Internal Ex-Post Evaluation for Technical Cooperation Project

conducted by Indonesia Office: February 2019

Country Name	Project for Research and Education Development on ICT in ITS (PREDICT-ITS) Phase 1 and 2
Republic of Indonesia	

I. Project Outline

Background	There were disparities of growth between the Western and the Eastern Part of Indonesia (EPI), and development of industries and communities in EPI was one of the most important issues for the sustainable economic growth. The Government of Indonesia has prioritized development of Information and Communication Technology (ICT)-related industries, and the Institut Teknologi Sepuluh Nopember (ITS) is recognized as a leading institute which contributes to stable socio-economic development of EPI. JICA implemented the "Project for Research and Education Development on Information and Communication Technology in ITS (Phase 1)" (2006-2010). ITS strengthened research and educational capacity of ICT related engineering departments through Labo-based Education (LBE) and joint researches. The request for the succeeding project (Phase 2) was made to further strengthen international level researches and LBE as well as expanding them to EPI universities.		
Objectives of the Project	Through introduction of LBE and joint research activities, the project aimed at strengthening ITS' education and research capabilities in the ICT-related engineering fields as a resource university in EPI, thereby contributing to capacity building of the industries, other universities and government institutes in EPI. 1. Overall Goal: 1) ITS will provide industries, other universities and government institutes in EPI with human resources having the state-of-the-art technologies and skills in the fields of ICT; 2) Universities in EPI will enhance their education and research capabilities. 2. Project Purpose: ITS strengthens its education and research capabilities in the ICT-related engineering fields as a resource university in EPI. (Project Purpose of PREDICT-ITS 1 and 2). Note: The objectives of the two projects restructured for the ex-post evaluation as explained in the "Special Perspectives Considered in the Ex-post Evaluation."		
Activities of the project	Project site: ITS 1. Main activities: Introduction of LBE, implementation of joint researches with Japanese and other EPI universities, joint activities with private companies and government institution, application of patents, training of the academic staff of other EPI universities, etc. 2. Inputs (to carry out above activities) Japanese Side Phase 1: 1) Experts from Japan: 15 persons 2) Training in Japan: 33 persons 3) Equipment: office equipment, etc. 4) Operation cost. Phase 2: 1) Experts from Japan: 10 persons 2) Training in Japan: 21 persons 3) Equipment: network server, software, etc. 4) Operation cost. Indonesian Side Phase 1: 1) Staff allocated: 22 persons 2) Land and facilities: Office space, laboratory, etc. 3) Operation cost for participation fees for the conferences and seminar, application of patents, scholarship for the researchers, etc. Phase 2: 1) Staff allocated: 65 persons 2) Land and facilities: Office space, etc. 3) Equipment for exploration and analysis 4) Operation cost.		
Project Period	Phase 1: April 2006 to March 2010 Phase 2: January 2012 to December 2014	Project Cost	Phase 1: (ex-ante) 330 million yen, (actual) 354 million yen Phase 2: (ex-ante) 199 million yen, (actual) 251 million yen
Implementing Agency	Directorate General of Higher Education, Ministry of Education & Culture (Restructured to the Ministry of Research Technology and Higher Education (RISTEKDIKTI) in 2014), Institut Teknologi Sepuluh Nopember (ITS).		
Cooperation Agency in Japan	Kumamoto University		

II. Result of the Evaluation

< Special Perspectives Considered in the Ex-post Evaluation >

- In the ex-post evaluation, the two projects were considered as one intervention since they shared the direction, and the Project Purpose and Overall Goal were restructured to verify achievement of the two projects as one intervention, as follows. Development of industries and communities in EPI was verified as a supposed impact. Efficiency was judged on the total project cost and period of the two projects, not by calculating the cost and period of each project separately.

1 Relevance

<Consistency with the Development Policy of Indonesia at the time of ex-ante evaluation and project completion>

The project was consistent with Indonesia's development policies from the time of the ex-ante evaluation of the Phase 1 to the project completion of the Phase 2, as capacity development of tertiary level educational institutions in the science and engineering fields was prioritized in the "National Mid-term Development Plans (RPJMN)" (2004-2009) (2010-2014).

<Consistency with the Development Needs of Indonesia at the time of ex-ante evaluation and project completion>

Although technical innovation in ICT was critical for sustainable development of the island-studded country, there were not sufficient number of technicians and researchers in EPI. Even after the Phase 1, there were still needs for further strengthening of international level researches and LBE in ITS as well as expanding them to other EPI universities. Thus, the project was consistent with the development needs of Indonesia from the time of the ex-ante evaluation of the Phase 1 to the project completion of the Phase 2.

<Consistency with Japan's ODA Policy at the time of ex-ante evaluation>

In "the Country Assistance Program for the Republic of Indonesia" (2004), one of the priority areas was set as "assistance to realize sustainable growth driven by private sector." Also, one of the focuses of human resource training is the personnel in industry and regional positions. In particular, development of human resources for the industry is considered necessary to achieve economic growth.

<Evaluation Result>

In light of the above, the relevance of the project is high.

2 Effectiveness/Impact

<Status of Achievement for the Project Purpose at the time of Project Completion>

The Project Purpose was mostly achieved. Among 24 joint research teams, six papers co-authored by researchers of ITS and EPI who belonged to the JICA joint research teams were posted in international journals. It is possible that more than six were submitted (Indicator 1). It was pointed out by the terminal evaluation team that contribution of EPI researchers was small due to insufficient research equipment. As well, ITS strengthened its educational functions, as many S2[1] students participated in regular laboratory meetings and answered that LBE would bring good future careers (Indicator 2). The average number of semesters needed to complete the master's thesis in the certified LBE laboratories decreased from 4.21 (2009) to 4.06 (2013) (Indicator 3), while it increased in all laboratories from 4.41 (2009) to 4.56 (2013).

<Continuation Status of Project Effects at the time of Ex-post Evaluation>

The project effects have continued. Since the project completion, the number of joint researches and the number of the papers co-authored by researchers of ITS and EPI both increased (Indicator 1). Joint researches have been uploaded on the website[2]. As an output of the Phase 1, ITS exchanged agreements with four EPI universities for joint researches, which has been extended to the network with 23 EPI universities (EPI-UNET). Regarding ITS' educational functions, any students' satisfaction survey has not been conducted. However, based on the facts of the increase in the number of LBE certified laboratories, it can be assumed that quality LBE has been sustained in ITS (Indicator 2). In 2017, 75% of S2 students graduated within four semesters (Indicator 3).

<Status of Achievement for Overall Goal at the time of Ex-post Evaluation>

The Overall Goal has been achieved. The number of academic staff who had gained degrees from ITS has been on an increasing trend ~~increased~~ (Indicator 1). In 2015, S2 degree and S3 degree holders were 99 and 42 in EPI universities, respectively, and it is presumed that the number has been increasing. According to the survey in the ex-port evaluation, the number of papers which are produced by the four EPI universities posted in academic journals increased from 79 in 2015 to 172 in 2017 (Indicator 2). Regarding the academic collaboration with the industry sector, among the four EPI universities, one has conducted 7 joint researches with private companies and the other, 2 joint activities, which have been increased compared to before the project (Indicator 3). For capacity building of EPI universities, ITS has annually conducted seminars, through EPI-UNET, particularly in the areas of joint research, quality assurance and internationalization. EPI-UNET has organized annual meetings with participation of the Directorate General of Institutional Affairs for Science Technology and Higher Education of RISTEKDIKTI.

<Other Impacts at the time of Ex-post Evaluation>

First, ITS has applied more and more patents (22 in 2015, 38 in 2016 and 52 in 2017), and some have been commercialized as innovate products including one related to CAD (computer-aided design). Second, through intervention in EPI-UNTE, the Directorate General of Institutional Affairs for Science Technology and Higher Education of RISTEKDIKTI has improved performance in processing publication and patent, according to observation of ITS. Third, though no exact data was available, according to ITS, the number of female lectures increased as LBE leaders at ITS. Female researchers trained in the Phase 1 were encouraged to take responsible positions, and nine of them were appointed as LBE leaders in the Phase 2.

<Evaluation Result>

Therefore, the effectiveness/impact of the project is high.

Achievement of the Project Purpose and Overall Goal

<table>
<tr><th>Aim</th><th>Indicators</th><th>Results</th></tr>
<tr><td rowspan="2">(Project Purpose)
ITS strengthens it education and research capabilities in the ICT-related engineering fields as a resource university in EPI.</td><td>1. At least one research paper, co-authored by researchers of ITS and EPI universities, is submitted to an international journal by each JICA joint research team. (Indicator 1 of the Project Purpose of PREDICT-ITS 2)</td><td><u>Status of achievement: Partially achieved (Continued).</u>
(Project Completion)
- Among 24 JICA joint research teams, six papers co-authored by researchers of ITS and EPI universities were "posted" in international journal, though it is possible that more papers would have been "submitted".
(Ex-post Evaluation)
- ITS has conducted researches and submitted papers to international journals, co-authored with researches of EPI universities.
<table>
<tr><td></td><td>2015</td><td>2016</td><td>2017</td></tr>
<tr><td>No. of joint researches</td><td>9</td><td>12</td><td>19</td></tr>
<tr><td>No. of the submitted papers</td><td>9</td><td>12</td><td>19</td></tr>
</table></td></tr>
<tr><td>2. More than 60% of students are satisfied with LBE of ITS. (Indicator 2 of the Project Purpose of PREDICT-ITS 2)</td><td><u>Status of achievement: Achieved (Partially continued).</u>
(Project Completion)
- 73% of S2 students considered that their participation in LBE would bring them good future careers in 2013.
- 90% of S2 students participated in more than 80% of the regular laboratory</td></tr>
</table>

[1] S2 (Sarjana 2) is equivalent to the master's degree. S3 is the doctor's degree.

[2] http://monitoring.epiunet.its.ac.id/ (Information is available in Indonesian only.)

<table>
<tr><td></td><td></td><td>meetings in 2013.
- 65% of S2 students conducted research activities for more than 30 hours per week in 2013.
(Ex-post Evaluation)
- Since the project completion, no survey on students' satisfaction has been implemented.
<Supplemental information>
- The percentage of the LBE-certified laboratories has increased: 28% (2015), 30 (2016) and 36% (2017), based on which it is presumed that LBE has been accepted by more students</td></tr>
<tr><td></td><td>3. The percentage of S2 students who complete his/her master's thesis at the end of 4th semester increases. (Indicator 3 of the Project Purpose of PREDICT-ITS 2)</td><td><u>Status of achievement: Achieved (Continued).</u>
(Project Completion)
- The average semester number needed to complete the master's thesis decreased from 4.21 (2009) to 3.66 (2012), 4.06 (2013).
(Ex-post Evaluation)
- The ratio of S2 students who complete his/her S2 course in 4 semesters has been increasing, according to ITS. In 2017, 75% of S2 students graduated within 4 semesters.</td></tr>
<tr><td rowspan="3">(Overall goal)
1. ITS will provide industries, other universities and government institutes in EPI with human resources having the state-of-the-art technologies and skills in the fields of ICT.
2. Universities in EPI will enhance their education and research capabilities.</td><td>1 The number of academic staff of universities in EPI in ICT-related engineering fields graduated from ITS with master's and/or doctoral degrees increases. (Indicator 1 of the Overall Goal of PREDICT-ITS 1 and 2)</td><td><u>Status of achievement: Mostly achieved</u>
(Ex-post Evaluation)
- The number of academic staff who gained S2 and S3 degree in ICT-related engineering fields from ITS has been on an increasing trend.
- Data of academic staff who gained S2 and S3 in EPI universities in 2016 and 2017 were not available. However, it is presumed that the number has been increasing, since their staff continued studies for S2 and S3 in 2016 and 2017.
<table>
<tr><td></td><td>2015</td><td>2016</td><td>2017</td></tr>
<tr><td>Academic staff with S2 degree in ITS</td><td>33</td><td>18</td><td>36</td></tr>
<tr><td>Academic staff with S3 degree in ITS</td><td>14</td><td>9</td><td>17</td></tr>
<tr><td>Academic staff with S2 degree in EPI universities</td><td>99</td><td>NA</td><td>NA</td></tr>
<tr><td>Academic staff with S3 degree in EPI universities</td><td>42</td><td>NA</td><td>NA</td></tr>
</table></td></tr>
<tr><td>2 The number of research papers produced by academic staff of EPI universities and published in journals increases. (Indicator 2 of the Overall Goal of PREDICT-ITS 2)</td><td><u>Status of achievement: Achieved.</u>
(Ex-post Evaluation)
- The number of research papers produced by researchers of ITS and EPI universities and published in journals has increased.
<table>
<tr><td></td><td>2015</td><td>2016</td><td>2017</td></tr>
<tr><td>Published papers by EPI university staff</td><td>79</td><td>167</td><td>172</td></tr>
</table>
Note: Data were collected from the University of Mataram, University of Nusa Cendana, Sam Ratulangi University and University of Cendrawasih.</td></tr>
<tr><td>3. The number of joint researches with industries conducted by EPI universities increases. (Indicator 3 of the Overall Goal of PREDICT-ITS 2)</td><td><u>Status of achievement: Partially achieved.</u>
(Ex-post Evaluation)
- Among the four surveyed universities, two (University of Nusa Cendana, Sam Ratulangi University) have newly conducted joint researches with industries.</td></tr>
</table>

Source: Terminal Evaluation Report, ITS Website, and information provided by ITS.

3 Efficiency

Although the total project period was as planned (ratio against the plan: 100%), the total project cost exceeded the plan (ratio against the plan: 114%). The outputs were produced as planned. Therefore, the project efficiency is fair.

4 Sustainability

<Policy Aspect>

Development of education and research at ITS and EPI universities in ICT-related fields is prioritized in RPJMN (2015-2019), and ICT is described as a strategic research field in "ITS Master Development Plan" (RENIP) (2016-2040) and "ITS Strategic Plan" (RENSTRA) (2016-2020).

<Institutional Aspect>

ITS has sustained an appropriate organizational structure to promote LBE and joint research. ITS Research Institute (LPPM) set under the rector is responsible for LBE at ITS. Every August, LPPM receives application for LBE certification from laboratories and selects those which meet qualifications, to which funds are granted. In 2018, 63 laboratories (35% of the total) were LBE-certified. LBE performance is monitored by LPPM. There has been a sufficient number of staff to support LBE, such as laboratory heads and PhD holder lecturers, according to ITS. Besides EPI-UNET, ITS has kept the network with Japanese universities[3] for joint researches, double degree program, student/staff exchange

<Technical Aspect>

LBE leaders and academic staff of ITS have sustained sufficient knowledge for promoting LBE and joint researches, as more S2 and S3 graduates have joined and published more research papers. For laboratories which are not yet LBE-certified, LPPM annually conducts trainings and share best practices of LBE laboratories. Guidelines for Defining LBE and its Criteria and Guidelines for

[3] ICT has kept the network with Kumamoto University, Kobe University, Osaka University, Hiroshima University, Kyushu University, Tohoku University, Tokyo Institute of Technology, Tokyo University, Saga University, Soka University, Wakayama University, and so on.

Monitoring and Evaluating LBE have been utilized by LPPM.

<Financial Aspect>

ITS has secured sufficient budgets for development of ICT infrastructure and promotion of LBE and joint researches with EPI universities: 250 million Indonesian Rupiahs (IDR) each year since 2015. Besides, since 2016, ITS has annually provided EPI-UNET with research funds for its collaborative research activities (300 million IDR). Although there has been no budget allocation from RISTEKDIKTI to EPI-UNET, research activities have been successfully conducted among ITS and EPI universities, as mentioned earlier.

<Evaluation Result>

Therefore, the sustainability of the effects is high.

5 Summary of the Evaluation

The Project Purpose was mostly partially achieved, and the project effects have continued. ITS strengthened its education and research capabilities, as indicated in the increase in the number of the produced academic papers and LBE-certified laboratories and decrease in the duration of S2 and S3 students to complete the program. Also, ITS has continued academic exchanges with EPI universities through the officially established network. Regarding sustainability, ITS has sustained an appropriate organizational structure and technical level to support LBE and joint researches. As for the project efficiency, the project cost exceeded the plan.

Considering all of the above points, this project is evaluated to be very satisfactory.

III. Recommendations & Lessons Learned

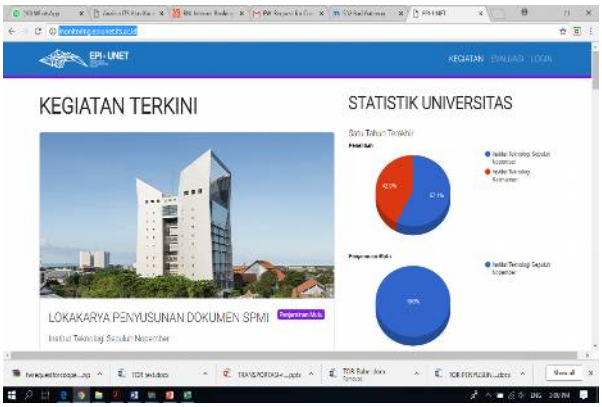
Recommendations for Implementing agency:

- It is recommended to the Directorate General of Institutional Affairs for Science Technology and Higher Education of RISTEKDIKTI to share the project experience with EPI universities in other fields than ICT, so that they could learn about joint researches and networking in the region. It is important to monitor progresses of collaboration of ITS and EPI-UNET on the degree programs for lecturers, LBE and joint researches.
- It is recommended to ITS to establish the database on successful cases of LBE and joint researches, including data such as the number of female researchers, students' satisfaction, and so on, and then to share the data within ITS and also with other EPI universities in order to further encourage LBE and joint researches. With regard to this, it is also recommended to ITS to organize a monitoring team which would coordinate with EPI universities to measure the progress of EPI-UNET and collect such data including the number of published research papers, workshop results, applied patents, and so on.
- It is recommended to EPI-UNET to strengthen further collaboration with ITS for utilizing LBE for joint research and involve other EPI universities in EPI-UNET so that their lecturers would participate in S2 and S3 programs at EPI universities.

Lessons learned for JICA:

- Through the activities of the Phase 1 and Phase 2, ITS strengthened its education and research capabilities and extended its experience with EPI universities through EPI-UNET. Official establishment of EPI-UNET has been attributed to the project efforts for involving EPI universities from the Phase 1, though the project mainly targeted at capacity development of ITS. Joint researches among ITS and EPI universities have been based on ITS experiences in joint researches with Japanese universities during the project period. Thus, in the projects, which aim at strengthening a certain institution as a center for capacity development of nearby institutions after the project completion, it is important to involve those nearby institutions and promote their networking during the project period, so that the target institution could learn how to disseminate the experience after the project completion. (either for Degree program for lecturer and or LBE utilization and or Research)
- Indicators for projects which are implemented in the remote areas shall be set carefully so as to avoid inefficient data collection for verification of target achievement after project is completed. In case sufficient data is not collected, project achievement cannot be verified or judged appropriately. Sending a team of monitoring after the project completion is one of the ways to update information on the project effects. Or, JICA offices should contact the implementing agency and make sure that it is monitoring the project effects based on set indicators.

EPI UNET workshop on outcome-based education in Surabaya in February 2018



Website of EPI-UNET