

Ex-Post Project Evaluation 2016: Package III-6  
(Egypt, Pakistan)

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JAPAN INTERNATIONAL COOPERATION AGENCY

GLOBAL GROUP 21 JAPAN, INC.

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Arab Republic of Egypt

FY2016 External Ex-post Evaluation Report

Technical Cooperation Project

“The Project for Establishment of Egypt-Japan University of Science and Technology  
(E-JUST)”

External Evaluator: Ryutaro Koga, Global Group 21 Japan

## 0. Summary

“The project for Establishment of Egypt-Japan University of Science and Technology (E-JUST)” (hereinafter referred to as “this project”) was implemented by the Egyptian Ministry of Higher Education and Egypt-Japan University of Science and Technology (hereinafter referred to as “E-JUST”) as counterpart organizations. The purpose of the project is to open a public educational facility at New Borg El Arab City in Alexandria District with the concept of “small class sizes, graduate school centered, research-oriented, practical and international standard education offering”. And by incorporating the characteristics of engineering education in Japan, to establish the basis for E-JUST to become one of the top science and technology universities in the world. This project was consistent with Egypt’s higher education policy and development needs for high-level human resources at the time of planning and completion, and also Japan’s aid policies towards Egypt, making relevance of this project “high”. The organizational cooperation of Japanese support universities (JSU) and provision of the latest equipment for research contributed to the establishment of E-JUST’s research and education abilities. But some crucial elements for establishment, such as the hiring of various faculty and staff, establishment of relevant legal status for E-JUST, and campus construction were delayed mainly due to the influence of political and social turbulences caused by two major political changes. Since the completion of this project, Phase 2<sup>1</sup> is currently being carried out smoothly and the project purpose is being achieved. It is, however, too early to evaluate the achievement of the overall goal, as it was assumed to be achieved in 10 years and only 6 years passed after its opening. Together, the effectiveness and impact of this project was considered “moderate”. The project schedule was almost finished on time, but due to an increase of expert dispatches through outsourcing contracts with supporting universities, and an increase of equipment provision, the project cost surpassed the initial plan, thus the efficiency of this project is “medium”. There are no major issues with this project’s policy, organizational, technical and financial aspects. Therefore, the sustainability outlook of this project is “high”.

In the light of the above, this project is evaluated to be “satisfactory”.

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<sup>1</sup> Egypt-Japan University of Science and Technology Project Phase 2 (2014-2019) (following this project, hereinafter referred to as “Phase 2”)

## 1. Project Description



Project Location



E-JUST Temporary Campus and Dormitory Buildings

### 1.1 Background

In Egypt, the number of enrolled students increased significantly due to the introduction in 1964 of a tuition free policy for national universities, and thus the decline in the quality of education became obvious by early 2000. For example, the number of students at Cairo University, the highest academic institution in the country, exceeded 260,000; and the number of students per faculty within the faculty of engineering was about 30, which was three times that of the top engineering universities in Japan and the world. This made high standard and quality education difficult. Especially in the field of science and engineering where such institutions were limited, many students went to overseas graduate schools and research institutions in Europe or United States. After graduation they would not return, causing a human resource shortage of individuals with advanced and specialized knowledge. To cope with this issue, the Egyptian government was working on reforming higher education to foster qualified personnel for nation building, by providing high quality education based on economic and social needs. Therefore, at the 3<sup>rd</sup> conference (2005) of “Japan-Arab Dialogue Forum”, initiated in 2003 by the Japanese Government, it was proposed to establish a national university, “Japan Arab Institute of Technology”, with the concept of “small class sizes, graduate school centered, research-oriented, practical and international standard education offering”, while incorporating the advantages of Japanese style engineering education. This project was developed from the concept proposed at the forum<sup>2</sup>.

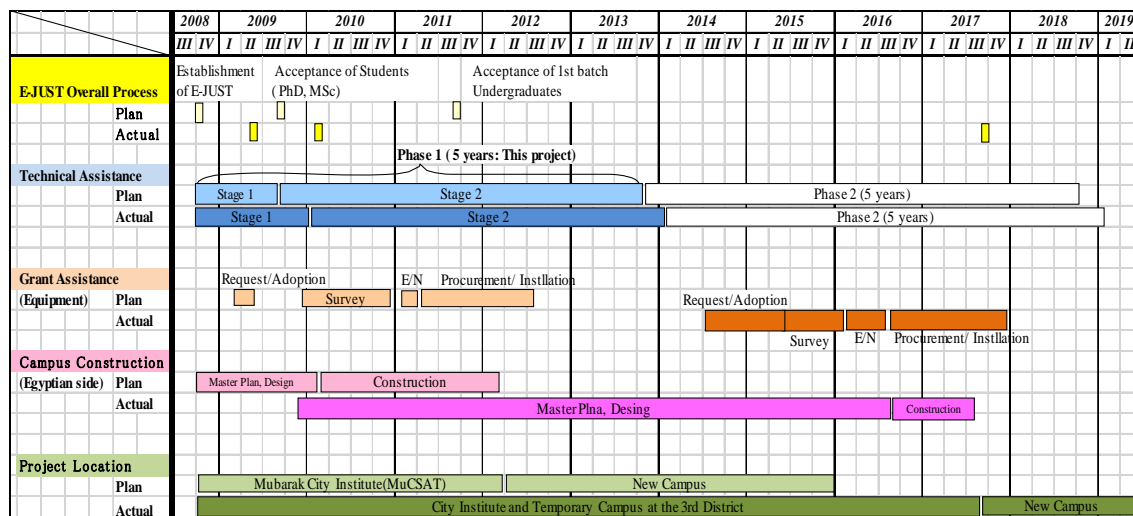
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<sup>2</sup> Project preparation advanced after the request letter was submitted from the Egyptian Government to the Japanese Government in August 2005. In May 2007, during the summit meeting, President Mubarak directly requested Prime Minister Abe for this project support, and from the beginning high-level commitments helped in the progress of this project.

## 1.2 Outline of the project<sup>3</sup>

This project was initiated in October 2008 by the Egyptian Ministry of Higher Education and the newly established E-JUST as counterpart organizations in New Borg El Arab City, Alexandria District, located about 300 km northwest of Cairo. The project purpose was to open E-JUST and to establish the foundation for E-JUST to become one of the top science and technology universities in the world. In March 2009, a “bilateral agreement<sup>4</sup>” was signed confirming the long-term commitment of both governments towards project cooperation. E-JUST started as a graduate school university and this project is focused on the cooperation for the graduate school’s research and education.

For this project, an ODA grant aid for equipment procurement support necessary for E-JUST was planned from the beginning. Also, the next phase in this project (Phase 2) to enable “E-JUST to become the base for fostering excellent personnel to contribute to the development of Egyptian Industry and society “, started with 5-year project span. This was also planned when this project commenced. Figure 1, shows the overall process of the E-JUST establishment project described in the Ex-ante Evaluation Study Report of E-JUST (October 2009). The delay of the original plan was mainly due to two major political changes from 2011 to 2013 as explained in 3.1.1 Consistency with development policy.



Source: Ex-ante evaluation study report and E-JUST

Note: “Actual” column after December 2016 are estimation at the time of ex-post evaluation.

Figure 1 E-JUST establishment project overall process

<sup>3</sup> This ex-post evaluation was conducted based on the Project Design Matrix (PDM), March 12, 2012, which revised the previous PDM reflecting the proposal made in the Midterm Review in 2012.

<sup>4</sup> “An agreement between the Government of Japan and the Government of the Arab Republic of Egypt concerning the Establishment of the Egypt-Japan University of Science and Technology (E-JUST)” was signed in March 2009. This agreement includes the establishment of undergraduate courses of engineering. The implementation of this project was conducted in two stages (Stage1: up until the acceptance of first batch of students, Stage 2: establishment of the foundation to become a leading university by practicing the basic concept of E-JUST). This evaluation evaluates Stage 2 as the Stage 1 result is interim output to achieve the project purpose of Stage 2.

It was agreed between the Egyptian and Japanese Government that the new campus construction of E-JUST (about 10 billion Japanese yen: including ancillary infrastructure such as electricity, water and sewerage, roads and maintenance cost of equipment) would be covered by the Egyptian side as an input element. Completion of the campus was scheduled in the 1st quarter of 2012<sup>5</sup>. Procurement of equipment (for research and education) was scheduled to be provided mainly by ODA grant aid scheme from Japan after the second quarter of 2011. Until that time, it was planned that some equipment would be provided by this project and/or borrowed from City Of Scientific Research And Technological Applications (SRTA-CITY), one of leading national research institutes in Egypt<sup>6</sup>.

Overall Goal	E-JUST will continuously produce outstandingly talented leaders in Egypt and Middle East African countries towards further economic and social development.	
Project Purpose	Foundation to become a world class leading university is established by steadily practicing the basic concept of E-JUST.	
Output	Output 1	Research ability of E-JUST faculty is improved to international standard level.
	Output 2	E-JUST students' practical and creative research abilities are cultivated through research-oriented education.
	Output 3	Competent technical staff who support research activities are secured and operating.
	Output 4	Collaboration between E-JUST and the industry in Egypt will be promoted.
	Output 5	Improve the management ability of management team and secretariat, including the E-JUST president
	Output 6	Information on the organization, research and education of E-JUST will be actively disseminated on a global scale.
Total cost (Japanese Side)	2,947 million yen	
Period of Cooperation	October 2008 - January 2014 (Extension period: October 2013 - January 2014)	
Implementing agency	Egypt-Japan University of Science and Technology (E-JUST)	
Other Relevant Host Country's Agencies / Organizations	Ministry of Higher Education (MOHE)	
Supporting Agency / Organization in Japan	12 Japanese support universities (Hokkaido University, Tohoku University, University of Tokyo, Waseda University, Keio University, Tokyo Institute of Technology, Nagoya University, Kyoto University, Kyoto Institute of Technology, Ritsumeikan University, Osaka University, Kyushu University, and Center of Middle East Cooperation, Middle East Investigation Committee, Tokyo Chamber of Commerce and Industry)	

<sup>5</sup> At the time of Ex-post evaluation, university operations of E-JUST were being conducted in City Research Institute located about 1km north-east of the new campus, and 14 renovated dormitory buildings about 0.5km east of the Institute.

<sup>6</sup> SRTA-CITY is located 1km eastward of E-JUST new campus. Before 2011 it was called "Mubarak City Institute for Scientific Research and Technology Applications"

Related projects	“Egypt-Japan University of Science and Technology Project Phase 2” (Technical Cooperation) (February 2014 ~ 2019), “Plan to introduce clean energy utilizing sunlight” (Grant Aid) (2009 ~ 2018) “E-JUST Education and Research Equipment Development Plan” (Grant Aid) (From 2016 ~ 2017)
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For the implementation of this project, a coordination support committee in Japan comprised of 12 JSU was organized<sup>7</sup>, and four program secretariat universities; Kyusyu University (in charge of Electronics & Communication Engineering program), Waseda University(Computer & Information Eng., Mechatronics & Robotics Eng.), Kyoto University(Material Science & Eng., Chemical & Petro-Chemical Eng.), Tokyo Institute of Technology (Management System, Energy Resources & Environmental Eng.) participated. Under this committee, the Working Group for university organization & operational strategy, Working Group for Campus facilities, and each program’s secretariat committee were set up and regular meetings were held to support not only research and education, but also university operations.

### 1.3 Outline of the Terminal Evaluation

#### 1.3.1 Achievement Prospect of Project Purpose at the Terminal Evaluation

The Terminal Evaluation (May 2013) described that, although some indicators were not achieved, the Japanese and Egyptian sides were tackling issues promptly in a concerted manner, and considering the effective contribution of Japanese supporting universities, the project purpose is projected to be achieved by the completion date. It further noted that upon (i) establishment of E-JUST legal status, (ii) new camps construction, (iii) expansion of faculty and administration staff, further significant improvements are expected.

#### 1.3.2 Achievement Status of Overall Goal at the Terminal Evaluation

The Terminal Evaluation described that “after the new campus is built and E-JUST becomes expanded with the acceptance of undergraduates of Engineering Faculty, it would start moving in the right direction to become one of top 500 universities in the world within 10 years”, and that “the collaboration system of E-JUST with industries is being developed, paving the way to stable employment for graduates. And E-JUST will become a core science and technology university which produces talents performing excellently in academia and business, contributing to the development of Egypt, Arab, and Africa through gradually improving the research and education environment.”

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<sup>7</sup> Hokkaido University, Tohoku University, Tokyo University, Waseca University, Keio University, Tokyo Institute of Technology, Nagoya University, Kyoto University, Kyoto Institute of Technology, Ritsumeikan University, Osaka University, Kyusyu University.

### 1.3.3 Recommendations from the Terminal Evaluation

Table 1 Recommendations from the Terminal Evaluation

Item	Description
Early construction of new campus	Because delay of the new campus affected the enrollment of students and research activities, early completion is desired. Until then, it is recommended to make use as best as possible of the current temporary campus.
Establishment of legal status	It is necessary to secure required budget and input personnel.
Expansion of faculty and other staff	In order to respond to the various research needs of industries and students, a sufficient number of faculty, technical staff and other administrative staff are needed.
Basic data accumulation and management	Basic data accumulation and data management regarding university operations in general, including number of papers published, acquired research funds, faculty member lists, etc. should be strengthened.
Support from Japan side	Longer dispatch periods of faculty members, support towards university operations other than research and education, and an increase of supporting universities outside of the current 4 anticipating the possibility of support for Liberal Arts education, would be optimal.

Source: Terminal Evaluation Report

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Ryutaro KOGA (Global Group 21 Japan, Inc.)

### 2.2 Duration of the Evaluation Study

This ex-post evaluation survey was conducted as follows;

Survey Period: October 2016- September 2017

Field survey Period: December 4-24, 2016, March 25-31, 2017

## 3. Results of the Evaluation (Overall Rating: B<sup>8</sup>)

### 3.1 Relevance (Rating: ③<sup>9</sup>)

#### 3.1.1 Consistency with the Development Plan of Egypt

At the time of planning, the Egyptian Government put “human resource development and employment increase” as one of seven major goals in “the long-term socio-economic development vision” (2002/03 - 2021/22). It also mentioned “development of education and scientific research” as one of the “ten major programs for development”, and prioritized

<sup>8</sup> A: “Highly satisfactory”, B: “Satisfactory”, C: “Partially satisfactory”, D: “Unsatisfactory”

<sup>9</sup> ①: Low; ②: Fair; ③: High



expansion of enrollment capacity of public education, education options, education responding to labor market needs, improvement of education quality, the improvement of quality of university education, etc. In the policy of MOHE, “development of excellence and competitiveness” and “leadership for national development” were the main pillars for the development of higher education. In addition, “Expansion of graduate school education and scientific research” was stated as one of the criteria to achieve improvement of the quality and efficiency of higher education, introduction of new education methods, international accreditation of degrees, etc. This project had high consistency with the above development policy and overall higher education policy.

The above policy was hindered during the two major political changes, the so-called “Arab Spring” from 2011 to 2013, but it has been stabilized and maintained since 2014 and is still valid now<sup>10</sup>. Therefore, it was determined that consistency with the Egyptian development policy has been maintained even at the completion of the project (2014).

### 3.1.2 Consistency with Development Needs

At the time of project planning, the decline of education quality in Egypt was apparent caused by the rapid increase of students resulting from the free tuition policy, and top talent was opting to go overseas for better education.

It is said that Egypt’s economic growth requires development in industries other than traditional tourism and agriculture. In order to foster highly skilled human resources that contribute to advancing industries, MOHE was planning to establish more than 20 national universities at and after the time of planning for this project. At the time of the ex-post evaluation, university shortages were continuing, such as 5 to 7 national universities scheduled to be opened in 5 years. Additionally, according to some faculty members of E-JUST, Cairo and Alexandria universities; the outflow of human resources had not stabilized yet, continuing the high demand for engineering education.

Considering the above, it is judged that this project is highly consistent with development needs at the time of project planning and project completion.

### 3.1.3 Consistency with Japan’s ODA Policy

At the time of planning, Japan’s “Country Assistance Program (June 2008)” determined “realizing sustainable growth and employment creation” in Egypt as a priority area in order to support the shift of Egypt towards a competitive and stable economic society. Thus, it was planned

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<sup>10</sup> The Egypt Revolution, which occurred in January 2011 ended President Mubarak’s 30-year regime. The amendment of the Constitution and Parliament Election followed, and the Muslim Brotherhood, a Muslim political party took over power. But the political situation did not stabilize and the government collapsed again after the military coup d’état in July 2013. In January 2014, the Constitution was amended again and the political situation stabilized. In June 2014, after the Presidential election, Abdel Fattah Saeed Hussein Khalil El-Sisi, who was Minister of Defense, became President.

“to support, besides skilled workers, higher education in the field of science and engineering indispensable to foster industrial human resources with advanced expertise and skills who can engage in research and development. Japan’s “Project Development Plan for Egypt (May 2009)” was based on the above policy and both are highly consistent with this project. In addition, this project utilizes the excellent scientific and technological capabilities of JSU, and consistency with the science and technology foreign policy promoted in “The 3<sup>rd</sup> Scientific Technology Basic Plan” was also high<sup>11</sup>.

Based on the above, this project is evaluated as having high relevance with Egypt’s development policy, development needs, and Japan’s aid policy.

## **3.2 Effectiveness and Impact (Rating: ②<sup>12</sup>)**

### **3.2.1 Effectiveness**

#### **3.2.1.1 Change of Project Design Matrix (PDM)**

The project design matrix of this project was modified at mid-term review (March 2012). At that time, the indicator, “E-JUST is certified by the National Authority of Quality Assurance and Accreditation for Education (NAQAAE)”, which was one of the two benchmarks measuring the achievement of the project purpose; was modified to “Common Understandings about E-JUST remains as an official agreement between Egyptian and Japanese sides”. This was because the establishment of the NAQAAE certification system was delayed and the prospect of certification was not high. This change was reasonable to maintain the management philosophy of E-JUST without the E-JUST establishment law during the time the government was in a state of confusion. The government entered stability in 2014 and since then, it has been deemed unnecessary.

In addition to the above; corrections, clarification and improvement of benchmark indicators were made, and those were appropriate changes.

#### **3.2.1.2 Achievement of Project Outputs**

In this project, in order to realize E-JUST’s basic concept, “small class sizes, graduate school centered, research-oriented, practical and international standard education offering”, the following activities were conducted.

##### **(1) Establishment of international standard research ability (Output 1)**

Senior professors of JSU were dispatched as long-term experts in charge of three academic departments<sup>13</sup> and an engineering department, as well as many short-term university

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<sup>11</sup> (Approved by Cabinet meeting in March 2006) Based on this plan, multilateral and international projects were implemented. It aimed to enhance trust in Japan by utilizing Japan’s science and technology and providing solutions to global mutual issues or responding to requests from foreign countries.

<sup>12</sup> Sub-rating for Effectiveness is to be put with consideration of Impact

<sup>13</sup> Under following 3 departments, initially 7, later 8 programs were placed; Dept. of Electronics, Communication and Computer Engineering (Electronics & Communication Eng., Computer & Information Eng.), Dept. of Innovative

professor experts. While conducting guidance on Japanese style research and education, they supported various group research and detailed reviews of research papers. In addition, state-of-the-art research equipment was provided and the development of suitable research environment necessary for a research-oriented university were promoted. As a result, publications of research papers in international journals greatly increased, and some research funds were acquired. However, due to the fact that E-JUST was a new university and the political unrest, collaborative research with Japanese universities was limited compared to the assumed. From the above, it is judged that the achievement on establishment of international standard research ability is “largely achieved”.

(2) Practicing research-oriented education (Output 2)

It was planned that all students would participate in laboratory and practice problem-solving type learning. According to the Terminal Evaluation, problem-solving type learning was being adopted, but it could not necessarily be concluded that research projects and laboratories were sufficiently launched in all the programs, and that “they write dissertation thesis based on research activities.” According to the beneficiary survey<sup>14</sup> of the graduates at the ex-post evaluation, the percentage who answered that they wrote theses based on their activities in the laboratory was 84% (31 out of 37 people). Also, at the time of completion of the project, the number of graduates was small<sup>15</sup>, and most of them were university faculty of other universities who came to E-JUST to obtain a degree and return to their university after graduation. It was not confirmed whether the employer side of industries etc. believed that the research capacity of graduates of E-JUST had improved. Therefore, it is judged that the achievement of practicing research-oriented education is “achieved at a limited level”.

(3) Establishment of research supporting system (Output 3)

It was planned to hire technical staff and place them in the technical management department (TMD) to support research experiment and equipment maintenance including trainings. There were only 4 staff members in TMD as of September 2013, less than the planned “one or more for each of the 8 programs”. According to the beneficiary survey for graduates, the ability of the technical staff regarding research experiment support, maintenance and management method of the equipment was low. It was necessary to have sufficient involvement of the

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Design Engineering (Mechatronics & Robotics Eng., Industrial Eng. and Management System, Material Science and Eng.), Dept. of Energy and Environmental Engineering (Energy Resources Eng., Environmental Eng., Chemical and Petro-chemical Eng.).

<sup>14</sup> During the ex-post evaluation, targeting current students and alumni (80 each) and all faculty members (35), a questionnaire survey through internet mail was conducted after group interviews and prior questionnaire test. Current students and alumni were chosen from student lists by random sampling. Respondents were current student 47 (response rate: 59%), alumni 37 (46%), faculty members 23 (66%), total 107.

<sup>15</sup> 44 students completed MSc and PhD courses and there were 122 students at the time of project completion. Most of MSc students advanced to PhD course.

experienced Japanese technical advisor for procurement, storage and maintenance of the equipment. The equipment committee was established in 2010, and consisted of representatives from each program to determine the priority of procurement and maintenance (including purchase of expendable supplies) of equipment. However, until the number of TMD staff was expanded in phase 2, TMD could not do the coordination work sufficiently. Therefore, the achievement of establishing the research supporting system is judged as “not achieved”.

(4) Establishment of an industry-academia collaboration system (Output 4)

An industry-academia collaboration team was organized and the Center for Innovative Technology (CINTEC) was established in 2013. However, the staffing arrangement was small, only two faculty members, two professionals, and one clerical staff, which proved insufficient. 18 projects/collaborative research with Egyptian corporations were carried out by the time of Terminal Evaluation survey, but this was focused on specific programs such as Computer Science and Information Engineering and Materials Engineering. In addition, in the interviews with several corporate stakeholders, those who knew E-JUST were only about 30%, less than the target of 50% (or more). Based on the above, it is judged that the achievement of the establishment of an industry-academia collaboration system is “achieved at a limited level”.

(5) Establishment of a university management system (Output 5)

The staffing of senior management and administrative positions, the planning of hiring and training of additional personnel, development of a financial management system and long-term financial strategy were aimed; and it was targeted that 75% or more of faculty and students were satisfied with the management and operation. However, due to the new campus construction delay, acceptance of students/faculty were delayed, leading to less than planned number of executive staff and administrative staff<sup>16</sup> at the time of Terminal Evaluation. Staff recruitment and a staff capacity improvement plan were prepared and partially implemented, but the internal training system was not fully planned and implemented. Training on the introduction of a new accounting system was conducted, and financial statements in compliance with the Egyptian accounting standard and international standards were prepared. The long-term financial strategy and management plan was outlined<sup>17</sup> in the “E-JUST Road Map 2018” created in 2013. In the satisfaction survey conducted during the Terminal Evaluation, 81% answered that they were “satisfied” or “mostly satisfied” with management, and 61% with the secretariat. From the above,

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<sup>16</sup> Four vice presidents (in charge of education/ research/international affairs/general and financial affairs) and 22 administrative departments were described in the organization chart at that time, but the vice president in charge of international affairs was vacant and 13 departments were not yet established.

<sup>17</sup> The long-term financial strategy includes the following: efficiency of operation/improvement of productivity/diversification of revenue/effective use of current real estate assets/strengthening of fund raising, donation/use of waiver of tuition fee and effective tuition support/strengthening and promotion of international collaboration/establishment of the E-JUST fund/establishment of faculty for international business and humanities.

it is judged that the achievement on the establishment of the university management system was “achieved at a limited level”.

(6) International dissemination of information (Output 6)

E-JUST actively hosted international symposiums and academic societies every year. As for academic research exchange agreements with universities and research institutions, 14 agreements were concluded by the time of Terminal Evaluation. Apart from this, 24 additional agreements were concluded with Japanese company “Mitsubishi Corporation”, Egyptian industries and domestic universities. In addition, the minutes of the university committees etc. were shared with JSU. From the above, it is judged that international information dissemination is “achieved”.

Table 2 Achievement of Outputs

Output	Achievement
<p>Output 1</p> <p>Research capacity of E-JUST’s academic staff is strengthened to match international standards.</p>	<p>(Largely Achieved)</p> <ul style="list-style-type: none"> <li>● The number of papers published in international journals was 55 out of 103, and the number of papers presented in international academic conferences was 251 (as of September 2013), surpassing their targets.</li> <li>● Except for some programs, the acquisition of competitive research funds advanced.</li> <li>● Joint researches with Japanese universities were conducted in only 3, (Material Eng., Environmental Eng. And Mechatronics-Robotics Eng.), out of 8 programs, as there were security issues and E-JUST was a newly established institution.</li> </ul>
<p>Output 2</p> <p>Capacity of E-JUST’s students to conduct practical and creative research is cultivated and enhanced by conducting ORT (on the research training/education)</p>	<p>(Achieved at a limited level)</p> <ul style="list-style-type: none"> <li>● It was expected that all students should implement Project Based Learning in laboratories. Based on the Terminal Evaluation, not all programs set up sufficient laboratories for PBL.</li> <li>● The Beneficially Survey of graduated students at the ex-post evaluation showed that 84% (31 out of 37 respondents) answered that they wrote their papers based on activities done in laboratories.</li> <li>● At project completion, the number of graduates was small and most of them were young faculty dispatched from other universities to obtain degrees and returned to their universities after graduation. Whether or not private company employers etc. considered that those graduates possess practical and higher than average ability of conducting research could not be confirmed.</li> </ul>
<p>Output 3</p> <p>Capable technical staff, who support research activities; are recruited and duties performed.</p>	<p>(Not achieved)</p> <ul style="list-style-type: none"> <li>● There were only 4 staff members in the Technical Management Department (TMD) in charge of equipment maintenance at September 2013, which was short of the target (one or more for each of the 8 programs).</li> <li>● According to the beneficiary survey, there were cases where technical staff were not familiar enough with methods of research support and equipment maintenance. This led to the need for sufficient involvement of a Japanese technical advisor from a Japanese university for procurement, operation and maintenance of equipment procured in the project.</li> </ul>

	<ul style="list-style-type: none"> <li>● Although an equipment committee was organized and discussed the priorities of procurement and maintenance (including purchase of expendables) of equipment, TMD could not coordinate the meetings well until Phase 2 started when TMD staff were expanded.</li> </ul>
<p>Output 4</p> <p>Collaboration between E-JUST and industries in Egypt and Japan is enhanced.</p>	<p>(Achieved at a limited level)</p> <ul style="list-style-type: none"> <li>● A specific team for collaboration efforts between E-JUST and industries was created within the Center for Innovative Technology (CINTEC) in 2013, but the personnel assigned were only 2 faculty members, 2 professionals and one clerical staff, making the collaboration effort insufficient.</li> <li>● By the time of the Terminal Evaluation, 18 joint/contract research activities were conducted with industries in Egypt, but those were only based on Computer &amp; Information Engineering or Material Engineering programs.</li> <li>● According to the hearing from some companies at the Terminal Evaluation, only about 30% were familiar with E-JUST activities, compared with a target of 50% or more.</li> </ul>
<p>Output 5</p> <p>Capacity of the senior management and the administrative staff of E-JUST to successfully manage the university are enhanced.</p>	<p>(Achieved at a limited level)</p> <ul style="list-style-type: none"> <li>● The staffing of senior management and administrative positions, the planning of hiring and training of additional personnel, development of a financial management system and long-term financial strategy were aimed; and it was targeted that 75% or more of faculty and students were satisfied with the management and operation. According to the satisfaction survey from the Terminal Evaluation, 81% of respondents were “satisfied” or “almost satisfied” with management, but the satisfaction level with the secretariat remained at 61%.</li> <li>● Due to the delay of the new campus construction, acceptance of students and faculty members were hindered, and a vice president in charge of international affairs and other senior staff could not be appointed as scheduled.</li> <li>● Plans for new staff recruitment and training was prepared and partially implemented, but an internal training system was not yet sufficiently developed and implemented.</li> <li>● Training for a new accounting system was conducted to introduce financial statement preparation in compliance with both Egyptian and international standards, and a long term financial strategy to strengthen E-JUST’s financial foundation was formulated.</li> </ul>
<p>Output 6</p> <p>Active information dissemination of E-JUST (organization, research and education) to Egypt and to all over the world is undertaken.</p>	<p>(Achieved)</p> <ul style="list-style-type: none"> <li>● E-JUST hosted international symposiums or conferences every year and 14 Memorandum of Understandings (MOU) on academic and research cooperation were signed (as of May 2013). Other 24 cooperation agreements were conducted with Japanese company (Mitsubishi Corporation) and Egyptian companies/ universities.</li> </ul>

Source: E-JUST materials, Terminal Evaluation Report, Beneficially Survey results at the Ex-post evaluation

Note: “The administrative staff” in Output 5 is not defined in the Ex-ante evaluation, etc., but it can be understood as those staff or organization other than senior management level which is in charge of “enhancing the university operation and management successfully.”

### 3.2.1.3 Achievement of Project Purpose

The project purpose of “Foundation to become a world class leading university is established by steadily practicing the basic concept of E-JUST”, and the two indicators set for this project purpose are shown in Table 1. As shown, both indicators were achieved with the contribution of the organizational cooperation of JSU and provision of the latest equipment for research. However, whether or not the “foundation of university” has been established needs to be judged by taking into account the aspects other than the two indicators, such as the legal status of E-JUST, the establishment of a financial and organizational foundation, and development of the new campus.

Table 3 Achievement of Project Goal

Project Purpose	Foundation to become a world class leading university is established by steadily practicing the basic concept of E-JUST.
Indicators	Actual Results
① The number of presentations in international conferences and research papers accepted in accredited international journals ranks within top 5 among Egyptian universities.	(Achieved) As the magnitude of faculty number differs from other universities, per faculty number, not an absolute number is compared. The number of research papers accepted in accredited international journals/per academic staff/per year of E-JUST is 1.09(at the time of Terminal Evaluation). There was no relevant public data of Egyptian universities available and were not able to obtain similar data through the visit survey with Alexandria University <sup>18</sup> . However, based on hearings with faculty members of some other major Egyptian universities, this number was higher than their numbers <sup>19</sup> . From these conversations, it is assumed that there is a high probability that 1.09 is within the top 5 among Egyptian universities.
② E-JUST maintains “Common Understanding” document as an official agreement between Egypt and Japan.	(Achieved) The original indicator, “To obtain the accreditation of NAQAAE (National Authority of Quality Assurance and Accreditation for Education)” was revised to the current one at the Midterm Review as the opening of the undergraduate course was delayed and NAQAAE was targeting universities with undergraduates. Accreditation of E-JUST, however, was obtained from the Supreme Council of Universities (SCU) for 7 programs (PhD and Master’s Degrees) in November 2012, and for the Environmental Engineering Program in 2013. Since the accreditation of E-JUST for awarding degrees was obtained, it was judged by rephrasing the initial indicator as “to obtain the approval of SCU”.

Source: JICA and E-JUST materials

<sup>18</sup> Alexandria University and Cairo University are considered as among the top 5 universities with engineering faculty in Egypt based on magnitude, history and the past world ranking of Times Higher Education.

<sup>19</sup> According to the members of engineering faculty of Alexandria University and Cairo University, who were contacted by the ex-post evaluator, “the Number of papers per faculty is about 0.5 and less than 1.”

Apart from the above indicators, the legal status, one of the foundations of university organization, was not obtained<sup>20</sup> within this project period, although the internal regulation<sup>21</sup> of the university advanced. Moreover, it should be noted that the new campus, which was indispensable for the improvement and expansion of the research and educational environment, was incomplete, and that the organizational improvement of the research support system/university administration system did not progress as planned (Outputs 3 and 5), and thus the stable expansion of faculty and students were not anticipated<sup>22</sup>. Considering these comprehensively, it is judged that this project achieved the project purpose at a limited level.

### 3.2.2 Impact

#### 3.2.2.1 Situations after the completion of this project

The progress of Phase 2 project etc. which affect significantly the attainment of project purpose and overall goal after the project are as follows.

##### (1) Implementation of Phase 2

In February 2014, directly after completion of this project, Phase 2 commenced with a 5-year project horizon. It was heard from many parties that since 2014, as Egypt regained political and social stability and a change of Board of Trustee members and the E-JUST president, E-JUST operations became much smoother. The deputy president in charge of international affairs, who had not been appointed, was finally appointed, and other faculty members and administrative staff joined as the preparation of accepting undergraduates developed. Establishment of research capability at an international standard and research-oriented education are progressing, and the number of papers published in international journals per faculty member greatly increased in Phase 2, from 1.4 (2014: the last year of this project) to 2.9(2015). The TMD staff has increased and the industry-academia collaboration has improved with the establishment of Center for Innovative Technology (CINTEC), which hosted joint seminars with industries, etc. In general, Phase 2 was progressing steadily.

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<sup>20</sup> E-JUST was established based on Presidential Decree No. 149 (May 2009), and after January 2011 revolution, Supreme Council of Military issued "E-JUST Status Decree" (May 9, 2011) to assure the status. But the legal foundation of E-JUST was finally established after promulgation of Presidential Decree No. 132(December 2014) and Prime Minister Decree No. 102 (January 2015) during Phase 2.

<sup>21</sup> There were only 3 bylaws (Financial, Board of Trustee, Academic) when E-JUST opened in 2010. However, E-JUST bylaws developed rapidly and by project completion there were upwards of 17 (Vision and Mission, President Selection, Financial, Procurement, Salary, Jobs and Roles, Financial/Management Authority, Student Discipline, Student Hall/Dormitory, Healthcare, Warehouse, Research Ethics, etc.), making the university foundation in the aspect of bylaws almost complete.

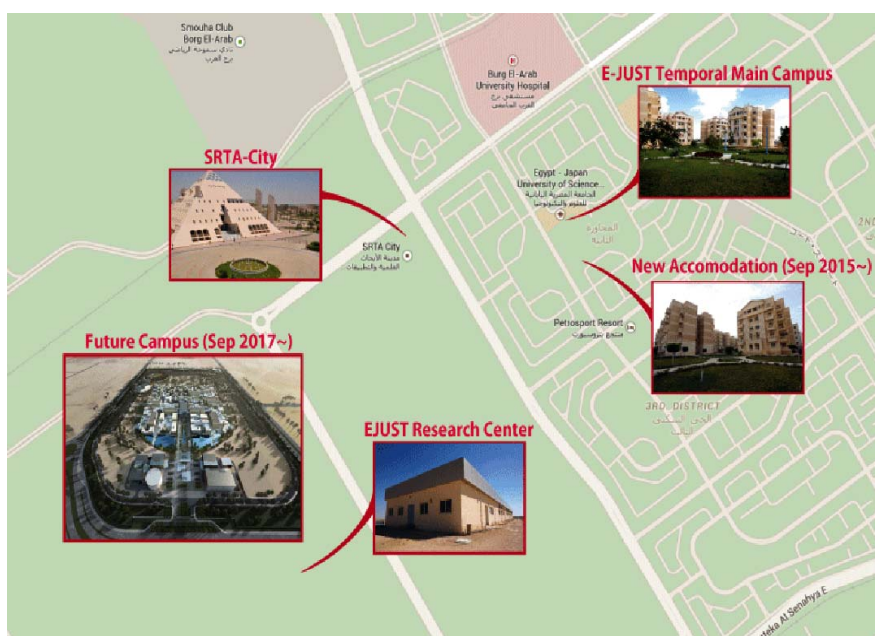
<sup>22</sup> One reason that stable expansion of students was not anticipated is the limited number of undergraduate candidate students in the country with the prerequisite relevant bachelors' degrees of engineering to feed into the graduate programs. For example, it was heard from relevant teachers that there were only 3 national universities with chemical and petrochemical departments, and therefore eligible students for E-JUST graduate studies are limited.



## (2) Acceptance of undergraduate students and New Campus Construction

E-JUST started as a graduate school and the target of this project and phase 2 was graduate level research and education, however, there was always a plan from the beginning of eventually accepting undergraduate students together with the construction of the new campus.

Undergraduate courses from faculty of engineering (maximum 500 students/year) and faculty of International Business and Humanities were expected to begin autumn 2017. With this expansion, improvement of the financial foundation, securing excellent faculty and graduate students, and university name's recognition, was expected. New campus construction (1<sup>st</sup> stage) started in September 2016<sup>23</sup>, and as of December 2016, basic infrastructure (power lead-in facilities, campus crossing underpass, etc.) were under construction and slated to finish June 2017<sup>24</sup>. The government of Egypt allocated necessary budget and showed strong commitment for early completion and the foundation of university facility is expected to be achieved soon.



Source: JICA material

Figure 2 E-JUST facility location map

## (3) Establishment of E-JUST's legal status

In Phase 2, the legal status of E-JUST, significant for the achievement of project purpose, was established. The establishment of E-JUST was initially approved by Presidential Decree No.149 (May2009). And after the 2013 political change, Presidential Decree No132 (October 2,

<sup>23</sup> Taking one year during this project period, an international competition for the Master Plan of E-JUST new campus was conducted. "Isozaki Arata Atelier" was selected to lead the design, and a modification to make the design more practical was conducted, but political changes ended up hindering the progress. By the end of this project, a temporary research building (2000 square meters) was built at the south west end of campus to accommodate equipment.

<sup>24</sup> At the 15<sup>th</sup> E-JUST's Board of Trustee meeting (May 15, 2017), it was confirmed that the prospect of earliest completion date of New Campus was December 2017.

2014) and Prime Minister Decree No.102 (January 19, 2015) were promulgated. The latter comprised of 20 articles, including those on independent budgeting with the treatment of faculty and staff, university operations taking advantage of Japanese research and education practices etc.

From the above, Phase 2 was progressing steadily and the preparation of accepting undergraduate students/ new faculties, construction of the new campus etc. was advancing. The achievement level of this project has further advanced and it is now considered that the project purpose's achievement degree which was "moderate" at the Terminal Evaluation, is being achieved at the time of ex-post evaluation.

### 3.2.2.2 Achievement of Overall Goal

The achievement of the overall goal of this project is shown in Table 4. Indicator ① targeted for E-JUST to become a model of an excellent research-oriented university in Egypt, and indicator② envisaged to nurture high level human resources to contribute to the linkage with advanced industries. From the beginning, it was assumed that achieving the overall goal required more than 10 years. It was, therefore, difficult to evaluate this indicator at the ex-post evaluation since only 6 years had passed since the opening of the temporary campus in February 2010, and the number of faculty members and students were less than one fifth of the initial plan. The commencement of undergraduate courses necessary for E-JUST to become eligible for university rankings is scheduled for after September 2017. As for indicator ②, many students are young faculty of other national universities, etc. studying at E-JUST to obtain Master or Doctoral Degrees, and therefore many graduates have not entered the private sector yet. Therefore, it is too early to judge the achievement of the overall goal. Since Phase 2 is currently being implemented and progressing well, it is envisaged that E-JUST will be able to eventually achieve the overall goal.

Table 4 Achievement of Overall Goal

Overall Goal	E-JUST becomes able to sustainably produce highly qualified human resources who can lead the socio-economic development of Egypt, Arab countries and Africa.
Indicator	Actual results
①E-JUST is ranked within the Global top 500 universities within 10 years.	(unevaluable) Only 6 years have passed since opening of the school at this ex-post evaluation, and E-JUST is not yet qualified for major university rankings as undergraduate programs are not available.
②The employment rate of E-JUST alumni after 1 year of graduation maintains over 90%.	(too early to evaluate) At the time of ex-post evaluation about 80-90% of graduates were young faculty members of other universities dispatched with MOHE scholarship to E-JUST to obtain degrees. There were only 10 graduates who weren't so, therefore there is not yet sufficient data to support this indicator.

Source: Created from the documents provided by JICA

Note: MOHE provided scholarships for 50 persons/year to E-JUST since 2008 and increased this to 75 persons/year in 2016. Some Japanese and Egyptian faculty members indicated that high tuition fee is a bottleneck for recruiting students in Egypt where there are only limited employment options for graduate students.

## Column: JICA's Roles / Contribution

This project was formed to comprehensively utilize JICA's technical cooperation and grant aid system. Although this project encountered major political changes that lasted three years during the implementation period, the following flexible responses contributed to keeping the implementation of the higher education project in Egypt to a minimal delay. With this, JICA's flexible responses are highly appreciated by the Egyptian side.

- (1) Expansion of the provision of equipment by technical cooperation to compensate for the delay in ODA grant aid:

As a result of the delay of the ODA grant aid (which was supposed to provide equipment for this project), caused by the new campus construction delay with the backdrop of political changes; JICA received a list from a Japanese technical advisor of equipment that faculty members of each program requested, and selected priority equipment and procured them more than initially planned for this project. By securing the supply of equipment, the project avoided obstacles to research / education / dissertation preparation due to lack of equipment.

Samples of Equipment provided:



Liquid chromatograph capable of high performance mass spectrometry



Transmission electron microscopy used for analysis of microscopic regions of engineering materials etc.

- (2) Flexible and stable dispatch of experts:

As for Japanese faculty dispatched as experts, initially many individual short-term dispatch contracts were planned to be used. After consulting with the universities after commencement of the project, outsourcing contracts with major universities was adopted. This change contributed to giving greater financial incentive to Japanese coordinating universities and securing a variety of faculty including project-specific ones. This also helped JICA reduce enormous contract procedures. This arrangement was considered effective in reducing the operation load, and ensuring the flexibility and diversity of dispatched faculty required for interdisciplinary education and latest theme related research for this project.

### 3.2.2.3 Other Positive and Negative Impacts

#### (1) Environmental and Social Impact

Involuntarily resettlement has not occurred with respect to development of the new and temporary campuses (located 2 km apart eastward). Each program separately processes waste-water/ liquids generated in experiments, and no particular problems have occurred. As it is expected, however, that since the amount of waste-water/ fluid will increase with the expansion of E-JUST and acceptance of undergraduate students, it is desirable to introduce facilities that efficiently perform waste-water treatment etc. for the entire campus.

#### (2) Other Social and Economic Impact

The first and second presidents of E-JUST were selected by fair public offering. This method of selection at national universities was the first attempt in Egypt, and it was reported to MOHE as a good example of an efficient and fair selection method of a president and highly appreciated. However, as Egypt is not familiar enough with this method, no other case which adopted this method has been confirmed to date.

To summarize, through the leverage of organizational cooperation of JSU and provision of the latest research equipment, this project was steadily implemented and achieved excellent results in research and educational aspects, and two indicators of the project purpose were achieved. This is seen from the increase of papers published in international journals and high acquisition rate of degrees (completion rate) of students within the designated time. However, the employment and arrangement of technical/senior/administrative staff, establishment of legal status, construction of a new campus, securing a steady number of faculty and students, which were considered to be important elements of “establishment of foundation to become a world class leading university in the field of science and technology”, were delayed due to the two major political changes and subsequent confusion from 2011 to 2013. Therefore, the overall achievement of the project purpose is moderate. While Phase 2 is progressing smoothly, the project purpose is being achieved gradually, but it is too early to evaluate the achievement of the overall goal.

Based on the above, the effectiveness and impact of this project are judged to be fair.

### **3.3 Efficiency (Rating: ②)**

#### 3.3.1 Input

The plan and actual inputs of this project is shown in Table 5.

Table 5 Plan and Actual Input

<b>Input factor</b>	<b>Plan (based on Ex-ante Evaluation)</b>	<b>Actual (based on Terminal Evaluation)</b>
<b>Input of Japanese side</b>		
(1) Dispatch of Experts	Long Term Experts: 6, Short Term Experts: about 30/year (7 programs x 4 faculty members/ year + 2 administrative staff) (Chief, University operation chief, University management, Education & research support, Technical support)	Long Term Experts: in total 12, Short Term Experts: in total 295 (227 were those from outsourcing contracts with 4 secretariat universities.) (Chief advisor, 3 academic supervisors, Technical advisor, University Operation advisor)
(2) Acceptance of trainees	About 10/ year (7 programs x 1 faculty member + 1 administrative staff)	10 (on 2 occasions) (Training of secretariat staff)
(3) Equipment provision	Total amount unknown, for research and education of doctoral and master course programs (Supplementary equipment of those owned by National City Institute)	1,530 million Japanese yen (as of the project completion) for research and education of doctoral and master course programs, software, vehicles, others.
(4) Overseas Operation strengthening expenses	Joint research expenses, daily activity expenses, etc.	80.25 Million Japanese yen
Financial contribution from Japan side	Total about 1,250 million Japanese yen	Total 2,947 million Japanese yen
<b>Input of Egyptian side</b>		
(1) Counterpart allocation	Employment and allocation of E- JUST faculty members, technical staff, other staff etc.	26 faculty members, 63 administrative and other staff
(2) Construction of Campus/ facilities	Construction of new campus and related facilities	84 ha of land for new campus, 14 dormitory buildings, temporary laboratory building (2000 square meters), etc.
(3) University operation expenses	Personnel expenses, research and education expense, maintenance expenses (buildings and equipment)	In addition to those expenses in the left column, project office space and furniture, etc.
(4) Project office expenses	Project office space, electricity and other utility charges, etc.	Local Cost: 72,512,010 Egyptian Pounds  *Calculated from the total University Operation Cost in FY2010-2013(Egyptian fiscal year) (based on BOT documents) (1 Egyptian pound = 14.3 Japanese yen: May 2013 JICA rate)
Financial contribution from Egyptian side	About 10 billion Japanese yen	About 1.03 billion Japanese yen

Source: E-JUST and JICA materials, Ex-ante Evaluation, Terminal Evaluation

### 3.3.1.1 Elements of Inputs

Input elements of this project, mainly the dispatch of experts and equipment provision, both increased much more than planned. The dispatch of Japanese experts increased due to the change of contract style, as an incentive to those program secretariat universities and in order to increase the flexibility of dispatches, from individual contracts to outsourcing contacts with those program secretariat universities, as well as another program being added. As for equipment, until the completion of the new campus, complementary procurement in this project and borrowing of equipment from City Institute was planned. But since construction of the new campus and launching of undergraduate programs were delayed, equipment provision within this project increased significantly to respond to the situation.

### 3.3.1.2 Project Cost

The Project Cost was planned at about 1,250 million yen; while actual cost was more than double, 2,947million yen (235% of the planned). The main reason was due to the change of contract type for short-term dispatch experts from individual contracts to outsourcing contracts<sup>25</sup> based on the discussion with universities after the commencement of the project, in order for the program secretariat universities to increase financial incentives and provide a broader range of experts. Another reason is the huge increase of equipment provision required for this project (570 million yen to 1,530 million yen: 268%, based on estimation<sup>26</sup> of ex-post evaluator), to compensate for the funds which were planned to be provided through an ODA grant aid together with the progress of the new campus construction, but was late due to the delay of the new campus construction. Even without this increase of equipment, the project cost surpassed the plan (148% of the plan).

### 3.3.1.3 Project Period

The project implementation was scheduled to take 60 months, and actual time was 63 months (with a 3-month extension, or 105% of planned schedule). This extension was crucial for the planned from the start smooth hand over of operations from phase 1 to phase 2 without a gap, due to the delay of commencement of phase 2 caused by the second political change occurring in the last year of this project. For evaluation purposes, this delay is not counted.

Both the project amount and project period surpassed the original plan. However, for the equipment portion of the project amount increase which shared more than half of it, this was to make up for the ODA grant aid project linked to this project, and the project period extension

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<sup>25</sup> The reason of contract change came from the request of the universities to dispatch teachers more flexibly. The change increased technical and administrative costs.

<sup>26</sup> Calculated from the procurement list in Phase 1.

was to make up for the delay of the start of Phase 2, and therefore, this project itself was not delayed. From the above, the efficiency of this project is fair.

### **3.4 Sustainability (Rating: ③)**

#### **3.4.1 Related Policy and Institutional Aspects for the Sustainability of Project Effects**

##### **(1) Establishment Law of E-JUST**

By the promulgation of Presidential Decree No. 132 in October 2014, and Prime Minister Decree No. 102 in January 2015, the legal status of E-JUST to become an independent governmental education entity with special characteristics different from other national universities, was finally established. This condition of being “an independent government education entity with special characteristics” was important for E-JUST to secure excellent faculty/ staff and adopt the Japanese research and education style to become a top-notch research-oriented university independent from regulations pertaining to other national universities. This law had been consulted between Japan and Egypt since the time before the establishment of the university and it can be confirmed<sup>27</sup> that Egypt's high interest and commitment to E-JUST has persisted even after the two political changes.

##### **(2) Continuous involvement of JSU**

The long-term and continuous involvement of JSU is indispensable for E-JUST to reach “international standard” levels in terms of education and research. During Phase 2, it is considered necessary to form a solid support system for E-JUST with all essential entities in Japan [Government (Ministry of Foreign Affairs, Ministry of Education, Ministry of Economy, Trade and Industry, etc.), universities, industries] so that involvement of JSU remains even after Phase 2 period. Regarding this, since the preliminary evaluation survey stage in 2008, the Ministry of Foreign Affairs has established the “E-JUST Support Council”, an all-Japan regime, to effectively show Japan’s commitment towards the bilateral agreement.

#### **3.4.2 Organizational Aspects for the Sustainability of Project Effects**

##### **(1) Enforcement of E-JUST management system**

It was pointed out in Termination Evaluation that further strengthening the management system of E-JUST was necessary. As explained in 3.2.2.1 Situations after the completion of this project, the implementation system of E-JUST advanced greatly during Phase 2 due to the fact that the Egyptian government regained stability and the reform of the university

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<sup>27</sup> Article 6 of Prime Minister Decree No.102 describes “The University Curricula, Research and Training Plans and Management are set according to the latest practices in the Japanese Universities and Research Centers by a decision from the Board of Trustees.” And legally ensures the Japanese style research and education system which was aimed to be maintained during the period of political turbulences through setting an indicator; “E-JUST maintains “Common Understanding” as an official agreement between the Egypt and Japan side.”

management team; including the increase of faculty and staff and the appointment of a vice president of international affairs which was previously vacant. As long as the university expands, further enforcement of personnel is required.

(2) Securing faculty members

Regarding the number of teaching staff, as a whole, no problems have occurred in providing courses. However, at the time of the ex-post evaluation, only 7 faculty members out of 35 have been continuously enrolled in E-JUST since opening in 2010. It is thought that accumulation of faculty will not be sufficient if faculty are not looked at as an important resource of the university<sup>28</sup>. The management of E-JUST is fully aware of this issue and is planning to introduce a lifetime tenure system as one of countermeasures. But there are also opinions that if a lifetime tenure system is adopted, the incentive to consistently publish papers in international journals (a mainstay of E-JUST) may be impaired, and thus has not been implemented yet.

### 3.4.3 Technical Aspects for the Sustainability of Project Effects

(1) Research activities

Faculty of E-JUST are generally top quality with a large number of accolades such as publication/ presentation of papers in international journals/ conferences. In addition, through research activities at E-JUST, eight patents were applied and five registered indicating the high standard of research capability of E-JUST. However, setting such strict selection criteria for faculty also constrains the hiring availability of new faculty.

(2) Education activities

The ratio of master's and doctoral students' completion within the designated periods (2 years for master's degree, 3 years for doctoral degree) is 71%, and the proportion of students completing with an extension of just one semester goes up to 95%. Taking into consideration that there are many cases where it takes upwards of 4 years to complete a master's degree and 5 years for doctorate, in other universities where students often engage in part time jobs during those period, this shows that E-JUST's educational ability and environment is excellent.

(3) Management and maintenance of equipment

There are various kinds of equipment, with different frequencies of usage, installed into many laboratory sites. Among them, TMD maintains and manages common equipment (electron

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<sup>28</sup> One of the reasons of slow accumulation of teachers is all teachers are hired with a time limit as they are dispatched to E-JUST using an on-leave system (in which teachers can work in other universities or research institutes for maximum 10 years) of their home universities and they need to return back 2 to 5 years later. In 2016, the regulation was amended and the 10-year time-limit was removed in case teachers are in a prioritized national mission, and the job in E-JUST was identified as one of such a national mission. But the effects of this amendment are still unknown.



microscope, numerical control processing machine, etc. used commonly in programs) and the other equipment is managed by technical staff of each program, while receiving support from TMD. This system was developed after commencement of Phase 2. As for training/technical support of equipment requiring updates and maintenance, technical training is provided on a semi-annually basis, centered on requests from each program including training of the latest equipment abroad, in total about 10 times per year. According to the Japanese technical adviser in Phase 2, TMD gained a mastery of training to maintain and manage the equipment almost entirely without the support of the Japanese technical advisor, given the current number of students (about 170 at the time of ex-post evaluation). Technical expertise related to the maintenance and management of technical staff had improved to such a level by 2014 that daily maintenance can be sufficiently implemented without the oversight of Japanese experts. In the beneficiary survey, 91% of faculty and 64% of students gave high evaluations on technical skills of technical staff.

(4) International standard accounting system

Regarding the new accounting system in compliance with international standards which was introduced in this project, the financial staff who received training in Japan recently retired, and therefore it is desirable to conduct training for the current staff in charge.

### 3.4.4 Financial Aspects for the Sustainability of Project Effects

(1) Financial situation

E-JUST is still in a transition period and the financial situation of E-JUST fluctuates greatly each year due to the construction of the new campus and the opening of undergraduate departments. Most of the financial resources depend on the government's budget, such as the national budget and scholarships from MOHE. Internal financial resources (tuition fees of individual students, competitive research funds, scholarships/ donations from private companies, etc.) are still limited. If students can be secured as planned, by the opening of departments after autumn 2017, the revenue base is expected to strengthen.

(2) Situation of revenues and expenses

The revenues and expenses for the recent four years are shown in Table 6. It went into black in the period 2013/2014 (fiscal year starts from July 1<sup>st</sup> and ends June 30<sup>th</sup>) when this project ended, maintaining a surplus for the subsequent two years. Expenses do not include depreciation of equipment. The construction costs of the new campus are covered by the state budget of Egypt.

(3) Maintenance budget of equipment

According to E-JUST, the budget for the operation and maintenance of common equipment provided by JICA has been fully distributed as requested (after some minor setbacks

of distribution in the short-term). Because of the approach of Japanese technical adviser and others, it seems that awareness towards the importance of maintenance management is getting through to the management level. According to the beneficiary survey for students, however, there are reports of lack of spare parts and delays in updating software due to lack of budget for equipment managed by individual programs.

Table 6 Revenues and Expenses (FY 2012 /3 to FY2015/6)

Unit: 1000 Egyptian Pounds (EGP)

	<u>2012/13</u>	<u>2013/14</u>	<u>2014/15</u>	<u>2015/16</u>
<b>Revenues</b>				
Governmental Revenues				
Grants from the Government	5,847	12,510	17,732	25,999
Tuition fees and student accommodation funded by MOHE	9,315	11,857	14,035	11,659
Miscellaneous revenues	1,008	160	300	427
Subtotal	16,169	24,527	32,068	38,085
Other Revenues	1,082	2,704	3,699	3,366
<b>Total Revenue</b>	<b>17,252</b>	<b>27,231</b>	<b>35,767</b>	<b>41,451</b>
<b>Expenses</b>				
Salaries and Wages	14,296	17,184	22,045	22,562
General administrative expenses	6,046	5,927	8,133	8,985
Claims provisions				500
End of service provision	523	749	922	----
Foreign currency exchange differences	268	811	2,192	----
Depreciation of fixed assets	13,113	13,672	14,550	16,735
<b>Total Expenses</b>	<b>21,132</b>	<b>24,672</b>	<b>33,291</b>	<b>32,046</b>
<b>Surplus/(Loss) of operating activities</b>	<b>(3,880)</b>	<b>2,559</b>	<b>2,476</b>	<b>9,404</b>

Source: Audit Reports of E-JUST

Note: Fiscal year is July 1 to June30.

Exchange rate at end of each term: 2012/13(1USD=5.78EGP), 2013/14(7.15), 2014/2015(7.61), 2015/16(8.88)

Based on the above, there are no major issues regarding the sustainability of this project in terms of policy, institutional, organizational, technical and financial aspects. Regarding the organizational aspect, it could be pointed out that there are frequent changes of faculty, and the delay of the expansion of faculty, students and administrative staff. With the strong commitment of the Egyptian government in promoting this project, however, the completion prospect of the new campus has been realized, and the expansion of the university organization is advancing. Furthermore, it can be pointed out that the strengthening of the financial base from establishing the undergraduate department is expected, and that the provision of equipment mainly for the undergraduate department via ODA grant aid is planned. Also, it is comprehensively taken into

consideration that Phase 2 of this project is being implemented and the sustainability anticipated by this project is high. However, with regards to the sustainability after Phase 2, it is necessary to verify the ongoing support sustainability by Japanese faculty, which is a major player in the practice of Japanese style research and education in this project.

#### **4. Conclusion and Lessons learned /Recommendations**

##### **4.1 Conclusion**

This project was implemented by the Egyptian Ministry of Higher Education and E-JUST as counterpart organizations. The purpose of the project is to open a public educational facility at New Borg El Arab City in Alexandria District with the concept of “small class sizes, graduate school centered, research-oriented, practical and international standard education offering”. And by incorporating the characteristics of engineering education in Japan, to establish the basis for E-JUST to become one of the top science and technology universities in the world. This project was consistent with Egypt’s higher education policy and development needs for high-level human resources at the time of planning and completion, and also Japan’s aid policies towards Egypt, making relevance of this project “high”. The organizational cooperation of Japanese support universities (JSU) and provision of the latest equipment for research contributed to the establishment of E-JUST’s research and education abilities. But some crucial elements for establishment, such as the hiring of various faculty and staff, establishment of relevant legal status for E-JUST, and campus construction were delayed mainly due to the influence of political and social turbulences caused by two major political changes. Since the completion of this project, Phase 2 is currently being carried out smoothly and the project purpose is being achieved. It is, however, too early to evaluate the achievement of the overall goal, as it was assumed to be achieved in 10 years and only 6 years passed after its opening. Together, the effectiveness and impact of this project was considered “moderate”. The project schedule was almost finished on time, but due to an increase of expert dispatches through outsourcing contracts with supporting universities, and an increase of equipment provision, the project cost surpassed the initial plan, thus the efficiency of this project is “medium”. There are no major issues with this project’s policy, organizational, technical and financial aspects. Therefore, the sustainability outlook of this project is “high”.

In the light of the above, this project is evaluated to be “satisfactory”.

##### **4.2 Recommendations**

###### **4.2.1 Recommendations for E-JUST**

- (1) Early construction of the new campus is an important element for E-JUST to achieve the project purpose and timely completion is highly recommended. It is also recommended that

the campus become the symbol of E-JUST, to aid in securing stable numbers of students and faculty by conscious efforts, such as enhancing its attractive features through the development of service center to accommodate various student needs, training gym and swimming pool etc.

- (2) Safety measures related to experiments in laboratories have progressed, including the installation of draft chambers indispensable for chemical experiments, and safety shower to be used in emergency situations. However, considering the future increase of students, countermeasures against wastewater and waste liquid are not sufficiently developed. It is recommended that efforts be made to implement improvement measures at an early stage.
- (3) Only 7 faculty members out of 35 have been continuously working at E-JUST since 2010. The system to accumulate faculty members, one of important resources of university foundation, has not developed yet. Many faculty believe that a tenure track, or a lifetime employment system, contributes to retaining faculty and recommends implementing such a system to improve the accumulation of faculty, and also the university operation system.

#### 4.2.2 Recommendations to JICA

- (1) Safety measures (including environmental measures) in laboratories have been introduced with the leadership of Japanese faculty. However, as domestic environmental standards are not fully developed, the countermeasures of wastewater/ waste liquid have not been advanced much. It is extremely meaningful for E-JUST to become a model “zero emission” university and act as a pioneer to other universities (promoted by the E-JUST President), of avoiding the environmental burden of emitting wastewater and waste liquid. Active support utilizing technical cooperation with this consideration and implementation in mind is recognized as important.
- (2) Although it was timely to support the introduction of a new accounting system in 2013 by procuring consulting services with certified public accountants. At the time of the ex-post evaluation, it was identified that the person in charge who was trained at that time had already retired, and the operation was not fully established. It is desirable to further provide training through Phase 2.

### 4.3 Lessons learned

- (1) Utilization of bilateral agreement to improve sustainability

Signing a high-level bilateral agreement between the two governments may be quite effective in maintaining the sustainability of the project. Although this project encountered two

major political changes during the implementation period, it proceeded without frustration due to the bilateral agreement showing the government's long-term commitment. This project had very strong commitment from both Egypt and Japan since project formulation, reflecting the long-term development needs to respond to Egypt's development of higher human resources, including that discussed in the Summit Meeting. This commitment was documented as an agreement between relevant ministers and the Japanese ambassador as signers, and supported JICA's R/D<sup>29</sup> at even higher levels. In case of projects that have a high-level commitment of both governments of a recipient country and Japan, and that a long project implementation is expected, in order to smoothly implement such a project, while minimizing the adverse effects of political changes, it is effective to utilize a bilateral agreement to strengthen the commitment of executing agencies of both countries through a R/D, etc.

(2) Countermeasures in case a linked ODA grant aid is delayed in a collaboration project of technical cooperation and ODA grant aid

In this project, the provision of equipment by grant aid, which was planned from the beginning and thought to be indispensable for the success of this project, did not proceed as planned because of the delay of the new campus construction. As the equipment provision demands increased significantly, fortunately the technical cooperation was able to fill the gap. This timely and flexible response was greatly appreciated. When implementing a collaboration project of technical cooperation and ODA grant aid, it is highly recommended to be able to respond promptly and flexibly by utilizing the technical cooperation, in case the linked ODA grant aid becomes delayed. In such a case, consideration is required so that it should be within the scope of technical cooperation while paying sufficient attention so as not to be overly flexible).

End

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<sup>29</sup> R/D stands for Record of Discussion. An agreement relating to a technical cooperation project between Japan and recipient government signed after project preparation studies between JICA and executing agencies, which includes project purpose, activities (outputs), inputs of both sides or demarcation of responsibilities in implementation, etc.

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”

External Evaluator: Hajime Sonoda, Global Group 21 Japan, Inc.

## **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.

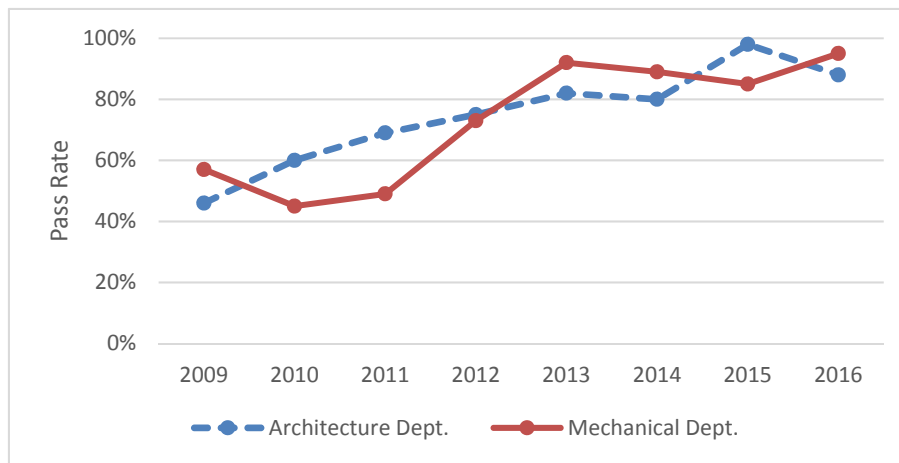
The beneficiary survey<sup>14</sup> conducted with the instructor in charge of practical training found that the number of usable equipment had increased in approximately two-thirds of the workshops. This increase in the number of equipment augmented the actual equipment operating time of individual 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>	<ul style="list-style-type: none"> <li>87%</li> <li>13%</li> <li>0%</li> <li>0%</li> <li>85%</li> <li>66%</li> <li>46%</li> <li>57%</li> <li>75%</li> <li>82%</li> </ul>	<ul style="list-style-type: none"> <li>66%</li> <li>33%</li> <li>1%</li> <li>0%</li> <li>85%</li> <li>81%</li> <li>43%</li> <li>59%</li> <li>69%</li> <li>43%</li> </ul>
Level of satisfaction by activity (ratio of satisfied students) <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>	<ul style="list-style-type: none"> <li>93%</li> <li>92%</li> <li>95%</li> <li>15%</li> <li>71%</li> <li>22%</li> <li>86%</li> </ul>	<ul style="list-style-type: none"> <li>75%</li> <li>90%</li> <li>90%</li> <li>18%</li> <li>72%</li> <li>25%</li> <li>50%</li> </ul>

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

Islamic Republic of Pakistan

FY2016 Ex-Post Evaluation of Technical Cooperation Project<sup>1</sup>

“The Project for Development of Centre of Excellence (CoE) for Technical Education”

External Evaluator: Hajime Sonoda, Global Group 21 Japan, Inc.

## **0. Summary**

Technical Cooperation Project “The Project for Development of Centre of Excellence (CoE) for Technical Education” (hereinafter referred to as “the Project”) was implemented with the purpose of turning the Government College of Technology Railway Road (hereinafter referred to as “GCT RR”) in Punjab Province into a center of excellence in the mechanical and architecture fields and providing technical education relevant to the needs of industry, and with the overall goal of disseminating the outputs of this to other Government Colleges of Technology (hereinafter referred to as “GCT”) in the province. Technical and vocational education had high importance in the policies and development needs of Pakistan and Punjab Province when the Project was planned and also when it was completed. The Project was also consistent with Japan’s ODA Policy at the time of planning. Therefore, it had high relevance. Through the Project, GCT RR’s system for linkage with industry and placement support was strengthened and a revised curriculum was introduced in line with the needs of industry, therefore, the project purpose was achieved. The revised curriculum has been applied in the province and training for mechanical department instructors is being advanced in line with it. However, the mechanical departments at other colleges are confronted with equipment constraints such as lack of access to the latest machinery and so on. Other project approaches such as strengthening of linkage with industry and so on have been only partially applied at other colleges. Accordingly, the overall goal was partially realized. In terms of other impact, the Project contributed to improving the quality of human resources that are supplied from GCT RR to industry. Accordingly, effectiveness and impact of the Project is considered to have been high. The project period was as planned. However, because project costs exceeded the planned amount, efficiency of the Project was fair. In terms of sustainability, there have been no major issues in political/institutional, organizational, technical and financial aspects. Since activities have been continuing in good condition in GCT RR following the completion of the Project, the sustainability of the Project has been high.

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

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<sup>1</sup> In this ex-post evaluation, an in-depth analysis was carried out by a Japanese expert regarding the female education and gender equality in technical and vocational education and training in Pakistan. Selection of the expert was done by the external evaluator, and subsequently agreed by JICA.



## 1. Project Description



Project Location



Government College of Technology  
Railway Road (GCT RR)

### 1.1 Background

The Government of the Islamic Republic of Pakistan compiled the national development plan, Vision 2030, in 2007 with the aim of achieving stable socioeconomic development, and it has been striving to promote industrialization under this with 2030 as the target year. With a view to developing the manpower to realize the Vision 2030 goals of increasing the GDP share of manufacturing from 18 percent to 30 percent and improving per capita GNP (from USD742 per person to USD3,000 per person), the Government of Pakistan has made it a priority to reconstruct the Technical and Vocational Education and Training (hereinafter referred to as “TVET”)<sup>2</sup> sector. In 2006, it established the National Vocational and Technical Training Commission (NAVTTTC)<sup>2</sup> and advanced formulation of the strategy for rebuilding the TVET sector. This strategy is composed of three basic objectives: (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, while individual strategies include establishment of advanced model schools (Centers of Excellence), strengthening of management of training and education institutions and so on. Moreover, on the level of provinces, the Technical Education and Vocational Training Authority (hereinafter referred to as “TEVTA”) has been established and is working to improve technical education and vocational training.

In Pakistan, due to the growth of manufacturing, construction and other industries, approximately 11 million new jobs were created between 1997 and 2007. However, while the manufacturing sector became increasingly modernized, the institutions responsible for implementing technical education and vocational training in Pakistan lacked the adequate facilities and equipment and were unable to conduct training to a sufficient level. Moreover, not

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

only did industry require skilled labor, but there was also an urgent need to develop middle-level technicians who could link between construction/manufacturing sites and management.

It was in these circumstances that the Government of Pakistan requested the Government of Japan to offer various assistance for the strengthening of its vocational and technical education institutions. JICA examined feasibility of such cooperation through implementing the Fact Finding Study on TVET in Pakistan in 2006-2007 and a preparatory study in 2008, after which it implemented the Project over five years starting in December 2008.

## 1.2 Project Outline

The Project was implemented with the purpose of turning the Government College of Technology Railway Road (GCT RR)<sup>3</sup> in Punjab Province into a center of excellence in the mechanical and architecture fields and providing technical education relevant to the needs of industry, with the overall goal of disseminating the Project knowledge and experience to other colleges and thereby providing technical education relevant to the needs of industry in Punjab Province.

Overall Goal		Acquired knowledge of the Project, which provides technical education to fulfill industrial needs, is applied into other institutes (mechanical and architecture) in Punjab.
Project Purpose		Mechanical and Architecture courses of Government College of Technology Railway Road (GCT RR) provide quality in technical education based on industrial needs as CoE.
Outputs	Output 1	Management system of GCT RR is strengthened as CoE which can offer technical education relevant to industrial needs.
	Output 2	Training management cycle of mechanical and architecture courses is strengthened.
	Output 3	Placement support of GCT RR is strengthened.
	Output 4	Knowledge and experience of GCT RR is shared with other courses in GCT RR and TVET institutes.
Total Cost (Japanese Side)		413 million yen
Period of Cooperation		December 2008 – December 2013
Implementing Agencies		Technical Education and Vocational Training Agency (TEVTA) Punjab, Government College of Technology Railway Road (GCT RR)
Other Relevant Agencies/		None

<sup>3</sup> The education system of Pakistan entails 10 years of basic education, which comprises elementary school (first to fifth grades), lower secondary school (sixth to eighth grades), and upper secondary school (ninth and tenth grades). Students then proceed to senior high school for two years (11th-12th grades), after which they can proceed to college or university. Apart from this, there is a vocational education line whereby graduates of elementary school and lower secondary school can enroll in vocational schools, while graduates of upper secondary schools can advance to three-year diploma courses. At the GCT targeted by the Project, education is conducted under this diploma course, and almost all the students enter the college after receiving 10 years of general education (equivalent to first grade at senior high school in Japan). At GCT RR in Punjab, in addition to the mechanical and architecture departments targeted for assistance in the Project, there are an air conditioning and refrigeration department and an automobile and diesel department, and diploma education is conducted through lessons divided according to the morning and afternoon.

Organizations	
Supporting Agency/ Organization in Japan	None
Related Projects	The Project for Strengthening of DAE <sup>4</sup> Mechanical & Architecture Departments in GCT Railway Road of Punjab Province (JICA Grant Aid, 2011), The Project for Strengthening DAE in Mechanical Technology at Government College of Technology in Punjab Province (JICA Technical Cooperation, 2015-2019)

### 1.3 Outline of the Terminal Evaluation

#### 1.3.1 Achievement Status of Project Purpose at the Terminal Evaluation

It was judged that the project purpose would have been achieved, not only because of the improvement of employee satisfaction, graduate satisfaction, and completion examination pass rate and achievement of the targets for each, but also in light of the improved performance of enrolled students and the certification results in the Mechanical Department by the National Vocational and Technical Training Commission (NAVTTTC)<sup>5</sup>.

#### 1.3.2 Achievement Status of Overall Goal at the Terminal Evaluation (Including other impacts)

The revised curriculum for the Mechanical Department has already been adopted at all the government colleges of technology in Punjab Province that have mechanical departments (19 colleges including GCT RR), while the revised curriculum for the Architecture Department has also been adopted at some colleges (private colleges, etc.) in the province. Accordingly, since the project outputs are being deployed throughout the province, it is judged that the overall goal will be achieved.

#### 1.3.3 Recommendations from the Terminal Evaluation

Recommendations for TEVTA Punjab and GCT RR by the time the Project is completed:

- Recruitment of teachers with consideration given to age composition, etc.
- Improvement in the quality of education, especially the quality of afternoon courses (assignment of teachers, completion examination pass rate, etc.)
- Implementation of regular seminars targeting other colleges in the province to disseminate the knowledge and experience of GCT RR
- Strengthening of the system for various supports including support for placement of

<sup>4</sup> Diploma of Associate Engineering

<sup>5</sup> In the certification assessment conducted by the National Vocational and Technical Training Commission, the Mechanical Department of GCT RR was rated B (second) in the four-stage rating (A-D) based on the results of evaluation in April 2012. The A rating was not awarded to any of the Mechanical Department of colleges in the entire country. As for the Architecture Department, this was not targeted for certification because the Architecture Department building was still being constructed under the Grant Aid "Project for Strengthening of DAE Mechanical & Architecture Departments in GCT Railway Road of Punjab Province" that was commenced while the Project was still being implemented.

female students in the Architecture Department

- Securing of necessary budget to improve the quality of education

Long-term recommendations for TEVTA Punjab and GCT RR following completion of the Project:

- Strengthening of the placement support office and dissemination of the placement support system to other colleges in the province
- Preparations for revision of curriculum starting in 2015
- Support for introduction of revised curriculum to other GCT in the province
- Systemization of the knowledge and experience acquired at GCT RR
- Activities to disseminate knowledge and experience acquired at GCT RR to other parts of the country

## **2. Outline of the Evaluation Study**

### **2.1 External Evaluator**

Hajime Sonoda, (Global Group 21 Japan, Inc.)

### **2.2 Duration of Evaluation Study**

The ex-post evaluation study was conducted with the following schedule.

Duration of the Study : September 2016 - September 2017

Duration of the Field Survey : November 16 - December 14, 2016

March 15 - 23, 2017

The external evaluator of the Project also implemented an ex-post evaluation for a grant aid project (the Project for Strengthening of DAE Mechanical & Architecture Departments in GCT Railway Road of Punjab Province; hereafter referred to as “the Grant Aid Project”) at the same time as that for the Project. Since the implementing 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.

## **3. Results of the Evaluation (Overall Rating: A<sup>6</sup>)**

### **3.1 Relevance (Rating:③<sup>7</sup>)**

#### **3.1.1 Consistency with the Development Plan of Pakistan**

As was described in section 1.1 Background, at the time of planning (2008), Pakistan had embarked on reform of the TVET sector with a view to achieving economic growth based on

<sup>6</sup> A: Highly satisfactory; B: Satisfactory; C: Partially satisfactory; D: Unsatisfactory

<sup>7</sup> ①: Low; ②: Fair; ③: High

industrialization and it was formulating strategies with the objectives of “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.

In Pakistan Vision 2025, which was adopted as the national development plan by the new administration that assumed power in July 2013, TVET is emphasized in relation to development of human resources, private sector-led growth, and strengthening of international competitiveness out of seven major goals. This administration implemented the TVET Reform Program (Phase 1: until December 2016) which began in 2011 while generally maintaining the direction set by the strategy.

Accordingly, the Project was highly consistent with the development policies of Pakistan at both the time of planning and the time of Project completion (December 2013).

### 3.1.2 Consistency with the Development Needs of Pakistan

As was described in section 1.1 Background, TVET institutions in Pakistan did not have adequate levels of facilities and equipment or education at the time of planning (2008). Moreover, not only did industry require skilled labor, but there was also an urgent need to develop middle-level technicians who could link construction/manufacturing sites with management. Lahore, the capital city of Punjab Province and home to the target institution of the Project, GCT RR, had concentrations of various engineering industries. However, the curriculum formulated by the provincial TEVTA had not been revised for more than 10 years and there was a high need to conduct revision to better reflect the needs of industry.

In Punjab Province, persons aged 30 years or under account for two-thirds of the population. In Punjab Growth Strategy 2018, the development plan that was compiled by Punjab Province in 2015, reflecting the need to create one million new jobs every year by 2018<sup>8</sup>, it was made a goal to implement TVET training for two million young people over four years between 2015 and 2018. By the time of completion of the Project (December 2013), it is thought that the needs for human resources in industry were sustained. Moreover, GCT RR, which was established as a center of excellence through the Project and the Grant Aid Project, was training master trainers capable of educating instructors in other colleges, so TEVTA Punjab has been anticipating that GCT RR would play a leading role in TVET training in the province’s mechanical and architecture fields.

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<sup>8</sup> The ratio of people aged 30 years or younger in Punjab Province is roughly the same as the national average.

Accordingly, the Project was highly relevant to the development needs of Pakistan at both the time of planning and the time of Project completion.

### 3.1.3 Consistency with Japan's ODA Policy

At the time of the ex-ante evaluation, Japan's ODA plan for Pakistan (February 2005) had the objectives of securing a sound market economy and diversifying the industrial structure. One of the priority fields of JICA's country-based project implementation policy was "support for higher education, technical education and vocational training geared to promoting growth of the middle class", and the "Technical Education and Vocational Training Program" was being implemented. The Project was implemented within this program.

The Project was highly relevant to the Pakistan's development plan and development needs, as well as Japan's ODA policy. Therefore, its relevance was high.

## 3.2 Effectiveness and Impact <sup>9</sup>(Rating: ③)

### 3.2.1 Effectiveness

#### 3.2.1.1 Achievement of Project Outputs and the Process Involved<sup>10</sup>

##### (1) Strengthening of linkage with industry (Output 1)

In the Project, activities were conducted to strengthen linkage between GCT RR and industries in Lahore making it possible to provide technical education corresponding to the needs of industry. The Institute Management Committee is composed of the representative (chairperson) of TEVTA Punjab, the college principal (vice chairperson), one instructor (secretary), and eight members of private sector representatives from industry. However, the private sector representatives did not have a good attendance record during the planning of the Project. In the Project, a Technical Working Group was newly added to the college operating committee and the private sector representatives were encouraged to actively take part in the school operations. Activities included; lecturers from private enterprises were invited to conduct lecture meetings; exhibitions inviting parents where works by (individual or group) students evaluated by lecturers belonging to private enterprises and universities are displayed; skill competitions to solve specific tasks with speed and accuracy; job fairs inviting private enterprises to provide personal careers advice to third-grade students; and internships with private companies lasting between 2 - 4 weeks conducted for third-grade students. Out of these activities, the lectures by private sector lecturers and internships in private sector enterprises had also been sporadically conducted before the Project. However, they came to be effectively conducted on an organized basis through the Project. As for the other activities, these were started as a result of the Project. At the same time, information on students,

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<sup>9</sup> Impact is also considered when rating effectiveness.

<sup>10</sup> Conditions regarding the achievement of indicators are attached to the end of the report.

education, equipment and placement (information on enterprises and employers) was computerized and made available for use in running colleges and courses. Accordingly, the strengthening of linkage with industry was achieved as planned.

(2) Development of revised curriculum and preparation of instructors and facilities to enable its introduction (Output 2)

Curriculum for the GCT RR Architecture Department and Mechanical Department had not been revised for more than 10 years and it had become detached from the needs of industry. In the Project, a training needs assessment was implemented with cooperation from 66 enterprises in the Lahore area. Based on this, the draft revisions compiled by instructors of GCT RR were modified upon hearing advice from private enterprises and university professors; provisional approval was obtained from TEVTA Punjab; and pilot classes were implemented and evaluated for one year before the revised curriculum was completed. These tasks were implemented in order one year at a time, and the first batch of students to receive three years of education under the revised curriculum graduated in 2012. The revised curriculum was approved by the TEVTA Punjab and the National Vocational and Technical Education Commission in April 2012.

The revised curriculum had new contents such as Computer Aided Design (CAD) and manufacturing with Computerized Numerical Control (CNC). The GCT RR instructors received training in the subjects covered by the revised curriculum, and this resulted in the development of 10 master trainers (instructors qualified to train instructors) in the Mechanical Department and eight master trainers in the Architecture Department<sup>11</sup>. In addition, the lesson plans, operation sheets, and handout materials for students were revised and compiled into books for each subject.

The equipment for practical training that became necessary under implementation of the revised curriculum was introduced to GCT RR through the Project and the Grant Aid Project that was implemented at the same time<sup>12</sup>. GCT RR renovated and constructed the equipment installation areas under the budget of TEVTA Punjab. The main equipment for practical training of the Project was installed by 2011. However, equipment supplied under the grant aid project was installed in 2013 (the final year of the Project), not in time to be used for the third-year training of the first graduates. Moreover, according to teachers in the Mechanical Department, there was not enough time for the Japanese experts to sufficiently train instructors on operation, maintenance and utilization in practical classes of the CNC processing equipment that was supplied under the Grant Aid Project.

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<sup>11</sup> At the start of the Project, the Architecture Department only had four lecturers, but by the time the Project was completed, it had eight lecturers including six females. Similarly, whereas the average age of lecturers in the Mechanical Department (29 lecturers) was high at the start of the Project, seven new lecturers had been recruited by the end of the Project. The total number of lecturers at the end of the Project was 13 in the Architecture Department and 31 in the Mechanical Department.

<sup>12</sup> In the Project, welding equipment, CNC processing equipment, surveying equipment and more than 300 PCs were supplied.

Accordingly, except for the fact that sufficient guidance could not be provided to instructors concerning some items of equipment before the end of the Project, the outputs regarding introduction of the revised curriculum were more or less achieved as planned.

(3) Strengthening of the placement support setup (Output 3)

In GCT RR, the instructors had conventionally offered individual careers advice to students. However, they had not organized information on recruitment. In 2011, GCT RR established the Career Support Center inside the main campus to offer students advice on careers and respond to job offer inquiries from enterprises, and it started operating its database of students, graduates and enterprises seeking human resources. A job placement officer was assigned to the Main Campus that housed the Mechanical Department, and another officer (also serving as an instructor) was assigned to the new campus that housed the Architecture Department, with whom individual career counselling was provided to third grade students. According to the both departments, most students utilized the career counseling. Also, a follow-up survey of the employment status of the first graduates under the revised curriculum was implemented. Students and employers were satisfied with these career support activities. Accordingly, strengthening of the placement support setup was achieved according to plan.

(4) Dissemination of the knowledge and experiences acquired at GCT RR (Output 4)

In 2013, the final year of the Project, the GCT RR Architecture and Mechanical Departments invited other GCT colleges in Punjab Province to a seminar to disseminate the knowledge and experience that had been acquired in the Project. Out of 18 colleges in the province that had a mechanical department, 17 colleges attended. Since GCT RR was the only college in the province to possess an architecture department, nine colleges in the province that had civil engineering courses were invited to the Architecture Department seminar, and six attended. According to TEVTA and GCT RR, the participants, including principals, course directors, and instructors, responded favorably to the seminars, and the Project outputs concerning dissemination of knowledge and experience were achieved according to plan.

3.2.1.2 Achievement of Project Purpose

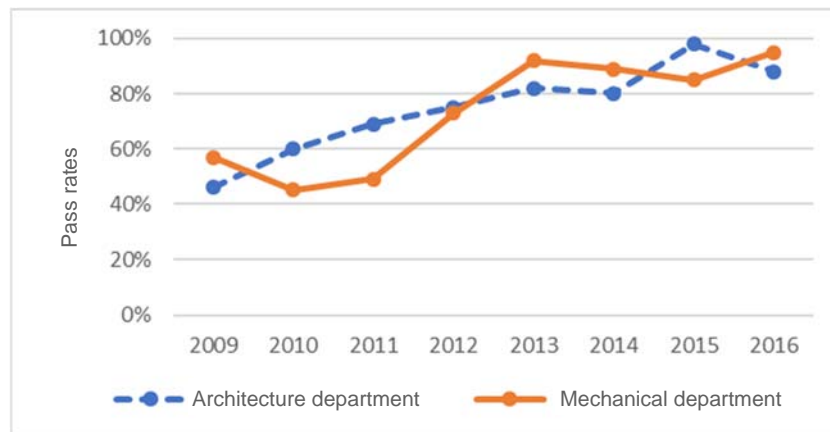
The project purpose of the Project was to turn GCT RR into a center of excellence capable of providing quality technical education relevant to the needs of industry in the Mechanical and Architecture fields, and three indicators of this were set as shown in Table 1. Considering that these three indicators and the outputs were achieved to a high degree, it is judged that the project purpose was achieved.



Table 1 Achievement of Project Purpose

Project Purpose	Actual
① 70% or more firms considers performance of graduates of GCT RR after new curriculum introduction is higher than previous graduates.	According to the survey of employers (implemented in March 2013 targeting 47 firms related to the Mechanical Department, and 10 firms related to the Architecture Department), 72% of firms related to the Mechanical Department and 100% of firms related to the Architecture Department responded that the graduates produced following introduction of the revised curriculum displayed “very good”, “good” or “satisfactory” performance compared to the previous graduates. <Achieved>
② 70% or more graduates of GCT RR are satisfied with diploma course contents compatible to industrial needs.	In the Mechanical Department, 95% of graduates responded that they were satisfied with the course contents. In the Architecture Department, 95% of graduates responded that they were satisfied with the curriculum and 100% that they satisfied with the equipment. <Achieved>
③ Passing examination rates of students in mechanical and architecture courses increase.	The completion examination pass rates in both departments improved over the duration of the Project. Following revision of the curriculum, the pass rates increased by approximately 20 - 30% <sup>13</sup> . (See Figure 1.) <Achieved>

Source: Materials provided by JICA, materials provided by GCT RR



Source: GCT RR

Figure 1 Completion Examination Pass Rates

<sup>13</sup> The completion examination is implemented by Punjab Board of Technical Education targeting all GCTs in the province. Since external examiners implement a common examination, it is assumed that objectiveness and consistency are secured to an extent. Moreover, the pass rate in the GCT RR Mechanical Department in 2013 (92%) was far higher than the pass rate achieved by other colleges in the province (65% at five main colleges out of 12 colleges).

### 3.2.2 Impact

#### 3.2.2.1 Achievement of Overall Goal

##### (1) Achievement of Overall Goal

The overall goal of the Project was to disseminate acquired knowledge of the Project which provides technical education to fulfill industrial needs to other institutes (mechanical and architecture) in Punjab. As the indicator of this, it was envisaged that the Project approach would be introduced to at least 70% of other GCT colleges in Punjab Province.

Table 2 Achievement of Overall Goal

Overall Goal	Acquired knowledge of the Project, which provides technical education to fulfill industrial needs, is applied into other institutes (mechanical and architecture) in Punjab. <Partially achieved>
Indicator	Actual
70% or more of GCTs (Mechanical and Architecture) in Punjab introduce the approach of the Project.	The revised curriculum is applied to other GCTs in Punjab Province. However, as for the mechanical departments, due to lingering equipment constraints, some of the practical training cannot be implemented according to the curriculum. Concerning collaboration between industry and academia and support for employment, partial introduction is being advanced to other colleges.

As is described on the following section, the revised curriculum has been applied as a unified curriculum to other colleges in the province that have diploma level architecture and mechanical courses<sup>14</sup>. The teaching materials that were created in the Project such as lesson plans, operation sheets, handout materials were distributed to the GCTs that implement the revised curriculum. Moreover, the revised curriculum is also applied to all private colleges (Architecture and Mechanical courses) in the province.

In the Mechanical Department, under the “Project for Strengthening DAE in Mechanical Technology at Government College of Technology in Punjab Province” (hereafter referred to as “the Subsequent Project”) that was implemented by JICA after the Project, Mechanical Department instructors of GCT Faisalabad are being developed as additional master trainers in addition to the master trainers who were trained in the Project. Furthermore, training is being advanced to the teachers of mechanical departments at 11 other colleges in the province<sup>15</sup>.

<sup>14</sup> At the time of the ex-post evaluation study, in addition to GCT RR, there were 12 GCTs with mechanical departments and two with architecture departments (of which one was scheduled to open in fiscal 2017) in Punjab Province. In addition, 65 private colleges had mechanical departments, while eight had architecture departments. The revised curriculum has been applied to all these colleges.

<sup>15</sup> The Subsequent Project was started in 2015 and was intended to continue over five years with the objective of “strengthening the organizational setup for providing high-quality education in Diploma of Associate Engineer mechanical course at GCTs in Eastern Punjab Province”. This project has added GCT Faisalabad as a center of excellence and is implementing intensive support there, and it is also striving to help the other 11 GCT colleges with mechanical departments make planning to approach to the level of the centers of excellence.

Since practical training for CNC processing and some other training items, which were newly introduced following revision of the curriculum, cannot be appropriately implemented without equipment, it is necessary to introduce new training equipment to implement the revised curriculum in the mechanical department. According to TEVTA Punjab, it is supplying equipment to other colleges over the scope permitted by its own budget, however, the equipment supply is behind schedule<sup>16</sup>.

Architecture courses were newly established at two colleges (one existing college and one new college, both of which are girls-only colleges) in the province following completion of the Project, and the head of the Architecture Department at GCT RR offered advice on how to conduct classes, etc. However, TEVTA Punjab has not implemented training for instructors.

Among the other activities that were adopted in the Project, exhibitions have come to be implemented all over the province as the organized activity of TEVTA Punjab. On the other hand, skill competition and activities for linkage with industry such as technical working groups, lectures by private sector instructors, internships, job fairs have only partially extended to other GCTs<sup>17</sup>. Concerning support for placement, TEVTA Punjab has established a job placement database (website) and the setup has been strengthened with the assignment of 21 placement officers throughout the province, although these activities have not followed the Project model.

Accordingly, it is judged that the overall goal of the Project has been partially achieved.

## (2) Continuation of activities following completion of the Project

### ① Linkage with industry

Activities that were either started or strengthened in the Project were continuing strongly at the time of the ex-post evaluation. According to the principal and instructors of GCT RR, enterprises are continuing to participate in internships, job fairs, Technical Working Groups, etc. and linkage with industry is satisfactory. Meanwhile, in the visit surveys of enterprises, one set of voices said that they were satisfied with linkage with GCT RR, while other voices called for stronger ties. In particular, according to a beneficiary survey targeting 30 related enterprises<sup>18</sup>, numerous voices called for revision of the curriculum to better reflect industrial needs, practical training using the latest CAD software, strengthening of internships and so on.

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<sup>16</sup> It is expected that some of the equipment needed by GCT Faisalabad will be supplied under the Subsequent Project.

<sup>17</sup> Concerning internships, TEVTA Punjab is considering making these compulsory for third-grade students.

<sup>18</sup> The beneficiary survey was implemented as a questionnaire survey targeting GCT RR instructors, students (third-grade), graduates, and the enterprises where graduates have found employment. The survey targeted all 47 instructors in both departments, and responses were received from 12 instructors in the Architecture Department and 25 in the Mechanical Department. Responses from students were received from 129 randomly selected students in the morning and afternoon classes; 61 out of 127 in the Architecture Department including 9 female students, and 68 out of 407 in the Mechanical Department (all males). Responses from graduates were received from 80 randomly selected graduates of 2014 and 2015 who could be reached by telephone and so on; 36 graduates of the Architecture Department including 3 females, and 44 graduates of the Mechanical Department (all males). As for enterprises, responses were received from 30 enterprises; 15 in the architecture field and 15 in the machine field, that were introduced by the GCT RR as the major employers of the graduates (enterprises that employ large numbers of graduates).

The skill competitions that were newly started in the Project were continuing at the time of the ex-post evaluation. As for exhibitions, TEVTA Punjab now implements a province-wide exhibition once every year.

## ② Implementation and dissemination of the revised curriculum

Concerning the mechanical course, a training needs assessment was implemented once again and further revision of the curriculum was examined as part of the Subsequent Project. According to the experts in this project, it is likely that Kaizen (continual improvement) and quality control will be added to the curriculum. Also, as was mentioned earlier, progress is being made on the training of master trainers at GCT RR and GCT Faisalabad and implementation of training by master trainers at the 11 other colleges in the province. On the other hand, installation of equipment for practical training is not progressing according to schedule due to budget constraints in TEVTA Punjab.

Concerning the architecture course, there are no moves to revise the curriculum again. TEVTA Punjab has not implemented training for the instructors of the architecture department in the two newly established colleges. The master trainers that were trained in the Project only conduct guidance and advice for newly appointed instructors in GCT RR.

The curriculum for the architecture and mechanical courses that was revised in the Project has been posted on the NAVTTC website as a standard curriculum (New Traditional Curriculum)<sup>19</sup>. According to NAVTEC, each provincial TEVTA in Pakistan can compile their own curriculums for each specialty, and the revised curriculum from the Project is disclosed as a reference example.

## ③ Support for placement

Dedicated instructors continue to be assigned to the GCT RR Career Section Office, and the databases of students, graduates and enterprises continue to be utilized for support of placement (responding to requests for recruitment from enterprises, introducing enterprises to students, career counselling, etc.). A job fair continues to be held once a year, and internships (in long-term holiday) continue to be implemented. According to hearings conducted in each course, these activities have continued at roughly the same pace or more actively following completion of the Project.

According to the beneficiary survey, roughly 20% of graduates of the Architecture Department and 50% of graduates of the Mechanical Department have found employment through the support activities of GCT RR. There have been numerous cases where students found

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<sup>19</sup> The website displays curriculums for more than 20 diploma-level courses in addition to the two courses here. Concerning the architecture course, in addition to the revised curriculum that was created in the Project, a separate curriculum compiled under assistance by another donor is also posted. No information could be obtained concerning whether the revised curriculum from the Project is being used or referred to by TEVTA in other provinces.

employment after being introduced by the Career Support Centre to enterprises seeking recruits, or where employment was arranged in a job fair, or where students found employment in the enterprises where they conducted internship and so on. Moreover, the ratio of graduates responding that they were “very satisfied” or “generally satisfied” with the placement support activities was 23% in the Architecture Department and 80% in the Mechanical Department. It is thought that the figure was so low among graduates of the Architecture Department because the Career Support Centre was established inside the Main Campus away from the New Campus where the Architecture Department is situated.

#### ④ Sustainment of the project purpose

According to the beneficiary survey, 93% of GCT RR graduates (80 graduates of the first and second years of the revised curriculum) in the Architecture Department and 94% in the Mechanical Department responded that they were satisfied with education at GCT RR. Moreover, as is described later, the enterprises where graduates have found employment rate GCT RR highly. Also, the pass rate in the completion examination has remained at a high level following the end of the Project. (See Figure 1.) Accordingly, it is judged that the project purpose has continued to be achieved at the time of the ex-post evaluation.

### 3.2.2.2 Other Positive and Negative Impacts

#### (1) Supply of human resources to industry

Following the first batch of students to graduate under the revised curriculum (2012), GCT RR has continued to turn out between 100 - 130 students every year in the Architecture Department and 300 - 400 students per year in the Mechanical Department. According to a follow-up survey by the college, it is inferred that almost 50% of Architecture Department graduates and approximately 70% of Mechanical Department graduates have found employment in relevant fields, indicating that human resources have been supplied to industry.

According to the beneficiary survey, many of the interviewed enterprises have indicated that the quality of GCT RR graduates improved following the Project and was higher than the quality of graduates from private colleges in the Lahore area. (See Table 3.) Concerning the Architecture Department, some enterprises commented that “graduates in the past could only draw by hand, but the current graduates are knowledgeable and skilled at computer drawing and they are fast workers”, whereas others commented that “graduates lack knowledge of the latest software”, “they lack English ability even though architecture drawings are all written in English”, “onsite training is needed to strengthen practical knowledge of building materials and standard dimensions, etc.”, “graduates need to see projects through from beginning to end to acquire understanding of the overall work flow, and they need sufficient ability to make presentations to clients”. Concerning the Mechanical Department, both positive and critical comments were made.

Among the positive comments, it was said that “graduates’ knowledge has increased following revision of the curriculum, meaning that less time needs to be spent on training following recruitment”; “while the curriculum is the same as at private colleges, GCT RR graduates acquire better technique because the college has a full range of equipment”. Among the critical comments, it was said that “it seems that the equipment in the college is not fully utilized as there are too many students per class. The students need to conduct practical training using actual equipment. We are not happy with the current situation”; “the teachers need to learn new technologies and enhance their ability through participating in training conducted by enterprises, etc.” Also, in both courses, it was pointed out by half the targeted enterprises that the English and communication skills such as presentation making ability, technical communication ability. of students need to be improved<sup>20</sup>.

Accordingly, the Project contributed to improving the quality of human resources supplied from GCT RR to industry. However, there is still room for improvement in line with the needs of industry.

Table 3 Assessment of GCT RR Graduates by Enterprises (5-scale Assessment)

	Architecture department	Mechanical department
The quality of graduates from 2012 onwards is “very good” or “good”	86%	60%
The quality of graduates is “much better” or “better” than that up to 2011.	67%	86%
The quality of graduates compared to other colleges in the province is “very good” or “good”	93%	80%

Source: Beneficiary survey

Note: Responses based on a five-stage assessment comprising: “Very good / Much better”, “Good / Better”, “The same”, “Poor / Worse”, and “Very poor / Much worse”.

## (2) Social and environmental impacts

As a result of the Project, female students came to be admitted to the GCT RR Architecture Department for the first time and co-education was commenced. Pakistani society has traditional stereotypes regarding the kinds of jobs that men and women should engage in, and TVET has conventionally separated colleges into those for boys and those for girls depending on

<sup>20</sup> The curriculum includes one lesson of English per week for first-grade students in both departments, and GCT RR is striving to strengthen English ability through finding an additional lesson for extra-curricular English. It is basically required that English be used for teaching materials and lessons in specialist subjects. However, most explanations are conducted in the local language (Urdu) and it is necessary to deepen the understanding of students that don’t possess good English ability. In the final examinations in each year, students can select Urdu or English as a media language for the examination. However, according to GCT RR, only a minority of students select English.

the vocation. Such stereotypes have prevented girls from freely receiving TVET. The adoption of co-education in the GCT RR Architecture Department through the Project has been a successful case of gender barriers being removed in public TVET. Moreover, promoting co-education is more efficient than building separate schools for boys and girls. (Refer to the expert analysis below.) Thus, the Project demonstrated the possibilities for eliminating gender impediments and improving efficiency of public TVET in Pakistan.

However, in the Architecture Department, even though 40% of the morning class capacity is assigned to female students (33-34 students out of 84, two classes in 2016), the number of female students enrolling in the college is decreasing and the classes are not being filled. As a result, the total number of students in the morning class is less than the capacity.<sup>21</sup> According to the Architecture Department, this college is famous as a boy's college and it is not widely known that female students can enroll for the Architecture Department, and parents also have resistance to enrolling daughters in co-education. Other major reasons why female students and their parents are unwilling to enroll in GCT RR are that the college has no exclusive buses or dormitories for female students and opportunities to continue studies at university following graduation are limited<sup>22</sup>.

No impacts on the natural environment were confirmed.

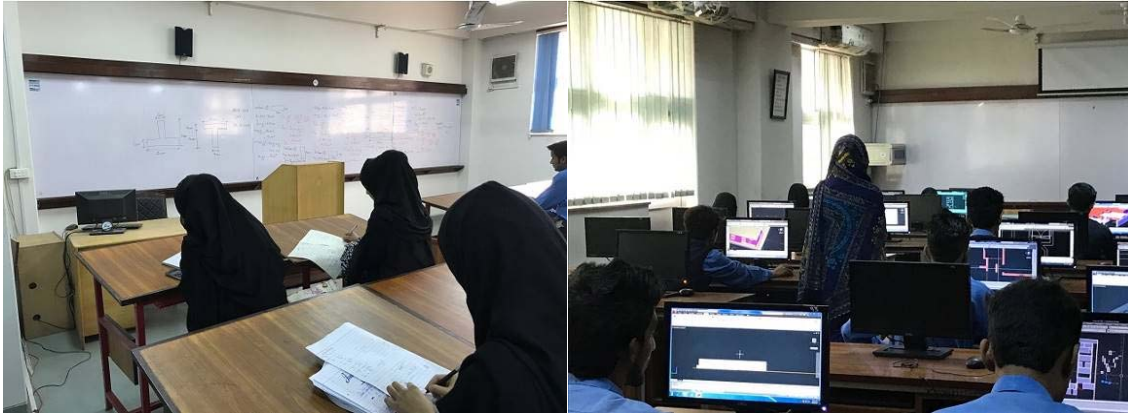


(Left) Practical training in the Mechanical Department

(Right) Works produced in the Mechanical Department CNC processing training

<sup>21</sup> The number of enrolled female students was 27 in 2010 and 35 in 2011, but the number has declined every year since, falling to 21 in 2012, 20 in 2013, 15 in 2014, 11 in 2015, and 10 in 2016.

<sup>22</sup> In Pakistan, it is not common for girls to commute to school with boys. According to instructors of the Architecture Department, the parents of girls who are interested in GCT RR are worried about this point. Moreover, co-education in Pakistan is generally conducted from university and it is normal for girls and boys to sit separate classes up to high school. University Architecture Departments are popular with girls in Pakistan. However, basically, only graduates of high school general courses are allowed to enroll, and only one diploma-level graduate is allowed to advance to each public university (where fees are cheaper).



(Left) Female students learning in the Architecture Department

(Right) PC practical training by a female instructor in the Architecture Department

### (3) Other impacts

According to the principal, vice-principal and instructors of GCT RR, they learned, through conducting joint work with the Japanese experts, how to appropriately conduct tidying, cleaning and time management and acquired techniques for managing work based on goals. The long-term dispatch of the Japanese experts imparted a beneficial impact on workplace customs in the college.

Summing up, the project purpose of “mechanical and architecture courses of GCT RR provide quality technical education based on industrial needs as CoE” was achieved through implementation of the Project. Moreover, concerning the overall goal, knowledge from the Project is being disseminated to other colleges in Punjab Province and effects are being manifested mostly according to plan. Therefore, effectiveness and impact of the Project are high.

### 3.3 Efficiency (Rating: ②)

#### 3.3.1 Inputs

The following table shows the planned and actual inputs for the Project on the Japanese side and the Pakistani side.



Table 3 Comparison of Planned and Actual Inputs to the Project

<b>Inputs</b>	<b>Plan</b>	<b>Actual (at time of Project completion)</b>
<b>Inputs from the Japanese side</b>		
(1) Experts	3 long-term experts (108 person-months) 2 short-term experts (60 - 90 person-months) Total 168 - 198 person-months	4 long-term experts (157.3 person-months) 3 short-term experts (4.7 person-months) Total 162 person-months
(2) Trainees received	Training in Japan: technical education policy and guidance methodology, etc.	Training in Japan: 18 persons
(3) Equipment	CNC work machines, surveying instruments, etc.	Ditto (Some contents were switched. Total approximately 110 million yen)
(4) Operational expenses	Database building work, onsite seminar staging costs, onsite consulting fees, etc.	Ditto (Approximately 45 million yen)
Japanese Side Total Project Cost	Total approximately 370 million yen	Total 417 million yen
<b>Inputs from the Pakistani side</b>		
(1) Assignment of counterparts	TEVTA Punjab, GCT RR employees (Numbers unknown)	Main counterparts: 35 persons Teachers: Mechanical 35 persons, Architecture 12 persons
(2) Others	Office for the Japanese experts, pilot training workshop, classrooms, etc.	Provision of office for the Japanese experts, etc.
Total project cost on the Pakistani side	Training needs assessment implementation costs, equipment maintenance costs, etc.	Facilities and equipment: 31 items including construction of 4 practical training classrooms, rehabilitation and repair of facilities, installation of generator and electrical equipment, etc. Total approximately 22 million yen

Source: Created by the evaluator based on materials provided by JICA

### 3.3.1.1 Elements of Inputs

Two Japanese experts (chief advisors) were assigned for approximately two years each, while long-term experts were assigned for more than four years to the Mechanical and Architecture departments (one expert in each department). According to GCT RR, the experts were highly skilled and their diligent and selfless attitude to their work imparted various beneficial impacts on the work attitude of the counterparts.

According to TEVTA Punjab and GCT RR, the Project was implemented smoothly. According to the beneficiary survey, almost all the teachers thought that communication with the experts and Project administration were good.

TEVTA Punjab and GCT RR displayed strong commitment to the Project through investing own funds in 31 items of facilities and equipment installation, prohibiting the trained

instructors from transferring to other colleges and so on. For the Project, TEVTA Punjab bolstered instructors in GCT RR, with numbers increasing from 29 to 31 in the Mechanical Department and from four to 13 in the Architecture Department. Teachers with high academic qualifications were recruited, and the ratio of teachers in both departments possessing bachelor's degree or higher (B.Sc. Tech., B. of Architecture) increased from 10% before the Project to 40% after the Project. Meanwhile, due to delays in the recruitment of practical training assistants, it was not possible to conduct adequate maintenance of practical training equipment including PCs and this hindered the practical training.

Since constructing and installing facilities and equipment under the budget of TEVTA Punjab would have taken too long, the JICA budget for the project (total 1.2 million PKRs) was used when urgency was needed. As equipment installation under the Grant Aid Project was conducted in the final year (2013), the first batch of graduates (in May 2013) in the Mechanical Department who studied under the revised curriculum were unable to receive practical training using appropriate equipment in some subjects. Moreover, it was not possible to implement sufficient training for instructors in how to use some items of equipment procured in the Grant Aid Project. (See 3.2.1.1 Achievement of Project Outputs and the Process Involved.)

GCT RR's practical training equipment was procured in the Project (75 million yen) and the Grant Aid Project (220 million yen). In the Project, three practical training rooms were added to the Mechanical Department centering on the CNC practical training room that was installed following the curriculum revision, and equipment was procured for the Architecture Department. In the Grant Aid Project, existing equipment was upgraded and bolstered: a wide range of equipment was procured for all 11 practical training rooms in the Mechanical Department; and facilities (classrooms, etc.) were constructed for the Architecture Department. The Grant Aid Project was completed in April 2013, after review of the request contents by the Japanese experts, issue of the request by the Government of Pakistan to the Government of Japan in 2009, implementation of the preparatory survey, signing of the Grant Agreement in July 2011, and the construction of facilities and procurement and installation of equipment.

### 3.3.1.2 Project Cost

The project cost on the Japanese side was planned as approximately 370 million yen but actually amounted to 417 million yen (113% compared to the plan). Since there was no itemized breakdown of the planned amount, the reasons for the additional cost cannot be identified. As the assigned expert person-months were less than planned, the additional costs likely arose from another area<sup>23</sup>.

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<sup>23</sup> It is possible that the equipment costs increased. The equipment contents changed greatly from the plan in the preparatory survey (December 2008) but it is difficult to conclude that the increased cost arose from the increase in equipment and additional outputs".

### 3.3.1.3 Project Period

The project period was planned as 60 months from December 2008 to December 2012. The Project commenced according to plan in December 2008 and was completed in December 2012.

Summing up, although the project period was within the plan, the project cost exceeded the plan. Therefore, efficiency of the Project is fair.

## 3.4 Sustainability (Rating: ③)

### 3.4.1 Related Policy and Institutional Aspects for the Sustainability of Project Effects

As was stated in 3.1 Relevance, placing emphasis on the TVET sector, the Government of Pakistan implemented the TVET Reform Program (Phase 1: until December 2016) with the objective of executing the “National Skills Strategy”. According to the NAVTTC, the draft TVET policy that was proposed as part of the said program was generally consistent with the direction of the National Skills Strategy, and final adjustments aimed at obtaining approval were being conducted at the time of the ex-post evaluation. Moreover, it is scheduled for a new National Skills Strategy to be compiled after the draft policy has been finalized. The said new policy contains no stipulations concerning establishment of advanced model colleges, while, the NAVTTC continues to certify such model colleges based on its certification system. Accordingly, concerning sustainability, there are no problems in policy and institutional aspects.

### 3.4.2 Organizational Aspects for the Sustainability of Project Effects

GCT RR, which conducts operation and maintenance of the Project facilities and equipment, has four departments that offer diploma-level courses: the Architecture Department, the Mechanical Department, the Air Conditioning and Refrigeration Department, and the Automobile and Diesel Department. Number of instructors in the Architecture Department and Mechanical Department in April 2017 are as shown in Table 4. In the Architecture Department, whereas the sanctioned quota of instructor is 14, only 12 instructors comprising nine instructors and three junior instructors are employed. In addition, there are three visiting instructors who take charge of afternoon classes. According to the head of the Architecture Department, it is planned to newly recruit an additional one visiting instructor and the quota is almost filled. However, considering the frequent turnover of visiting instructors and the fact that the shortage of instructors means that the permanent instructors are too busy to devote enough time to lesson preparation and their own studies, it is desirable to replenish the permanent instructors. On the other hand, in the absence of practical training assistants, it had been necessary to outsource the maintenance of practical training PCs and software. However, the junior instructor who was employed in 2016 following the end of the Project now performs this work. Whereas it took time to resolve problems

when work was outsourced, things have since been speeded up. At the time of the ex-post evaluation, the number of sanctioned posts for instructors in the Mechanical Department was 30, and 31 staff comprising 27 instructors and four junior instructors were working. In addition, there were 16 visiting instructors in charge of afternoon classes. Roughly one or two shop assistants / shop attendants were assigned to each practical training room. These shop assistants / shop attendants were conventionally graduates of secondary school. However, according to the policy of TEVTA Punjab, they are being replaced with diploma level personnel (graduates of GCT RR or equivalent) who jointly serve as junior instructors and practical training technicians<sup>24</sup>.

Table 4 Number of Instructors in GCT RR Architecture Department and Mechanical Department (March 2017)

	Architecture Department	Mechanical Department
Number of classes (AM/PM)	6 / 6	12 / 15
Sanctioned posts	14	30
Total permanent instructors	12	31
- Instructors	9	27
- Junior instructors	3	4
Visiting instructors	3	16

Source: GCT RR

The Career Support Center, which was newly established in the Project, is staffed by five staff members who also work as instructors in the departments. While there are no dedicated members of staff, there is merit in having instructors who individually know the students conduct career assistance and there is no problem in terms of the setup. At the time of the ex-post evaluation, the director of GCT RR, head of the Architecture Department, and head of the Mechanical Department demonstrated strong commitment to maintaining the Project effects<sup>25</sup>.

Summing up, concerning the Project sustainability, in terms of setup, there is need to replenish the permanent teaching staff in the Architecture Department, while there are no major issues.

### 3.4.3 Technical Aspects for the Sustainability of Project Effects

At the start of the Project, many GCT RR instructor held diplomas. However, since the policy of TEVTA Punjab now requires that newly appointed teachers be university graduates or higher, the academic level of instructors is gradually improving in line with the turnover of

<sup>24</sup> According to the Mechanical Department, as of April 2017, shop assistants / shop attendants have been replaced with junior instructors also serving as practical training technicians in roughly half of the practical training rooms.

<sup>25</sup> According to TEVTA Punjab, as the background to this, the Project was necessary and important for the province's TVET sector and GCT RR; the motivation of counterparts (including teachers) was boosted by the training in Japan, etc.; and important outcomes including the establishment of the first co-education courses in the country were achieved.

instructors.

In the Architecture Department, 16 instructors received training as counterparts and enhanced their teaching knowledge and skills in the Project. Of these, eight permanent instructors received additional training and became master trainers. As of April 2017, due to retirements, transfers to other colleges and other reasons, six of the instructors who received training (including four master trainers) are employed. According to the head of department, since there are experienced instructors and even master trainers who can perform core functions and teaching materials such as lesson plans, handout materials are also available, the Project outputs are being adequately sustained.

In the Mechanical Department, 35 instructors received counterpart training, and 10 of these went on to receive further training and become master trainers. As of April 2017, 10 of the original 35 instructors have retired or been transferred, while eight of the master trainers remain. In the Subsequent Project, young instructors in the Mechanical Department have received further training to become master trainers. Each responsible instructor conducts maintenance of the practical training equipment, and since they provide instruction on maintenance and it is possible to receive support from domestic suppliers if necessary, there are no major problems in technical terms.

According to the beneficiary survey with the instructors, 60% of instructors feel that they need to build their capacity through training, etc. Especially in the Mechanical Department, many instructors want to receive training in subjects and on equipment from practical training from experts with corporate experience or onsite training in enterprises. According to the Mechanical Department, TEVTA Punjab compiles a training program for instructors every year. However, inexperienced lecturers are appointed and the contents do not always correspond to the needs on the ground.

TEVTA Punjab curriculum section, which carries out curriculum revisions, has established a cycle of surveying training needs in multiple departments and revising curriculums with support from external experts in enterprises and universities as necessary, so there are no major problems in technical terms. Concerning GCT RR's Mechanical Department, curriculum revision work has been advanced while receiving support in the Subsequent Project. Meanwhile, the TEVTA Punjab training section, which trains instructors, implements various training programs for thousands of instructors employed at more than 400 TVET institutions in the province. Training is also conducted in response to the individual requests of TVET institutions, however, as was mentioned earlier, the ability to appropriately plan specialized training is inadequate.

Summing up, in technical aspects, there is need to continue training for GCT RR instructors and to strengthen the training implementation setup in TEVTA Punjab, while there are no major problems.

### 3.4.4 Financial Aspects for the Sustainability of Project Effects

The budget for TEVTA Punjab is allocated by the government of Punjab Province and is on the increase. It increased by approximately 2.5 times over the nine years between 2008 and 2016. (See Table 5.) According to TEVTA Punjab, it is expected that the budget will continue to increase from now on in accordance with the provincial government policy of providing TVET training for 2 million young people by 2018<sup>26</sup>. Out of the TEVTA Punjab budget, the development budget (investment in buildings and equipment) increased by approximately 1.5 times between 2015 and 2016.

Table 5 Historical Trends in the TEVTA Punjab Budget

(Unit: 1,000 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 budget	3,030	3,738	5,035	5,744	6,353	6,024	6,135	6,485	6,589

Source: TEVTA Punjab

Note: 1PKRs=approximately 1.1 yen

Table 6 Historical Trends in GCT RR Expenditure

(Unit: 1,000 PKRs)

	2010	2011	2012	2013	2014	2015
TEVTA subsidies: personnel expenses	125,913	136,559	155,637	157,998	164,416	174,007
TEVTA subsidies: non-personnel expenses	1,832	12,872	8,253	13,444	9,193	13,842
Own college 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 Punjab

Note: 1PKRs=approximately 1.1 yen

Approximately 80% of the GCT RR budget comes from subsidies for TEVTA Punjab, while the remaining approximately 20% comes from the college budget including lesson fees, etc. (See Table 6.) The amount of expenditure increased approximately 1.5 times over six years up to 2015. According to the college, the budget is appropriate but it is not plentiful, and it was observed during the field survey that the college needs to strive to save money through limiting use of the generator during power interruptions, refrain from using air conditioners in the Architecture Department and so on. Concerning operation and maintenance of the facilities and equipment, no major budget constraints that could inhibit the effect of the Project were seen.

Accordingly, there are no major issues regarding the financial sustainability of the Project.

<sup>26</sup> It wasn't possible to obtain data on expenditure by TEVTA Punjab, however, it says that the allocated budget is almost entirely executed.

Summing up, no major problems have been observed in the policy background and the institutional, organizational, technical, financial aspects. Therefore, sustainability of the project effects is high.

## **4. Conclusion, Lessons Learned and Recommendations**

### **4.1 Conclusion**

The Project was implemented with the purpose of turning the GCT RR in Punjab Province into a center of excellence in the mechanical and architecture fields and providing technical education relevant to the needs of industry, and with the overall goal of disseminating the outputs of this to other GCT in the province. Technical and vocational education had high importance in the policies and development needs of Pakistan and Punjab Province when the Project was planned and also when it was completed. The Project was also consistent with the Japan's ODA Policy at the time of planning. Therefore, it had high relevance. Through the Project, GCT RR's system for linkage with industry and placement support was strengthened and a revised curriculum was introduced in line with the needs of industry, therefore, the project purpose was achieved. The revised curriculum has been applied in the province and training for mechanical department instructors is being advanced in line with it. However, the Mechanical Departments at other colleges are confronted with equipment constraints such as lack of access to the latest machinery and so on. Other project approaches such as strengthening of linkage with industry and so on have been only partially applied at other colleges. Accordingly, the overall goal was partially realized. In terms of impact, the Project contributed to improving the quality of human resources that are supplied from GCT RR to industry. Accordingly, effectiveness and impact of the Project is considered to have been high. The project period was as planned. However, because the project costs exceeded the planned amount, efficiency of the Project was fair. In terms of sustainability, there have been no major issues in political/institutional, organizational, technical and financial aspects. Since activities have been continuing in good condition in GCT RR following the completion of the Project, the sustainability of the Project has been high.

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

### **4.2 Recommendations**

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

(1) Examination of measures for increasing female students (Architecture Department)

Since the quota for female students in the Architecture Department is not filled, it is necessary for TEVTA Punjab and GCT RR to examine and implement the following measures to increase female admissions to the department:

- Strengthening of explanation meetings in local secondary schools and advertising campaign through the mass media

- Securing of college buses for female students
  - Construction of a women's dormitory
  - Establishment of a bachelor's degree course in the Architecture Department that is attached to GCT RR
- (2) Strengthening of English capacity in students (Architecture and Mechanical Departments)
- To further advance the development of human resources that meet the needs of industry, it is necessary for GCT RR to secure ample time for English lessons and utilize Communication Skill lessons and so on to improve English capacity in students. It also needs to work on improving the English ability of teachers and work for lessons to be conducted in English as much as possible. Also, it is desirable for TEVTA Punjab and the Punjab Board of Technical Education to examine measures that will encourage students to receive year-end examinations in English, or to allow them receive these examinations in English only.
- (3) Provision of practical training equipment for Mechanical Department in other GCT colleges in Punjab Province
- To implement classes according to the new revised curriculum in the Mechanical Departments of other GCT colleges in the province, it is necessary to install practical training equipment that is lacking. It is necessary for TEVTA Punjab to confirm the needs for practical training equipment and promptly install it.
- (4) Implementation of training for instructors of Architecture Department in other GCT colleges in Punjab Province
- It is necessary for TEVTA Punjab to implement training by the GCT RR master trainers who were developed in the Project for instructors of the Architecture Departments (two colleges) that have been newly established in the province.
- (5) Strengthening of the training setup for instructors of Mechanical Departments of Punjab Province
- To improve training for instructors of Mechanical Departments at GCT colleges in Punjab Province, it is necessary for TEVTA Punjab to examine and implement the following measures.
- TEVTA Punjab should conduct a training needs assessment for the Mechanical Departments of GCT colleges in the province and compile annual training programs.
  - Cooperation should be sought from master trainers at GCT RR, which is an advanced model college, for implementation of the training needs assessment, planning of



training themes, contents and lecturers, and evaluation of the training results.

- In addition to utilizing the GCT RR master trainers for the training, onsite training (company training), which is demanded by numerous teachers, should be utilized.

#### 4.2.2 Recommendations to JICA

It is desirable that JICA support the above recommendations pertaining to mechanical departments through the Subsequent Project.

### 4.3 Lessons Learned

#### Implementation schedule for grant aid projects that assumes synergic effects with technical cooperation projects

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 and/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 was provided by the Grant Aid Project, but the actual installation of such equipment took place in the final year of the 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 outsource training after the completion of the Project to an external institute and the Subsequent 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 for providing sufficient training on utilization of the new equipment to be added to the grant aid project should be made possible to complement the technical cooperation project.

End

Achievement of Outputs – Summary Table

<p>Output 1: Management system of GCT RR is strengthened as a CoE which can offer technical education relevant to industrial needs. (Achieved)</p>	<ul style="list-style-type: none"> <li>① Use of computerized data on students, teachers, equipment, job placement, etc. for school / department management</li> <li>② Ten (10) or more significant market players participate in working group for promoting collaboration between GCT and industries.</li> <li>③ Ten (10) or more annual collaborative activities with industry.</li> <li>④ Quarterly meetings of working group for promoting collaboration between institute and industries.</li> <li>⑤ Production of quarterly project newsletters, regularly updated webpage of GCT RR</li> </ul>	<ul style="list-style-type: none"> <li>① Achieved: Department-separate data, career support data, equipment data, etc. are computerized, updated and utilized.</li> <li>② Achieved: Five or more enterprises participated in the college operating committee and working group meetings by the time of the terminal evaluation.</li> <li>③ Achieved: Activities such as training for enterprises, lectures by lecturers from enterprises, visits to enterprises, skill competition, internships, job fairs, etc. were conducted.</li> <li>④ Achieved: Reflecting the opinions of industry, around two meetings per year were deemed to be appropriate and have been conducted.</li> <li>⑤ Achieved: Implemented.</li> </ul>
<p>Output 2: Training Management Cycle (TMC) of Mechanical and Architecture courses is strengthened. (Almost achieved)</p>	<ul style="list-style-type: none"> <li>① Implementation of training needs assessment</li> <li>② Revised curriculum based on industrial needs</li> <li>③ Trained master trainers (15) for the pilot courses</li> <li>④ Instructors trained by the master trainers</li> <li>⑤ Revised of teaching materials and examination papers</li> <li>⑥ Installed equipment and maintenance activities</li> <li>⑦ Monitoring and evaluation of pilot courses</li> <li>⑧ Preparation of TMC manual</li> </ul>	<ul style="list-style-type: none"> <li>① Achieved: This was implemented with cooperation from 66 enterprises.</li> <li>② Achieved: The revised curriculum was approved by TEVTA Punjab.</li> <li>③ Achieved: 10 master trainers were trained in the mechanical field, and 8 were trained in the architecture field.</li> <li>④ Generally achieved: Education and training were conducted by the master trainers in each department.</li> <li>⑤ Achieved: Teaching materials were created based on the revised curriculum. Examinations were conducted by TEVTA Punjab based on the revised curriculum.</li> <li>⑥ Achieved: The equipment required in the revised curriculum was installed and is properly maintained.</li> <li>⑦ Achieved: A monitoring and evaluation (M&amp;E) survey of the pilot courses was implemented.</li> <li>⑧ Achieved: A training management cycle manual was created.</li> </ul>

<p>Output 3: Placement support of GCT RR is strengthened. (Achieved)</p>	<ul style="list-style-type: none"> <li>① Computerized data on placement, internships, and employment opportunities.</li> <li>② 70% or more of students take career counseling.</li> <li>③ 70% or more of students are satisfied with placement support.</li> <li>④ 70% or more of employers are satisfied with placement support.</li> </ul>	<ul style="list-style-type: none"> <li>① Achieved: The Job Placement Office was established and a database of information on careers, internships, and employment opportunities was constructed.</li> <li>② Achieved: In the Mechanical Department, 76% and 84% of third-year students received counseling in 2012 and 2013 respectively. In the Architecture Department, the figures were 95% and almost 100% in 2012 and 2013 respectively.</li> <li>③ Achieved: 92% and 100% of students responded they were satisfied in the Mechanical Department and Architecture Department respectively.</li> <li>④ Achieved: In the Mechanical Department, 45 out of 47 companies (96%) responded they were satisfied. In the Architecture Department, 17 out of 17 enterprises (100%) said they were satisfied.</li> </ul>
<p>Output 4: Knowledge and experience of GCT RR is shared with other courses in GCT RR and other TVET institutes. (Achieved)</p>	<ul style="list-style-type: none"> <li>① Two or more seminars held.</li> <li>② 70% or more of DAE institute in Punjab Province (mechanical and architecture) participate in the seminars.</li> <li>③ 70% or more of participants understand the seminar contents.</li> </ul>	<ul style="list-style-type: none"> <li>① Achieved: Each department conducted a seminar inviting other colleges in the province.</li> <li>② Achieved: In the mechanical department, 17 out of 18 colleges (94%) participated, while in the architecture department, 6 out of 9 colleges (67%) participated.</li> <li>③ Achieved: 100% of participants responded they understood the seminar contents.</li> </ul>

**Female Education and Gender Equality Geared to Realization of SDGs**

**--- Issues of technical and vocational education and training (TVET) in Pakistan ---**

Dr. Yasushi Katsuma<sup>27</sup>

In the 2030 Agenda for Sustainable Development that was adopted by the United Nations in 2015, it is anticipated that TVET will contribute to multiple Sustainable Development Goals (SDGs). First, in terms of education policy, it helps to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” (Goal 4). In terms of industrial policy, it is anticipated that it will help “Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all” (Goal 8). Furthermore, in terms of promoting participation in economic activities by impoverished people and women, it contributes to “End poverty in all its forms everywhere” (Goal 1) and “Achieve gender equality and empowering all women and girls” (Goal 5).

In TVET initiatives, gender disparities regarding participation in economic activities in the labor market and the income impoverishment of females that arises from this are important issues that demand consideration. This should not be forgotten in light of the basic ethos of the SDGs that “no one will be left behind”.

As a background to gender disparities in the labor market, not only is there gender bias whereby employers are unwilling to employ women, but there are also social stereotypes regarding occupations that view engineering jobs as belonging to men and sewing work as belonging to women.

On the other hand, as the academic background and lack of technical and vocational skills among job-seeking women are also major issues, TVET for girls and women is important. Having said that, against the background of gender bias among the enterprises that seek human resources and stereotypes in society, the TVET side also sometimes limits opportunities for girls and women. Such institutional discrimination arises when public TVET is provided by boys-only or girls-only colleges rather than co-educational colleges.

In Pakistan, it is common for secondary education, technical education and vocational training to be conducted separately for boys and girls. Pakistani society has traditionally not encouraged adolescent boys and girls to conduct learning in the same classrooms. Therefore, TVET has been conducted separately in boys-only or girls-only colleges, with colleges providing courses for vocations that have traditionally been reserved for each gender. This contributes to the embedding of gender stereotypes regarding occupations and hinders the social advancement of women. Looking ahead, the challenge will be to find concrete measures to equalize women’s access to TVET and encourage female empowerment<sup>28</sup>.

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<sup>28</sup> Government of Pakistan, NAVTTC (2016). “Gender analysis of TVET sector in Pakistan: Key issues and opportunities,” Government of Pakistan, Ministry of Education, Training and Standards in Higher Education.

In the Architecture Department of the Government College of Technology Railway Road (GCT RR), which received assistance from JICA through a Technical Cooperation project and Grant Aid project, the fact that a co-education diploma course was established for the first time in the country is noteworthy as an attempt to overcome gender stereotypes in TVET. This was made possible thanks to the fact that JICA proposed co-education from a third-party viewpoint in consideration of needs in the architecture sector, which was open to women, and the fact that the assigned Japanese experts conducted sincere and practical negotiations with officials of TEVTA Punjab and GCT RR. Furthermore, JICA prepared a women's-only lounge and toilets in the Architecture Department and thereby created an environment that would persuade families to let their daughters study at the college. Amidst JICA's efforts to enhance the contents of technical education in the Architecture Department, multiple female instructors were recruited. These female instructors not only became role models for female students, but also the presence of teachers able to listen to the concerns of and counsel female students helped reassure the families of these students.

Against such a background, the adoption of co-education in the GCT RR Architecture Department has proved to be a success story regarding the elimination of gender barriers preventing access to public TVET. However, since the adoption of co-education, numbers of female students have not reached capacity. To encourage more female students to enroll from now on, the department will need to analyze and eliminate any remaining barriers such as the attitudes and insufficient information on the side of parents (especially fathers) and families, the dearth of safe public means of transport suitable for by girls.

Encouraged by the fact that it is now possible for architectural design firms and so on to employ women and the fact that co-education has been adopted by the GCT RR Architecture Department, two girls-only colleges in provincial cities of Punjab Province are establishing similar diploma-level architecture departments. However, when establishing architecture departments in girls-only public colleges, it is necessary to do so in tandem with boys-only colleges that also have Architecture Departments, otherwise opportunities for boys to enroll in architecture departments will be conversely denied. Having said that, it is also financially prohibitive to establish separate boys-only colleges and girls-only colleges having architecture departments in the same city. Therefore, it is financially more realistic to build co-educational architecture departments. Assuming it is financially impossible to build boys-only colleges and girls-only colleges for all departments, the current situation whereby only boys-only colleges can offer education for jobs traditionally reserved for men will continue and it will be impossible to realize equal access to opportunities for girls. Accordingly, since Pakistan aims to promote a gender-equal society, in the field of public TVET, assuming that various efforts will need to be made to remove impediments as demonstrated in the Project, it will basically be desirable to promote co-education from now on.

As reforms continue to be made in the TVET sector, it is hoped that the National Vocational & Technical Training Commission (NAVTTTC), which is responsible for public TVET in Pakistan, will explore ways for disseminating the example of co-education in the Project to other public TVET programs and departments in other fields.

On View of Expert

In this ex-post evaluation, opinion of academia was invited to capture more specialized and diverse views for the projects, in addition to the perspectives of the DAC five evaluation criteria to be conducted by the external evaluator. The external evaluator selected and enlisted the support of a leading figure in the field: Yasushi Katsuma, Professor for International Studies Program, Graduate School of Asia-Pacific Studies (GSAPS), Faculty of International Research and Education (FIRE), Waseda University.

Prof. Katsuma, author of this report, specializes in Development Studies, International Human Rights, Human Security and Global Governance so that the external evaluator asked him to conduct detailed analysis based on his expertise and experience. Specifically, the detailed analysis titled “Female Education and Gender Equality Geared to Realization of Sustainable Development Goals (SDGs)” was conducted to supplement the ex-post evaluation of this project, namely, “The Project for Development of Centre of Excellence (CoE) for Technical Education” (technical cooperation project for Pakistan 2008-2013) regarding to the issues of technical and vocational education and training (TVET) in Pakistan.

The purpose of the analysis is to objectively grasp the situation of female education and the gender issue of access to public TVET at the time of ex-post evaluation regarding to the fact that a co-education diploma course was established for the first time in the country at the Government College of Technology Railway Road in Punjab Province.

Thereby the author tried gaining insights regarding the impact of gender which were implemented under the project mentioned above. Moreover, the expert shared his comments and suggestions for the further improvement of female education in public TVET which are obtained through the analysis. The result of the analysis was partially included in the evaluation report and the summary of the analysis was appended to the evaluation report as attachment.

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