Economy and the Smart Nation. Within the educational sector, the concept of digital education and IT development are also prioritized. The government is also planning to enact laws on quality assurance of education the following year and will launch many more debates in this area. The following indicate the direction of educational reform in Kyrgyz, based on analyzing information of interviewees; international organizations in particular:

- Human resource development met with industrial needs and economic trends
- Industry-academia collaboration
- Transition to an education system meeting European standards
- Digital Economy
- Expansion of TVET for youth employability
- Development of a job placement service and career guidance
- IT education
- English education
- Renaissance of the Kyrgyz language

6.3. Higher Education Institutions in the Science and Engineering Field

6.3.1. Outline of Educational Institutions for Higher Education

Four higher education categories are available in Kyrgyz: university, Institute, Academy specialized higher educational institution (e.g., Kyrgyz National Conservatory, Bishkek Technical College)¹²⁸.

According to rankings by the OECD Programme for International Student Assessment (PISA), Kyrgyz ranked last in the fields of mathematics, science, and reading among the countries that participated in 2006 and 2009¹²⁹. The education curriculum is inherited from the USSR era.

6.3.2. Current Situation and Issues of Higher Education Institutions in Science and Engineering

(1) Research Equipment/Facilities

Apart from the equipment provided by donors, the experimental/research equipment looks superannuated in many institutions. Financial constraints make it difficult to procure new equipment. Certain types of equipment and facilities apparently prepared in the former Soviet era are still utilized at some of the universities. On the other hand, the equipment is well maintained and seems to be basically free of any major problems hindering their use for educational purposes.

The schools would face difficulty, however, in implementing highly technical work and even basic laboratory work requiring the use of accurate data.

(2) Industry-Academia Collaboration

Kyrgyz lacks sufficient quality control and inspection institutions, etc. capable of supporting industries aiming for overseas markets. This makes it impossible to certify quality assurance to support the boosting of domestic companies to develop overseas markets. Even for analytical institutions not directly aiming for the development of overseas markets, the roles they play are very important in areas such as food safety and the management of environmental problems. The establishment of facilities and inspection organizations in these areas is an especially urgent issue.

¹²⁸ Tempus Programme "HIGHER EDUCATION IN KYRGYZ", July 2012.

http://eacea.ec.europa.eu/tempus/participating_countries/overview/Kyrgyz.pdf, (Accessed June 5th, 2017.)

¹²⁹ World Bank, Europe and Central Asia "Knowledge Brief" (April 2011)

<https://openknowledge.worldbank.org/bitstream/handle/10986/10100/622570BRI0Educ0Box0361475B00PUBLIC0.pdf?sequence=1&isAllowed=y>, (Accessed June 5th, 2017)

(3) Limited Technical Skills Training

Scientific research activities at higher educational institutions are functioning insufficiently, chiefly due to a lack of experiment/research equipment. This circumstance is impeding the improvement of the research and analysis skills of students who intend to become researchers. The use of older research equipment limits the education/research content and makes it difficult to achieve good research results.

6.3.3. Information on Major Higher Education Institutions in the Science and Engineering Field

The names on the following list of institutions (mainly governmental) with science/engineering faculties in Kyrgyz were retrieved mainly from websites. We managed to make appointments with these institutions with support from the JICA Kyrgyz Office.

Table6-14 List of Respondents for the Field Survey of Higher Education Institutions in the Science and Engineering Field

Visit Day	Location	Name of Institutions
May 10	Bishkek	Kyrgyz State Technical University named after Iskhak Razzakov
May 11	Bishkek	Kyrgyz State University named after I.Arabaeva
May 11	Bishkek	Japan Style Training Center (Institute of Japanese Studies under Kyrgyz State University named after I. Arabaeva)
May 11	Bishkek	National Academy of Science of Kyrgyz
May 12	Bishkek	Institute of Mining and Mining Technologies Academician named after W. Asanalieva
May 12	Bishkek	International University of Innovative Technologies (IntUIT)
May 112	Bishkek	Kyrgyz Turkish Manas university
May 12	Bishkek	Chemistry Institute under the National Academy of Science
May 13	Bishkek	Kyrgyz National University named after Jusup Balasagun
May 13	Bishkek	Kyrgyz National Agrarian University named after K.I. Skryabin
May 15	Bishkek	Kyrgyz-Russian Slavic University named after B.N. Yeltsin
May 15	Bishkek	Kyrgyz State University of Construction, Transport and Architecture named after N. Isanov
May 16	Bishkek	International University of Kyrgyzstan (IUK)
no interview	Osh	Osh Technological University named after Academician M. Adyshev

* Note) The Survey Team had also considered a visit to Osh Technological University named after Academician M. Adyshev, an institution participated in the first JICA training program in Japan. However, time constraints during the stay in Kyrgyz forced the Team to abandon the plan.

The institutions are outlined below.

(1) Kyrgyz State Technical University named after Iskhak Razzakov

Name of Institution	Kyrgyz State Technical University named after Iskhak Razzakov (KSTU)
Name in Russian	Кыргызский Государственный Технический Университет им. И. Раззакова
URL	http://kstu.kg/ (accessed: June 18, 2017)
Language Used	Russian, English

KSTU was established in 1954 as the Frunze¹³⁰ Polytechnic Institute and switched to its current name in 1995. KSTU has a Lyceum and a College. Students graduating from the Lyceum can go on to KSTU or the College. Those who complete a course at the two-year College can get a job or transfer to the second year of KSTU.

KSTU has eight faculties: Faculty of Engineering and Economics, Power Engineering Faculty, Transport and Machine Building Faculty, Technological Faculty, Faculty of Information Technologies, Faculty of Ecology and Economics, Faculty of Mining and Metallurgy, and Geology Prospecting Faculty.

The main international partnerships are organized with Erasmus +, GIZ, Russia, etc.

Prioritized research themes are related to food technology. In order to comply with HACCP (Hazard Analysis and Critical Control Point), the school crucially relies on training programs, analysis/research equipment, and industry-academia collaboration for meeting and monitoring the related laws and regulatory requirements regarding food safety. Vegetable and fruit processing training equipment is also required for the processing and export of agricultural products made in Kyrgyz.

In addition to the above research themes, the school educates and researches in the fields of agricultural logistics, telematics, mechanical engineering and materials, renewable energy (hydropower, wind power, sunlight, biogas), and transportation management (automobile inspection registration, compulsory automobile insurance, pollution monitoring), etc. These are all important research fields prioritized in KSTU.

Regarding the "Collaborative Academy and Education Center," a cooperatively formed body for advanced industrial human resources development using Japanese style engineering education, Ms. Baichekirova Venera Kachkynbaevna, Head of the KSTU International Relations Department, is

¹³⁰ Frunze: former name of Bishkek (1927 - 1991).

preparing draft ideas. The center will mainly focus on learning in the fields of mining, energy, tourism, agriculture, transportation, finance, and business based on environment-oriented technology. Japanese and Japanese martial arts will also be incorporated into the overall concept for the center.

(2) Kyrgyz State University named after I. Arabaev

Name of Institution	Kyrgyz State University named after I. Arabaev (KSU)
Name in Russian	Кыргызский Государственный Университет им. Арабаева
URL	http://arabaev.kg (accessed: June 18, 2017)
Language Used	Kyrgyz, Russian, (English is under construction)
URL (Japan-Style Training Center)	http://www.japanstyle.kg/arabaev-kyrgyz-national-university.html (accessed: June 18, 2017)
Language Used	Japanese
URL (Facebook)	https://www.facebook.com/japanstyle.kg/ (accessed: June 18, 2017)
Language Used	Russian

KSU was founded in 1950 as a Female Pedagogical College (Russian: Женское педагогическое училище). It was renamed the Kyrgyz State Pedagogical University named after I. Arabaeva in 1994 and then took its current name in 2005.¹³¹

There are currently four faculties in KSU: Faculty of Oriental Studies and International Relations, Faculty of Biology and Chemistry, Faculty of Geography, Ecology and Tourism, and Faculty of Arts and Education. Most of the students who graduate from KSU become teachers.

Partnerships have been concluded with Russia, Kazakhstan, USA, Austria, Iran, China, Korea, Belarus, Turkey, Germany, etc.

KSU also offers a 4-year undergraduate program started by a Japanese company, “Japan Style Training Center,” the “Institute of Japanese Studies under Kyrgyz State University named after I. Arabaev (Russian: Институт Японоведения при Кыргызском Государственном Университете имени Ишеналы Арабаева).” The institute was started in 2016 with the aim of developing advanced human resources who can be active overseas, including in Japan.

Eighteen students are active in Japanese hotels mainly in Okinawa, on internships of several months as Japanese-Russian interpreters for the long-stay Russian travelers. The institute has a plan to form a partnership with Osaka University of Tourism¹³².

¹³¹ ” Kyrgyz State University named after I. Arabaev (Кыргызский Государственный Университет им. И. Арабаева)”, Moscow State Linguistic University (Московский государственный лингвистический университет), http://inlang.linguanet.ru/Cis/CisCountries/detail.php?ELEMENT_ID=2612&SHOWALL_1=1, (accessed: June 6, 2017)

¹³² “Overseas partner institutions,” Osaka University of Tourism (Original in Japanese) ,

(3) National Academy of Science of Kyrgyz

Name of Institution	National Academy of Science of Kyrgyz
Name in Russian	Национальная академия наук Кыргыз
URL	http://www.nas.aknet.kg (accessed: June 18, 2017)
Language Used	Kyrgyz, Russian, English

The National Academy of Science of Kyrgyz was established in 1943 as the Kirghiz Branch of the Academy of Science USSR. It was reorganized in 1993 after the collapse of the Soviet Union.

Their tasks are to conduct fundamental research, acquire new knowledge on nature and society, and commercialize knowledge and technologies vitally needed to enhance international competitiveness. Collaborative work with foreign scientific research institutes is progressing. Agreements on scientific cooperation have been signed with Switzerland, Germany, the United States, Japan, Mongolia, Norway, India, CIS countries, etc.

There are 19 research institutes under the Academy's umbrella, including the following 14 in science and engineering:

- Institute of Automation and Information Technologies
- Institute of Mathematics
- Institute of Engineering Science
- Institute of Physical and Technical Problems and Materials Science
- Institute of Water Problems and Hydro energy
- Institute of Geology. M.M. Adysheva
- Institute of Geo-mechanics and Subsoil Development
- Institute of Seismology
- Institute of Chemistry and Chemical Technology
- Institute of Biotechnology
- Biological and Soil Institute
- Institute of Forestry, VN Sukachov
- Institute of Mining Physics and Medicine
- Institute of Natural Resources named after A.S. Jamanbayev

(4) Institute of Mining and Mining Technologies Academician named after W. Asanalieva

Name of Institution	Institute of Mining and Mining Technologies Academicians named after W. Asanalieva
Name in Russian	Институт горного дела и горных технологий имени академика У. Асаналиева
URL	http://www.igd.kg/ (accessed: June 18, 2017)
Language Used	Russian (Kyrgyz and English are under construction)

The Institute of Mining and Mining Technologies Academicians named after W. Asanalieva was started as a part of KSTU in (1) above. Today the institute operates as a completely independent educational institution. About 3,000 students currently study at the institute, typically for a period of 5 years.

There are four faculties with focus on mining: the Mining and Metallurgical Faculty, the Geological Exploration Faculty, Faculty of Ecology and Economics, and Faculty of Distance Learning.

Foreign partnerships universities are in Russia, Austria, China, and Japan (Shimane University). The students of Shimane University conduct a survey of mineral resources in Kyrgyz.

There are about 17,000 deposits in Kyrgyz, but only 17 are in operation. Obsolete educational facilities and equipment will have to be updated if more experts are to be trained to contribute to the development of deposits, and teachers will have to be trained by means such as overseas dispatch. Financial support from the government is difficult to receive, however, so prospects for support from private enterprises are considered.

The university has a mineral museum and an electronic catalog for students available online.

(5) International University of Innovative Technologies

Name of Institution	International University of Innovative Technologies (IntUIT)
Name in Russian	Международный Университет Инновационных Технологий
URL	http://www.intuit.kg/ (accessed: June 18, 2017)
Language Used	Kyrgyz, Russian, English

IntUIT was established in 2008. The campus, which includes a college, is located about 10 km from Bishkek city.

The main departments are the Department of Information Technology, the Department of the Technology and Design of Garments, the Department of Building, the Department of Power Supply, the Department of Design of Architectural Environments, the Department of Management, etc.

Foreign relationship agreements have been arranged with universities in Russia, Kazakhstan, etc., along with an alliance with GIZ. IntUIT is also actively promoting cooperation with companies, and 80% of graduates find employment (including self-employment).

(6) Kyrgyz Turkish Manas University

Name of Institution	Kyrgyz Turkish Manas University
Name in Russian	Кыргызско-Турецкий университет "Манас"
URL	http://www.manas.edu.kg/index.php/ (accessed: June 18, 2017)
Language Used	Turkish, Kyrgyz, Russian, English

Manas University was established in 1995. About 6,000 students are enrolled there, of whom 80% are Kyrgyz, 10% are Turkish, and 10% are from other Central Asian regions. The curriculum conforms to the Bologna process. Tuition is free, and some excellent students can receive scholarships.

The university has nine faculties in total, including the following in science and engineering: Faculty of Natural Sciences, Faculty of Engineering, the Veterinary Faculty, and Faculty of Agriculture. Four Higher Schools (Высшая школа) specialized in Physical Education, Music, Tourism, and Foreign Languages are located on campus, along with a vocational training school.

Faculty of Engineering has four departments: the Computer Engineering Department, Chemical Engineering Department, Environmental Engineering Department, and Food Engineering Department. The latest educational/research equipment is installed in their laboratories.

Most students decide on their employment prior to graduation. A few go on Master's and Ph.D. programs. Graduates from the Department of Chemical Engineering are mainly employed in mining companies because positions at chemical companies in Kyrgyz are difficult to find.

The university is cooperating with Kumamoto University in the fields of engineering and natural sciences. Partnerships have also been arranged with Iwate University and several Turkish and German universities.

(7) Chemistry Institute under the National Academy of Science

Name of Institution	Chemistry Institute under the National Academy of Science
Name in Russian	Институт химии и химической технологии
URL	http://www.naskr.kg/index.php (accessed: June 18, 2017)
Language Used	Kyrgyz, Russian, English

The Chemistry Institute was established in 1954 as a group of independent research institutes in the fields of inorganic chemistry, organic chemistry, and physical chemistry. These research institutes were integrated into the current form of the Chemistry Institute in 1994.

Eighty-four researchers are currently enrolled. There are eight departments according to the following research themes prioritized by the nation: Biophysical Chemistry, Inorganic Chemistry, Organic Chemistry, Minerals, Antimony and Arsenic, Noble Metals, Material Study, and Nanotechnologies.

The biggest problem of the institute is a lack of necessary facilities, equipment, test substances, and reagents due to the limited funds to purchase. For example, the research on Nanotechnologies, the researchers are attempting to apply the research results to drug development. However, the experimental equipment is so insufficient that by the researchers' ingenuity, experiments are conducted utilizing limited equipment somehow. It requires extra time for yielding the harvest of research. Furthermore, even Kumamoto University (Japan) was willing to donate used microscopes, but transportation costs were too high to accept the arrangement.

The institute has acquired a number of patents and has the ability to shape ideas, but its activities are constrained by a lack of funds. And even if young scientists have the opportunity to study at overseas institutions, their prospects for a shift to better-paying jobs upon returning to Kyrgyz are greater than their commitment to continue their career in the institution.

(8) Kyrgyz National University named after Jusup Balasagun (KNU)

Name of Institution	Kyrgyz National University named after Jusup Balasagun (KNU)
Name in Russian	Кыргызский национальный университет имени Жусупа Баласагына
URL	https://www.knu.kg/ (accessed: June 18, 2017)
Language Used	Kyrgyz, Russian, English

KNU was established in 1951 on the basis of Kyrgyz State Pedagogical Institute. Currently there are six faculties in fields of science and engineering among 21 faculties: the (1) Faculty of Mathematics, Informatics and Cybernetics, (2) Faculty of Physics and Electronics, (3) Faculty of Chemistry and Chemical Technology, (4) Faculty of Biology, (5) Faculty of Geography, Faculty of Geography, Ecology and Tourism, (6) Faculty of Information and Innovation Technologies.

The Mathematics Department specializes in two main themes, "Integrated Differential Theory" and "Topology," plus the more recent theme of Navier-Stokes Equations. The research results are

published in scientific journals and international conferences.

The main themes of the Chemistry Department are Humic Substances, Medicine Chemistry for Oncology, and Triple Systems with Rare Metals. The Physics Department focuses on Technical Physics, Electronics, and Nano Electronics. Experimental equipment is important for these studies, but difficult to acquire new ones due to financial constraints. KNU recently received a new spectrophotometer provided with Turkey's support.

After graduation, students from the Chemistry Department are often employed in mining companies; students from the Mathematics Department, in software companies; students from the Physics Department, as medical affiliates. About 50% of the students who graduate become teachers. About 15% of the students go on to graduate school.

International partnerships are arranged with Russian, Turkish, Norway, Indian, American, Chinese, and Korean universities.

(9) Kyrgyz National Agrarian University named after K.I. Skryabin

Name of Institution	Kyrgyz National Agrarian University named after K.I. Skryabin (KNAU)
Name in Russian	Кыргызский национальный аграрный университет им. К.И.Скрябина
URL	http://knau.kg/ru/ (accessed: June 18, 2017)
Language Used	Kyrgyz, Russian, English

KNAU was established in 1938 to train agricultural experts. There are six faculties: the (1) Faculty of Water Reclamation, Ecology and Land Management, (2) Faculty of Economics and Information Systems named after E. Arabaeva, (3) Faculty of Agronomy and Forestry, (4) Faculty of Veterinary Medicine and Biotechnology, (5) Faculty of Engineering and Technology, (6) Faculty of Technology for the Production and Processing of Agricultural Products.

KNAU currently has about 4,000 students, including 200 distance education students. About 75% of the students who graduate find jobs, but not always in their fields of specialization.

International cooperation agreements are in place with universities and research centers in the CIS countries, Germany, Czech Republic, Switzerland, Sweden, Italy, Turkey, Finland, China, Korea, etc. KNAU also engages in personnel exchanges with the University of Tsukuba in Japan. International projects are underway with Erasmus+, Biodiversity International, JICA, the German Academic Exchange Association (DAAD), and ICARDA (International Center for Agricultural Research in Dry Areas), etc.

There are no pressing issues with regard to the educational equipment at KNAU. Kyrgyz imports tractors and other agricultural machinery from Russia, Belarus, Turkey, China, etc., having no production capacity at home. KNAU prefers to use high-quality Japanese machinery (second hand), as well.

The problems listed by KNAU were (1) the education level of applicants for enrollment and (2) the economic situation of students after admission. Many students live in rural area, have low levels of education, and fail to pass the entrance examination (90% of applicants are from rural area)¹³³. Students from rural areas also live separately from their parents when they come to KNAU, which requires them to work part-time to cover their living expenses. Many students therefore tend to be absent from classes due to their jobs.

(10) Kyrgyz-Russian Slavic University named after B.N. Yeltsin

Name of Institution	Kyrgyz-Russian Slavic University named after B.N. Yeltsin
Name in Russian	Кыргызско-Российский Славянский университет им. Б.Н. Ельцина
URL	http://www.krsu.edu.kg (accessed: June 18, 2017)
Language Used	Russian, English

Kyrgyz-Russian Slavic University was established in 1993 under the support of the Yeltsin Foundation. A Kyrgyz Presidential Decree of 2004 bestowed the name of Boris Yeltsin, the first Russian president, as a proof of the nation's great appreciation for the establishment of the university.

There are seven faculties, including the following in science and engineering: the Faculty of Natural and Technical Sciences, Faculty of Medicine, and Faculty of Architecture, Design & Construction.

The following research themes are selected in the Faculty of Natural and Technical Sciences: Microelectronics and Semiconductor Devices, Meteorology, Physical Processes of Mining Production, Software Support for Computing Machinery and Automated Systems, Dynamics and Machine Durability, Nontraditional and Renewable Energy Sources, Applied Mathematics and Informatics, Organization and Traffic Safety Control, Networks and Communications Systems.

The male-female ratio is about 70%:30%. The rate of employment rate in the students' specialized fields is about 80%.

¹³³ Students who are not admitted are allowed to enrol at a college. After graduating from college, they can transfer to the second grade of KNAU.

On graduation, a student can obtain both Russian and Kyrgyz diplomas. International collaborations have been arranged with Russia, Israel, US, Germany, England, Tajikistan, Kazakhstan, etc.

While some educational equipment is not new, the equipment is well maintained and in adequate upkeep for educational purposes. Russia also sends funds every year (several million roubles) for equipment updates.

(11) Kyrgyz State University of Construction, Transport and Architecture named after N. Isanov

Name of Institution	Kyrgyz State University of Construction, Transport and Architecture named after N. Isanov (KSUCTA)
Name in Russian	Кыргызский государственный университет строительства, транспорта и архитектуры им.Н.Исанова
URL	http://www.ksucta.kg (accessed: June 18, 2017)
Language Used	Kyrgyz, Russian, English, German, Chinese

KSUCTA was established in 1992. Its base is the Frunze Polytechnic Institute.

There are five faculties: the Kyrgyz-German Faculty of Informatics, Faculty of Information Technology, Kyrgyz-Indian Faculty of Computer Engineering, Building and Engineering Faculty, and Faculty of Economics and Management.

Relations with JICA have been ongoing since 1997; much of it focused on cooperation in road construction fields. Collaborations are in place with other organizations and countries such as Erasmus+, Germany, China, India, etc. Recently, 50 to 60 faculty members participated in an exchange program.

KSUCTA currently has about 9,000 students enrolled. The male-female ratio is 60% : 40%.

While the educational program is modeled after the five-year USSR system, KSUCTA offers a European master's program. The employment rate for graduating students is around 70%, but not many employers select graduates for their specialties.

KSUCTA has collaboration agreements with 300 companies under which third-grade students work in the companies as interns (up to 8 weeks). Companies may require changes in the education curriculum.

Most of the experimental facilities and equipment were purchased in the former Soviet era, they still

function well overall.

(12) International University of Kyrgyzstan

Name of Institution	International University of Kyrgyzstan (IUK)
Name in Russian	Международный университет Кыргызстана
URL	http://www.iuk.kg (accessed: June 18, 2017)
Language Used	Russian

IUK was established in 1993 and operates a college established much earlier, in 1930.

There are three faculties: the (1) Faculty of Social, Humanities and Natural Science Disciplines, (2) Faculty of Diplomacy, Law, Business and Computer Technology, and (3) Faculty of Linguistics and Regional Studies).

About 10,000 students attend the school, including about 3,000 foreign students, many of whom are Pakistani, Indian, Iranian, Malaysian, and Russian.

International cooperation arrangements are underway with 35 countries, including Japan. IUK cooperates with 70 universities in fields such as sustainable development, education, medicine, law, economics, social science, etc. The school also has agreements with Osaka University on nano-electronics.

The research theme of focus is sustainable development of mountainous areas. The effective utilization of abundant resources of Kyrgyz is thought to heavily depend on an ecologically friendly approach.

6.4. Technical Vocational Education and Training (TVET)

6.4.1. History of TVET

From the collapse of the Soviet Union in 1991 and the independence leading to it, the tulip revolution in 2005 and up until the Kyrgyz upsurge in 2005, the political regime has continued to change, but since the current administration was established in 2010, various social systems have been established. In the field of education, including vocational training, reform of the fundamental portion has been progressing steadily since early days including in 2012, the Education Development Strategy of the Kyrgyz Republic for 2012-2020. From then, vocational technical education and training have been developed underpinned by this strategy. In the National Sustainable Development Strategy for the Kyrgyz Republic for 2013-2017, it is also stipulated that this Education Development Strategy must be promoted, reflecting the target of a flexible, open and modern national education system; combining the best national traditions of education and international experience.

6.4.2. Outline of TVET

There are two categories of vocational education and training in Kyrgyz: primary vocational education and training and secondary vocational education and training. The former is administered by the Primary Vocational Education Agency under the Ministry of Education and Science, which deploys 100 schools nationwide in the name of Vocational Lyceum¹³⁴. After graduating from junior school, equivalent to the 9th grade of Japanese junior high school, students enter Vocational Lyceums and take 10 months of education and training. The latter are directly under the jurisdiction of the Ministry of Education and Science, with 135 schools nationwide named colleges¹³⁵. Students enter these colleges after graduating from junior school and engage in two years and ten months of education and training, or in other cases, students enter college after completing 11 years and graduating from high school and take education and training for two years. They also offer short-term training courses for the general public. In 2015, 29,100 people entered Vocational Lyceums and 31,800 entered colleges¹³⁶.

(1) Curriculum

The revision and abolition of the curriculum is handled by the Republican Science and Methodology Center under the Ministry of Education and Science, which also sets up common general subjects (80% of the total) such as mathematics and mechanical engineering and checks and approves a special

¹³⁴ Helvetas Swiss Intercooperation Kyrgyz May 12, 2017

¹³⁵ Ministry of Education and Science of the Kyrgyz Republic May 10, 2017

¹³⁶ Kyrgyz stat committee 5.03.00.11 Number of admitted students by types

subject curriculum (20% of the whole) compiled by each school after consulting with local industry. In addition, information at the time of visiting the college suggested that this ratio will change to 50% and 50% from the latter half of this year.

(2) Materials and Equipment

Education and training comprises class study, practices and internships, but when we travel around the school site, it seemed that the teaching materials and equipment for practical use were extremely old, the required functions were lacking and the quantity was also insufficient. The quality of education and training are unlikely to suffice. Also when interviewing school officials, many schools showed expectations for cooperation on improving teaching materials and equipment.

(3) Employment

Collaboration with local industry has been quite carefully handled, such as setting up curriculums and accepting internships. Internships in particular are useful, not only for learning knowledge and skills at enterprise workplace practice but also to facilitate the transition to employment. Students start preparing for employment from the time they go to internships and the recruitment prospects are often clarified during internships. On graduation, 85% of lyceum students have firm employment offers, 40% of those in college proceed to higher education, 35% find employment in companies and some 25% opt for overseas labor. The lack of national labor needs means seeking work overseas is established as a viable option.

(4) Expectations for JICA

As for expectations for JICA, the Ministry of Education and Science and the Elementary Vocational Education Agency have shown hope that general cooperative relationships will be provided in future, from schools updating educational materials and equipment, support for restoring building facility functions and support for general practical training education.

Some explanations from the ministry set out how they are in the process of conforming to European standards and developing standards for vocational qualification and to assess graduation.

6.4.3. Survey Visit Results

(1) Bishkek Technical College

In 1951, the Furunze Automobile Industrial Technicum came into being, named after the city at the time, Furunze and since 2000, has conducted secondary vocational education covering ten subjects in five fields; adding IT, energy, commerce and mining.

Education and training has two courses, one of which lasts two years and ten months after graduating from the 9th grade and the other lasting ten months after graduating from 11th grade school. Every year about 375 people are enrolled and about 750 students - 90% of whom male - are currently studying in school. Completing the education and training curriculum allows students to obtain a technician's national diploma in each subject. While 35% of graduates will get a job, 40% proceed to university via transfer and the remaining 25% continue to search for work.

Cooperation agreements have also been concluded with more than 50 local companies. Each company accepts students for internships lasting two to six weeks per year during the three-year education period and three members from companies participate in the five-member examination committee on graduation. Students gradually receive firm employment offers throughout this period.

The school occupies a massive historic downtown building, but facilities such as classrooms are thought to have been left as they were and appear unsatisfactory aspect based on modern standards. Practical training laboratories appear poorly maintained, likewise equipment, which has a serious impact on education and training.

As for donor support, ADB is providing cooperation related to industrial collaboration activity. The school faces the following issues: 1. the need to renovate the school building and renew educational materials and equipment, 2. the need to improve instructors' technical knowledge and skills, 3. the shortage of technical exchanges with Asian countries, 4. Retraining practical skills of instructors. For JICA in particular, a Japanese-style vocational training system was requested, as well as training in the company of Asian countries.

(2) Vocational Lyceum No. 94

This school, situated on the outskirts of Bishkek city in an industrial area, was founded in 1965 to provide courses in areas including photography processing, watch repair and shoe repair and currently offers four courses of tailoring, sewing, beauty and home appliance repair, in line with requests from local industry. There is also the prospect of introducing a fire protection facility course, given the emergence of light industry in recent years.

The term of study is ten months, together with 60% of practice and 40% of class study. There is no exam on entering school but a health check is imposed. 85% of students will be hired through internships during the last three months, while the remaining 15% of students graduate without a firm job offer. Accordingly, schools maintain strong links with industries, commercial associations,

business associations, shops and so on.

The school building is old, but well maintained, while each classroom and practice workshop is well prepared. In the practical class on the sewing course in particular, it seemed training drills were frequently practiced.

In terms of support from donors, KOICA's youth overseas volunteers are stationed as lecturers on the home appliance repair course, together with support for equipment and classroom refurbishing equivalent to 20,000 US dollars. He attended the visit.

(3) Vocational Agricultural Lyceum No. 28

This institution in a rural location about an hour from Bishkek city was established as an agricultural school in 1973 and currently offers seven courses: farming machinery repair, tractor operation, welding and commercial vehicle driving, all for agricultural occupations (male) and sewing, cooking and beauty for females. Four courses are set up to cover all agriculture-related work, which includes actual agricultural experiences such as soil and seeding, etc. As well as selling, accounting and personnel affairs, subjects necessary for entrepreneurial activity, including drafting of business plans and issuing cost estimations, are taught.

As the Soviet Union collapsed, farmland was transferred to all families engaged in agriculture and many small-scale farmers emerged. This school has responded to the increased demand for education and farm training. In the course, one month's internship at an agricultural workplace is included at the end of each grade.

Students enter the school by graduating from the ninth year of their previous school and provided they receive education and training for a year, can obtain education certificates. By continuing for three years, however, they can obtain a farmer's graduation diploma and a total of 424 students are currently enrolled. After graduation, although more than 75% will get work, the remaining 25% will proceed to university and continue job-hunting.

There is a wide practice farm on the premises and the school building, including the practice shop, is also in place. However, a large practical machine workshop was poorly maintained, while tractors and farming machinery were decrepit and in a poor state of repair, with some parts missing. Students were also practicing without textbooks or notes.

In terms of collaboration with industry, farms are the main partners and the surrounding area includes many cooperative agricultural enterprises changed from the kolkhoz (collective farms) of the Soviet era. They operate with agricultural land on a 400-hectare scale. About ten students are sent there for internship, around six of whom later gain employment.

The curriculum is proposed by the science and methodology center under the umbrella of the Ministry of Education and at the request of the school. Within the school itself, round-table conferences are held with about 50 people, mainly related companies, to discuss the contents, whereupon the school applies to the primary vocational education agency with jurisdiction for approval.

There are 45 teachers: 15 male and 30 female, with an average age of around 40. The base salary is 6,000 Som (around 10,000 yen) and relatively low compared to other domestic salaries for example, compared with the average monthly salary of 13,500 som in 2016 of the manufacturing industry. Accordingly, as well as taking charge of course class study and practice, teachers also grow vegetables, fruit and flowers for additional income in school and cooperate with industries for knowledge and skills. Any teachers requiring retraining will be sent to an agricultural company for a week, but with no support provided nationally to cover expenses incurred.

The major issues as recognized by the school are updating outdated and decrepit equipment, curriculums and textbooks as the national budget has not yet been set. What is expected of JICA is to give details of Japan's agricultural vocational training and provide good quality practical agricultural machinery made in Japan

6.4.4. Issues and Prospects of TVET

(1) System of Practical Education and Training

The limited national budget severely restricts spending on vocational schools. Apart from the labor expenses of teachers and others, there is very little maintenance and renewal of facility buildings and equipment. Accordingly, equipment essential for practical training education has not been well maintained for many years and most of the schools surveyed lacked such equipment in a state ready to use. This meant practical training education merely constituted a venue to listen to information. It is imperative to ensure the personnel in demand by industry are familiar with machinery and equipment when entering the workplace and this must be kept in mind.

(2) Industry Collaboration

In many of the schools visited, the need to improve the curriculum and course are said to be issues. Even so, they have cooperated with the industrial side in revising, abolishing and reviewing to a sufficient extent and there has been sufficient opportunity to consider the points required by industry. This underlines the strong possibility that industrial collaboration may become merely a soundbite. Over long-term cooperation activities between schools and industry, most of the expected points, such as analysis of relations between industrial technology and human resource training and consideration of future prospects have been missed and it is vital to review this point.

(3) Retaining of Teachers

The average age of educational and training staff is about 40 and many people have continued ever since the collapse of the Soviet Union, as was also observed during the visit. The knowledge, competence and instructional skills of teachers who train and educate students are key in terms of school management, but lacking under the current Kyrgyz system. Although a reeducation institution exists directly under the Ministry of Education, it is proposed that each school acknowledge this as a major issue requiring action and support.

6.5. Donor Assistance in the Industrial Human Resource Development Field

6.5.1. Overview of Donors in the Education Sector

Many donors such as GIZ, USAID, UNESCO and the World Bank are mostly focusing on assistance in primary and secondary education, given the major educational challenges in Kyrgyz of illiteracy and the reduced enrollment rate in basic education. In higher education meanwhile, Erasmus+ supports exchange, research and mobility among higher educational institutions. The EU is continuing to support educational reform in line with the Action Plan of Education Development 2018-2020 as formulated by the Ministry of Education and Science, while ADB and GIZ have continuously supported TVET system development. Currently, ADB is implementing the Second Vocational Education and Skills Development Project, while GIZ is implementing the Promotion of Employment and Vocational Qualification.

6.5.2. Overview of Donors in the Industrial and Private Sectors

In the area of SME development, ongoing projects include: “Women’s Entrepreneurship Development Project” and “Second Invest Climate Improvement Project” by the ADB, the “Business Growth Initiative” and “Agro Horizon Project” by USAID and the “Integrated Dairy Productivity Improvement Project” by the World Bank. These projects are supporting SMEs in key industrial sectors such as agriculture, livestock, tourism and textiles to increase productivity and boost market access. EBRD provides consultation service to MSMEs, while GIZ is promoting regional trade in Central Asia.

6.5.3. Donor’s Current Information

The fields of support from each donor in Kyrgyz can be found on the following donor map.

Table6-15 Donor Map

Donor	Industry sector	Education sector		Other Priority Sectors
		Higher education	Technical training education	
ADB	<ul style="list-style-type: none"> • “Women Entrepreneur Development Project” targeting women’s economic empowerment • Second Invest Climate improvement project 		<ul style="list-style-type: none"> • TVET reinforcement project • Second Vocational Education and Skills Development Project 	<ul style="list-style-type: none"> • Central Asia Regional Economic Cooperation (CAREC) Program • Economic development • Finance • Energy • Transportation · Roads • Trade
EBRD	<ul style="list-style-type: none"> • Provided a consultation service for SMEs 			
Erasmus+ (EU)		<ul style="list-style-type: none"> • Collaborative research project with EU universities • International Unit Movement Project • EU short-term study abroad • Jean Monet 		
EU		<ul style="list-style-type: none"> • Education sector reform contract • Education sector support • Development of a financial mechanism for a safe school educational environment • Enhancement of learning achievement assessment 		
GIZ	Support for regional trade in Central Asia		Professional education and vocational training in Central Asia (2010-2018) Agricultural food processing and job training support for Kazakh, Kyrgyz, Tajik	<ul style="list-style-type: none"> • Primary and Secondary Education • Private Sector Development • Health • Peacebuilding • Governance · Law • Water management
UNESCO		<ul style="list-style-type: none"> • SDGs education index • Educational reform policy support • Exchange Study Abroad Program 		<ul style="list-style-type: none"> • Preschool education • Primary and Secondary Education • Climate change • Environmental protection • Natural resource management
USAID	<ul style="list-style-type: none"> • SME support for tourism and textile industries • Agro business support 	<ul style="list-style-type: none"> • American University of Central Asia • National examination system reform, including the college entrance examination test system 		<ul style="list-style-type: none"> • Primary and Secondary Education • Health • Environment • Governance democratization • Agriculture • Economic development (tourism)
World Bank	<ul style="list-style-type: none"> • Integrated dairy productivity improvement project (dairy product production support) 		Skill and job project being prepared	<ul style="list-style-type: none"> • Primary and Secondary Education • Preschool education • Environment • Private Sector Development • Finance

(1) ADB

ADB has been implementing TVET projects since 1997¹³⁷. Recently, the Second Vocational Education and Skills Development Project¹³⁸ have got underway, in 2017-2018, to strengthen the TVET system to meet labor market needs. (Budget: 20 million US dollars). Its major activities are as follows:

- 1) Developing the CBT Curriculum and teaching materials to meet labor market needs
- 2) Maintaining facilities and equipment
- 3) TOT for instructors and managers
- 4) Promoting dialog with industrial sectors
- 5) Managing educational institutions
- 6) Training Plan with social inclusion, considering gender, disabilities and ethnic minorities

ADB is helping the Kyrgyz Republic address mismatches in the labor market through vocational education reforms. The project will boost skills training opportunities for adults and out-of-school youth. It will improve teaching and learning environments; update the curriculum, assessment methods, and learning materials; and support training for instructors and school managers.

ADB supports the Kyrgyz Republic to address mismatches in the labor market through vocational education reforms. The project will boost skills training opportunities for adults and out-of-school youth. It will improve teaching and learning environments; update the curriculum, assessment methods, and learning materials; and support training for instructors and school managers. ADB is helping the Kyrgyz Republic address mismatches in the labor market through vocational education reforms. The project will boost skills training opportunities for adults and out-of-school youth. It will improve teaching and learning environments; update the curriculum, assessment methods, and learning materials; and support training for instructors and school managers. ADB is helping the Kyrgyz Republic address mismatches in the labor market through vocational education reforms. The project will boost skills training opportunities for adults and out-of-school youth. It will improve teaching and learning environments; update the curriculum, assessment methods, and learning materials; and support training for instructors and school managers.

These activities fund grants to the Ministry of Education and Science, Agency of Primary Vocational Education, Ministry of Economy and Ministry of Labor and Social Development to strengthen their

¹³⁷ GIZ Kyrgyz, <https://www.adb.org/projects/38298-022/main>. (Accessed May 30, 2017).

¹³⁸ Asian Development Bank, Second Vocational Education and Skills Development Project, <https://www.adb.org/projects/38298-023/main#project-pds> (Accessed May 30, 2017)

political and institutional framework. The ADB also supports systematic TOT for master trainers on practical teaching methodology by establishing the Republican Science and Methodology Center, as well as promoting collaboration with industry-owned training centers.

The 1.5 million US dollars Women's Entrepreneurship Development Project, financed by the Japan Fund for Poverty Reduction, is helping scale up businesses operated by women in rural areas. In 2016, the ADB approved a further 25 million US dollars toward the Second Investment Climate Improvement Program to continue improving the business environment; promoting public-private partnerships and expanding access to finance for SMEs. Women are trained in business skills such as marketing, accounting and value addition.

The ADB Country Partnership Strategy 2013-2017 shows priority areas for ADB assistance are transportation and energy development, including hydropower, while others are education, the private sector and trade development¹³⁹. The ADB plans to strengthen youth employment through vocational education; targeting rural areas in particular.

(2) EBRD

The EBRD Kyrgyz is implementing consultation services for MSMEs by utilizing EU funds, as part of a common international scheme for EBRD.

There are two types of consultants; local and international and the work scope of local consultants includes business administration, finance and marketing within a single quarter. International consultants are responsible for highly specialized areas such as ISO and engage in consultation for around an 18-month period.

The EBRD Kyrgyz is locally implementing a case study while utilizing the Swiss Fund that introduces a Management Information System to wholesalers to increase productivity and develop customers.

(3) Erasmus+

Erasmus+ is the EU program for education, training, youth and sport for the period 2014-2020 which offers a number of opportunities for higher education students, doctoral candidates, staff and institutes (Budget: 16.5 billion Euro). In Kyrgyz, 53 universities, including AUCA, Alatau Kyrgyz-Turkish University and Mana Kyrgyz-Turkish University, have participated in the program

¹³⁹ Asian Development Bank, ADB Country Partnership Strategy, <https://www.adb.org/sites/default/files/publication/59620/kgz-2016.pdf>. (Accessed May 30, 2017) .

since 2013 and introduced and applied European standards to their own universities. The program comprises the following activities¹⁴⁰:

1) Capacity-Building of Higher Education Institutes

It supports joint projects between European and Kyrgyz universities and system development of Kyrgyz universities such as:

- Curriculum development
- Development of a quality assurance system
- Development of NQF—Engineering and IT
- Improved mobility of students and teachers

2) International Credit Mobility

It supports the short-term exchange of students between universities both within and outside the EU, where unit acquisitions at EU universities are certified by Kyrgyz universities. A two-month period of training abroad is also prepared for university lecturers.

3) Jean Monet

It supports and promotes education and research on EU. Individual research on the EU and the establishment of an EU research center are subsidized.

(4) The EU

The overall objective is to support the Government to implement structural reforms in the education sector in line with the Education Development Strategy (EDS) 2020 and the Action Plans of Education Development (APED) 2016-2017 and 2018-2020 to enhance the quality of human capital, alleviate poverty, stimulate socio-economic development and improve the quality of life for the citizens of Kyrgyz. The specific objectives are: (i) To strengthen the capacities of national and local authorities to formulate, implement and monitor educational policy and ensure sound and effective financial management and resource allocation; (ii) To ensure equitable access to high-quality education and training; (iii) To ensure greater synergy between the needs of the labor market and the skills and qualifications offered by the general and vocational education and training systems. Currently, the following four projects are ongoing:

- 1) Education Sector Reform Contract (Direct Budget Support/grant, 2016-2018, Budget: 30 million Euro)

¹⁴⁰ Erasmus+, <http://erasmusplus.kg/en/> (Accessed May 30, 2017)

Direct budget support to The Kyrgyz Government, Ministry of Finance and Ministry of Education for all levels of education.

- 2) Support for the Education Sector in KR (Technical Assistance, 2014-2019, Budget: 3.1 million Euro)

The TA is supposed to help the GoK, MoF and MoE meet various budget support conditions/indicators; enabling GoK to receive Budget support payments/tranches.

- 3) Development of Financial Mechanisms for a Safe Educational Environment at Schools in the Kyrgyz Republic (grant project to NGO, 2017-2019, Budget: 1 million Euro)

Development and promotion of national standards on safe educational environment in Kyrgyz schools; Capacity-building of stakeholders in the field of management and financial provision of safe educational environment at national, local and institutional levels; Development of mechanisms and dissemination of best practices on safe educational environment among local self-government bodies and on a national level.

- 4) Strengthening the Education Attainment Assessment to Influence Decisions about Instructional Needs, Curriculum and Funding (grant project to NGO, 2017-2019, Budget: 1 million Euro)

Carry out the student assessment country-wide together with the Ministry of Education; Facilitate negotiations of the Government bodies, local authorities, academic society, School Boards of Trustees and CSOs on joint courses of action to address ongoing or emerging education assessment challenges and efficient budget spending.

There is another Education Support Program Package of almost 36 million Euros in the pipeline; to cover the period 2019-2021. The formulation and design of the program will be launched in 2018 to get the new Education Sector Reform Contract activated on a timely basis in 2019 to avoid any gap and promote further reforms. The core activities and criteria will be based on the Action Plan of Education Development 2018-2020 to be approved by the Kyrgyz Government in the course of 2017.

- (5) GIZ

GIZ has emphasized primary and secondary education and TVET development, with a regional program on reforming educational systems in Central Asia already completed.

In the TVET field, GIZ has continued supporting TVET system development since 2009. The Project on Promotion of Employment and Vocational Qualification (2017-2018) is targeting rural TVET organizations collaborating with the Ministry of the Economy, the Ministry of Labor and Social

Development, the Ministry of Education and Science, the Agency of Primary Vocational Education and the Chamber of Commerce. The objective of the Project is to reduce the unemployment rate (16%) by providing short-term skilled training to meet local labor market needs. The Project also strengthens career guidance and job counselling activities at regional job centers. Three key areas:

1) Improving Labor Market Services

Career guidance and counselling to collaborate with employers, local Government, youth centers and parents

2) Promotion of Youth and Women Employment

Qualifications on construction, food processing, welding, plumbing and greenhouse management.

3) Improvement of Vocational Education

A sectorial admission system with industry and chambers of commerce

The component of women's economic empowerment focuses on milk production and processing, with on-the-job training for rural women to instruct on marketing and value addition of cheese products.

In the economic development field, the Project on "Support to Regional trade in Central Asia"¹⁴¹ (2014-2019) is ongoing to target four countries (excluding Turkmenistan) in Central Asia. The three approaches are as follows: i) Single Window or One-Stop Shops, ii) Reform of the quality management infrastructure for foreign trade, iii) Development of regional consultation and coordination mechanisms.

The priority areas of assistance of GIZ are private sector development, health, water management, law and peace-building¹⁴².

(6) UNESCO

UNESCO in Kyrgyz is implementing education programs as well as holding a platform to monitor, exchange and share expertise with the Ministry of Education and Science to achieve SDG goals in the field of education. Promoting and safeguarding tangible and intangible cultural heritage is one of their main works. These cultural activities are mainly conducted in pre-schools and primary schools. Major

¹⁴¹ GIZ Kyrgyz, Support to Regional trade in Central Asia, <https://www.giz.de/en/worldwide/14062.html>. (Accessed May 30, 2017)

¹⁴² GIZ Kyrgyz, <https://www.giz.de/en/worldwide/356.html>. (Accessed May 30, 2017)

activities in the educational sector are as follows:

- 1) Holding international and regional conference on educational reform
- 2) Advice on making a National Action Plan on SDGs with the donor working group
- 3) Conducting exchange programs with Moscow, Paris, Geneva and Bangkok etc.
- 4) Supporting the NGO “IT Academy” for young engineers
- 5) Working for the international program on Geoscience Park¹⁴³
- 6) Publishing and disseminating teaching materials and textbooks titled “Maras” (heritage) on traditional stories of Kyrgyz (2013~)¹⁴⁴.

UNESCO is working for Education for All and will concentrate on secondary education to achieve full enrollment, while social inclusion programs promoting education for girls and the disabled are also planned. In the science research field, re-organization of the Academy of Science is one of the main targets to develop research activities by young scientists.

UNESCO also has a regional program encompassing activities on environmental protection, climate change and water management.

(7) USAID

USAID has emphasized primary education development, literacy and reading comprehension. In the higher education field, USAID has supported the establishment of the American University of Central Asia (AUCA) with scholarships, exchange program, TOT and career center and so on. USAID has also supported the efforts by the Ministry of Education and Science to reform the national test system to enter universities in Kyrgyz. The achievements of these projects are as follows:

1) American University of Central Asia, Moving Forward Project

USAID had a project called “AUCA Moving Forward” (Budget: 5,426,768 US dollars) during 2010-2015, which supported the foreign exchange of lecturers, scholarships for talented students, IT school management, adult education, the establishment of a career center and the Central Asia Study Institute. AUCA is noted as one of the best universities in Kyrgyz with comprehensible English education. The IT Faculty has successfully collaborated with the private sector and the employment

¹⁴³ Geoscience-programme, <http://www.unesco.org/new/en/natural-sciences/environment/earth-sciences/international-geoscience-programme/>, (Accessed May 30, 2017)

¹⁴⁴ The policy of providing education in Kyrgyz language was issued in 2013, consolidating lessons in Kyrgyz language ever since.

rate for its graduates is announced as 92%.

2) Supporting Equity through National Admission Testing

Though various kinds of tests were created and operated by the National Test Center based on requests, no system of national unified tests had been established. USAID had been working to design and launch the National Admission Test (NAT) in partnership with the Ministry of Education and Science and had supported efforts to establish an independent testing organization, a Center for Educational Assessment and Teaching Method (CEATEM). Based on these efforts, completion of the NAT for admission to both public and private universities has been mandatory since 2012.

In the area of MSME development, The Project on Business Growth Initiative (2014-2018, Budget: 20.2 million UD dollars) has been implemented; targeting the tourism and apparel sector in Kyrgyz. In the tourism sector, the Project directly supports MSMEs such as guesthouse owners and mountain tour operators; inviting foreign trainers to engage in business management and hospitality training. In the apparel sector, efforts are made to match manufacturers and buyers to improve access to both domestic and international markets.

In the agri-business development field, the Agro Horizon Project (2014-2018: budget: 22 million US dollars) is targeting smallholder farmers to improve productivity, expand markets and increase the competitiveness of targeted value chains, which has allowed 76,000 farmers rearing maize, apricot, potatoes, livestock and vegetables to benefit.

The USAID Country Development Cooperation Strategy 2015-2019 cites major areas of development as health, education, governance, democracy, agriculture, the environment, economic development through tourism and food processing. The USAID development objectives are set out as: i) Inclusive and accountable democracy, ii) Improved service delivery and policies for all citizens, iii) Accelerated growth of a diversified and equitable economy¹⁴⁵.

(8) The World Bank

The World Bank Kyrgyz focused on pre-school, primary and secondary education and continues to support participatory school management within the community. In 2017, the Project on Engaging Communities for Better Schools¹⁴⁶ started to strengthen school management skills to improve the primary and secondary school enrollment rate within rural communities.

¹⁴⁵ USAID, National Development Corporation Strategy, <https://www.usaid.gov/kyrgyz-republic/cdcs>, (Accessed May 30, 2017)

¹⁴⁶ World Bank, Engaging Communities for Better Schools, <http://projects.worldbank.org/P159699?lang=en>, (Accessed May 30, 2017)

The Country Partnership Strategy of World Bank Kyrgyz¹⁴⁷ particularly emphasized the following areas: i) raising standards of public administration and public service delivery; ii) improving the business and investment climate and iii) strengthening the stewardship of natural resources and the physical infrastructure. 11 projects (207.85 million US dollars in total) are ongoing. In the industrial sector, the World Bank confirms that agriculture is a key sector of the economy; providing about one-third of the country's employment and about 12% of total exports. The World Bank has just launched "The Integrated Dairy Productivity Improvement Project" to increase the productivity of livestock and irrigated agriculture. It applies an integrated approach to improve dairy and livestock production to meet the standard of the Eurasian Economic Union.

In the coming Country Partnership Strategy, starting from 2018, the World Bank plans to prioritize private sector and entrepreneurship development for social protection to create jobs for vulnerable groups such as unemployed young people and women. In this context, the 'Skills and Jobs' project" targeting youth employability is under appraisal and will start in 2019. The World Bank also plans future projects in the field of the Digital Economy that the Government plans to promote.

¹⁴⁷ World Bank, Country Partnership Strategy 2013-2017, <http://www.worldbank.org/en/country/kyrgyzrepublic/overview#2>. (Accessed May 30, 2017)

6.6. Analysis of Contents of Support by Japan

This chapter confirms "development policy" by Kyrgyz, Japan and other donors. In addition, "Industrial Human Resources Needs", "Outline of Education Sector", "Science and Engineering Higher Education Organization", "Vocational Technical Education and Training (TVET)", "Support by Other Donors" and the development policy will be investigated. Among these issues, we examined what is to be prioritized and the resources of Japan that contribute to solving the problem, and summarized it as a solution approach.

6.6.1. Kyrgyz's Policy

6.6.1.1. Kyrgyz's National Development Strategy

In Kyrgyz, in January 2013, the "National Sustainable Development Strategy 2013 – 2017"¹⁴⁸ was adopted and the following items are listed as priorities to be addressed:

Table6-16 Priority Areas in Kyrgyz Development Strategy

- | |
|---|
| <ol style="list-style-type: none"> 1) Sustainable economic growth and macroeconomic stability 2) Improvement of the business and investment environment 3) Development of the financial sector 4) Development of strategic economic fields (agricultural industry, energy, mineral resources, transportation / communication, tourism / services) 5) Regional economic development |
|---|

Reference: National Sustainable Development Strategy 2013 – 2017"

6.6.1.2. Participants of Invitation to Japan

The following table shows the affiliation of participants from Kyrgyz.

Table6-17 Name of the Organization Invited

1st invitation to Japan (February 2016)	2nd invitation to Japan (March 2017)
Ministry of Education and Science	Ministry of Education and Science (Agency of primary vocational education)
Osh Technological University named after Academician M. Adyshev	Kyrgyz State Technical University named after Iskhak Razzakov
Kyrgyz State Technical University named after Iskhak Razzakov	Kara-Balta Technical- Economical College

¹⁴⁸ The World Bank, Information resource on donors activities in the Kyrgyz Republic "National Sustainable Development Strategy 2013-2017" <http://www.donors.kg/images/NSSD-final-version-eng-Feb4.doc> (accessed: June 1, 2017)

6.6.2. Assistance Policy to Kyrgyz

6.6.2.1. Japan's Country Assistance Policy

The content of support in Japan is based on the framework of the country-specific aid policy (Kazakhstan Country Assistance Policy was formulated in May 2012), the development policy (plan) set by each country and “Central Asia + Japan” dialogue¹⁴⁹. In the dialogue, five issues common to Central Asia regional cooperation are; “Trade and Investment (including agriculture)”, “Environment, Energy Conservation and Renewable Energy”, “Millennium Development Goals (MDGs) Achievement and Disparity Correction”, “Afghanistan for Stabilization Cooperation”, “Cooperation for Disaster Prevention” and “Disaster Prevention Cooperation”.

Table6-18 Kyrgyz Country Assistance Policy (formulated in December 2012)¹⁵⁰

Basic policy (large goal)	Support for sustained and balanced economic growth boosting the establishment of a democracy		
Priority field (medium target)	Maintenance of transport infrastructure and correction of regional disparities		
Development issue (Small target)	Improve transportation infrastructure	Agriculture · business promotion	Improve governance and policy-planning skills
Current situation and issues	<p>1. For economic development, it is essential to establish a transportation infrastructure connecting each region and neighboring countries (Russia, Kazakhstan, China) which are large consumption areas as the basis. There is also a need to reduce transportation costs.</p> <p>2. Conversely, road conditions are worsening, not only when disasters (landslides, avalanches, etc.) occur, or when accessing remote districts during winter snowfall, not only hindering access to local districts from the</p>	<p>1. Agriculture is an important industry that produces about 20% of GDP. Also, given that approximately 60% of the population lives in rural areas, the creation of employment opportunities in agriculture-related sectors (including food processing industries etc.) is not limited to the context of ‘eradicating poverty’ It is also imperative from the perspective of correcting regional disparity 2. Given the scale of the domestic market, strengthening export competitiveness, such as exporting agricultural products to</p>	<p>1. Since independence, with two political changes in 2005 and 2010, regional disparities have been corrected, but consistent policy management imperative for socioeconomic development is not being implemented stably and the government’s policy-making ability is relatively fragile.</p> <p>2. Collaboration between the government and private sector also faces challenges and is an obstacle to revitalizing domestic socioeconomic activities and attracting</p>

¹⁴⁹ Ministry of Foreign Affairs “Central Asia + Japan” Dialogue - Decade Road (2014) <http://www.mofa.go.jp/mofaj/press/pr/wakaru/topics/vol117/index.html> (accessed June 1, 2017)

¹⁵⁰ Ministry of Foreign Affairs “Kyrgyz Country Assistance Policy to Kyrgyz” <http://www.mofa.go.jp/mofaj/gaiko/oda/files/000072285.pdf> (accessed: June 1, 2017)

	<p>perspective of revitalizing economic activities but, poor road conditions and complicated customs procedures which hinder logistics are a problem, which must be improved, including maintenance and management.</p>	<p>neighboring countries by utilizing geographical advantages such as cultivation environment, is indispensable. 3. Promotion of small-scale farming through privatization of farmland has resulted in cultivation techniques among farmers declining, has prompted a collapse of the agricultural product distribution system and problems such as an increase in fallow land and crop yield due to insufficient agricultural machinery, etc.</p>	<p>foreign investment. There is also a need to improve transparency and accountability of the government, as exemplified by corruption prevention.</p>
<p>Japan's response policy to development issues</p>	<p>Secure transportation routes leading to cities and rural areas, as well as overseas markets will support the development of transportation infrastructure (including strengthening of maintenance and management systems, technical capabilities etc.) centered on trunk road networks and logistics infrastructure. From the perspective of infrastructure development to promote logistics, implement assistance with border management and road disaster prevention (including preventive measures) in view.</p>	<ol style="list-style-type: none"> 1. Develop a cooperation program intended to create a "value chain" for overseas markets (support for highly demanding crop production, efficiency of harvesting and collecting and shipping agricultural products, marketing, cultivation of agricultural and livestock products processing industry). 2. Implement infrastructure support such as improvement of agricultural machinery, irrigation and processing equipment. 3. Establish a food inspection system, etc. and develop the surrounding environment related to the export of agricultural products. 4. Support SME promotion and improvement of business and investment environment. 5. As for the Japan Center, support while emphasizing industrial human resource development. 	<p>Within the field prioritized by the Kyrgyz government in the national strategy, human resource development that helps improve the policy-making capacity of government officials will be implemented. In the process of policy planning and implementation, as well as government officials capacity of private sector actors with important roles such as economic organizations, public benefit corporations, NGOs and private enterprises, will also be developed.</p>



Priority field (medium target)	Reconstruction of social infrastructure	Other
Development issue (Small target)	Social safety net development	Promotion of regional cooperation
Current situation and issues	<p>1. Since independence, the social infrastructure is becoming obsolete, including various social sectors such as education and healthcare. Factors such as the reduction of public expenditure in the social sector adversely affect the socially vulnerable.</p> <p>2. With economic growth, economic disparities between urban and rural areas are expanding and securing sustainable and balanced economic development is a challenge. Both sides highlighted the significance of the provision of education and medical equipment in the joint statement at the time of Prime Minister Shinzo Abe's visit in 2015.</p>	<p>1. Central Asia requires regional cooperation based on a philosophy of human security to solve poverty, the environment, water resources, disaster prevention, terrorism and narcotics. By promoting regional cooperation in fields such as narcotics measures and border control in anticipation of agriculture, disaster prevention, Afghanistan is included in the joint statement adopted at the "Central Asia + Japan" Dialog · the 5th Foreign Ministers' Meeting in 2014.</p>
Japan's response to development issues	To raise the standard of living people who take the center of the market economy and democratization through recovery of the social sector, such as healthcare and education, which is exhausted by the collapse of the socialist regime.	Utilize the framework of the "Central Asia + Japan" dialog to play a role as a catalyst to promote regional cooperation and strive to ensure stability and prosperity across the entire region.

6.6.2.2. Support Policies and Strategies of Other Donors¹⁵¹

Many donors are supporting primary and secondary education and preschool education to improve literacy and enrollment rates, which are a major issue in Kyrgyz. Support for higher education includes policy support for the Ministry of Education and Science, support to reform the educational system, collaboration with EU universities and support for short-term study abroad. TVET reinforcement support has long been ongoing.

Regarding the industrial sector, SMEs and entrepreneurs working in fields such as agriculture, the livestock industry, tourism and the textile industry, etc., which are major Kyrgyz industries, are being supported by multiple donors.

¹⁵¹ See Table 6-15, Kyrgyz Donor Map

6.6.3. Analyzing Issues Related to Advanced Industrial Human Resource Development

6.6.3.1. Problem Analysis

The problems are extracted based on the information described in previous sections and compiled in the table below:

Table6-19 Problem Analysis of Advanced Industrial Human Resource Development in Kyrgyz

Field		Task		Cause	Solution
Industry sector	Policy · institution	Attracting foreign companies	EEU measures against FEZ companies are not available.	<ul style="list-style-type: none"> Inability to compare the opinions of ministries and agencies deciding to join the EEU, with the Ministry of Justice of FEZ. 	<ul style="list-style-type: none"> Promote efforts to attract service industries unaffected by EU member accession.
		Support for export-oriented companies	Impossible to engage in discussion and plan policy concerning change in business environment due to policy changes such as accession to EEU etc.	<ul style="list-style-type: none"> Lack of knowledge and experience about corporate support policies. 	<ul style="list-style-type: none"> Foster knowledge of corporate policy in government personnel. Invite relevant parties to the Ministry of Economy, Trade and Industry of Japan, SME Agency etc. to develop bureaucratic skills.
	Industry human resource needs	Industrial human resources	Lack of human resources entrusted with management and professional engineers entrusted with direct production activities.	<ul style="list-style-type: none"> No young mid-level engineers engaged in road improvement and construction of dams and, high-voltage transmission lines for the domestic power-supply service. Lack of fostering mid-level engineers and planning advisors to the tourism industry. 	<ul style="list-style-type: none"> Train engineers and technical skills in construction and civil engineering fields. Foster mid-level engineers and planning advisors to the tourism industry

Education sector	Policy · institution	Compliance with international standards	<p>Not participating in the Bologna process. Soviet-style traditional education system remains and is a process conforming to modern European and international standards.</p>	<ul style="list-style-type: none"> ▪ Implementation of national educational policy is delayed. ▪ No cooperation system between educational institutions has been established and exchange of information and opinions among educational institutions has stalled. ▪ English education has not penetrated within educational institutions. 	<ul style="list-style-type: none"> ▪ Educate talented persons on scholarships such as Erasmus+ as part of efforts to establish Western-standard educational systems. ▪ Reflect this issue in the next policy document action plan. ▪ Establish a forum for exchange of opinions among educational institutions. ▪ Strengthen English language education for educators.
		Industry-academia collaboration	<p>Industry-academic collaboration has stalled systematically.</p>	<ul style="list-style-type: none"> ▪ Cooperation between the Ministry of Education and Science and the Ministry of the Economy is insufficient in vertically divided administration. ▪ Industry-academia collaboration is left to the self-help efforts of educational institutions. ▪ Educational institutions cannot fully analyze industrial needs. ▪ No mechanism to promote collaborative research between educational institutions and companies. 	<ul style="list-style-type: none"> ▪ Strengthen implementation of industry-university cooperation policy and strengthen collaboration among ministries and agencies. ▪ Certify universities and vocational training schools that are undertaking advanced initiatives as good benchmark schools. Also promote information exchange between institutions. ▪ Research industrial and labor market needs. ▪ Promote the creation of mechanisms to promote collaborative research.
		Quality of education	<p>No system to guarantee the quality of education.</p>	<ul style="list-style-type: none"> ▪ Evaluation criteria for higher education have yet to be established. ▪ Policies and laws related to the quality of education are inadequate. 	<ul style="list-style-type: none"> ▪ Strengthen the education quality evaluation system. ▪ Reflect this issue in the next policy document and state it clearly.

Higher education in general	Studying abroad	No system related to the mobility of education has yet been established.	<ul style="list-style-type: none"> ▪ In traditional education systems, study abroad and study visits were not encouraged. ▪ Transferring to other universities domestically was difficult. 	<ul style="list-style-type: none"> ▪ Expand the overseas study system. ▪ Develop a system for transferring to other universities domestically.
	IT education	Many educational institutions lack IT infrastructure and equipment.	<ul style="list-style-type: none"> ▪ Obsolete and not maintained. 	<ul style="list-style-type: none"> ▪ Improve IT infrastructure and equipment and thoroughly maintain.
	Curriculum development	Discretionary curriculum development at individual institutions is limited.	<ul style="list-style-type: none"> ▪ Due to the centralized education system, most curriculum development is performed by central ministries. 	<ul style="list-style-type: none"> ▪ Spearhead a system allowing individual educational institutions to further develop curriculums.
	Graduate employment	Even for college graduates, finding a job is difficult.	<ul style="list-style-type: none"> ▪ The proficiency level demanded by industry and the skill level acquired by university graduates are inconsistent. ▪ No training commensurate with local economic needs 	<ul style="list-style-type: none"> ▪ Strengthen the career guidance function of the university. ▪ Develop professional standards that match labor market needs. ▪ Strengthen cooperation and information exchange between vocational training schools and local companies to promote local workers. ▪ Foster entrepreneurs
	Teachers' status and ability	Teachers suffer from a low status and the ability to meet new needs is insufficient.	<ul style="list-style-type: none"> ▪ Lack of retraining opportunities. ▪ Salary is low. 	<ul style="list-style-type: none"> ▪ Strengthen faculty training institutions. ▪ Establish a reeducation system for educators
	Educational Infrastructure	Facilities and equipment of universities and research institutions are poorly developed.	<ul style="list-style-type: none"> ▪ Facilities and equipment are not prepared according to industry needs. 	<ul style="list-style-type: none"> ▪ Investigate how research should respond to industry needs.
	Education content	Inability to provide education capable of fostering the human resources sought by industry and diverge from industrial human resources needs.	<ul style="list-style-type: none"> ▪ Most of the curricular development is done by central government agencies and there is little room for universities to develop independently. 	<ul style="list-style-type: none"> ▪ Push forward with the creation of a system allowing individual educational institutions to further develop curriculums. ▪ Promote the creation of a

				<ul style="list-style-type: none"> Collaboration between universities and companies has stalled 	<ul style="list-style-type: none"> mechanism to facilitate collaboration among universities and companies
		Disparity in education levels	There are more universities overall due to the increase in private universities, but there are both universities with abundant funds and those lacking sufficient capacity and the educational level varies very considerably among universities.	<ul style="list-style-type: none"> The education level tends to be high in private and other universities with capital from overseas, while national universities cannot secure educational quality; mainly due to lack of funds and inability to hire hiring teachers with sufficient knowledge and skills. 	<ul style="list-style-type: none"> Strengthen government support system for national universities. To ensure the quality of education, strengthen implementation of the certification evaluation system such as course contents
	Higher education institutes in science and engineering	Research Equipment / Facility	Suitable educational experiment / research equipment / facilities are not substantial. Knowledge and skills to utilize this equipment are in sufficient	<ul style="list-style-type: none"> The equipment is becoming increasingly obsolete. Financing for new procurement is difficult. Inability to fund renewal of equipment. Insufficient knowledge of equipment / facility. 	<ul style="list-style-type: none"> Establish appropriate equipment plans and procure the necessary equipment accordingly.
		Technical level	Obsolete research equipment limit the scope of research and hinder efforts to achieve research results.	<ul style="list-style-type: none"> Aging equipment / facilities make it difficult to conduct adequate experiments. It is also difficult to secure experimental accuracy. 	<ul style="list-style-type: none"> Secure a budget for each research theme and formulate an appropriate equipment plan.
		Quality control / inspection organization	There is a lack of quality control and inspection institutions etc. capable of supporting industries targeting overseas markets.	<ul style="list-style-type: none"> Few opportunities for teachers / students to study excellent research institutions abroad. Lack of knowledge to allocate the necessary equipment 	<ul style="list-style-type: none"> Give the faculty / students the opportunity to engage in the necessary training to cope with the new technology.
		Scientific research	Scientific research at university is not functioning sufficiently.	<ul style="list-style-type: none"> Autonomy of university research is restricted by the Academy of Sciences, which is the scientific research authority. Limited number of master's and 	<ul style="list-style-type: none"> Review the authority of the Academy of Sciences. Expand the scope of master's and doctoral programs. Promote joint research between

				<ul style="list-style-type: none"> doctoral programs. No collaborative research with industry has been conducted. 	<ul style="list-style-type: none"> companies and universities. Increase opportunities for teachers and researchers to study abroad and accept foreign researchers
Technical vocational education and training (TVET)	Practical training education	It has been difficult to maintain equipment essential for practical training for many years. Most of the schools surveyed have no equipment ready to use.	<ul style="list-style-type: none"> Lack of an equipment-related budget Lack of awareness on the need for a practical training education Maintenance of facility and equipment is limited. No maintenance of equipment for practical training. 	<ul style="list-style-type: none"> Secure a budget related to equipment. Understand the need for practical training education. Study gap on skills of graduates. 	
	Curriculum that reflected Industrial needs	There is a strong possibility that industrial collaboration may stall.	<ul style="list-style-type: none"> Insufficient acquisition and analysis of curriculum-related information from industry. 	<ul style="list-style-type: none"> Review methods and perspectives on exchanges of views on curriculum and department. 	
	Instructor retraining	The knowledge, skills and guidance skills of the staff who educate and train have reached the required level and are not maintained.	<ul style="list-style-type: none"> The quality and quantity of the instructor's retraining is insufficient. Although there is a reeducation training institution directly under the umbrella of the Ministry of Education, both quality and quantity are not deemed to be at the required level 	<ul style="list-style-type: none"> Expand the scale of retraining facilities. Improve knowledge and skills of instructors. Enrich faculty retraining equipment 	

6.6.3.2. Priority Issues in Training Advanced Industrial Human Resources in Kyrgyz

Among the tasks extracted in 6.6.3.1 above, priority issues are summarized in the table below:

Table6-20 Priority Issues

Item Number	issue	Specific content	Solution(draft)	Utilization of Japanese resources (draft)
1	Industry-academia collaboration	<ul style="list-style-type: none"> Industry-academia collaboration is not progressing systematically. 	<ul style="list-style-type: none"> Strengthen implementation of industry-university collaboration policy and strengthen collaboration among ministries and agencies. Certify universities and vocational training schools that are undertaking advanced initiatives as good practice model schools. Also promote information exchange between institutions. Research industrial needs and labor market needs. 	<ul style="list-style-type: none"> Place a corporate advisor on the Japan Center (existing) and advise on various problems. Carry out an academic-industry cooperation check survey (information gathering / analysis) that introduced Japanese experts. Implement technical cooperation projects for higher education institutions that conduct advanced initiatives.
2	Curriculum development	<ul style="list-style-type: none"> Discretionary curriculum development at individual institutions is limited. 	<ul style="list-style-type: none"> Advance the creation of a system that enables individual educational institutions to develop curriculum more 	<ul style="list-style-type: none"> Dispatch policy advisor. Implement technical cooperation project for higher education institutions that can contribute to the development of advanced human resources for major industrial sector.
3	Graduate's employment	<ul style="list-style-type: none"> Even graduate from college, difficult to find a job. 	<ul style="list-style-type: none"> Strengthen the career guidance function of the university. To strengthen cooperation and information exchange between vocational training schools and local companies to promote local workers. Train entrepreneurs 	<ul style="list-style-type: none"> Prepare a business platform like the Japan Center and implement fundraising training for entrepreneurs
4	Research Equipment /	<ul style="list-style-type: none"> Experimental research equipment / facilities suitable 	<ul style="list-style-type: none"> Establish appropriate equipment plans and procure necessary equipment accordingly 	<ul style="list-style-type: none"> Implement technical cooperation projects for higher education institutions that can

	Facility	for education are not substantial. Also. Knowledge and skills to utilize these equipment are short		contribute to the development of advanced human resources for major industrial sector.
5	Technical level	<ul style="list-style-type: none"> Research content is limited, making research results difficult. 	<ul style="list-style-type: none"> Secure budget for each research theme and formulate appropriate equipment plan. 	<ul style="list-style-type: none"> Implement technical cooperation projects for higher education institutions that conduct advanced initiatives
6	Quality control / inspection organization	<ul style="list-style-type: none"> Quality control and inspection institutions etc. that can support industries aiming for overseas markets are short 	<ul style="list-style-type: none"> Give the faculty / students the opportunity for the necessary training to cope with the new technology 	<ul style="list-style-type: none"> Implement technical cooperation projects for higher education institutions that conduct advanced initiatives.
7	Practical training education	<ul style="list-style-type: none"> Equipment is not ready for use at many schools. Understanding and adapting to machinery and equipment is very important when working in the workplace in the future, but it is neglected 	<ul style="list-style-type: none"> Secure budget related to equipment. Understand the necessity of practical training education. 	<ul style="list-style-type: none"> Implement technical cooperation projects for agricultural vocational training schools/ lyceum.
8	Instructor retraining	<ul style="list-style-type: none"> The knowledge, skills and guidance skills of the instructors (staff) who train education have not reached the required level 	<ul style="list-style-type: none"> Expand the scale of retraining training facilities. Increase opportunity for instructor retraining. Improve knowledge and skills of instructors. Enrich faculty re-training equipment. 	<ul style="list-style-type: none"> Provide equipment by grant aid. Dispatch policy advisor. Implement technical cooperation projects for agricultural vocational training schools/ lyceum.

6.6.4. Selected Approaches to Solve Priority Issues in Advanced Industrial Human Resource Development in Kyrgyz

6.6.4.1. Solution Approach to Priority Issues in Kyrgyz

As described in 6.6.3.2, result of extracting the priority issues for developing advanced industrial human resources in Kyrgyz, it was confirmed that there is a great need for technical support accompanying the provision of equipment and support for corporate human resources. In order to contribute to them, we propose the following three approaches. However, the needs, order of priority and feasibility of the proposed approaches need to be further reviewed within JICA. Hence, the approaches below are shown rigidly as ideas.

In order to contribute to 2, 5, 6, and 8 stated in "Table 6-20 Priority Issues", we propose the following approach utilizing Japanese resources:

Table6-21 Approach 1

Approach 1	Kyrgyz State Technical University's Food Hygiene Management Center Project (technical cooperation project)
Objective	➤ The hygienic environment of agricultural and livestock processing industries is improved
Output	<ul style="list-style-type: none"> ➤ Food sanitation engineers is trained ➤ Kyrgyz State Technical University's Food Hygiene Management Center is established ➤ The necessity for food sanitation is recognized.
Activity	<ul style="list-style-type: none"> ➤ Establish a food sanitation management center. ➤ Develop the curriculum necessary to manage food hygiene ➤ Procure and maintain the equipment necessary for the Food Sanitation Control Center ➤ Re-educate teachers / instructors according to the new curriculum ➤ Conduct PR for food hygiene
Assumed C / P Organization	<ul style="list-style-type: none"> ➤ Ministry of Education and Science ➤ Kyrgyz State Technical University
Beneficiaries	<ul style="list-style-type: none"> ➤ Kyrgyz State Technical University students and faculty members ➤ Kyrgyz's food-related industries
Input	<ul style="list-style-type: none"> ➤ Japanese expert on food sanitation ➤ Food hygiene related equipment

In order to contribute to 1, 2, 3 and 8 described in "Table 6-20 Priority Issues", we propose the following approach utilizing Japanese resources:

Table6-22 Approach 2

Approach 2	Placement of corporate advisor at the Japan Center
Objective	➤ Kyrgyz's company's problems are solved
Output	➤ A consultation window by a corporate advisor is opened at the Japan Center
Activity	<ul style="list-style-type: none"> ➤ Advice and recommendations on entrepreneurship provided ➤ Advice and recommendations on financial planning / accounting issues provided ➤ Advice and recommendations on student internship acceptance provided ➤ Advice and recommendations on strengthening industry-university collaboration provided ➤ Advice and recommendations on promoting industry-academic collaborative research provided ➤ Advice and recommendations on equipment plan provided ➤ Advise and recommendations on promoting the introduction of digital / ICT equipment provided
Assumed C / P Organization	<ul style="list-style-type: none"> ➤ Industry, Energy, Underground Resource Utilization Committee (State committee of Industry, Energy and Subsoil Use) ➤ Japan Center
Beneficiaries	<ul style="list-style-type: none"> ➤ Kyrgyz companies and employees ➤ Kyrgyz Entrepreneurs
Input	➤ Corporate advisor

In order to contribute to 2, 7 and 9 described in "Table 6-20 Priority Issues", we propose the following approach utilizing Japanese resources:

Table6-23 Approach 3

Approach 3	Agricultural machinery improvement project at vocational training school (or Lyceum)
Objective	➤ Agricultural machinery maintenance engineers who help improve agricultural productivity is fostered
Output	<ul style="list-style-type: none"> ➤ Training content of agricultural mechanic maintenance department of existing vocational training school is improved ➤ Teachers capable of instructing on the latest agricultural machinery maintenance is trained
Activity	<ul style="list-style-type: none"> ➤ Conduct a baseline survey on agricultural machinery introduction status ➤ Procure additional equipment necessary to maintain agricultural machinery ➤ Improve the training curriculum for agricultural machine maintenance training ➤ Conduct ToT for teachers to train in maintenance of agricultural machinery.
Assumed C / P Organization	<ul style="list-style-type: none"> ➤ Ministry of Education and Science ➤ Vocational school or lyceum
Beneficiaries	<ul style="list-style-type: none"> ➤ Vocational school faculty and lyceum students ➤ Agricultural corporations, farmers
Input	<ul style="list-style-type: none"> ➤ Training equipment necessary to maintain agricultural machinery ➤ Japanese experts such as agricultural machinery maintenance

Asia Region

**Data Collection Survey on
Advanced Industrial Human
Resource Development
in Central Asia**

Annexes

July 2017

Japan International Cooperation Agency (JICA)

**O.P.C Corporation
Global Development & Management Consultants Inc.**

Annex 1 Schedule of the Field Survey

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Schedule of the Field Survey

1. Kazakhstan

Date	Name of the Place		City	Visiting Members
23 Jan (Mon)	10:00	JICA Kazakhstan Liaison Office	Astana	Mr Kakisu, Mr Ishii, Mr Motoya, Mr Tsuyuki, Ms Takeda, Ms Ikeda, Ms Okada
	11:30	Asian Development Bank Kazakhstan Resident Mission	Astana	Ms Ikeda, Ms Takeda, Ms Okada
	13:30	GIZ	Astana	Mr Kakisu, Mr Ishii, Mr Tsuyuki
	14:00	Polytechnic College of Astana City	Astana	Mr Kakisu, Mr Ishii, Ms Ikeda, Ms Okada
	15:00	Marubeni Corporation	Astana	Mr Tsuyuki, Ms Takeda
24 Jan (Tue)	10:00	ATAMEKEN	Astana	Mr Tsuyuki, Ms Takeda
	12:00	Kazakhstan Education Research Association (KERA)	Astana	Mr Motoya, Ms Ikeda, Ms Okada
	15:00	[Private Company] TOOPAXAT ACTAHA	Astana	Mr Tsuyuki, Ms Takeda
	16:00	Holding Kasipkor	Astana	Mr Kakisu, Mr Ishii, Mr Motoya
25 Jan (Wed)	10:00	[Private Company] Astananinsky Electrotechnical Plant	Astana	Mr Tsuyuki, Ms Takeda
	10:00	Committee on Statistics	Astana	Ms Ikeda, Ms Okada
	12:00	[Private Company] Trading House Ecolos	Astana	Mr Tsuyuki, Ms Takeda
	14:30	[Private Company] Astana Eco Standart	Astana	Mr Tsuyuki, Ms Takeda
	15:00	World Bank	Astana	Mr Kakisu, Mr Ishii, Ms Ikeda
	16:30	L.N.Gumilyov Eurasian National University	Astana	Mr Kakisu, Mr Ishii, Mr Motoya, Ms Ikeda, Ms Okada
	17:00	[Private Company] Socks Manufacture Bota	Astana	Mr Tsuyuki, Ms Takeda
26 Jan (Thu)	9:00	Nazarvaev University	Astana	Mr Kakisu, Mr Ishii, Mr Motoya, Ms Ikeda, Ms Okada

	10:00	[Private Company] DD21	Astana	Mr Tsuyuki, Ms Takeda
	17:00	Ministry Investments and Development of the Republic of Kazakhstan (Industrial Development and Industrial Safety Committee)	Astana	Mr Tsuyuki, Ms Takeda
27 Jan (Fri)	11:00	ATAMEKEN	Astana	Mr Tsuyuki, Ms Takeda
	12:00	Ministry of Education and Science	Astana	Mr Kakisu, Mr Ishii, Ms Ikeda, Ms Okada
	15:00	[Private Company] UTARI	Astana	Mr Tsuyuki, Ms Takeda
	16:00	Embassy of Japan in the Republic of Kazakhstan	Astana	Mr Kakisu, Mr Ishii
30 Jan (Mon)	12:00	Abai Kazakh National Pedagogical University	Almaty	Ms Ikeda, Ms Okada
	13:30	Mitsubishi Corporation	Almaty	Mr Tsuyuki, Ms Takeda
	15:00	ATAMEKEN	Almaty	Mr Kakisu, Mr Ishii, Mr Motoya, Mr Tsuyuki, Ms Takeda, Ms Ikeda, Ms Okada
	16:00	British Council	Almaty	Ms Ikeda, Ms Okada
	16:00	Kazakhstan-Japan Center for Human Development	Almaty	Mr Kakisu, Mr Ishii, Mr Motoya, Mr Tsuyuki, Ms Takeda
31 Jan (Tue)	10:00	Almaty Management University	Almaty	Mr Kakisu, Mr Ishii, Mr Motoya, Ms Ikeda, Ms Okada
	11:30	Almaty Technological University	Almaty	Mr Kakisu, Mr Ishii, Mr Motoya, Ms Ikeda, Ms Okada
	14:00	American Councils	Almaty	Mr Kakisu, Mr Ishii
1 Feb (Wed)	10:00	Almaty State Polytechnic College	Almaty	Mr Kakisu, Mr Ishii, Mr Motoya
	11:00	Erasmus+ Program National Office	Almaty	Ms Ikeda, Ms Okada
	11:00	[Private Company] IBF Group	Almaty	Mr Tsuyuki, Ms Takeda
	13:00	[Private Company] Almaty Fan Manufacture	Almaty	Mr Tsuyuki, Ms Takeda
	14:30	Al-Farabi Kazakh National University	Almaty	Mr Kakisu, Mr Ishii, Mr Motoya, Ms Ikeda, Ms Okada

	14:30	[Private Company] ASIA Avto Gaz	Almaty	Mr Tsuyuki, Ms Takeda
	16:00	[Private Company] Imayo	Almaty	Mr Tsuyuki, Ms Takeda
	16:00	Kazakhstan Engineering-Technological University	Almaty	Mr Kakisu, Mr Ishii
2 Feb (Thu)	10:00	Almaty Polygraphy College	Almaty	Mr Kakisu, Mr Ishii, Mr Motoya
	10:00	UNESCO	Almaty	Ms Ikeda, Ms Okada
	11:00	[Private Company] Aigulline	Almaty	Mr Tsuyuki, Ms Takeda
	11:30	Kazakh-British Technical University	Almaty	Mr Kakisu, Mr Ishii, Mr Motoya, Ms Ikeda, Ms Okada
	16:00	Almaty University of Power Engineering and Telecommunications	Almaty	Mr Kakisu, Mr Ishii, Mr Motoya
3 Feb (Fri)	10:00	Central Asia Technical-Economic College	Almaty	Mr Kakisu, Mr Ishii, Ms Ikeda
	10:00	ATAMEKEN	Almaty	Mr Tsuyuki, Ms Takeda
	12:00	[Private Company] IDC	Almaty	Mr Tsuyuki, Ms Takeda
	14:30	[Private Company] Almaty Autocenter KAMAZ	Almaty	Mr Tsuyuki, Ms Takeda
	16:00	Toyota Tsusho	Almaty	Mr Tsuyuki, Ms Takeda
	16:40	National Academy of Sciences of Kazakhstan	Almaty	Mr Motoya, Ms Okada

2. Uzbekistan

Date	Contents		City	Members
6 Feb (Mon)	10:00	JICA Uzbekistan Office	Tashkent	Mr Tsuyuki, Ms Takeda
	12:00	Uzbekistan-Japan Center Tashkent	Tashkent	Mr Tsuyuki, Ms Takeda
7 Feb (Tue)	13:00	Marubeni Corporation	Tashkent	Mr Tsuyuki, Ms Takeda
	16:00	Agency for Foreign Labor Migration Affairs	Tashkent	Mr Tsuyuki, Ms Takeda
8 Feb (Wed)	10:00	CCI Samarkand	Samarkand	Mr Tsuyuki, Ms Takeda
	12:00	[Private Company] Tamirloyaha Samarkand	Samarkand	Mr Tsuyuki, Ms Takeda
9 Feb (Thu)	9:00	[Private Company] Hotel Asia Bukhara	Bukhara	Mr Tsuyuki, Ms Takeda
	10:00	CCI Bukhara	Bukhara	Mr Tsuyuki, Ms Takeda
	11:00	[Private Company] SulSherJahon	Bukhara	Mr Tsuyuki, Ms Takeda
	11:45	[Private Company] Livadiya-Bukhara	Bukhara	Mr Tsuyuki, Ms Takeda
	14:00	Uzbekistan-Japan Center Bukhara	Bukhara	Mr Tsuyuki, Ms Takeda
13 Feb (Mon)	11:00	[Private Company] ART MEBEL	Tashkent	Mr Tsuyuki, Ms Takeda
	12:00	[Private Company] Samo-Product LLC	Tashkent	Mr Tsuyuki, Ms Takeda
	15:00	[Private Company] La Tienda	Tashkent	Mr Tsuyuki, Ms Takeda
14 Feb (Tue)	10:00	[Private Company] Pronto	Tashkent	Mr Tsuyuki, Ms Takeda
	15:00	Ministry of Higher and Secondary Specialized Professional Education	Tashkent	Mr Tsuyuki, Ms Takeda
15 Feb (Wed)	10:00	[Private Company] Trustia Corporation	Tashkent	Mr Tsuyuki, Ms Takeda
	11:00	[Private Company] UZINTOUR	Tashkent	Mr Tsuyuki, Ms Takeda
	13:30	[Private Company] Ziola Medical	Tashkent	Mr Tsuyuki, Ms Takeda
	16:00	JICA Uzbekistan Office	Tashkent	Mr Tsuyuki, Ms Takeda

2 Mar (Thu)	16:00	JICA Uzbekistan Office	Tashkent	Mr Motoya, Ms Okada
4 Mar (Sat)	10:00	Tashkent State Agrarian University	Tashkent	Mr Motoya, Ms Okada
	14:00	Tashkent Institute of Textile and Light Industry	Tashkent	Mr Motoya, Ms Okada
6 Mar (Mon)	9:30	Moscow State University in Tashkent named for M. V. Lomonosov	Tashkent	Mr Motoya, Ms Okada
	11:00	JICA Uzbekistan Office	Tashkent	Mr Motoya, Ms Okada
	14:00	Tashkent University of Information Technology	Tashkent	Mr Motoya
	15:00	National Erasmus+ Programme Office	Tashkent	Ms Okada
7 Mar (Tue)	10:00	Tashkent State Technical University Named after A.R.Beruni	Tashkent	Mr Kakisu, Mr Ishii, Mr Motoya, Ms Okada
	11:30	UNESCO	Tashkent	Ms Okada
9 Mar (Thu)	10:00	Daiichi Auto Parts Foreign Enterprise LLC	Tashkent	Mr Kakisu, Mr Ishii
	10:00	Tashkent State Pedagogical University Named After Nizami	Tashkent	Ms Ikeda, Ms Okada
	12:00	Tashkent Chemical Technological Institute	Tashkent	Mr Motoya
	16:30	World Bank	Tashkent	Ms Ikeda, Ms Okada
10 Mar (Fri)	10:00	Turin Polytechnic University in Tashkent	Tashkent	Mr Kakisu, Mr Ishii, Mr Motoya
	12:00	National University of Uzbekistan named by after Mirza Ulugbek	Tashkent	Mr Kakisu, Mr Ishii, Mr Motoya, Ms Ikeda, Ms Okada
	14:00	Center for Higher Technologies	Tashkent	Mr Motoya
13 Mar (Mon)	9:30	Tashkent Polytechnical Professional College	Tashkent	Mr Kakisu, Mr Ishii
	10:00	Bukhara Engineering Institute of High Technology	Bukhara	Mr Motoya
	11:00	GIZ	Tashkent	Mr Kakisu, Mr Ishii
	11:00	Asian Development Bank	Tashkent	Ms Ikeda
	12:00	Bukhara State University	Bukhara	Mr Motoya

	16:00	JICA Uzbekistan Office	Tashkent	Mr Kakisu, Mr Ishii, Ms Ikeda
14 Mar (Tue)	14:00	Samarkand State University	Samarkand	Mr Motoya
	14:00	Samarkand Professional Industrial College	Samarkand	Mr Ishii
	14:00	Samarkand State University	Samarkand	Mr Motoya
	14:30	EU Delegation to the Republic of Uzbekistan	Tashkent	Ms Ikeda
	16:00	Samarkand Automobile Factory LLC	Samarkand	Mr Ishii
15 Mar (Wed)	10:00	Samarkand branch of Tashkent University of Information Technologies	Samarkand	Mr Motoya
	11:30	Academic Lyceum No.1 under Samarkand Institute of Economics and Services	Samarkand	Mr Ishii
	13:00	British Council	Tashkent	Ms Ikeda
17 Mar (Fri)	10:00	1st Academical Lyceum named after Sirojiddinov	Tashkent	Mr Ishii
	12:30	Sergeli Polytechnical Professional College	Tashkent	Mr Ishii

3. Turkmenistan

Date	Contents		City	Members
14 Apr (Fri)	10:00	Ministry of Trade and Foreign Economic Relations	Ashgabat	Mr Tsuyuki, Ms Takeda
	11:00	Union of Industrialists and Entrepreneurs	Ashgabat	Mr Tsuyuki, Ms Takeda
	11:00	Institute of Chemistry of Academy of Sciences	Ashgabat	Mr Ishii, Mr Motoya
	14:00	Centre of Technologies of Academy of Sciences	Ashgabat	Mr Ishii, Mr Motoya
	16:00	Institute of "Sun" of Academy of Sciences	Ashgabat	Mr Ishii, Mr Motoya
17 Apr (Mon)	10:00	Ministry of Foreign Affairs of Turkmenistan	Ashgabat	Mr Tsuyuki, Mr Motoya, Ms Okada
	11:00	Ministry of Education of Turkmenistan	Ashgabat	Mr Ishii, Ms Ikeda, Ms Okada
	14:00	International Oil and Gas University	Ashgabat	Mr Motoya
	15:00	International University for Humanities and Development	Ashgabat	Mr Ishii, Ms Ikeda, Ms Okada
	16:00	Turkmen State Agricultural University	Ashgabat	Mr Motoya
18 Apr (Tue)	10:00	The Academy of Sciences	Ashgabat	Mr Motoya
	11:00	Oguz Han University of Engineering Technologies	Ashgabat	Mr Ishii, Mr Motoya, Ms Ikeda, Ms Okada
	14:00	Turkmen State Institute of Transport and Communications	Ashgabat	Mr Ishii, Mr Motoya
	15:00	World Bank	Ashgabat	Ms Ikeda, Ms Okada
	16:00	Turkmen State Institute of Architecture and Construction	Ashgabat	Mr Ishii, Mr Motoya
	17:00	EBRD	Ashgabat	Ms Ikeda, Ms Takeda, Ms Okada
19 Apr (Wed)	10:00	Institute of Seismology of Academy of Sciences	Ashgabat	Mr Motoya
	10:30	School of Mechanics and Technology of the Ministry of Textile	Ashgabat	Mr Kakisu, Mr Ishii
	11:00	USAID	Ashgabat	Ms Ikeda, Ms Okada
	15:00	School of Construction of the Ministry of Construction and Architecture	Ashgabat	Mr Kakisu, Mr Ishii

	15:00	State Bank for Foreign Economic Affairs	Ashgabat	Mr Tsuyuki, Ms Takeda
	17:00	Embassy of Japan in Turkmenistan	Ashgabat	Mr Kakisu, Mr Motoya
20 Apr (Thu)	10:00	Ministry of Healthcare and Medical Industry of Turkmenistan	Ashgabat	Mr Tsuyuki, Ms Takeda
	11:00	EU	Ashgabat	Mr Ishii, Ms Ikeda
	14:00	UNDP	Ashgabat	Mr Kakisu, Ms Ikeda

4. Tajikistan

Date	Contents		City	Members
24 Apr (Mon)	10:00	Tajik Academy of Science	Dushanbe	Mr Kakisu, Mr Ishii, Mr Motoya
	11:00	Ministry of Industry and New Technologies	Dushanbe	Mr Tsuyuki, Ms Takeda
	14:00	Ministry of Education	Dushanbe	Mr Kakisu, Mr Ishii, Ms Ikeda, Ms Okada
	15:30	JICA Tajikistan Office	Dushanbe	Mr Kakisu, Mr Ishii, Mr Motoya, Mr Tsuyuki, Ms Ikeda, Ms Takeda, Ms Okada
25 Apr (Tue)	10:00	Ministry of Labour and Social Protection	Dushanbe	Mr Kakisu, Mr Ishii
	11:00	Technical University of Tajikistan named after academic Osimi	Dushanbe	Mr Motoya
	15:00	Chamber of Commerce and Industry of Tajikistan	Dushanbe	Mr Tsuyuki, Ms Takeda
	16:30	Ministry of Foreign Affairs	Dushanbe	Mr Kakisu, Mr Motoya, Ms Okada
	17:00	World Bank	Dushanbe	Ms Ikeda, Ms Okada
26 Apr (Wed)	8:30	Ministry of Economic Development and Trade Tajikistan	Dushanbe	Mr Kakisu, Mr Ishii, Mr Tsuyuki, Ms Takeda
	9:00	Tajik State Pedagogical University named after Jurayev	Dushanbe	Ms Ikeda, Ms Okada
	11:00	Technological University of Tajikistan	Dushanbe	Mr Kakisu, Mr Ishii, Mr Motoya
	16:00	Swiss Agency for Development and Cooperation (SDC)	Dushanbe	Ms Ikeda, Ms Takeda, Ms Okada
	17:00	EBRD	Dushanbe	Ms Takeda
27 Apr (Thu)	9:00	GIZ	Dushanbe	Mr Kakisu, Mr Ishii
	10:00	S.U. Umarov Physical-Technical Institute	Dushanbe	Mr Motoya
	10:00	"Entrepreneurship Development Fund" under the Government of Tajikistan	Dushanbe	Mr Tsuyuki, Ms Takeda
	11:00	Technical Industrial College	Dushanbe	Mr Kakisu, Mr Ishii
	11:00	JDS Project Office	Dushanbe	Ms Ikeda, Ms Okada
	13:30	[Private Company] Ferdows-E Bartar	Dushanbe	Ms Takeda

	14:00	[Private Company] Tajik Hydro Electric Montage	Dushanbe	Mr Tsuyuki
	15:00	USAID	Dushanbe	Ms Ikeda, Ms Okada
	15:00	Russian Centre for Science and Culture in Dushanbe	Dushanbe	Mr Motoya
28 Apr (Fri)	9:30	National Association of Small and Medium Business of the Republic of Tajikistan	Dushanbe	Mr Tsuyuki, Ms Takeda
	10:00	Russian-Tajik Slavonic University	Dushanbe	Mr Motoya
	11:00	Dushanbe Polytechnical College	Dushanbe	Mr Kakisu, Mr Ishii
	11:30	UNDP	Dushanbe	Ms Ikeda, Ms Takeda, Ms Okada
	14:00	Aga Khan Foundation	Dushanbe	Ms Ikeda, Ms Okada
	14:00	Tajik Institute of Entrepreneurship and Service	Dushanbe	Mr Motoya, Ms Takeda
	14:00	[Private Company] Production Cooperative Iskich	Dushanbe	Mr Tsuyuki
	16:00	[Private Company] Rukhom Company	Dushanbe	Mr Tsuyuki
	16:00	Tajik National University	Dushanbe	Mr Kakisu, Mr Ishii, Mr Motoya
29 Apr (Sat)	10:00	[Private Company] Avesta	Dushanbe	Mr Tsuyuki, Ms Takeda
	11:00	Agricultural University of Tajikistan	Dushanbe	Mr Kakisu, Mr Ishii, Mr Motoya
	11:30	[Private Company] LLC Comfort Plast	Dushanbe	Mr Tsuyuki, Ms Takeda
	14:00	[Private Company] Vahdat Textile LLC	Dushanbe	Mr Tsuyuki, Ms Takeda
1 May (Mon)	10:00	Asian Development Bank Tajikistan Resident Mission	Dushanbe	Mr Kakisu, Mr Ishii, Ms Ikeda, Ms Takeda
	14:00	EU	Dushanbe	Mr Kakisu, Mr Ishii
2 May (Tue)	11:00	Qatari Diar Real Estate Investment Company	Dushanbe	Mr Kakisu, Mr Ishii
	11:00	Meeting with JDS Project Graduate	Dushanbe	Ms Ikeda, Ms Okada
	11:00	[Private Company] JSC Tajikcable	Dushanbe	Mr Tsuyuki

	11:00	[Private Company] Saodat	Dushanbe	Ms Takeda
	14:00	JICA Tajikistan Office	Dushanbe	Mr Kakisu, Mr Ishii, Mr Motoya, Mr Tsuyuki, Ms Ikeda, Ms Okada
	14:00	[Private Company] OJSK Shirin	Dushanbe	Ms Takeda
	16:00	[Private Company] Japan Tajikistan Commerce support LTD	Dushanbe	Mr Tsuyuki

5. Kyrgyz

Date	Contents	City	Members
4 May (Thu)	9:30	JICA Kyrgyz Office	Bishkek Mr Kakisu, Mr Ishii, Mr Motoya, Mr Tsuyuki, Ms Ikeda, Ms Takeda, Ms Okada
	11:00	State Committee of Industry, Energy and Subsoil Use of the Kyrgyz Republic	Bishkek Mr Tsuyuki, Mr Motoya, Ms Takeda
	14:00	Chamber of Commerce and Industry of Kyrgyz	Bishkek Mr Tsuyuki, Ms Takeda
	15:00	Agency of Primary Vocational Education by the Ministry of Education and Science	Bishkek Mr Kakisu, Mr Ishii, Ms Ikeda, Ms Okada
	16:00	Ministry of Economy	Bishkek Mr Tsuyuki, Ms Takeda
8 May (Mon)	15:00	Meeting with JOCV	Bishkek Mr Tsuyuki, Ms Ikeda
9 May (Tue)	10:00	[Private Company] Agroholding "Jashyl charba"	Bishkek Mr Tsuyuki, Ms Takeda
10 May (Wed)	8:00	[Private Company] Agroholding "Jashyl charba" Greenhouse visit	Bishkek Mr Tsuyuki, Ms Takeda
	10:00	American University of Central Asia	Bishkek Ms Okada
	10:00	Kyrgyz State Technical University	Bishkek Mr Kakisu, Mr Ishii, Mr Motoya
	10:00	Kyrgyz Republic - Japan Center for Human Development	Bishkek Mr Tsuyuki, Ms Ikeda, Ms Takeda
	13:00	Erasmus+ National Office	Bishkek Ms Ikeda, Ms Okada
	14:30	[Private Company] Kulikovskiy confectionary house	Bishkek Mr Tsuyuki, Ms Takeda
	15:00	Ministry of Education and Science	Bishkek Mr Kakisu, Mr Ishii, Ms Ikeda, Ms Okada
	16:00	[Private Company] LLC Detskii mir	Bishkek Mr Tsuyuki, Ms Takeda
11 May (Thu)	10:00	Bishkek Technical College	Bishkek Mr Ishii
	10:00	Kyrgyz State University n.a. I.Arabaeva	Bishkek Mr Kakisu, Mr Motoya, Ms Ikeda, Ms Okada

	11:30	Japan Style Training Centre under Kyrgyz State University n.a. I.Arabaeva	Bishkek	Mr Kakisu, Mr Motoya, Ms Ikeda, Ms Okada
	14:00	Project for Promotion of Exportable Vegetable Seed Production	Bishkek	Mr Ishii, Mr Tsuyuki
	14:00	The National Bank of Kyrgyzstan	Bishkek	Ms Takeda
	14:30	National Academy of Science of Kyrgyz	Bishkek	Mr Kakisu, Mr Motoya
	15:00	USAID	Bishkek	Ms Ikeda, Ms Okada
12 May (Fri)	9:00	[Private Company] Ardamina Ltd	Bishkek	Mr.Tsuyuki, Ms.Takeda
	10:00	Institute of Mining and Mining Technologies Academician named after W. Asanalieva	Bishkek	Mr Ishii, Mr Motoya
	10:00	American University of Central Asia	Bishkek	Ms Okada
	10:30	Asian Development Bank Kyrgyz Republic Resident Mission	Bishkek	Mr Kakisu, Ms Ikeda
	11:00	Japanese Expert, Mr Kumagiri	Bishkek	Mr Tsuyuki, Ms Takeda
	12:00	International University of Innovative Technologies (IntUIT)	Bishkek	Mr Ishii, Mr Motoya
	13:00	[Private Company] Aigul tecstyle company	Bishkek	Mr Tsuyuki, Ms Takeda
	13:00	Kyrgyz Turkish Manas university	Bishkek	Mr Motoya, Ms Ikeda, Ms Okada
	14:00	№94 Vocational Lyceum	Bishkek	Mr Kakisu, Mr Ishii
	15:00	[Private Company] LLC waikiki	Bishkek	Mr Tsuyuki, Ms Takeda
	15:00	Chemistry institute under National Academy of Science	Bishkek	Mr Motoya
	15:30	Meeting with JOCV	Bishkek	Ms Ikeda
	16:00	HELVETAS Programme Office	Bishkek	Mr Kakisu, Mr Ishii
13 May (Sat)	10:00	Kyrgyz National University named after Jusup Balasagyn	Bishkek	Mr Motoya, Ms Okada
	13:00	Kyrgyz National Agrarian University named after K.I. Skryabin	Bishkek	Mr Kakisu, Mr Ishii, Mr Motoya
	14:00	National Statistical Committee of Kyrgyz	Bishkek	Ms Ikeda, Ms Takeda
	16:00	Kyrgyz Association of Software and Services Developers	Bishkek	Mr Kakisu, Mr Ishii, Mr Tsuyuki

	18:30	[Private Company] Restoran Kim	Bishkek	Mr Tsuyuki, Ms Takeda
15 May (Mon)	9:00	Kyrgyz-Russian Slavic University	Bishkek	Mr Motoya
	10:00	[Private Company] Goldmark	Bishkek	Mr.Tsuyuki, Ms.Takeda
	10:00	Vocational Lyceum #28	Bishkek	Mr Kakisu, Mr Ishii
	10:00	JDS Project Office	Bishkek	Ms Ikeda, Ms Okada
	12:00	USAID	Bishkek	Ms Ikeda, Ms Takeda
	14:00	Ministry of Labour and Social Development	Bishkek	Mr Kakisu, Mr Ishii
	14:00	Kyrgyz State University of Construction, Transport and Architecture n.a. N. Isanov	Bishkek	Mr Motoya
	14:00	World Bank	Bishkek	Ms Ikeda, Ms Takeda, Ms Okada
	14:00	[Private Company] Kyrgyz Concept	Bishkek	Mr.Tsuyuki
	16:00	JICA Kyrgyz Office	Bishkek	Mr Kakisu, Mr Ishii, Mr Motoya, Mr Tsuyuki, Ms Ikeda, Ms Takeda, Ms Okada
16 May (Tue)	10:00	[Private Company] Kaindy Cable Factory	Bishkek	Mr.Tsuyuki
	10:00	[Private Company] Kulikovsky confectionary house, factory tour	Bishkek	Ms.Takeda
	10:00	International University of Kyrgyzstan (IUK) Polytechnical College Of Kyrgyz International University (Joint Meeting)	Bishkek	Mr Kakisu, Mr Ishii, Mr Motoya
	10:00	National Testing Center in Kyrgyzstan	Bishkek	Ms Ikeda, Ms Okada
	13:00	[Private Company] Business association JIA	Bishkek	Mr Tsuyuki
	14:00	GIZ	Bishkek	Ms Ikeda, Ms Takeda, Ms Okada
	16:00	EBRD	Bishkek	Ms Takeda
	16:00	OVOP Project	Bishkek	Ms Ikeda, Ms Okada
17 May (Wed)	10:00	UNESCO	Bishkek	Ms Ikeda, Ms Okada

	12:00	Meeting with Invitation Programme Participants	Bishkek	Mr Tsuyuki, Ms Ikeda, Ms Takeda, Ms Okada
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Annex 2 List of the Respondents

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List of the Respondents

1. Kazakhstan

(1) Ministries and Governmental Organizations

Committee on Statistics

Ms. Belonossova Natalya	Division of Labor and Standard of Living Statistics	Head
Ms. Karaulova Gulmira	Division of Social and Demographic Statistics	Head
Ms. Maldybayeva Gulmira	Division of National Accounts	Head
Ms. Sametova Almagul	Division of Labor and Standard of Living Statistics	Chief Expert
Ms. Turebayeva Aliya	Division of Social and Demographic Statistics	Expert
Ms. Meiramova Diana	Division of International Statistics Cooperation	Expert

Ministry of Investments and Development

Mr. Timur Narashev	Industrial Development and Industrial Safety Committee	Deputy Chairman
Mr. Zhaiyk Khassanov	Industrial Development and Industrial Safety Committee	Head

Ministry of Education and Science

Ms. Akerke Abylaikhan		Deputy Director
Ms. Ainur Erzhepekova		

(2) Universities and Research Institutions

L.N.Gumilyov Eurasian National University

Baubek SOMZHUREK		Vice Rector for International Cooperation and Innovations
NURBEKOVA Zhanat K.	Faculty of Information Technology	Head
Tusupov D.A.	Department of information systems	Head
Ospanov S.S.		
Sagindykov K.M.	Mathematics and Mechanics (Science & Innovation)	
Tashenova Zh.M.		
Zhumadillaeva A.K.		
Shakhmetova G.B.		
Isainova A.N.		
Eszhanov T.		
Berdenov Zh.		
SATTAROV Sapar Slyamiyanovich	Department of Geodesy and Cartography	
ASSANOV Seilbek	International Activity Development Office	Director
KARMEL YUK Anastassiya	International Cooperation Department	Head

Nazarbaev University

Ms. Loretta O'Donnell	Office of the Provost	Vice-Provost for Academic Affairs
Mr. Ilfat Fazylybayev	Department of Human Resources Management	Senior Manager
Mr. Zhumabay Bakenov	Department of Chemical Engineering	Professor
Mr. Boris Goldman	Department of Chemical Engineering	Associate Professor
Ms. Yevgeniya Kim	Career and Advising Center	Director

Abai Kazakh National Pedagogical University

Mr. Yermaganbetov Mubarak		First Vice Rector
Mr. Kulsariyeva Aktolkyn		Vice Rector for Academic Work
Mr. Kosov Vladimir		Vice Rector for Research
Ms. Aigul Iskakova	Pedagogical Sciences	Professor

Almaty Management University

Ms. Almagul Kanagatova		Rector
Ms. Gulmira Kurganbayeva	Academic Department	Vice Rector
Ms. Aigerim Kaumenova	International Department	Head

Almaty Technological University (ATU)

Baurzhan Nurakhmetovich		First Vice Rector
Berdan Rskeldiyev		Vice Rector of Educational Affairs
Maigul Kizatova		Vice Rector for Science and Innovations
Rudik Mnatsakanyan		Chairman of Trustees Board
Lyazzat Uvakassova	International Relations & Academic Mobility Department	Head

Al-Farabi Kazakh National University

Mr. Mukhambetkali Burkibayev		First Vice Rector
Mr. Tlekkabul Ramazanov		Vice rector Research – Innovation Affairs
Ms. Aizhan B. SMAILOVA	International Cooperation Department	Head
Mr. Askar Dauletov	Physics and Technology Faculty	
Mr. Kakimzhan Malayev	Economy Department	
Mr. Bolatkhan Zayadan	Micro-biology Faculty	Professor
Mr. Vitaly Salnikov	Geography and Environmental Sciences Faculty	

Kazakhstan Engineering-Technological University

Mr. Temirbekov Nurlan		Rector
-----------------------	--	--------

Astananinsky Electrotechnical Plant

Mr. Suzdykov Askar

Director

Mr. Omarov Bakhtzhan

Technical Manager

Trading House Ecolos

Ms. Klyushina Natalya

Branch Manager

Astana Eco Standart

Mr. Zhenis Dosmaganbetov

Director

Socks Manufacture Bota

Ms. Merkunova Gulysanat Pionerovna

Director

DD21

Mr. Gulsanat Merculova

Director

UTARI

Ms. Dinara Chuibekova

Sales Manager

Solo Ltd.

Mr. Abelentsev Vladimir

Technical Manager

Ms. Lissakonova Oksana Aleksandrovna

Accounting Manager

Mitsubishi Corporation Almaty Liaison Office

Mr Toru Yasuda

Chief Representative

IBS Group

Mr. Sergey Issak-Zade

Director

Mr. Raushan Myrzabayeva

Accounting Manager

Mr. Yuriy Rochshin

Technical Manager

Mr. Vassiliy Reznik

General Manager

AB3

Mr. Syrym Batyrshayev

Director

Mr. Alexander

Factory Director

Asia Auto Gas

Mr. Sergey Gennady Shkurchuk

Director

Imayo Creation Interior Design

Mr Yuji Imayo

Director

AigulLine

Ms. Aigul Zhanserikova

Director

Mr. Olzhas Mukhametzhonov

Deputy Director

Toyota Tsusho Corporation Almaty Representative Office

Mr. Nobuyuki Nick Arakawa

Chief Representative

IDC

Mr. Vladimir Vorobie

Director

Almaty Autocenter KAMAZ

Mr. Andrey Kovganov

Director

Mr. Sergey Boyarkin

Deputy Director

(5) Donors

Asian Development Bank

Ms. Assemgul R. Kaliyeva

Financial Sector

Assistant Project Officer

GIZ

Mr. Jorg Pudelka

Regional Director

Mr. Rainer Herz

Chief Advisor

World Bank

Ms. Aliya Bizhanova

Operation Officer

British Council

Mr. Rowan Kennedy

Head of Education and Society

Mr. Daniyar Mukitanov

Education Project Manager

American Councils

Ms. Jessica Leonard

Regional Director for Central Asia

Erasmus + Programme

Ms Shaizada U. Tasbulatova

Coordinator

UNESCO

Ms. Lina Benete

Specialist for Education Program

Ms. Yuliya Pismennaya

Assistant

(6) Others

JICA Kazakhstan Liaison Office

Ms Makiko Uehara

Project Formulation Advisor

Mr. Gennadiy Redkin

Program Coordinator

Kazakhstan Education Research Association

Ms. Sulushash Kerimkulova

Deputy Director

Mr. Kairat Kurakbayev

Secretary

Kazakhstan-Japan Center for Human Development

Ms. Zhanar Orazgalieva

Director

Ms Naomi Abe

JICA Expert

National Academy of Sciences of Kazakhstan

Mr. Zhurinov MURAT ZHURINOVICH

Director

2. Uzbekistan

(1) Ministries and Governmental Organizations

Ministry of Labour Agency for Foreign Labour Migration Affairs

Mr. Khujabakhilil Asamov Deputy Director

Ministry of Higher and Secondary Specialized Education

Mr. Yakubjon A. IRGASHEV	Department of International Relations	Head
Mr. Rajabov	Main Department of Control over the Implementation of New Programs (curricula) and Educational Literature	Professor
Mr. Ismailov Bahramzhon Mahmudovich	Management of Coordination of Scientific Research Activities	Chairman

(2) Universities and Research Institutions

Tashkent State Agrarian University

Mr. Islamov Sohob Yahshibekovich		Vice Rector
Mr. Farmonov Erkin	Faculty of Agricultural Engineering	Head
Mr. Allonov Kholig	Agronomy Faculty	Head
Mr. Adilov Sanjar	International Relations Department	Head
Mr. Abdulakhim Radjabov	Agricultural Engineering	Professor

Tashkent State Institute of Textile and Light Industry

Mr. Yunusov Salokhiddin Zununovich		Rector
Mr. Azamat E. Gulamov		Vice Rector
Mr. Muxammadali Temirov	External Affairs Department	Head

Moscow State University in Tashkent named for M. V. Lomonosov

Mr. Saydamatov Erkin Mamatovich		Executive Director of the Branch
Mr. Karshiev Talip Ollaevich	Educational and Scientific Work	Deputy Director
Mr. Ruzibaev Jakhongir	Education Division	Director
Ms. Deyneka Natalya	Applied Mathematics and Computer Science Faculty	Student

Tashkent University of Information Technology

Mr. Fayzulla AGZAMOV		Vice Rector
Ms. Zakirova Feruza Mahmudovna	Department of Professional Education	Head

Tashkent State Technical University named after A.R. Beruni

Mr. Zaripov Oripjon Olimobich		Vice Rector
Mr. Bystrov Dmitry Viktorovich	Department of International Relations	Head
Mr. Khurshid Mahmudov		Director of Uzbekistan-Japan Innovation Center

Tashkent State Pedagogical University Named After Nizami

Ms. Abdullaeva Barno		Vice Rector
Mr. Abduazimov Aziz	Science Department	Head
Mr. Qodirov Khayot	Science and Methodical Department	Head
Ms. Kuchkeldiyeva Umida	International Relations Department	Head

Tashkent Chemical Technology Institute

Mr. Rovshan Adilov	Deputy Rector	Vice Rector
Mr. Abduvali Ismoilov		Chief of international relations
Mr. Obidjon Yunusov	Faculty of Food Technology	Head
Ms. Mkrtchyan Ripeime Vachaganobha		Deputy Rector for cultural affairs and Chief of innovation department

National University of Uzbekistan named by after Mirza Ulugbek

Mr. Umarov Abduvakhob Tursunovich	Faculty of Economy	Head
Mr. Vakhobov Abdurakhim Vasikevich		Head
Mr. Fazilkhon Hoshimov	Faculty of Economics	Head
Mr. Dilshod Odinaev		Professor

Center for High Technologies

Mr. Sharafitdin Mirzaakhmedov		Director
Mr. Rustam Khalmatov		Senior Researcher
Ms. Shoira Saidkarimova		Public Relations
Ms. Regina Saffaeva		Public Relations

Bukhara Engineering Institute of High Technology

Mr. Ulugbek Mukhamedkhanov		Rector
Mr. Kakhramon Olimov		Vice Rector
Mr. Komil		Researcher

Bukhara State University

Mr. Abror Juraev		Director of International Office
------------------	--	----------------------------------

Samarkand State University

Mr. Boston Ismoilov	Vice-Rector	Vice Rector
Mr. Nasirov Mukhtar	International Department	
Mr. Dilshod Oblokulov	International Department	Engineer Coordinator
Mr. Akmal Yarmuhamedov	Educational Department	

Samarkand branch of Tashkent University of Information Technologies

Mr. Bekmurodov Qosim		Deputy Director
Mr. Karimov Zayuddin	International Department Head	Specialist
Mr. Indiaminov Ravshan	Education Department	Head

(3) TVET Institutions

Turin Polytechnic University in Tashkent

Mr. Kongradbay Sharipov		First Vice Rector
Mr. Farhad Niyazov	International Department	Head
Mr. O'ktam	Andijan Machine Building University	Rector

Tashkent Polytechnical Professional College

Ms. Dilnoza Rasuleva		Director
----------------------	--	----------

Samarkand Professional Industrial College

Mr. Alisher Bultakov		Director
Ms. Mubaro Barakaeva		Deputy Director for Curriculum
Mr. Kakhramon Nasrullaev		Deputy Director for production and internship
Mr. Akmal Olimov		Deputy Director for ideological affairs and culture

Academic Lyceum No.1 under Samarkand Institute of Economics and Services

Mr. Akobir Matlyubov		Director
Mr. S. Nazarov		Deputy Director for Ideological Affairs
Ms. L. Nazarova		Deputy Director for Curriculum

1st Academical Lyceum named after Sirojiddinov

Dr. Ubaydullaev Kakhramon		Director
Ms. Islomova, Markhabo		Deputy Director

Sergeli Polytechnical Professional College

Mr. Sobir Rasulov		Director
-------------------	--	----------

(4) Private Sector

Marubeni Corporation Tashkent Liaison Office

Mr Yasuaki Fujii

Chief Representative

Chamber of Commerce and Industry Samarkand

Mr. Jamshed Urakov

Head of Department

Chamber of Commerce and Industry Bukhara

Mr. Jamshid Qandov

Head of Department

SulSherJahon

Mr. Suetonov Sherali

Director

Livadiya-Bukhara

Mr. Sayfiyev Ilkhom

CCI Bukhara Head of
Department

Hotel Asia Bukhara

Mr. Kamol Mahmudov

Director

Tamirloyiha Samarkand

Mr. Kodirov Dilshod Botirovich

Director

La Tienda

Mr. Sanjarbek Nasirbekov

Director

Samo-Product LLC

Mr. Abror Dadakhodjaev

Chairman of the Board

ART Mebel Tashkent

Mr. Abor Dadakhodjaev

Chairman of the Board

Mr. Akmal A. Dadakhodjaev

Commercial Director

Mr. Baybulatov Bobir

Director of Finance and
Manufacture

Pronto

Mr. Nahit Dursun

Director

Mr. Yusuf Dursun

Deputy Director

Zilola Medical

Mr. Numon S. Inoyatov

Director

Daiichi Auto Parts Foreign Enterprise LLC

Ms. Muattarkhon Musakhodjaeva

Deputy General Director

Samarkand Automobile Factory LLC

Mr. Farmon Babadjanov

Administrator

UZINTOUR

Mr. Shorakhimov Sardor

Director

(5) Donors

Erasmus+ Programme

Mr. Bahadirov Kudratkhon

Specialist

UNESCO Tashkent Office

Mr. Namazov Bakhtiyor

Education Professional Officer

World Bank

Ms. Tatyana Shin

Education Specialist

GIZ office Tashkent

Mr. Torsten Brezina

Country Director

Mr. Ava Fazilov

Specialist of development of SME

Asian Development Bank

Mr Motoo Konishi

Country Director

EU Delegation to the Republic of Uzbekistan

Mr. Jean-Luis Veaux

Program Manager for Rural
Development

Mr. Kudratkhon Bahadirov

Specialist for Erasmus+ Program

Mr. Akmal Rustamov

Project Manager

British Council

Mr. Mark Crossey

Program Officer

(6) Others

JICA Uzbekistan Office

Mr. Katsutoshi Fushimi

Mr. Kenjiro Azuma

Mr 杉浦 伸郎

Mr. Malik Mukhitdinov

Chief Representative

Project Formulation Advisor

Project Formulation Advisor

Program Officer

Uzbekistan-Japan Center Tashkent

Mr. Hidehiko Takata

Chief Representative

Uzbekistan-Japan Center Bukhara

Ms. Natsuko Furusho

Ms. Dardora

Mr. Yokimov Filipp

JOCV

Trainee

Researcher

3. Turkmenistan

(1) Ministries and Governmental Organizations

Ministry of Trade and Foreign Economic Relations

Mr. Serdar Atagylyjov	Trade and Foreign Economic Department	Head
Mr. Byashimow Garyagdy	Production Department	Head

Ministry of Foreign Affairs

Mr. Bayram Klychmamedov	Asian-Pacific Department	Head
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