

Republic of the Union of Myanmar

Ex-Post Evaluation of Technical Cooperation Project
“The Project on ICT Human Resource Development at ICT Training Institute”

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0. Summary

The objective of this project is to newly establish the Information and Communication Technology Training Institute (ICTTI) as a practice-oriented ICT training institute in Yangon, Myanmar and to continuously produce high-quality graduates from the training courses developed at ICTTI, thereby aiming at enhancing educational capacity of computer universities in Myanmar as well as providing high-quality human resources to the ICT industry in the future.

The relevance for implementing this project is high since it is highly consistent with the Myanmar’s development plan and development needs, as well as Japan’s ODA policy. The practice-oriented training courses of Software Development, Network Development and Short Modules were developed and implemented at ICTTI and a total of 1,963 graduates of training courses were produced as of the ex-post evaluation, including 951 graduates during the project period as well as 1,012 graduates from the project completion to the time of ex-post evaluation, leading to a rise in the level of ICT human resources in Myanmar. Of the trainees of ICTTI training courses, the lecturers of computer universities improved their teaching skills as well as the general trainees successfully obtained employment at ICT companies and they contribute to enhancing educational capacity of computer universities as well as providing high-quality human resources to the ICT industry. The project therefore has fulfilled its desired effects and has produced certain effects which had been expected to be produced in the future. While the period and cost of the project has exceeded the planned ones, the training courses of ICTTI have been continuously implemented smoothly and sustainability of the project effects is high.

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

1. Project Description



Project Location



Scenery of Class at ICT Training Institute

1.1 Background

Under the Economic Structural Adjustment Policy Support which was implemented by the Japanese Government in a period from December 2000 to March 2003 with the objective of enhancing the capacity of policymakers in Myanmar, the Governments of Japan and Myanmar established a joint task force, which was composed of representatives from industry, government and academia both in Japan and Myanmar. The task force was further divided into sub-groups to conduct surveys and compile policy proposals in the fields of fiscal and financial affairs, industry and trade, ICT and rural villages. In the ICT sub-group, the policy proposals were made with the goal of contributing to promotion of ICT utilization as well as ICT industry in Myanmar.

On another front, the development of human resources in the ICT sector, which acts as an impediment to development of information and communication industry, was regarded as a priority issue in Myanmar. The Government of Myanmar established 2 national computer universities and 24 computer colleges¹ during the late 1990s – early 2000s for the country's ICT development and defined common curriculum and syllabus of all computer universities. However, their methods of education were largely classroom-based and crucially lacked practical training. Accordingly, graduates of computer universities still needed to undergo long-term training based on OJT after they found employment with ICT companies. The University of Computer Studies, Yangon (UCSY) played a central role in the ICT education and in charge of administration of computer universities in Myanmar. While UCSY aimed to strengthen practical drill education through revising its curriculum, there was little likelihood of major improvement due to lack of practical ICT guidance techniques among lecturers, shortages of computers and drill equipment, and frequent power interruptions.

Under these circumstances, the Government of Myanmar urgently required a training

¹ All computer colleges were upgraded to universities in January 2007.

organization to develop ICT human resources with practical skills in its national commitment to develop ICT industry, and requested the Government of Japan for a technical cooperation project on establishing the new ICT training institute under UCSY that would develop prospective ICT engineers to play core roles and would also serve as an intermediary between university education and the ICT industry. JICA dispatched several study teams to clarify the needs for establishing such training center and confirm the industry requirements and trend, and based on the results of these studies, the project started in December 2006.

1.2 Project Outline

Overall Goal	High quality graduates from the training course developed at ICTTI are continuously produced each time.	
Project Purpose	ICTTI conducts practice-oriented ICT training.	
Output(s)	Output 1	The project operation function is established.
	Output 2	Machinery and equipment are provided, installed, operated and maintained properly.
	Output 3	Counterparts improved their teaching skills through the implementation of the training course in ICT related fields.
	Output 4	Curriculum, syllabuses, and teaching materials for the courses are developed and modified as needed.
Total cost (Japanese Side)	746 million yen	
Period of Cooperation	December, 2006 – November, 2009 (Extension period: December, 2009 – November, 2011)	
Implementing Agency	ICT Training Institute (ICTTI), University of Computer Studies, Yangon (UCSY), Ministry of Science and Technology (MOST) Note: ICTTI is currently under the Center of Information and Communication Technology Training (CICTT)	
Other Relevant Agencies / Organizations	None	
Supporting Agency / Organization in Japan	Japan Development Service Co., Ltd	
Related Projects	None	

1.3 Outline of the Terminal Evaluation

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

At the Terminal Evaluation conducted in September 2011², it was concluded that the Project Purpose would be successfully achieved by the completion of project and that the achievement of the Project Purpose was enabled through the achievement of each Output.

1.3.2 Achievement Status of Overall Goal at the time of the Terminal Evaluation (including other impacts)

It is prospected that the Overall Goal will be achieved if the training courses are continuously provided at the ICTTI after the project. Positive impacts have been seen on the trainees of the ICTTI training courses such as the improvement in teaching skills of the existing faculty at the computer universities and good evaluation of performances of general trainees who were employed by ICT companies after the course. On the other hand, negative impacts were neither reported nor expected.

1.3.3 Recommendations at the time of the Terminal Evaluation

The following recommendations were provided at the Terminal Evaluation.

- (1) Continuing to utilize a check list based on the “Competency-Based Training (CBT)” to keep the level of lecturers of ICTTI.
- (2) Continuing to conduct questionnaires to the trainees of ICTTI at the end of the training courses
- (3) Maintaining the sufficient number of lecturers of ICTTI
- (4) Implementing the ICTTI future management plan

All the above recommendations have been actually implemented by ICTTI after the project, for example, newly assigned ICTTI lecturers have been checked for their skills based on the check list of CBT as well as questionnaires to trainees have been conducted at the end of training courses every batch, same as during the project period. The number of ICTTI lectures has been always around 20 and this number is enough to provide training courses. The ICTTI future management plan has been also implemented since the completion of the project.

2. Outline of the Evaluation Study

2.1 External Evaluator

Sawa Hasegawa, International Development Center of Japan

² This project was extended for two years and the Terminal Evaluation was conducted twice in September 2009 and September 2011 before and after the extension.

2.2 Duration of Evaluation Study

Duration of the Study:	September, 2014 – August, 2015
Duration of the Field Study:	November 30 – December 18, 2014 March 18 – 23, 2015

3. Results of the Evaluation (Overall Rating: B³)

3.1 Relevance (Rating: ③⁴)

3.1.1 Relevance to the Development Plan of Myanmar

At the ex-ante evaluation of the project, the national development plan on ICT of Myanmar⁵ was the “ICT Master Plan” (2000-2010) established in 2002. In this plan, the mission, strategy and the implementation plan were prescribed in perspective of future until 2010, and ICT education (human resources development toward development of ICT industry) was placed as one of the five priority areas of ICT development in Myanmar, including ICT application, building of ICT industry, ICT infrastructure and development of ICT laws. This master plan was taken over by the secondary phase “ICT Master Plan” (2011-2015) established in July 2011 and ICT human resources development was regarded as one of the eight priority areas of the new master plan. Therefore, ICT human resources development and strengthening of ICT education have always been the priority areas in Myanmar’s policy of ICT sector development from the ex-ante evaluation through to the completion of this project and the project had relevance to Myanmar’s national development policy.

3.1.2 Relevance to the Development Needs of Myanmar

As a result of the questionnaire surveys and interviews with the persons concerned at UCSY, ICT companies and associations in Myanmar, and the graduates of the ICTTI training courses, it was confirmed that there had been a pressing need in ICT industry for ICT human resources endowed with practical skills. The background behind this need was that a total of 26 computer universities and computer colleges were established in Myanmar around 2000 before starting this project but their quality of education was low due to reasons including lack of practical ICT guidance techniques among lecturers at the universities and shortages of computers and drill equipment. In addition, the Government of Myanmar and the universities were aware of the lack of teaching skills of lecturers at the computer universities and the need to train the

³ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁴ ③: High, ②: Fair, ①: Low

⁵ While the Myanmar government makes the National Development Plan every 5 year since 1992, the Plan has not been publicized. On the other hand, the sector development plan such as health, education, agriculture, environment, etc. has been made and publicized (Ministry of Foreign Affairs, *ODA Databook (2011)*).

lecturers in adequate techniques and skills. These needs for improvement of quality of the computer universities including strengthening teaching skills and for ITC human resource development were continuously high throughout the duration of this project from the ex-ante evaluation through to the completion.

3.1.3 Relevance to Japan's ODA Policy

At the ex-ante evaluation of the project, the Japan's basic policy for ODA economic cooperation towards Myanmar placed 1) the project of urgent need and truly humanitarian assistance, 2) the development of human resources who contribute to promotion of the democracy and economic structural reform and 3) project targeting CLMV (Cambodia, Laos, Myanmar and Vietnam) countries or whole area of ASEAN region as one of the core area⁶. The project with the aim of developing human resources in ICT industry through reinforcement of ICT education was positioned as a project of human resource development to contribute to the aforementioned economic structural reform. Besides, under the ICT task force implemented in October 2002 as part of the Economic Structural Adjustment Policy Support, the policy proposal was made, emphasizing the importance of ICT human resource development in Myanmar. Thus the project was consistent with the Japan's ODA policy.

As explained above, this project was fully in line with the Myanmar's development plan and development needs, as well as Japan's ODA policy. Therefore, its relevance is high.

3.2 Effectiveness and Impact⁷ (Rating: ③)

3.2.1 Effectiveness

3.2.1.1 Project Output

ICTTI was newly established for the project which consists of four outputs such as 1) establishment of operation function of ICTTI (Output 1), 2) proper provision, installation, operation and maintenance of machinery and equipment at ICTTI (Output 2), 3) development of curriculums, syllabuses and teaching materials for training courses at ICTTI as well as their modification as necessary (Output 4), and 4) improvement of ICTTI lecturers in terms of teaching skills through the implementation of training courses (Output 3). The project aimed to achieve these four outputs so that ICTTI could provide practice-oriented ICT training.

The project achieved these four outputs during the project period. After the official

⁶ Ministry of Foreign Affairs, *ODA Databook (2006)*

⁷ Sub-rating for Effectiveness is to be put with consideration of Impact.

establishment of ICTTI with the commencement of project (Output 1), the two training courses of Software Development and Network Development were developed and the curriculum, syllabus, students' textbook, lecturers' instruction manual, drill materials, final examination questions, modification manual, etc. for each course were developed in accordance with the "IT Skills Standard (ITSS, explained on the next page)" and based on the then latest trend of ICT mainly by experts. These materials were revised by ICTTI lecturers for their improvement based on the actual use (Output 4). About 20 lecturers of ICTTI⁸ who were in charge of either of both courses were trained by the experts through experiencing the whole process of courses at first and providing actual lectures by themselves (Output 3). The machinery and equipment necessary to conduct training courses such as computers, software, rack mount server, network equipment, projectors, etc. were provided and installed by the project and a manual for operation and maintenance for the machinery and equipment was also made (Output 2). The maintenance of hardware was managed by system administrator of ICTTI and the upgrade of software was by ICTTI lecturers.

The duration of each training course was 22 weeks and conducted twice a year, from May to September and from October to March. 9 times in total, from the first batch to the ninth batch of each course were conducted during the project period. The Short Module Courses which accounted for 2-7 weeks were additionally offered in the middle of the project, in response to the needs for module-based advanced courses from ICT industry.

The trainees of ICTTI training courses consisted of two types: one was active lecturers of computer universities, who were also government officers of MOST⁹ and another was general trainees who are mainly fresh graduates of computer universities¹⁰. While the lecturer trainees took the courses at no charge and are due back to their universities after finishing the training courses, general trainees paid their course fees and most of them hoped to find a job at private ICT companies after their finishing.

The subjects of Software Development and Network Development Courses as well as Short Module Courses are listed as follows.

⁸ During the project period the ICTTI lectures belonged to UCSY as well as MOST and they had been transferred to other computer universities from ICTTI as part of the internal transfer. The number of lectures had not been fixed during the project period, but about 20 lecturers had been allocated as necessary to provide training courses.

⁹ There were several trainees who came from other ministries and other ICT-related universities such as technology universities in this type of trainees.

¹⁰ There is a "graduation eligibility of computer universities" as one of the qualification requirements in applying for the ICTTI training courses.

Table 1: List of Subjects of Software Development Course,
Network Development Course and Short Module Courses

<Common Subjects of Software and Network Development Courses> (approx. 5 weeks)	
Fundamental Linux Fundamental Network Fundamental Security Fundamental Application Development Fundamental Database New Technology Trend Fundamental Project Management Review Technique	
<Advanced Subjects of Software Development> (approx. 17 weeks)	<Advanced Subjects of Network Development> (approx. 17 weeks)
Java Programming Database Design and Administration Database Programming Object Oriented Analysis and Design Team Software Process Localization and Globalization Planning, Evaluation and Testing Methodology of Software Product Development Java Programming Advanced Workshop & Presentation	TCP/IP and Routing Protocols Network Design Linux Administration Linux Server Linux Management & Security Network Administration Workshop & Presentation
<Short Module Courses>	
Advanced Web Development Course (Web Design and PHP Web Development) (5 weeks) Oracle Database 11g Course (SQL, PL/SQL and DBA) (3 weeks) Java Framework-based Development Course (Spring-3) (2 weeks) Web and Cloud System Development Course (4 weeks) Ruby on Rails Framework-based Development Course (2 weeks) Advanced Server Course (Virtualization and LDAP) (7 weeks) Cisco Learning Network Course (Cisco Routing & Switching and Voice) (4 weeks) Project Management Course (4 weeks) Mobile Phone System Development Course (4 weeks)	

<Source> Introducing leaflet of ICTTI

Note: Above are the courses provided at ICTTI at the time of ex-post evaluation. The number of courses slightly differs from that provided during the project since some of the Short Module Courses are combined after the project in response to the requests of ICT industry and “Mobile Phone System Development Course” was newly added from the 12th batch onward.

3.2.1.2 Achievement of Project Purpose

The achievement of Project Purpose is considered and judged by the results of four indicators set for the project. The indicators and their actual results are as follows.

Achievement of Project Purpose

Project Purpose	Indicator	Actual Results
ICTTI conducts practice-oriented ICT training.	Staff of ICTTI acquires ability of ICT on ITSS 3.	- All ICTTI lecturers who are in charge of either Software Development or Network Development Courses acquired the ability of ICT corresponding to the level of ITSS 3 in the period of January – August, 2007 through the technical transfer by JICA experts as well as

		through providing actual class from the second batch of training courses that started in October, 2007. "The ability of ICT corresponding to the level of ITSS 3" is based on the assessment of the experts since the official qualification of ITSS is not specifically established.
	ICTTI conducts a training course twice a year systematically according to needs.	<ul style="list-style-type: none"> - Two general training courses of Software Development and Network Development have been conducted twice a year (October – March and May – September semesters) starting from October 2007. The courses were provided for a total of 8 times until the end of the project (excluding the first session provided to ICTTI lecturers by the experts). Practical drills are compulsory in each training course. - Questionnaires for trainees were conducted every time after finishing the course and the courses have been improved based on the results to reflect their opinions if possible, including allocation of hours between subjects. - Short Module Courses were added as the module-based advanced courses on a trial basis in June 2009 during the fifth batch based on the needs of ICT industry and started on a full scale from the seventh batch during the extension of the project. There are different Short Module Courses consisting of some modules selected from the existing courses and some new modules and they vary in course term.
	The total number of graduates from the training course who acquire ability of ICT on ITSS 2 increases year by year.	<ul style="list-style-type: none"> - As explained above, official qualification of ITSS is not established but all trainees of ICTTI training courses are required to take a final examination for each course at the end of the courses and only those who passed the exam can be the graduates of the courses. Those who passed the final exam are the equivalent to the level of ITSS 2. Therefore the number of the graduates of the ICTTI courses equals the number of trainees who acquired ability of ICT on ITSS 2. The total number of graduates increases year by year as shown in the Table 2 below.
	Quality of former trainees' classes at ICT related universities is improved.	<ul style="list-style-type: none"> - According to the result of lecturers' questionnaires conducted at the Terminal Evaluation, most of them responded that the quality of their teaching at class improved after completion of the ICTTI training courses and that they provide the practice-oriented ICT training at their classes that they have learned at ICTTI as much as possible. - The project manager (professor of UCSY) observes the lectures provided by the graduates of lecturers of computer universities generally improved in their teaching after they finished the ICTTI training courses.

Note 1: ITSS stands for the “Skill Standards for IT Professionals” proposed by the Information-technology Promotion Agency and it is “a set of systematic indices that clarify and systemize the skills needed for people working in the IT services industry which is intended for use as an effective measuring tool (common framework) for developing and training professional human resources in industry and academia sectors. <Source> Homepage of Information-technology Promotion Agency (IPA).

Note 2: Official examination to certify ITSS levels is not established but according to IPA, ITSS 2 is the level that one can carry out one's responsibility as a project member under the guidance of team leader and ITSS 3 is the level that one can make the design and development of specific area of technology under the guidance of team leader.

Table 2: Number of Graduates of ICTTI Training Courses during the Project Period

Batch (Training Period)	Training Course	Number of Graduates
2nd Batch (Oct 2007 – Mar 2008)	Software Development	25
	Network Development	20
	Sub-total	45
3rd Batch (May 2008 – Sep 2008)	Software Development	40
	Network Development	32
	Sub-total	72
4th Batch (Oct 2008 – Mar 2009)	Software Development	53
	Network Development	51
	Sub-total	104
5th Batch (May 2009 – Sep 2009)	Software Development	32
	Network Development	59
	Short Modules	10
	Sub-total	101
6th Batch (Oct 2009 – Mar 2010)	Software Development	51
	Network Development	73
	Sub-total	124
7th Batch (May 2010 – Sep 2010)	Software Development	38
	Network Development	39
	Short Modules	158
	Sub-total	235
8th Batch (Oct 2010 – Mar 2011)	Software Development	32
	Network Development	35
	Short Modules	54
	Sub-total	121
9th Batch (May 2011 – Sep 2011)	Software Development	33
	Network Development	32
	Short Modules	84
	Sub-total	149
Total		951

<Source> JICA and Japan Development Service, *Project Completion Report 2 on “The Project on ICT Human Resource Development at ICT Training Institute”* (December 2011)

Note 1: The number of graduates for the first batch is excluded from the total number achieved in the ex-post evaluation as the graduates of this batch were ICTTI lecturers trained by experts.

Note 2: The Short Module Course was introduced at the 5th batch as trial and was converted into a full scale from the 7th batch.

Note 3: Above is the record on all the number of graduates of ICTTI Training Courses who passed the final examination. The record on the number of all the trainees during the project period is not available in the existing reports.

As described above, all the four indicators for Project Purpose were achieved during the project period and it lead to an achievement of the Project Purpose within the planned period. It is clear that this achievement of Project Purpose was brought about by the achievement of each output since ICTTI was newly established by the project as well as the provision of practice-oriented ICT training was realized by completing activities for each output: 1) establishment of operation function of ICTTI (Output 1), 2) proper provision, installation, operation and maintenance of machinery and equipment at ICTTI (Output 2), 3) development of curriculums, syllabuses and teaching materials for training courses at ICTTI (Output 4), and 4) improvement of ICTTI lecturers in terms of teaching skills (Output 3).

3.2.2 Impact

3.2.2.1 Achievement of Overall Goal

The achievement of Overall Goal is also considered and judged by the result of indicator set for the project. The indicator and its actual results are as follows.

Achievement of Overall Goal

Overall Goal	Indicator	Actual Results
High quality graduates from the training course developed at ICTTI are continuously produced each time.	The number of graduates stands more than 1,000 people for three years after the project finished.	<ul style="list-style-type: none"> - After the project ended in November 2011, ICTTI has continuously provided the training courses of Software Development, Network Development and Short Modules twice a year, same as during the project period. Only those trainees who passed the final examination can be the graduates of the courses and the contents of exam are renewed every year to keep a certain level of the graduates. The total number of graduates after the project is 1,012 as shown in the Table 3 below. - Several changes were made to the training courses after the project; the number of classes of Network Development Course was increased to 3 from 2, two modules of the Short Modules Courses were combined as required, and a new Short Modules Course “Mobile Phone System Development (4 weeks)” was introduced. - Teaching skills of the lecturers in charge of each training course are kept at a certain level. The skill level of the graduates is also maintained as the final examination questions are renewed every year according to the revision manual. Therefore, the level of the training courses in general is maintained after the project.

Table 3: Numbers of Trainees and Graduates of ICTTI Training Courses after the Project

Batch (Training Period)	Training Course	Number of Trainees	Number of Graduates
10th Batch (Oct 2011 – Mar 2012)	Software Development	41	39
	Network Development	40	39
	Short Modules	75	62
	Sub-total	156	140
11th Batch (May 2012 – Sep 2012)	Software Development	39	33
	Network Development	55	47
	Short Modules	76	64
	Sub-total	177	144
12th Batch (Oct 2012 – Mar 2013)	Software Development	46	44
	Network Development	59	54
	Short Modules	67	63
	Sub-total	172	161
13th Batch (May 2013 – Sep 2013)	Software Development	48	43
	Network Development	59	54
	Short Modules	39	37
	Sub-total	146	134
14th Batch (Oct 2013 – Mar 2014)	Software Development	37	35
	Network Development	62	60
	Short Modules	51	46
	Sub-total	150	141
15th Batch (May 2014 – Sep 2014)	Software Development	42	37
	Network Development	59	55
	Short Modules	52	52
	Sub-total	153	144
16th Batch (Oct 2014 – Mar 2015)	Software Development	44	38
	Network Development	61	51
	Short Modules	64	59
	Sub-total	169	148
Total		1,123	1,012

<Source> Reference provided by CICTT

As shown above, training courses at ICTTI were continuously provided after the completion of the project and the total number of ICTTI graduates after the project to March 2015 was 1,012 and exceeded 1,000, and the indicator for Overall Goal was achieved at the time of ex-post evaluation. All of these graduates also passed the final examination. It led to a result that quality graduates were continuously produced from ICTTI after the project, thus the project achieved its Overall Goal.

3.2.2.2 Other Impacts

The project produced some impacts other than the achievement of Overall Goal. In the ex-post evaluation, the following beneficiary surveys were conducted to identify actual effects which the project brought about to the beneficiaries: 1) a questionnaire survey for the graduates of ICTTI training courses, who consist of lecturers of

computer universities and general trainees; and 2) interviews to the computer universities where graduates of lecturers of computer universities belonged as well as ICT companies in Myanmar, where graduates of general trainees were lately employed.

As for the questionnaire survey, at first the questionnaire for both graduates of lecturers of computer universities and general trainees was sent through E-mail to approximately 150 graduates from 10th batch to 15th batch, who were randomly selected from the list of graduates, however, only 7 responses were collected from them. Accordingly, the questionnaire for graduates of lecturers of computer universities was directly sent to each computer university through UCSY and 98 responses were collected from them. The questionnaire for graduates of general trainees was also directly sent to ICT companies where some of the graduates are currently working as well as where the interview was made in the ex-post evaluation¹¹. As a result, a total of 166 responses were collected in the questionnaire survey.

As for the interview, the survey was conducted with UCSY where most graduates of lecturers of computer universities belong and 6 ICT companies (including Japanese companies) where 3 to 20 graduates of general trainees were lately working for, as well as “Myanmar Computer Federation,” the largest association of ICT industry in Myanmar. The numbers of respondents of each survey are summarized as follows.

Table 4: Summary of Respondents of Beneficiary Surveys

Type of Survey	Respondents of Survey		Number of Respondents
Questionnaire	Graduates of lecturers of computer universities	Software Development	52
		Network Development	46
		Total	98
	Graduates of general trainees	Software Development	37
		Network Development	31
		Total	68
Interview	Computer universities - UCSY		1
	ICT companies and industrial associations - Myanmar Information Technology Pte., Ltd. - Acroquest Myanmar Technology Co., Ltd. - Myanmar DRK Co., Ltd. - NTT Data Myanmar Co., Ltd. - Myanmar Daiichi Computer Resource - Azure Net Co., Ltd ¹² - Myanmar Computer Federation		6 companies 1 association

¹¹ It implies that the result of questionnaire survey for graduates of general trainees shows a high employment rate in ICT companies since the responses were mainly collected from the current employees of ICT companies.

¹² The interview for Azure Net Co., Ltd was not conducted and the response of questionnaire was collected instead.

(1) Effects on the Graduates of ICTTI Training Courses

The current status of employment for lecturers of computer universities and general trainees among the respondents of questionnaire survey for the graduates of ICTTI training courses is as follows.

Table 5: Current Status of ICTTI Graduates of Lecturers of Computer Universities
(among respondents)

Training Course	Active	Retired
Software Development	51	1
Network Development	45	1

Table 6: Job Placement of ICTTI Graduates of General Trainees (among respondents)

Training Course	ICT company	Other company	Government office	No job
Software Development	37	0	0	0
Network Development	19	7	4	1

According to the result of questionnaire survey, the ICTTI training courses have obtained very high satisfaction from the graduates, regardless of course type of Software or Network Development as well as regardless of trainee's type of lecturers of computer universities or general trainees. For example, shown as Table 7, most graduates answer "satisfied very much" to the ICTTI training courses and some graduates answered "satisfied to some degree" while no graduates answer "not satisfied so much" and "no satisfied."

Table 7: Satisfaction to ICTTI Training Courses by ICTTI Graduates
(among respondents)

ICTTI graduates	Training Course	Very much	To some degree	Not so much	No	DK/NA*
Lecturers of computer universities	Software Development	45	7	0	0	0
	Network Development	41	5	0	0	0
General trainees	Software Development	29	8	0	0	0
	Network Development	28	1	0	0	2

* Do not know/No answer

In addition, they also provide positive responses on the effectiveness and usefulness of training courses they took in their present works. The detailed results of questionnaire survey for the ICTTI graduates are presented as follows with respect to lecturers of computer universities and general trainees.

Table 8: Effects of ICTTI Training Courses that Made on Graduates of Lecturers of Computer Universities (among respondents)

1) Are the knowledge and skills you learned at the ICTTI training course directly linked to your teaching subjects?

Training Course	Very much	To some degree	Not so much	No	DK/NA
Software Development	35	15	0	0	2
Network Development	32	11	1	1	1

2) Do you utilize the course materials of ICTTI training course in your teaching?

Training Course	Very much	To some degree	Not so much	No	DK/NA
Software Development	22	22	3	3	2
Network Development	19	21	2	3	1

Note: The course materials used at the ICTTI training courses are not official materials of computer universities. However, as the data shows, the lecturers answer they utilize the course materials 'very much' and 'to some degree,' which means they are using them as reference in their teaching.

3) Does your university have the environment of teaching your subjects based on what you learned at the ICTTI training course?

Training Course	Very much	To some degree	Not so much	No	DK/NA
Software Development	25	22	0	0	5
Network Development	24	18	3	0	1

4) Are there any influences on the curriculum or syllabus of your university by the ICTTI training courses?

Training Course	Yes	No	DK/NA
Software Development	29	23	0
Network Development	28	16	2

5) Do you think the quality of your teaching was improved by learning at ICTTI?

Training Course	Very much	To some degree	Not so much	No	DK/NA
Software Development	27	22	1	0	2
Network Development	41	4	0	0	1

Table 9: Effects of ICTTI Training Courses that Made on Graduates of General Trainees
(among respondents)

1) Is your current job what you had wanted to have before you took the ICTTI training course?					
Training Course	Yes	No			
Software Development	35	2			
Network Development	18	13			
Note: The reason why the answer of 'No' is relatively more among respondents of Network Development is that there is not sufficient number of companies specifically related to the network in Myanmar while the number is currently increasing.					
2) Was the completion of the ICTTI training course an advantage in getting your jobs?					
Training Course	Yes	No			
Software Development	36	1			
Network Development	31	0			
3) Do you think you could have same kind of training in other training schools?					
Training Course	Yes, and other schools are better	Yes, but ICTTI is better	No	DK/NA	
Software Development	0	17	15	5	
Network Development	1	21	9	0	
4) Are the knowledge and skills you gained at the ICTTI training course directly linked to your job?					
Training Course	Very much	To some degree	Not so much	No	DK/NA
Software Development	19	16	0	1	1
Network Development	18	5	4	1	3

(2) Effects on Computer Universities and ICT Companies

According to the result of interview to the computer university, responsible officials of UCSY acknowledge that their lecturers who are the graduates of ICTTI training courses are now equipped with practical ICT knowledge and skills and show improvement in their teaching as a result of taking the courses and that they are satisfied to have those lecturers trained at ICTTI. UCSY plans to dispatch their lecturers to ICTTI regularly and to use ICTTI as an institution to provide them reeducation. The same effects of improvement in skills of the graduated lecturers are seen in other computer universities under the administration of UCSY, according to the officials of UCSY.

According to the result of interviews to the ICT companies, all companies respond that they are satisfied with their employees who are the graduates of ICTTI training courses and 5 of 6 companies are actively hiring the graduates of ICTTI. The interviewed ICT companies usually conduct OJT to new employees for half a year and some of companies reply that OJT for the graduates of ICTTI can be three months. Some companies also reply that the graduates of ICTTI have skills other than technical

skills that are necessary for practical work in ICT companies such as cooperation with others. This is one of the results of the training courses in which trainees have learned about teamwork through participating in workshop drills to work as a team of several members of trainees.

ICT companies are very popular among job seekers in Myanmar and they usually have more than 10 times applicants to the offered numbers. The graduates of ICTTI training courses can be advantageous to the highly competitive application over other applicants who only graduated from a computer university. According to officials of Myanmar Computer Federation, a curriculum of training courses at ICTTI is very useful for graduates of computer universities to learn practical ICT skills and it is contributing to the improvement of ability of ICT human resources in Myanmar.

(3) Other Effects

Another example of impacts produced after the project is as follows: After the project, ICTTI entered into partnership with UCSY and both Software Development and Network Development Courses were authorized as an object of diploma. As a result, the graduates of both courses have been provided a diploma degree under the joint names of UCSY and ICTTI since the 15th batch. During the project period, a completion certificate issued by ICTTI alone had been provided to the graduates of training courses.

As described above, the project has produced some positive impacts. Meanwhile, there have been no reports of any serious negative impact in terms of the environmental and social aspects during the project period as well as at the time of ex-post evaluation, and it is unlikely that any negative impact of the project will emerge in the future.

As explained above, it is found that the project has achieved its purpose: “ICTTI conducts practice-oriented ICT training” by the end of the project and also its Overall Goal judging from the fact that ICTTI successfully has provided training courses and continuously produced the quality graduates by passing the final examination since the end of the project. In addition, it is also observed the graduates of the training courses at ICTTI consisting of lecturers of computer universities and general trainees have enjoyed positive results such as improvement of teaching skills and obtaining employment by ICT companies. The computer universities and the ICT companies where these graduates belong to are also highly satisfied with the result. Therefore, intended effects of the project have been seen and effectiveness and impact of the project are high.

3.3 Efficiency (Rating: ①)

3.3.1 Inputs

Inputs	Plan	Actual
(1) Experts	7 Short-Term (67 MM*)	12 Short-Term (218 MM)
(2) Trainees received	12 persons	41 persons
(3) Equipment	Necessary equipment for training courses such as computers, software, rack mount server, etc.	Computers, software, rack mount server, network equipment, projectors, etc.
(4) (Others)	Repair works of ICTTI buildings before the project	Repair works of ICTTI buildings before the project, repair works for damaged ICTTI buildings due to the Cyclone Nargis
Japanese side Total Project Cost	310 million yen	746 million yen
Myanmar side Operational Expenses	Counterpart staff cost, project operational cost, etc.	Counterpart staff cost, project operational cost, etc.

* MM stands for man month.

3.3.1.1 Elements of Inputs

The inputs of the project were provided by both Japanese and Myanmar sides almost as planned. The experts were dispatched as planned except for the additional dispatches for the Short Module Courses added during the extension period. The number of trainees planned to be received was 12 persons in total, 4 per year, in the original plan but the number of trainees actually received was 41 significantly exceeding the plan. The equipment was provided as planned. According to the results of questionnaire survey and interview to the related persons of ICTTI, there was no problem in the quantity and quality of inputs provided by the Japanese side.

3.3.1.2 Project Cost

As shown above, the total project cost was 746 million yen in contrast to 310 million yen in the plan. The main reason why the total cost went far beyond the planned one was the extension of project period. The project was extended for two years and it brought about a net increase in the total cost. Other reasons for the cost increase were 1) significant increase of trainees received in Japan to 41 from 12 in the

plan, 2) additional dispatch of experts associated with the additional offering of Short Module Courses, and 3) additional financial assistance provided for the restoration of damaged part of ICTTI buildings, etc. due to the severe Cyclone Nargis in 2008.

Regarding the increase of trainees received, despite the proposal by experts to select trainees depending on their performance, the Myanmar side insisted selecting trainees taking also into account their ranks among counterparts and other factors. As a result, the trainees covered only some of counterpart members in the original plan which caused a feeling of unfairness among the members over the selection of trainees and reduced the motivation among them. In the aftermath all the members participated in the training in Japan since the effectiveness of training was well acknowledged by JICA experts. This resulted in significant increase in the number of trainees received.

Thus the project cost is significantly higher than the planned one (over 150%).

3.3.1.3 Period of Cooperation

While the outputs and Project Purpose were implemented almost as planned showing a reasonable achievement in relevance, effectiveness, efficiency and impact at the time of the first Terminal Evaluation conducted in September 2009, only the achievement of sustainability was slightly low. The project was extended for two years to secure the better sustainability for the future and the following five additional activities were added to implement during the extension period without changing the contents of the project outputs.

- To introduce short module courses at ICTTI
- To implement seminars for external participants
- To provide training support for lecturers of computer universities
- To implement a follow-up and support activities for ICTTI graduates
- To provide support for improvement of the capacity of the management of ICTTI

Since all the above activities were fulfilled during the extension period and the sustainability of the project was considered to be favorable as described herein below, it is observed that these activities somewhat contributed to the favorable sustainability. However, the necessity to extend the project period for two years was considered to be low since both Outputs and Project Purpose had mostly been achieved within the original project period.

Thus the actual period of cooperation was significantly longer than the planned one in the result (over 150%).

As explained above, both the project cost and project period significantly exceeded the plan. Therefore, efficiency of the project is low.

3.4 Sustainability (Rating: ③)

The objective of the project is to newly establish ICTTI as the practice-oriented ICT training institute and continuously produce high quality graduates from the training courses of ICTTI, thereby the project aims to strengthen the education capacity of computer universities in Myanmar as well as to provide high quality ICT personnel to the ICT industry. As described in the paragraph of “effectiveness and impact” above, ICTTI is continuously providing training courses after the project at the same level of volume and quality as those during the project period and constantly producing high quality graduates of the courses. As a result, sustainability of the intended effects of the project was confirmed at the time of ex-post evaluation.

Factors that enabled such sustainability of the effects and the perspectives necessary to further support such sustainability in future will be discussed in the policy and institutional, organizational, technical and financial aspects in this section.

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

According to the questionnaire survey and interview with officials of MOST, the Government of Myanmar still supports the “ICT Master Plan” (2011-2015) and the development of ICT sector, including promotion of e-government, is continuously placed as one of the priority areas in Myanmar. ICT human resources development including strengthening of ICT education is supported by the Government of Myanmar as of ex-post evaluation. MOST has conducted evaluation research on the current ICT Master Plan as of ex-post evaluation, and based on the results of the research, MOST plans to determine the policy and contents of the next-term Master Plan.

As the specific examples of strengthening of ICT education, the new school called “Center of Excellence” is established as of 2012 as a branch campus of UCSY with the aim of serving as an educational center to build up the future ICT elites and to accept top enrolled students of UCSY. In addition, the Myanmar government intends to use the training courses at ICTTI continuously as important educational tools to develop ICT human resources and plans to establish a new course at ICTTI that provides training in relation to e-government for officials of government organizations and agencies in near future.

The policy and institution for ICT human resources development and strengthening ICT education are continuously implemented without change after the project.

3.4.2 Organizational Aspects of the Implementing Agency for the Sustainability of Project Effects

Just before the project ended in September 2011, ICTTI was shifted from under

UCSY to under the Center of Information and Communication Technology Training (CICTT)¹³. As of the ex-post evaluation, CICTT is directly under the jurisdiction of MOST and has managed another ICT-specified training institute named “India-Myanmar Center for Enhancement of Information Technology Skills (IMCEITS)” established in 2008 by the Indian fund. While the Center Director and nine administrative staff of CICTT are currently in charge of management of both ICTTI and IMCEITS, lecturers in charge of training courses are different each other¹⁴. 23 lecturers are currently engaged in the class of each training course at ICTTI at the time of ex-post evaluation and this number of lecturers is considered to be enough to conduct the present training courses.

According to the results of questionnaire survey and interview with the Center Director of CICTT, the operational structure of CICTT with 10 staff including the Center Director was working well without problems and in the new structure under CICTT, ICTTI can now directly communicate with and request to MOST as necessary, different from during the project period when the requests were not directly made to MOST but through UCSY. In addition, while the ICTTI lecturers were required to provide class at UCSY during the project period and it caused a heavy burden for them, they can now concentrate on the class of ICTTI. In this regard, organizational structure of ICTTI has been improved from the one during the project period.

Management and maintenance of machinery and equipment are carried out in the same way as in the project period. The ICTTI lecturers are responsible for updating software and the system administrator is in charge of the maintenance of the hardware in an appropriate manner in accordance with the management schedule specified in the “ICTTI Future Management Plan.” Thus the maintenance system is also working well without problems.

In addition, interaction between ICTTI and private ICT companies became active after the project that was prompted by the shift to civilian rule implemented in March 2011. As a result, technical and physical support are actively provided from private companies to ICTTI and employment opportunities for the graduates of the training courses and chances of information collection on recent trend of ICT industry are increasing. Thus the environment that surrounded ICTTI got better than that during the project period.

Judging from what described above, the organizational structure necessary for sustaining the effects produced by the project is considered to be fully established.

¹³ As part of the education reform in Myanmar, while all computer universities sifted to under the Ministry of Education in April 2015, CICTT is still under MOST.

¹⁴ According to the Center Director of CICTT, a new institute is planned to be established under CICTT in addition to ICTTI and IMCEITS in FY2015, which is based on the research and development of ICT.

3.4.3 Technical Aspects of the Implementing Agency for the Sustainability of Project Effects

According to the result of questionnaire survey and interview to the ICTTI lecturers, the software, textbooks and contents of final examinations, etc. used in the training courses have been updated by the ICTTI lecturers as necessary based on the manual for revision. The update of software has been also operated by the lecturers and according to the result of interview to them, they do not have special problems in updating them.

Regarding the technical aspect of ICTTI lecturers, 13 out of 23 lecturers at the time of ex-post evaluation had belonged to ICTTI during the project period. The newly assigned lecturers are all selected from the graduates of ICTTI training courses based on stringent criteria and all the lecturers at ICTTI are the quality personnel. The technical transfer from the existing lecturers to newly assigned ones has been conducted smoothly based on the ‘Competency-Based Training,’ which was adopted as the useful method of technical transfer in the project.

“Mobile Phone System Development” course was the only course that has been newly introduced after the project. This was not due to technical reasons but mainly due to the fact that the priority was placed on the expansion of the capacity of class of the existing training courses to respond to the number of applicants for the existing training courses of ICTTI is more than doubled of the capacity. During the project period, there were 2 classes each for Software Development Course and Network Development Course and after the project 1 class was added to Network Development Course and the course currently consists of 3 classes.

Thus it is considered that there is no particular problem in terms of technical aspect in sustaining produced effects after the project.

3.4.4 Financial Aspects of the Implementing Agency for the Sustainability of Project Effects

According to the results of questionnaire survey and interview with the Center Director of CICTT, all the budget of ICTTI directly disbursed from MOST and even training fees paid from general trainees go to the public treasury of MOST.

The following table shows the annual budget and expenditure of CICTT (including both ICTTI and IMCEITS).

Table 10: Annual Budget and Expenditure of CICTT¹⁵Fiscal years: April – March, Unit: Myanmar Kyat¹⁶

	FY2012/13	FY2013/14	FY2014/15	FY2015/16
Budget	36,169,900	98,351,000	109,648,474	109,648,474
Expenditure	127,210,750	384,028,660	911,544,644	Not available yet

<Source> Reference provided by CICTT

As shown in the table above, the expenditure amount significantly exceeds the budget amount every fiscal year and this phenomenon is not unusual in the government organizations of Myanmar. The annual budget allocated to CICTT from MOST includes only the expense items of personal expense, utility expense and supplies expenses. The expenses that additionally incur such as machinery and equipment expenses are not included in the budget but included only in the expenditure. After an application for machinery and equipment expenses is filed to MOST through CICTT, the equivalent amount is disbursed. As shown above, both annual amounts of budget and expenditure at CICTT have been increasing year by year and such increase is only the case among the government organizations. In addition to the budget disbursement from the ministry, efforts are made to obtain external support, for example, grant of scholarship to the trainees and projectors provided free of charge from the related ICT companies. According to the Center Director of CICTT, current amount of regular and supplementary budgets disbursed from MOST for ICTTI is enough to maintain the training courses and there has not been any financial problem.

Most of the machinery and equipment provided by the project are working normally without problems after more than 8-year use. However, some of them such as computers, projectors, UPS etc. are old and their failure rate is high. Failed equipment is repaired if possible for continual use and old computers and projectors the unit prices of which are relatively inexpensive have been replaced with new ones using supplementary budget from MOST. In FY2015 and FY2016, it is planned to further replace about 200 units of slow computers used at ICTTI and about 120 units at IMCEITS with new ones using the supplementary budget from MOST. However, the UPS for each classroom is left under trouble though the UPS for the server PC has been replaced with new one by senior volunteers dispatched from JICA. Supplementary budget for UPS has not been smoothly approved for disbursement partly as it is expensive. The above is not considered a priority issue since the training courses can be run without it and the impact on the overall operation of the project is small.

Thus there is no particular problem in terms of financial aspect in sustaining produced

¹⁵ As for the budget and expenditure before FY2012/13, the budget for ICTTI had been disbursed from UCSY and the data was not available at the ex-post evaluation.

¹⁶ 1 Kyat = approx. 0.11 Japanese yen (based on the exchange rate as of March 2015)

effects after the project.

3.4.5 Demand of Practical ICT Training in Myanmar

Currently the number of applicants for the training courses of ICTTI keeps more than doubled every batch as described above. Besides, the number of ICT companies including both local and foreign-financed ones is also on the increase in Myanmar since the transition to civilian rule in 2011. According to the Myanmar Computer Federation, the current number of fellow members of the Myanmar Computer Industry Association is 894 (as of December 2014), significantly increased from 301 as of October 2011 and 275 as of October 2010. If included non-member companies, the increasing ratio of the entire number of ICT companies is even higher.

The following table shows the number of ICT companies categorized by the business type among the fellow members of Association.

Table 11: Number of ICT Companies Categorized by the Business Type

Type of Business	Number of Companies as of 2011	Number of Companies as of 2014
Hardware Sales & Service	134	448
Software	43	113
Mobile Sales & Service	-	99
Education & Training	55	90
Web & Internet Services	6	52
Multimedia Services	-	47
ICT Services	-	43
Telecommunication	-	2
Others	63	-
Total	301	894

<Source> Reference provided by the Myanmar Computer Federation

Note: The definitions of each category of “Type of Business” in 2011 and 2014 are not the same.

Due to the rapid increase of the ICT businesses, demand for ICT human resources is also increasing. According to officials of the Myanmar Computer Federation, demand in the industry for ICT personnel trained and equipped with practical skills is very high. In addition, as described above, MOST is considering opening a new course related to e-government at ICTTI to train government officers for the promotion of e-government which is one of the policies of the Government of Myanmar. It is therefore highly prospected that the trained ICT human resources will be much in demand in Myanmar for some time to come as well as ICTTI will continuously be the good supply source of skillful ICT human resources supported by a stable demand from both industry and public organizations.

As explained above, no major problems have been observed in the policy background and the organizational, technical, financial aspects of the implementing agency. Therefore, sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of this project is to newly establish ICTTI as a practice-oriented ICT training institute in Yangon, Myanmar and to continuously produce high-quality graduates from the training courses developed at ICTTI, thereby aiming at enhancing educational capacity of computer universities in Myanmar as well as providing high-quality human resources to the ICT industry in the future.

The relevance for implementing this project is rated high since it is highly consistent with the Myanmar's development plan and development needs, as well as Japan's ODA policy. The practice-oriented training courses of Software Development, Network Development and Short Modules are developed and implemented at ICTTI and a total of 1,963 graduates of training courses have been produced as of the ex-post evaluation, including 951 graduates during the project period as well as 1,012 graduates from the project completion to the time of ex-post evaluation, leading to a rise in the level of ICT human resources in Myanmar. Of the trainees of ICTTI training courses, the lecturers of computer universities have improved their teaching skills as well as the general trainees successfully have obtained employment at ICT companies and they contribute to enhancing educational capacity of computer universities as well as to providing high-quality human resources to the ICT industry. The project therefore has fulfilled its desired effects and has produced certain effects expected to be produced in the future. While the period and cost of the project has exceeded the planned ones, the training courses of ICTTI have been continuously implemented smoothly and the effects made by the project are highly sustainable.

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

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

The machinery and equipment provided by the project are old enough now as 8 years have passed since they were installed. Especially some of computers, projectors and UPS have troubles due to their oldness and ICTTI has replaced old computers and projectors within the limits of supplementary budget from MOST since their unit cost is rather inexpensive compared to UPS. While the UPS for the main server of ICTTI have been replaced to new one by the JICA's assistance at the dispatch of senior volunteers

after the project, the UPS for each classroom is still under trouble. This is because the supplementary budget for UPS has not been smoothly approved for disbursement partly as UPS is very expensive and mainly it is not considered a priority issue since its impact on the implementation of training courses is small. Although courses are operational without normal function of UPS, power failure, if occurred, would cause considerable damage including loss of data on each computer. To avoid this risk, replacement of the UPS for each classroom is desirable. MOST is therefore expected to review preparation for the supplementary budget to purchase new UPS for each classroom in the next financial year in order to provide comfortable environment for implementing training courses.

4.2.2 Recommendations to JICA

JICA continuously provides assistances to ICTTI even after the project, such as accepting trainees from ICTTI lecturers and providing them with technical training on ICT at the Okinawa Training Center as well as dispatching IT specialized senior volunteers to ICTTI. While these assistances of soft aspect are useful and effective, it is revealed from the interview with officials of ICTTI that the issue of higher priority than technical assistance for them is replacement of old and deteriorated machinery and equipment in view of continuous implementation of the training courses. Making suggestions for budgeting effort on the Myanmar side is important as described in the recommendation to MOST. At the same time, it would contribute to sustaining the project effects more in ongoing assistance to ICTTI if JICA continuously supports ICTTI in the hardware aspect such as a part of assistance to replacement of UPS in addition to soft aspect as it did for the especially deteriorated UPS for the server through its assistance dispatching senior volunteers.

4.3 Lessons Learned

None