

Islamic Republic of Pakistan

FY 2016 External Ex-Post Evaluation of Japanese Grant Aid Project

“The Project for Strengthening of DAE Mechanical & Architecture  
Departments in GCT Railway Road of Punjab Province”

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## **0. Summary**

The Project for Strengthening of DAE<sup>1</sup> Mechanical & Architecture Departments in GCT Railway Road of Punjab Province (hereinafter referred to as “the Project”) was implemented to strengthen the functions of Governmental College of Technology Railway Road (hereinafter referred to as “GCT RR”) in Punjab Province to provide high quality education and training responding to the industrial needs, with an overall goal of contributing to the development of the economy and industries of Pakistan by means of supplying professional personnel with excellent skills. At the time of both planning and ex-post evaluation, technical and vocational education were particularly important in the context of the development policies and development needs of Pakistan and Punjab Province. Also, the Project was highly relevant to Japan’s ODA policy at the time of planning. Therefore, the relevance of the Project was high. The Project was generally implemented in accordance with the planned cost and period, making its efficiency high. Through an increase of the number of classrooms, the Project contributed to an increase of the number of classes and students of the Architecture Department and Mechanical Department of GCT RR and also improved the efficiency of the practical training at some two-thirds of the workshops. In the Architecture Department, constraints posed by facilities were substantially removed while constraints posed by equipment were removed in the Mechanical Department. Therefore, the conditions have been in place to provide education in line with the curriculum which was revised to meet the needs of the industrial circles through the preceding Japanese Technical Cooperation Project. Such improvement is reflected in the good reputation of GCT RR graduates among employers, producing the expected impact of “contributing to the development of economy and industries through the supply of professional personnel with excellent skills”. Accordingly, the effectiveness and impact of the Project are high. There are no major problems regarding the political/institutional, organizational, technical and financial aspects of the sustainability of the Project. The general conditions of the utilization, operation and maintenance of the facilities and equipment are also good. Therefore, the sustainability of the Project is high.

In light of the above, this Project is evaluated to be highly satisfactory.

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<sup>1</sup> Diploma of Associate Engineering

## 1. Project Description



Project Location



Architecture Department Building  
(GCT Railway Road)

### 1.1 Background

The Islamic Republic of Pakistan (hereinafter referred to as “Pakistan”) formulated “Vision 2030”, its national development plan, in 2007 with the aim of achieving stable socio-economic development and has promoted the country’s industrialization with a target year of 2030. Vision 2030 calls for an increase of the GDP share of the manufacturing sector (from 18% to 30%) and an increase of the annual national income per capita (from USD 742 to USD 3,000) by the year 2030. In order to foster a capable work force required to achieve these targets, the Government of Pakistan considered the restructuring of the Technical and Vocational Education and Training (hereinafter referred to as “TVET”) Sector to be essential and established the National Vocational and Technical Training Commission (NAVTTTC) in 2006<sup>2</sup> as part of the work to formulate a strategy for restructuring of the TVET sector at the national level. This strategy is composed of three basic objectives, namely (i) training of technical personnel capable of responding to the needs of the industrial sector, (ii) improvement of the access to education and vocational training opportunities as well as employment opportunities, and (iii) guaranteeing of the appropriate quality of course contents for education and vocational training. There are also individual strategies, such as the establishment of advanced model schools (Centres of Excellent: CoE) and strengthening of the management of educational and training institutions. At the provincial level, Technical Education & Vocation Education Authorities (hereinafter referred to as “TEVTA”) were established to improve technical education and vocational training.

Some 11 million new jobs were created in Pakistan in the 10 year period from 1997 to 2007 due to the growth of the manufacturing sector, construction sector, etc. However, while modernization of the manufacturing sector was in progress, the level of educational facilities and equipment to implement technical education and vocational training was inadequate as was the level of practical education. Meanwhile, there was an urgent need in industrial circles to not only secure skilled workers but also to foster middle-ranking engineers to provide a vital link between

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<sup>2</sup> This Commission was originally called the National Vocation & Technical Education Commission (NAVTEC) but was renamed in 2011 to become the National Vocation & Technical Training Commission (NAVTTTC).

construction/manufacturing sites and management.

Under these circumstances, the Government of Pakistan made a request to the Government of Japan for the provision of a range of cooperation pertaining to the strengthening of technical and vocational education institutions in Pakistan. In response to this request, JICA launched a five-year technical cooperation project entitled “The Project for Development of Centre of Excellence (CoE) for Technical Education” (hereinafter referred to as “the Technical Cooperation Project”) in December 2008 for the purpose of making the Government College of Technology Railway Road (GCT RR) in Punjab Province a CoE in the field of mechanical and architecture sectors capable of providing technical education to meet the needs of industries<sup>3</sup>. The Project (subject of the present ex-post evaluation) was implemented to complement the foregoing Technical Cooperation Project in terms of facilities and equipment. The contents of the Project were carefully examined with the assistance of experts assigned to the Technical Cooperation Project and the Project commenced in 2011 after the completion of a preparatory survey which followed the request made by the Government of Pakistan for the Project in 2009.

## 1.2 Project Outline

The objective of the Project is to strengthen the functions of GCT RR in Punjab Province to provide high quality education and training responding to the industrial needs by means of expanding the range of facilities and equipment of the Architecture Department and also the equipment of the Mechanical Department, thereby contributing to the development of the economy and industries through the provision of professional personnel with excellent skills.

E/N Grant Limit / Actual Grant Amount	867 million yen / 880 million yen
Exchange of Notes Date / Grant Agreement Date	July 2011 / July 2011
Executing Agency	Technical Education and Vocational Training Authority (TEVTA), Punjab Province
Project Completion	April 2013
Main Contractors	Tobishima Corporation; Mitsubishi Corporation
Main Consultant	System Science Consultants Inc.
Basic Design	September 2010 - May 2011

<sup>3</sup> The education system in Pakistan consists of basic education for 10 years; primary education for 1st - 5th grades, middle education for 6th - 8th grades and lower secondary education for 9th-10th grades. On completion of Grade 10, pupils may proceed further to 11<sup>th</sup> and 12<sup>th</sup> grades to obtain a higher secondary school certificate which is required to proceed to tertiary education at a college or university. For vocational education, those completing primary education or middle education are eligible to study at a vocational education school while those completing lower secondary education are eligible to take a three-year diploma course. A GCT, which is the target level of education for the Project, provides diploma course and most students enroll at this type of college after completing general education up to Grade 10 (equivalent to a first-year student of a senior high school in Japan). GCT RR in Lahore, Punjab Province has the Air-Conditioning and Refrigeration Department and the Automobile and Diesel Department in addition to the Mechanical and Architecture Departments targeted by the Project. Diploma courses are provided in two shifts, i.e. morning and afternoon courses.

Related Projects	The Project for Development of Centre of Excellence (CoE) for Technical Education (JICA Technical Cooperation, 2008 - 2013); Project for Strengthening Mechanical Course of Government College of Technology in Punjab (JICA Technical Cooperation, 2015 - 2019)
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## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Hajime Sonoda (Global Group 21 Japan)

### 2.2 Duration of Evaluation Study

The ex-post evaluation study for the project was conducted over the following period.

Duration of the Study: September 2016 - September 2017

Duration of the Field Survey: 16<sup>th</sup> November - 14<sup>th</sup> December, 2016, and  
15<sup>th</sup> - 23<sup>rd</sup> March, 2017

The external evaluator of the Project also conducted an ex-post evaluation of the Technical Cooperation Project “The Project for Development of Centre of Excellence (CoE) for Technical Education” concurrently with the ex-post evaluation of the Project. Since the executing agencies and related organizations of the two projects overlap, the survey was carried out in an integrated manner, but the ex-post evaluation reports were prepared separately for each project. This report covers the Project (grant aid).

## 3. Results of the Evaluation (Overall Rating: A<sup>4</sup>)

### 3.1 Relevance (Rating: ③<sup>5</sup>)

#### 3.1.1 Consistency with the Development Policies of Pakistan

As described in 1.1 Background, Pakistan at the time of planning (2011) began the reform of the TVET sector with the aim of achieving economic growth primarily through industrialization and was in the process of formulating a strategy for the “training of technical personnel capable of responding to the needs of the industrial sector”, “improvement of the access to education and vocational training opportunities as well as employment opportunities” and “guaranteeing of the appropriate quality of course contents for education and vocational training”. This strategy was finalized as the National Skills Strategy 2009 - 2013. It contains individual strategies, including the establishment of CoE and strengthening of the management of educational and training institutions.

Of the seven pillars of the Pakistan Vision 2025 published by the new administration inaugurated in July 2013, TVET is emphasized in relation to “development human and social

<sup>4</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>5</sup> ①: Low; ②: Fair; ③: High

capital”, “private sector and entrepreneurship-led growth” and “developing an international competitiveness”. This administration implemented the TVET Reform Programme (Phase 1: until December 2016) which began in 2011 while generally maintaining the direction set by the strategy. According to the NAVTTC, the draft TVET policy proposed as part of the programme largely inherited the direction shown by the National Skills Strategy and the final adjustment work is in progress at the time of this ex-post evaluation. It is planned to prepare a new National Skills Strategy after the finalization of the TVET policy. Although the draft TVET policy does not specifically refer to the establishment of CoE, the NAVTTC has continued its work of certifying them based on the relevant certification system.

As described above, the Project is highly relevant to the development policy of Pakistan at the time of both planning and ex-post evaluation.

### 3.1.2 Consistency with the Development Needs of Pakistan

As already described in 1.1 Background, the level of educational facilities and equipment and level of practical education at TVET institutions in Pakistan were insufficient at the time of the planning (2011). There was an urgent need in industrial circles not only to secure skilled workers but also to foster middle-ranking engineers to provide a vital link between shop floor workers and management. In Lahore City, the capital of Punjab Province, where GCT RR, the subject college of the Project, is located, there was a concentration of various engineering industries. However, the curriculum set by the Punjab TEVTA for GCT RR was more than 10 years old, indicating a strong necessity for its revision to reflect the actual industrial needs.

The Punjab Growth Strategy 2018, a development plan formulated by the government of Punjab Province in 2015, identifies the need to create one million new jobs a year up to 2018 in the province where two-thirds of the total provincial population is 30 years old or younger<sup>6</sup>, making it essential to provide TVET training for two million young people during the 4 years from 2014 to 2018. To achieve these objectives, the Punjab TEVTA plans to increase the annual number of trainees by 2.6 times from 70,000 in 2014 to 180,000 in 2018 through the expansion and improved training efficiency of existing TVET institutions in addition to the introduction of new TVET institutions.

At GCT RR of which the consolidation and improvement of facilities have been made under the Project and the Technical Cooperation Project to make it a CoE, master trainers to train the trainers of other TVET institutions were fostered under the Technical Cooperation Project. The TEVTA Punjab expects GCT RR to play a leading role in TVET training in the province’s mechanical and architectural fields.

Based on the above, the Project is highly relevant to the development needs of Pakistan

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<sup>6</sup> The ratio of population aged 30 or younger in Punjab Province is roughly the same as the national average.

at the time of both planning and ex-post evaluation.

### 3.1.3 Consistency with Japan’s ODA Policy

At the time of planning, Japan’s Country Assistance Programme for Pakistan called for the securing of a sound market economy and the provision of a diverse industrial structure. Meanwhile, JICA’s Project Implementation Policy for Pakistan identifies “assistance for higher education, technical education and vocational training to facilitate the expansion of middle class” and JICA was implementing the Technical Education and Vocational Training Programme, under which the Project was placed.

Based on the above, the Project is highly relevant to Pakistan’s development plan and development needs as well as Japan’s ODA policy. Therefore, its relevance is high.

## 3.2 Efficiency (Rating: ③)

### 3.2.1 Project Outputs

Under the Project, the new Architecture Department building was constructed at a site owned by GCT RR located near the Main Campus (hereinafter referred to as the “New Campus”) and a range of equipment for practical training, primarily targeting the Mechanical Department, was provided. Table 1 shows the planned and actual outputs.

Table 1 Comparison between the Planned and Actual Outputs

Planned	Actual (as of December 2015)
<p>&lt;Japanese Side&gt;  <u>Building</u>            Three-stories building with partial basement and rooftop tower            Total floor area: 2,125.0m<sup>2</sup></p> <p><u>Equipment</u></p> <ul style="list-style-type: none"> <li>• Equipment for the Mechanical Department – main equipment: 40 units</li> <li>• Equipment for the Architecture Department – main equipment: 13 units</li> </ul> <p>&lt;Pakistan Side&gt;  <u>Facilities and Equipment</u></p> <ul style="list-style-type: none"> <li>• Removal of existing obstacles and levelling of the ground, etc.</li> <li>• Extension of the electricity, telephone lines, water, and gas</li> <li>• Installation of computers for CAD training</li> <li>• Car park, gate, fencing, planting and outdoor facilities</li> <li>• Lift (if necessary)</li> </ul>	<p>&lt;Japanese Side&gt;  <u>Building</u></p> <ul style="list-style-type: none"> <li>• Architecture Department Lecture Building: 3 stories</li> <li>• Machinery and Training Building: single story</li> <li>• Total floor area: 2,114 .3 m<sup>2</sup></li> </ul> <p><u>Equipment</u>            Generally as planned</p> <p>&lt;Pakistan Side&gt;  <u>Facilities and Equipment</u>            As planned</p>

Source: JICA and TEVTA

Some modifications were made to the planned building to accommodate certain facilities for which the necessity was recognized in relation to the contents of the revised curriculum and concrete training contents. These modifications included changes of the purpose of use and layout of some classrooms, increase of the usable land area due to the removal of an old building and cancelation of the basement in the light of a flood risk. These modifications were appropriate as they were based on the relevant necessities which were confirmed after the preparatory study. The fulfilment of the obligations of the Pakistan side were confirmed in regard to the facilities and equipment.

According to GCT RR, the planning, design and actual quality of the buildings and equipment are generally excellent. The field survey for this ex-post evaluation did not find any specific problems in regard to the planning, design and actual quality of the facilities and equipment provided under the Project. However, many of the existing workshops in which the newly supplied equipment has been installed are fairly cramped. Some of them appear to suffer from poor ventilation due to the insufficient provision of windows and/or a ventilation system.



Exclusive lounge for female students of the Architecture Department



(Left) Survey equipment and tools of the Architecture Department (for practical training),  
(Right) Lathe machine of the Mechanical Department (for practical training)



CNC processing machines of the Architecture Department (for practical training)

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Cost

The planned total project cost was 887 million yen of which 867 million yen and 21 million yen were to be borne by the Japanese and Pakistani sides respectively.<sup>7</sup> The actual project cost for the Japanese side was 860 million yen for the detailed design and project implementation (including construction of buildings, procurement of equipment and work supervision) and that for the Pakistani side was 20 million yen (estimate at the time of the ex-post evaluation). The total project cost of 880 million yen was within the plan (99% of the planned cost).

#### 3.2.2.2 Project Period

The planned project period was approximately 22 months, including the detailed design and procurement periods, from the Exchange of Notes in July 2011 to April 2013. The Exchange of Notes took place in July 2011 as planned and the detailed design work commenced in September 2011. After the procurement period, the construction work commenced in February, 2012 and was completed in April 2013 as planned<sup>8</sup>. No problematic issues leading to an increase of either the project cost or project period occurred at the implementation stage of the Project.

Both the project cost and project period were as planned. Therefore, the efficiency of the Project is high.

<sup>7</sup> The figures for the planned cost and actual cost do not include the cost of a lift which could be installed if necessary. Since the figures are rounded off, the total figures do not agree with the sum of the amounts on the Japanese side and Pakistan side.

<sup>8</sup> A lift was installed in November 2015 by the Pakistan side. As this lift is for the exclusive use of disabled persons and visiting guests, the delayed installation of the lift did not create any special problems for the operation and maintenance of the Project. Therefore, this delay is not considered in the evaluation of the project period.

### 3.3 Effectiveness<sup>9</sup> (Rating: ③)

#### 3.3.1 Quantitative Effects (Operation and Effect Indicators)

In regard to the project objective of “strengthening the functions to provide high quality education and training responding to the industrial needs”, two quantitative indicators were adopted at the time of planning, which were “reduction of the number of students per classrooms from around 60 - 70 to around 40” of the Architecture Department and “reduction of the number of students per lathe machine from 3 to 2” of the Mechanical Department. The former relates to the elimination of the classroom shortage of the Architecture Department by means of the construction of a new department building. It was perceived that this construction of a building to house the Architecture Department would increase the total number of usable classrooms at GCT RR, at the same time, making it possible to increase the number of classes as well as students of the both departments. It was, therefore, appropriate to make “an increase of the number of classes and students (of the Architecture and Mechanical Departments)” an additional indicator. Moreover, the “pass rate of the final examination” was newly added as a reference indicator in this ex-post evaluation because such an indicator is believed to be appropriate to judge the quality level of education.<sup>10</sup> The state of achievement of these four indicators is described next.

##### (1) Number of Classes and Students (Additional Indicators)

Compared to the 2010 figures before the commencement of the Project, the number of classes and students increased for both departments. In line with the policy of the TEVTA Punjab to quantitatively increase TVET training, the Architecture and Mechanical Departments of GCT RR have gradually increased the number of classes since 2010. The number of classes of the Architecture Department increased from 6 to 12 while the number of classes of the Mechanical Department increased from 22 to 27 (Table 2). Following the construction of the new school buildings under the Project, the Architecture Department which had been using classrooms in the old school building moved to the new school building. The increase of the total number of classrooms is believed to have contributed to the increased number of classes of both departments. In the Architecture Department, the actual increase of the number of students did not correspond to the increased number of classes because the student quota allocated to girls has not been fully met. (Further details are given in the next paragraph.) In the case of the Mechanical Department, the actual increase of the number of students matched the increased number of classes, indicating a positive contribution by the Project.

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<sup>9</sup> The effectiveness is rated in consideration of not only the effects but also the impacts.

<sup>10</sup> The final examination is organized by the Punjab Board of Technical Education for all GCTs in Punjab Province. As external examiners supervise a uniform examination, a certain level of objectivity and consistency is ensured. The pass rate of students of GCT RR's Mechanical Department of 92% in 2013 far exceeded the average pass rate of other GCTs in the province of 65% (figure for five out of 12 GCTs). The pass rate of the final examination was also adopted as an indicator for the objective of the Technical Cooperation Project.

Table 2 Historical Changes of the Number of Classes, Number of Students and Average Number of Students per Class

	Architecture Department			Mechanical Department		
	No. of Classes	No. of Students	Average No. of Students per Class	No. of Classes	No. of Students	Average No. of Students per Class
2010	6	350	58.3	22	1,026	46.6
:	:	:	:	:	:	:
2014	10	370	37.0	25	1,130	45.2
2015	11	405	36.8	26	1,241	47.7
2016	12	467	38.9	27	1,266	46.9
Ratio 2016/2010	200%	133%	67%	123%	123%	101%

Source: GCT RR

Note: The Project was implemented from July 2011 to April 2013

Table 3 Number of Classes, Number of Students and Average Number of Students by Grade in 2016

	Architecture Department			Mechanical Department		
	No. of Classes	No. of Students	Average No. of Students per Class	No. of Classes	No. of Students	Average No. of Students per Class
Year 1:AM	2	77	38.5	4	168	42.0
Year 1: PM	2	106	53.0	5	279	55.8
Year 2:AM	2	68	34.0	4	158	39.5
Year 2: PM	2	89	44.5	5	254	50.8
Year 3:AM	2	72	36.0	4	159	39.8
Year 3: PM	2	55	27.5	5	248	49.6
AM Total	6	217	36.2	12	485	40.4
PM Total	6	250	41.7	15	781	52.1

Source: GCT RR

## (2) Average Number of Students per Class (Indicator for the Architecture Department)

In general, a smaller number of students per class makes it easier to provide high quality education. For a TVET where practical training is particularly stressed, the training of a small number of students per class leads to the efficient learning of knowledge and skills.

The standard class size at GCT RR used to be 55 students per class. Following a recommendation by the Technical Cooperation Project which preceded the Project to reduce the class size in order to enhance the effects of education, the standard class size has been set at 42 students since 2009. In order to attain the target of providing TVET training for 2 million youth by 2018 set by the provincial development plan, in the case of the Architecture and Mechanical Departments, the class size has been allowed to exceed 42 students since 2014<sup>11</sup>, mainly for PM

<sup>11</sup> According to the policy adopted by the TEVTA, the class size has been allowed to increase up to 125% of the standard size since 2016. At GCT RR, students with a good academic background are allowed to enrol for an AM

classes, as long as there are eligible applicants.

The average number of students per class of the Architecture Department drastically declined from 58.3 students in 2010 to 38.9 students in 2016 (Tables 2 and 3). This decline is primarily attributed to the decline of the number of female students. Even though 40% of the quota of AM classes of the Architecture Department (33 - 34 of the 84 student positions for two classes in the 2016 academic year) is allocated to female students, the number of enrolled female students is showing a declining trend, failing to meet the allocated quota. As a result, the number of students per class has fallen<sup>12</sup>. According to the Architecture Department, GCT RR is well-known as a boys' school and the fact that girls can enroll for an architecture course is not widely known. In addition, there is a common resistance on the part of parents to send their daughters to a co-education school. Other reasons for the reluctance of girls and parents to enroll at GCT-RR include the lack of an exclusive school bus service or dormitory for female students and limited opportunity to proceed to university for further study after graduation.<sup>13</sup> Based on the above observations, even though the number of students per class of the Architecture Department has declined, it cannot be said that the Project has contribute to this decline.



(Left) Practical training on CAD at the Architecture Department

(Right) Practical training on processing work using a lathe at the Mechanical Department

### (3) Number of Students per Lathe Machine (Indicator for the Mechanical Department)

In general, the longer the time each student has to operate a machine for practical

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class and the tuition fee is subsidized by the TEVTA. Enrolment for a PM class is accepted on a first come, first served basis but there is no tuition subsidy. An increase of the number of PM class students leads to increased revenue for GCT RR.

<sup>12</sup> The number of enrolled female students in 2010 was 27. After a peak number of 35 in 2011, the number has steadily declined from 21 in 2012, 20 in 2013, 15 in 2014, 11 in 2015 to 10 in 2016.

<sup>13</sup> According to an instructor of the Architecture Department, the parents of girls who are interested in GCT RR are concerned with these issues. The general practice in Pakistan is for co-education to take place at the university level and gender-separated education is the standard practice up to the higher secondary level. While architecture is a popular subject among female students at the university level, eligible applicants are, in principle, limited to those graduates of an ordinary higher secondary school. In the case of state universities with a low tuition fee, only one place is available for graduates with a diploma.

training, the more effective the vocational or technical training is. In the case of the Project, it was anticipated that the provision of additional equipment would reduce the number of students per equipment, resulting in better practical training effects. The indicator of “the number of students per lathe” was introduced to typically show the effects of better practical training in the Mechanical Department.

In the preparatory survey, the average number of students per standard lathe was planned to fall from three students per lathe before the Project (15 lathe machines for a class of 47 students) to two students per lathe after the Project (20 lathe machines, including five additional lathe machines, for a class of 40 students, making two students per machine). In practice, however, a standard lathe machine has been used by a group of 7 - 8 students before the Project, and also after the Project with no much differences. The reason for this is that the actual number of lathe machines simultaneously in operation has not increased despite five new lathe machines due to (i) the poor operating status of some of the old lathe machines, (ii) insufficient power supply to operate all lathes simultaneously in the workshop and (iii) difficulty for a single instructor to supervise many groups.

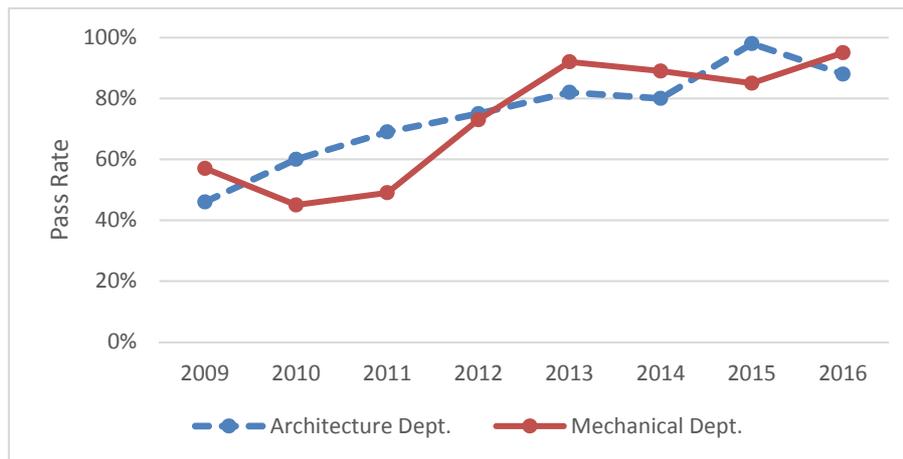
The beneficiary survey<sup>14</sup> conducted with the instructor in charge of practical training found that the number of usable equipment had increased in approximately two-thirds of the workshops. This increase in the number of equipment augmented the actual equipment operating time of individual students, improving the efficiency of the practical training. Therefore, when not only the lathe machines but also all other equipment for practical training are taken into consideration, the Project contributed to reducing the number of students per equipment. Meanwhile, in the case of equipment of which the available number is small, students have to wait a long time for their turn and the practical training efficiency is not high. It must also be noted that the actual training time is reduced by the preparation, cleaning up and other routine works to be conducted in each practical training session.

#### (4) Pass Rate of the Final Examination (Referential Indicator)

Since the commencement of the Technical Cooperation Project in December 2008, the pass rate of the final examination has improved for both departments (Fig. 1), suggesting a synergy effect of the Technical Cooperation Project.

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<sup>14</sup> A beneficiary survey using a questionnaire was conducted with instructors, students (3rd grade), former graduates and enterprises which have employed GCT RR graduates. Of the total number of 47 instructors in the two departments, 12 in the Architecture Department and 25 in the Mechanical Department replied. 3rd-grade students were randomly selected and 129 students (61 in the Architecture Department and 68 in the Mechanical Department) replied. Past graduates (those graduating in academic years 2014 and 2015) were randomly selected from among those which could be contacted by phone and 80 past graduates (36 from the Architecture Department and 44 from the Mechanical Department) replied. The enterprises concerned were introduced by GCT RR on the basis of a relatively large number of GCT RR graduates recruited and 30 enterprises (15 related to the Architecture Department and 15 related to the Mechanical Department) replied.



Source: GCTRR

Fig. 1 Pass rate of the final examination

### 3.3.2 Qualitative Effects (other effects)

The Project has various positive effects for both departments in addition to those mentioned above. The results of the questionnaire survey are described below featuring the state of other effects which emerged, any constraints for the emergence of positive effects and the opinions of instructors and students who are the users of the new facilities in each department.

#### 3.3.2.1 Effects on and Constraints in the Architecture Department

##### (1) Effects of the New Facilities

In the Architecture Department, course work is conducted in line with the revised curriculum and the facilities are used as planned. The average usage ratio of the classrooms at the time of the ex-post evaluation is 66%. The course work of this department used to take place at the Main Campus before the Project but the departmental facilities consisting of two PC laboratories, one drafting room and one lecture room were insufficient. It was, therefore, necessary for the department to borrow classrooms belonging to other departments for its course work. However, as these classrooms were basically for lectures, they were not really big enough for modelling or drafting which require large space. To make matters worse, the distance to walk to these classrooms was quite long. After the relocation of the department to the New Campus with the implementation of the Project, the number of departmental rooms increased to seven (one drafting room, three PC laboratories, two lecture rooms and one multi-purpose workshop). Because of the much larger size of these rooms than before, the constraints on the department's course work described above were much mitigated.

Relocation to the New Campus also meant a substantial improvement of the physical environment compared to the ageing Main Campus. The new Architecture Department building has not only a staff room but also other facilities, including exclusive toilets for female student, the number of which was previously insufficient, as well as a common room and lockers for

female students. The level of satisfaction with the facilities is high among instructors of the Architecture department. (All of the instructors in the beneficiary survey replied that they are satisfied.) Some instructors, however, voiced concern that the classrooms are rather cramped during some afternoon classes as the maximum number of students exceeds 50<sup>15</sup>.

As far as practical training is concerned, the procurement of simple concrete test equipment under the Project has enabled practical training in line with the revised curriculum.

## (2) Constraints on the Deployment of Instructors

The Architecture Department has 12 instructors including nine instructors and three junior instructors compared to the quota of 14. In addition, there are three visiting instructors mainly involved in afternoon classes. It is planned to recruit one more visiting instructor in the future. According to the Head of the Architecture Department, while the quota of instructors is generally met, there are some issues, such as frequent changes of visiting instructors and insufficient time for permanent instructors to prepare course work and conduct their own studies, because of an instructor shortage.

### 3.3.2.2 Effects on and Constraints in the Mechanical Department

#### (1) Effects of New Equipment for Practical Training

The Technical Cooperation Project which preceded the Project led to the revision of the curricula of the Architecture and Mechanical Departments to respond to the needs of industrial circles and some equipment, etc. which was newly required to follow the revised curriculum was provided for the Mechanical Department. Also under the Project, CNC machining centers and other practical training equipment were provided to generally cover a range of training equipment to effectively implement the revised curriculum<sup>16</sup>. The lack of certain equipment in the past meant that practical lessons were not possible and teaching was confined to theory or introductory lessons using model equipment or a video. The provision of the new equipment, etc. has enabled concrete practical training and the number of practical training items using actual equipment has increased. All of the equipment provided under the Project is still operable and fully used in line with the revised curriculum.

Interviews with instructors of the Mechanical Department and the beneficiary survey found that 80 - 90% of the equipment required to fully implement the revised curriculum is currently provided. Almost all of the instructors responsible for practical training replied that the range of new equipment responds to the needs of industrial circles to enable students to master

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<sup>15</sup> The preparatory survey for the Project assumed a class size of 40 students to determine the classroom size. See Footnote 11 for the background for an increased number of students.

<sup>16</sup> Computerized numeric control (CNC) means machining operation which is numerically controlled by a computer. Such machining as cutting and turning is performed using data supplied by a CAD (computer-aided design) software, etc.

the required skills and that students now have a deeper understanding of the contents of the practical training. To be more precise, some of the expressed opinions are: “the replacement of old-fashioned and deteriorated equipment (some of which was more than 40 years old) has enabled practical training using new equipment which is actually used by enterprises”, “the new machines have functions which the old machines do not have and offer a precise machining performance without breaking down” and “the new machines comparable with those used by enterprises enables practical training to match the actual needs of enterprises”. Meanwhile, some 30% of instructors responsible for practical training mentioned an insufficient quantity of equipment and a shortage of appropriate equipment, suggesting that equipment-related constraints have not yet been fully eliminated at all of the workshops.

## (2) Constraints Posed by the Environment for the Workshops

As the land area of the Main Campus where the Mechanical Department is located is limited, some of the workshops lack a sufficient floor area. Although equipment operation is not restricted, some students have to sit on the floor to await their turn, making the room fairly congested. In the case of the welding workshop, even though there are seven arc welding machines<sup>17</sup>, only one or two machines are simultaneously operable because of poor ventilation, forcing many students to simply wait their turn.

## (3) Constraints on Training for Instructors

While training using the equipment provided under the Project was mainly conducted under the preceding Technical Cooperation Project, the fact that the provision of equipment coincided with the final year of the Technical Cooperation Project means that training using some of the equipment was insufficient. To compensate for this, four instructors of the Mechanical Department participated in a two month training course for workers of enterprises held at another training institute in Lahore to learn the operation of some CNC machining centers. For some CNC machining centers, the relevant training was provided by a Japanese expert assigned to the succeeding Project for Strengthening of Mechanical Course of Government College of Technology in Punjab (2015 - 2019; hereinafter referred to as “the Succeeding Technical Cooperation Project”)<sup>18</sup>.

The beneficiary survey found that 60% of instructors of the Mechanical Department hoped to receive additional training on the operation and maintenance of the equipment and its

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<sup>17</sup> Arc welding is a type of electric welding to weld the same metal parts using the phenomenon of arc discharge in the air.

<sup>18</sup> The Succeeding Technical Cooperation Project commenced in 2015 for a planned period of five years for the purpose of strengthening the organizational system to provide high quality education by the mechanical diploma course at each GCT in the eastern part of Punjab Province. In this project, GCT Faisalabad is added to GCT RR as CoE for concentrated assistance while assistance primarily for the planning to become a centre of excellence is provided for the other 11 GCTs in the province.

use for practical training. Many hopes were expressed for training at an enterprise (including on-site training) and advanced training led by experts of individual equipment. Some instructors pointed out a need for training on the effective use of various instruments as well as thermodynamic equipment and also on PC maintenance.

### 3.3.2.3 Evaluation by Instructors and Students

In regard to the range of equipment provided under the Project, 13 out of 14 instructors responsible for practical training in the Mechanical Department replied that the equipment in question was either “very useful” or “useful” for the implementation of the revised curriculum and also to meet the industrial needs. In contrast, only half of the instructors found the quantity of equipment to be “sufficient” as the other found it either “almost sufficient” or “insufficient”. In regard to the effects of the improved availability of equipment, most instructors replied that students can “learn the skills required by industries”, “become able to practice alone with equipment for a longer period” and “better understand the contents of the subjects for practice training” (Table 4).

The questionnaire survey with 3rd-grade students of the Mechanical Department found that almost all of the students were satisfied with the education at GCT RR and 81% referred to the good range of training equipment as the reason for their satisfaction (Table 5). 90% of the students were either “very satisfied” or “satisfied” with the practical training with 37% of them listing the good range of equipment as the primary reason. (Answers with multiple selection.)

Table 4 Effects of the Improvement of Equipment  
(Questionnaire Survey with 14 Practical Training Instructors)

	Very Applicable	Applicable	Not so Applicable	Not Applicable
Learning of the skills required by industries	29%	64%	7%	0%
Able to practice alone with equipment for a longer period	14%	64%	21%	0%
Better understanding of the contents of the subjects for practical training	29%	64%	7%	0%

Source: Beneficiary survey

Table 5 Opinions of 3rd-Grade Students on the Education at GCT RR

Item	Architecture Dept. (61 students: 52 males, 9 females)	Mechanical Dept. (68 students)
<ul style="list-style-type: none"> <li>• Are you satisfied with the education at GCT RR?</li> <li>- Very satisfied</li> <li>- Satisfied</li> <li>- Not much satisfied</li> <li>- Not satisfied at all</li> <li>• Reasons for satisfaction (multiple answers)</li> <li>- Instructors</li> <li>- Equipment</li> <li>- Curriculum</li> <li>- Teaching materials</li> <li>- Lessons</li> <li>- Facilities</li> </ul>	<p>87%</p> <p>13%</p> <p>0%</p> <p>0%</p> <p>85%</p> <p>66%</p> <p>46%</p> <p>57%</p> <p>75%</p> <p>82%</p>	<p>66%</p> <p>33%</p> <p>1%</p> <p>0%</p> <p>85%</p> <p>81%</p> <p>43%</p> <p>59%</p> <p>69%</p> <p>43%</p>
<p>Level of satisfaction by activity (ratio of satisfied students)</p> <ul style="list-style-type: none"> <li>- Curriculum</li> <li>- Classes</li> <li>- Practical training</li> <li>- Field trips</li> <li>- Internship</li> <li>- Support for placement</li> <li>- School management</li> </ul>	<p>93%</p> <p>92%</p> <p>95%</p> <p>15%</p> <p>71%</p> <p>22%</p> <p>86%</p>	<p>75%</p> <p>90%</p> <p>90%</p> <p>18%</p> <p>72%</p> <p>25%</p> <p>50%</p>

Source: Beneficiary survey

The questionnaire survey with 12 instructors of the Architecture Department found that all of them were “very satisfied” or “satisfied” with the department’s facilities. Meanwhile, the questionnaire survey with 61 3rd-grade students of the Architecture Department found that all of them were satisfied with the education at GCT RR and the primary reason for their satisfaction was the good facilities (82% with multiple answers).

As shown in Table 5, the level of satisfaction among students of both departments is commonly high for the curriculum, classes, practical training and internship. In contrast, the level of satisfaction is low for field trips and support for employment. A sense of dissatisfaction was often voiced regarding the lack of a cafeteria and extracurricular activities, including sports.

### 3.4 Impacts

#### 3.4.1 Intended Impacts

The principal impact (overall goal) of the Project was assumed to be “contribution to the development of the economy and industries through the provision of professional personnel with excellent skills”.

According to data of GCT RR, the career choices made by graduates of the two departments under the revised curriculum (2014 - 2016) are as shown in Table 6. In the case of

the Mechanical Department, the career choices are not confirmed for half of the graduates. The Head of the Mechanical Department and others suggest that most of these graduates had likely gone to Middle Eastern countries to work there<sup>19</sup>. Assuming that these graduates are working in fields related to their studies, nearly half of the graduates of the Architecture Department and some 70% of the graduates of the Mechanical Department have found study-related employment. The employment situation of the graduates of each department is described in more detail below.

Table 6 Career Choices of Graduates in 2014, 2015 and 2016

	Architecture Dept. (number of female students in parenthesis)	Mechanical Dept.
Employed in a related field (including self-employed)	123 (23) (44%)	279 (20%)
Higher education in a related field	59 (20) (21%)	273 (20%)
Employed or higher education in a different field	99 (12) (35%)	130 (10%)
Unknown	0 (0) (0%)	682 (50%)
Total	281 (55) (100%)	1,364 (100%)

Source: GCT RR

### Architecture Department

According to the Head of the Architecture Department and others, while the number of employments in the architecture field has shown an increasing trend due to the expectation of economic growth associated with the development of the China-Pakistan Economic Corridor and other reasons, the number of graduates with the title of architect from universities in Lahore has sharply increased in recent years, creating competition with the Architecture Department of GCT RR of which the graduates have the title of assistant architect. Therefore, the employment prospects for GCT RR graduates is not particularly good<sup>20</sup>. The beneficiary survey found that of 24 employed graduates, 14 are engaged in drafting work, three in the supervision of construction work and two in architectural planning and design. Three are engaged in design work in fields other than architecture and two are engaged in work which is not related to architecture. 70% of these employed graduates say that they are satisfied with their current job. Most of the graduates participated in a group interview (10 graduates) are engaged in drafting work as a draftsman and voiced their dissatisfaction with the situation that they are not engaged in planning/design or site

<sup>19</sup> According to the Head of the Architecture Department and others, some graduates find jobs in Middle Eastern countries. Because of a smaller number of students, graduates of the Architecture Department can be traced better.

<sup>20</sup> A graduate of the Architecture Department of GCT RR is, in theory, capable of assisting “an architect” who is an architecture graduate of a university as an assistant architect. However, as the position of assistant architect is often filled by an architect, a graduate of GCT RR tends to work as a draughtsman. However, there is a chance that an excellent GCT RR graduate can officially obtain the position of “assistant architect”. An assistant architect is engaged in not only architectural design work but also the work to prepare presentation materials with 2D and/or 3D data using a dedicated software. GCT RR provides a subject teaching this sort of work. Compared to this, the work of a draughtsman is much simpler and does not require much creativity.

supervision as an assistant architect. Meanwhile, 60% of the current 3rd-grade students hope to proceed to the architecture department of a university, presumably because of the reasons explained above.

The Project assisted the production of female graduates through the improvement of facilities dedicated for receiving female students (such as toilets and a girls' common room) at GCR RR. In the case of female graduates, the employment rate is slightly lower than that for male graduates while the university enrollment rate is slightly higher than that of male graduates.<sup>21</sup> However, the actual number of enrollment at GCT RR is lower than the quota allocated to female applicants. (See 3.3.1 (2) Average Number of Students per Class.) The current situation where the quota for female students is not met has led to a decrease of the total number of (male and female) graduates prepared for an architecture-related field.

The beneficiary survey found that GCT RR graduates are highly valued by enterprises and that the majority opinion is that their quality has improved since the implementation of the Project (Table 7). GCT RR graduates enjoy a good reputation compared to graduates of private colleges in Lahore. This is believed to be a synergy effect of the Project which improved facilities and equipment and the Technical Cooperation Project which introduced a revised curriculum to meet the industrial needs. The following opinions were expressed, among others, during interviews with enterprises employing GCT RR graduates.

- Recent graduates are very capable as they have good knowledge and skills regarding drafting with a PC to quickly complete the work. However, their knowledge of the latest drafting software is not necessarily adequate as new software is introduced every few years in the field of architecture.
- While all architectural plans are written in English, the English competency of GCT RR graduates is not necessarily adequate. Further field training is required to strengthen the practical knowledge of building materials and standard dimensions. If a GCT RR graduate wants to work as an assistant architect, he/she must be capable of (i) completing an entire project with understanding of the flow of work and also of (ii) performing an adequate presentation to a client.

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<sup>21</sup> As architectural design work is indoor work without any need to go outside the office and as females are believed to be suited to design work, architecture courses are popular among female university students in Pakistan. The architecture departments of universities in Lahore have more female students than male students.

Table 7 Evaluation of the Quality of GCT RR Graduates by Their Employers  
(30 major enterprises)

	Architecture Dept.	Mechanical Dept.
Graduates since 2012 are “very good” or “good”.	86%	60%
Compared to graduates up to 2011, recent graduates are “much better” or “better”.	67%	86%
Compared to graduates of other colleges in the province, GCT RR graduates are “very good” or “good”.	93%	80%

Source: Beneficiary survey

Note: Selection with five scales: very good / much better, good / better, same, not good / worse, bad / very bad

### Mechanical Department

According to the instructors of the Mechanical Department and other persons, manufacturers of automobiles (including Japanese) and agricultural machinery are concentrated in Lahore and its surrounding area. As GCT RR enjoys a good reputation compared to private colleges, etc. in the area, the number of job offers for GCT RR graduates has been increasing, creating stable employment prospects for graduates. The beneficiary survey found that two-thirds of the students actually hope to advance to a university, mainly to obtain either a Bachelor of Science of the Engineering Technology Course (four years) attached to GCT RR or to a faculty of engineering of a university<sup>22</sup>. The ratio of graduates proceeding to a higher education is actually approximately 20%. According to the Job Placement Office, the starting salary for a higher course graduate is double that of a GCT RR graduate. In answer to the question concerning satisfaction with the present job, 75% of former graduates in employment replied that they were “neither satisfied nor dissatisfied”. Only 8% said that they were satisfied. There are various reasons for dissatisfaction, ranging from the level of salary (67%), unsatisfactory working conditions (58%) and few opportunities for career advancement or higher education (50%).

The reputation of GCT RR graduates of the Mechanical Department among employers is generally good (Table 7). This is again believed to be the result of the synergy between the Project which improved facilities and equipment and the Technical Cooperation Project which introduced a revised curriculum to meet the industrial needs. Positive opinions were expressed during interviews with enterprises employing GCT RR graduates. For example, “the level of knowledge among GCT RR graduates has improved since revision of the curriculum and, therefore, the number of in-house education hours have been reduced” and “while the same curriculum is used by private colleges, GCT RR excels because of its possession of wide-ranging equipment”. Some constructive criticisms were also expressed, such as “the equipment at the college may not be fully utilized with a large number of students per class”, “the current level of

<sup>22</sup> The Bachelor of Science degree of the Engineering Technology Course requires three years and six months study (theory and practical training) and six months internship at an enterprise in collaboration with the University of Engineering and Technology, Lahore. The course quota is 135 students per year, of which 70% are allocated to diploma course graduates and the remaining 30% to ordinary higher secondary school certificate holders.

practical training is not satisfactory as students should develop more practical skills to use various equipment” and “it may be necessary to develop the capacity of instructors through their own study of new technologies at an enterprise”. In short, enterprises hope for the capacity development of instructors and further improvement of the education and training at GCT RR through the more active use of the available equipment.

### 3.4.2 Other Impacts

Some of the equipment provided for the Mechanical Department has been used by other departments (like Air-Conditioning and Refrigeration Department and Automobile and Diesel Department) as well as for practical training for the Bachelor of Science course on engineering technology at GCT RR, most likely contributing to the improvement of the education of these departments and courses. Moreover, there have been short training courses on CNC machining for working people in order to meet the demands of enterprises since 2015. Based on contracts with the TEVTA Punjab and multiple enterprises, two 3-months courses with 15 participants each and one 6-months course with 25 participants have so far been organized, targeting prospective employees of these enterprises. The equipment provided under the Project is actively used for these courses.

The introduction of dedicated toilets, a common room and lockers for female students in the Architecture Department building under the Project has pushed forward efforts to facilitate coeducation at the Architecture Department initially promoted by the Technical Cooperation Project. The coeducation realized by the Architecture Department of GCT RR is a successful example of removing the gender barrier to access to public TVET and is an efficient approach to the education of young people rather than the pursuit of gender-specific schools. In this sense, the Project showed the possibility of removing the gender barrier and improving the educational efficiency at public TVET institutions in Pakistan.

As the newly constructed Architecture Department building is located on the premises of GCT RR, the acquisition of land was unnecessary. Nearby residents were given a proper explanation prior to the construction work and, therefore, there was no specific problems with residents. No impacts on the natural environment are observed.

Through its implementation, the Project has largely achieved its objectives. Therefore, the effectiveness and impact of the Project are high.

## 3.5 Sustainability (Rating: ③)

### 3.5.1 Institutional Aspects of Operation and Maintenance

GCT RR responsible for the operation and maintenance of the facilities and equipment provided under the Project has four diploma courses, i.e. architecture, mechanical,

automobile/diesel and air-conditioning/refrigeration. As of April 2017, the Architecture Department has nine instructors and three junior instructors against a quota of 14 instructors. In addition, there are three visiting instructors mainly teaching afternoon classes. According to the Head of the Architecture Department, recruitment of another visiting instructor is planned. While the quota is nearly met, the appointment of more full-time instructors is preferable. While there used to be no assistant to maintain the PCs and software for practical training, a junior instructor recruited in 2016 now provides a quick response to PC and software issues. Since the Project, three guards have been assigned to the New Campus where the Architecture Department is located. Meanwhile, the Mechanical Department has an instructor quota of 30. The reality is that there are 27 instructors and four junior instructors, totaling 31 teaching staff. There are also 16 visiting instructors mainly teaching afternoon classes. In addition, each workshop has one or two shop assistants / shop attendants. They used to be mainly secondary school leavers but their replacement by diploma-level junior instructors-cum-laboratory technicians (equivalent to GCT RR graduates) has been in progress in line with the policy of the TEVTA Punjab<sup>23</sup>.

Due to the strong commitment of the Principal and both Heads of the Architecture and Mechanical Departments of GCT RR to the continued maintenance of the effects of the Project at the time of this ex-post evaluation<sup>24</sup>, it is safe to conclude that there are no major problems in the institutional aspect.

### 3.5.2 Technical Aspects of Operation and Maintenance

The day-to-day operation and maintenance of the training equipment provided under the Project are conducted by the instructors responsible for individual workshops. As these instructors have the position of teaching equipment maintenance, they have the basic technical capability. The in-house manufacture of components for lathe machines and other processing machines is possible. The instructors responsible for such new equipment as CNC machining centers are capable of performing their routine maintenance. As the equipment manufacturers and suppliers provide technical assistance for the repair or trouble-shooting of equipment when necessary, there are no special problems in the technical aspect. No special problems are anticipated in regard to the buildings as these buildings do not require any special skills for their operation and maintenance.

### 3.5.3 Financial Aspects of Operation and Maintenance

The TEVTA Punjab's budget is allocated by the Provincial Government of Punjab. It

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<sup>23</sup> According to the Mechanical Department, the replacement of shop assistants / attendants by junior instructors-cum-laboratory technicians has been completed at approximately half of the workshops as of April 2017.

<sup>24</sup> According to the TEVTA, the background for a strong commitment is the necessary and important nature of the Project for the TVET sector and GCT RR as well as such important achievements as enhanced motivation on the part of the counterpart personnel through training in Japan, etc. and the achievement of the first co-education in Pakistan.

has been showing an increasing trend, growing by approximately 2.5 times in the nine-year period from 2008 to 2016 (Table 8). According to the TEVTA, a steady increase of its budget is expected in line with the provincial policy of providing TVET training for two million young people by 2018<sup>25</sup>. Of the TEVTA budget, the size of the development budget (investment in buildings and equipment) increased by approximately 1.5 times between 2015 and 2016.

Table 8 Historical Changes of TEVTA Budget

(Unit: thousand PKRs)

	2008	2009	2010	2011	2012	2013	2014	2015	2016
TEVTA Budget	3,911	5,445	6,595	7,856	7,806	7,574	8,135	8,582	9,589
Development Budget	881	1,707	1,560	2,112	1,453	1,550	2,000	2,097	3,000
Other	3,030	3,738	5,035	5,744	6,353	6,024	6,135	6,485	6,589

Source: TEVTA

Note: 1 PKR = approx.1.1 yen

Table 9 Historical Changes of GCT RR Expenditure

(Unit: thousand PKRs)

	2010	2011	2012	2013	2014	2015
TEVTA Grant: Personnel Cost	125,913	136,559	155,637	157,998	164,416	174,007
TEVTA Grant: Other than Personnel Cost	1,832	12,872	8,253	13,444	9,193	13,842
Own Budget	30,818	31,038	28,688	26,615	34,921	50,188
Total	158,563	180,469	192,578	198,057	208,530	238,037

Source: TEVTA

Note: 1 PKR = approx. 1.1 yen

Some 80% of the expenditure of GCT RR relies on the TEVTA grant while some 20% relies on GCT RR's own income sources, including tuition fees (Table 9). The size of the expenditure increased by approximately 1.5 times in the six-year period from 2010 to 2015. Although the budget size appears to be adequate, it is not necessarily ample. Attempts to curb the expenditure were observed during the field survey. Some examples are the non-use of the emergency generator during power outages and suspension of the operation of the air-conditioning units in the Architecture Department. There are, however, no major budgetary constraints which could damage the effects of the Project in terms of the operation and maintenance of the facilities and equipment.

Based on the above, there are no major problems regarding the financial aspects of the operation and maintenance of the Project.

#### 3.5.4 Current Status of Operation and Maintenance

The buildings and facilities of the Architecture Department are adequately maintained.

<sup>25</sup> Expenditure data for the TEVTA was not obtained. The TEVTA says that the allocated budget has been almost entirely executed.

The safety and cleanliness conditions of the New Campus are excellent. As both students and staff members wear indoor shoes inside the building, the interior is fairly clean. The training equipment and machinery are adequately utilized and maintained.

All of the training equipment and machinery of the Mechanical Department are in working condition and are adequately maintained. Each workshop has its own equipment manuals and maintenance plan and shop assistants conduct periodic inspection and maintenance (daily, weekly, monthly, etc.) and minor repairs. During long holiday periods without classes, instructors, etc. conduct the overhaul and major repair of the equipment. The necessary replacement parts are procured although some parts/components may be manufactured in-house. There is an initial stock of spare parts for the advanced CNC machining centers, etc. newly introduced under the Project. If necessary, some parts can be procured in Pakistan. A technician employed by the manufacturer and stationed in Lahore can be consulted on maintenance issues. Several processing machines broken down, presumably because of improper operation, but have been restored with the help of a Japanese expert working for the succeeding Technical Cooperation Project. Based on the above, it is safe to conclude that the operation and maintenance situation of the training equipment is generally good.

No major problems have been observed in regard to the institutional, technical and financial aspects of the operation and maintenance of the Project and, therefore, the sustainability of the project effects is high.

## **4 Conclusions, Lessons Learned and Recommendations**

### **4.1 Conclusion**

The Project was implemented to strengthen the functions of GCT RR in Punjab Province to provide high quality education and training responding to the industrial needs, with an overall goal of contributing to the development of the economy and industries of Pakistan by means of supplying professional personnel with excellent skills. At the time of both planning and ex-post evaluation, technical and vocational education were particularly important in the context of the development policies and development needs of Pakistan and Punjab Province. Also, the Project was highly relevant to Japan's ODA policy at the time of planning. Therefore, the relevance of the Project was high. The Project was generally implemented in accordance with the planned cost and period, making its efficiency high. Through an increase of the number of classrooms, the Project contributed to an increase of the number of classes and students of the Architecture Department and Mechanical Department of GCT RR and also improved the efficiency of the practical training at some two-thirds of the workshops. In the Architecture Department, constraints posed by facilities were substantially removed while constraints posed by equipment were removed in the Mechanical Department. Therefore, the conditions have been in place to

provide education in line with the curriculum which was revised to meet the needs of the industrial circles through the preceding Japanese Technical Cooperation Project. Such improvement is reflected in the good reputation of GCT RR graduates among employers, producing the expected impact of “contributing to the development of economy and industries through the supply of professional personnel with excellent skills”. Accordingly, the effectiveness and impact of the Project are high. There are no major problems regarding the political/institutional, organizational, technical and financial aspects of the sustainability of the Project. The general conditions of the utilization, operation and maintenance of the facilities and equipment are also good. Therefore, the sustainability of the Project is high.

In light of the above, this Project is evaluated to be highly satisfactory.

## **4.2 Recommendations**

### **4.2.1 Recommendations to TEVTA and GCT RR**

#### **(1) Improved Efficiency of Practical Training (Mechanical Department)**

GCT RR should examine and implement the following measures to further improve the training efficiency of the Mechanical Department.

- Re-planning of the timetable to reduce the preparation, cleaning and waiting times: continuation of practical training over two lesson periods, etc.
- Re-planning to increase the number of equipment simultaneously in operation to reduce the group size of students: assistance by a shop assistant who has been adequately trained for the instructor and increased capacity of power sources, etc.
- Improvement of infrastructure to increase number of equipment operable at the same time: to enhance power supply, to secure adequate ventilation at welding shop, etc.

#### **(2) Recruitment of Instructors (Architecture Department)**

GCT RR needs to recruit more full-time instructors to ensure stable and high quality education at the Architecture Department where the number of full-time instructors falls short of the quota. It is also desirable to periodically review the curriculum so that it can respond to changes in software required by the architectural industry.

### **4.2.2 Recommendations to JICA**

It is desirable for JICA to provide assistance for the implementation of the above recommendations to the extent possible, particularly those for the Mechanical Department, through the succeeding Technical Cooperation Project. It is hoped that the efficiency of the practical training at GCT RR will be further improved with the guidance of an expert who has accumulated abundant experience at Japan’s TVET which stresses practical training.

### **4.3 Lessons Learned**

#### Implementation schedule of grant aid project that assumes synergistic effects with technical cooperation project

When the provision of facilities and equipment under a grant aid project is planned to have synergistic effects with a technical cooperation project, it is essential to carefully examine the implementation schedule so that the planned training on or utilization of the facilities and equipment under the grant aid project are completed within the implementation period of the technical cooperation project. In this Project, some of the equipment enabling the introduction of the revised curriculum by the Technical Cooperation Project was provided but the actual installation of such equipment took place in the final year of the Technical Cooperation Project as the detailed study on the equipment needs by the experts and JICA's preparatory study took two years to complete. Because of this, students in the first year under the revised curriculum were unable to use the new equipment. Meanwhile, as there was not sufficient time to fully train instructors on the use and maintenance of the new equipment, it was necessary to provide training after the completion of the Technical Cooperation Project by an external institute and the succeeding Technical Cooperation Project. This situation suggests that it was necessary to carefully examine the implementation schedules of the two projects in advance. For example, if the sufficient use of or guidance on new equipment cannot be anticipated to take place during the technical cooperation period, the arrangement of a soft component to be added to the grant aid project should be made possible to complement the technical cooperation project.

End