

Lao People's Democratic Republic

FY2016 Ex-Post Evaluation of Technical Cooperation Project

“Project on Human Resource Development in IT Service Industry at NUOL”

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0. Summary

This project was implemented at the National University of Laos (NUOL), with the aim of fostering human resources to meet the needs of the information technology (IT) service market. At the time of planning and completion of the project, promoting the IT industry and fostering human resources for this were important policy targets for the country. The need for advanced IT human resources in the industrial sector of the country has been also high, and consistent with the country's development policy and needs. At the time of planning, the advanced level of human resource development for strengthening private sector was a key area in Japanese assistance policy to support Laos Government. Therefore, the relevance of implementation of this project is high.

Most graduates of the IT Specialist Course (ITSC) at the Department of Computer Engineering and Information Technology (IT Department), Faculty of Engineering, NUOL have been employed by IT companies in the country, and have a good reputation in their places of work. Short courses have been conducted by IT Business Unit (ITBU) every year. These courses are implemented as seminars for IT industry human resources outside the university, utilizing a part of the IT related subjects (lecture modules) which consists of ITSC. This realizes the project objective of developing and enhancing IT human resources. Since this project also contributed to the development of the IT industry in Laos to some extent, which was its overall goal, effectiveness and impact are high. In addition, project cost and period were as planned. Therefore, efficiency of the project is also high.

The national policy and NUOL system to maintain the IT Practical Master Course (ITPM), which was established based on the ITSC, are expected to continue in the future. The operation system of the IT Department in the Faculty of Engineering at NUOL is appropriate, apart from the inadequate operation system of Lao IT Business Incubation Center (LIBIC). The techniques of lectures in ITPM have been maintained without any problem. There is a minor problem with financial operation, as no budget has been allocated to update equipment required for practical work in the ITPM network course. Therefore, the sustainability of effectiveness through implementation of this project is fair.

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

1. Project Description



Capital: Vientiane
(Project site)

Project Location

source: website of Ministry of Foreign Affairs of Japan



Building of IT Department, Faculty of Engineering where ITPM is implemented

1.1 Background

At the time of planning this project, while neighboring countries had taken measures to promote their economy through utilization of IT, the utilization and development of IT in Laos had been delayed, and there was concern that disparity between Laos and other countries had been widening in stimulating their economy through utilization of IT. Therefore, JICA Technical Cooperation Project, ‘The Upgrading Information Technology Education Project (Information Technology Bridging Course) (2003-2008)’ was implemented at NUOL, with the aim of higher diploma holders obtaining a Bachelor’s degree in a short time frame.

The IT Bridging Course, supported by the project to start as a Bachelor’s degree program at the Faculty of Engineering at NUOL, mainly aimed to train students as system administrators for operation and maintenance of IT systems. This course produced four batches of graduates by the completion of the project.

This project achieved its objective to a certain extent; however, there was a strong need to educate IT specialists who were highly skilled and ready to contribute to IT service industry development in the future. Therefore, educating IT specialists in the field of networks, databases, application development, project management. The project was implemented to fulfill this need.

1.2 Project Outline¹

Overall Goal		IT service industry is well-developed in the Lao PDR.
Project Purpose		Human resources are developed according to the IT service market through the ITSC by the IT Department of the Faculty of Engineering at the NUOL.
Output(s)	Output 1	ITSC are properly operated at the IT Department of the Faculty of Engineering, the NUOL.
	Output 2	The IT Business Unit (ITBU) is properly operated at the IT

¹ The Project Design Matrix (PDM) used in the ex-post evaluation was the revised final version dated June 2011.

		Department of the Faculty of Engineering, the NUOL.
	Output 3	Practical skills and teaching capabilities of lecturers in charge of the ITSC and master course that is planned to be established are enhanced in the field of the software engineering.
	Output 4	ITSC and master course ² , which is planned to be established, are ³ for ⁴ the practical software engineering and business skills are developed.
	Output 5	Collaboration among the government, industry and academia is reinforced.
Total cost (Japanese side)		345 million yen
Period of Cooperation		December 2008 to November 2013
Implementing Agency		National University of Laos (NUOL)
Other Relevant Agencies / Organizations		None
Supporting Agency/ Organization in Japan		None
Related Projects		<ul style="list-style-type: none"> ● JICA, “The Upgrading Information Technology Education Project (Information Technology Bridging Course)”(Technical cooperation project), April 2003 – March 2008 ● JICA, “ASEAN University Network/Southeast Asia Engineering Education Development Network (AUN/SEED Net) Project Phase3” (Technical cooperation project), 2013 - 2018⁵ ● JICA, “The Project on Capacity Building for Supporting Private Sector Development and Japanese Investment in Lao P.D.R. through LJI of NUOL” (Technical cooperation project), September 2014 –March 2019⁶ ● Asia Development Bank, “Second Strengthening Higher Education Project” (approved in September 2016)

² It is described as ‘IT Practical Master Course (ITPM) in Japanese version of this report. However, the evaluator put ‘master course’ which is used in PDM in English.

³ ‘are’ is not grammatically necessary, however, the evaluator put ‘master course’ which is used in PDM in English.

⁴ ‘mastering’ is described in Japanese version of this report. However, the evaluator did not put it as PDM in English.

⁵ AUN/SEED Net Phase 3 aims to support the development of a system for higher education and research through cooperation between the 14 supporting universities in Japan and a network of 26 member universities in 10 ASEAN countries, in order to strengthen cooperation among the member universities, industry, and the local community. NUOL is the only university in Laos to participate. (source: website of JICA, https://www.jica.go.jp/english/publications/j-world/c8h0vm000082pnre-att/1309_03.pdf, accessed on 25 February 2017).

⁶ To strengthen the capacity of the Lao-Japanese Center as a major objective, the Project supports implementation of a business course and strengthens the utilization of business networking and operation system for local business entrepreneurs and private companies (including Japanese companies) in Vientiane Capital and Savannakhet Province (source: website of JICA, https://www.jica.go.jp/english/our_work/types_of_assistance/tech/projects/j_center/laos.html accessed on 25 February 2017).

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement Status of Project Purpose at the Terminal Evaluation

An evaluation of ITSC graduates from their major places of employment was positive. Since 95% of the total 62 persons in the first and second batches of graduates found a job with the IT service market, and the number of trainees from the short-term course had increased steadily, it was concluded that the project purpose was mostly achieved.

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

Considering the number of graduates from ITPM three years after project completion, it was found at the time of the Terminal Evaluation that the possibility of this project changing the proportion of IT services in the GDP of Laos, and the percentage of IT service employees in the working population, was low and difficult to achieve the Overall Goal indicators.

1.3.3 Recommendations from the Terminal Evaluation

Recommendations at the time of the Terminal Evaluation and status of implementation at the time of the Ex-Post Evaluation are summarized as follows:

Table 1 Recommendations Provided at the Time of Terminal Evaluation and Status of Implementation at the Time of the Ex-Post Evaluation

Recommendations	Status of Implementation at the Time of the Ex-Post Evaluation
(1) Conduct systematic evaluation of overall program, including the curriculum, teaching materials, equipment and lecturers of ITPM and short-term courses for maintaining the quality of the IT courses	<p>Based on the regulations of the National University of Laos, the curriculum of Master's programs should be revised every five years.</p> <p>As a part of curriculum evaluation activities in the IT Department, the survey on the industrial sector's needs and opinions from graduates was conducted in 2016. The IT Department collected information for updating the ITPM curriculum - this is planned in 2017.</p> <p>Evaluation and revision of teaching materials are conducted based on lecturers' observations of their students' reactions. The lecturers assure that the quality of the course is secured. The meaning of 'systematic evaluation of overall program' is unclear; however, a questionnaire to the students who joined the course during the implementation the project is not required to conduct in the regulations of Master's programs. Therefore, it has not been implemented after</p>

Recommendations	Status of Implementation at the Time of the Ex-Post Evaluation
	completion of the project.
(2) Update IT knowledge of lecturers to reflect the latest needs of the IT industry	After completion of the project, the lecturers have continued to update their IT knowledge by themselves, and some of them could pass the IT technology related commercially certified examination.
(3) Monitor change in enrollment rate of ITPM and make the prerequisites less strict if needed	The number of enrolled ITPM students has been monitored by the IT Department. However, the requirements for applications have not been relaxed to ensure the quality of students.
(4) Monitor management capacity of ITBU continuously.	IT Department confirms the implementation status of the short-term course from ITBU, and continuously monitors through a verbal report of the result of questionnaire responded by the trainees.

2. Outline of the Evaluation Study

2.1 External Evaluator

Kazuko Shirai, Kaihatsu Management Consulting, Inc.

2.2 Duration of Evaluation Study

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

Duration of the Study: July, 2016 – July, 2017

Duration of the Field Study: October 30, 2016 – November 15, 2016 and
January 22, 2017 – January 25, 2017

2.3 Constraints during the Evaluation Study

Some data for indicators to evaluate the Overall Goal and part of the indicators for Output, which were set in the PDM of the Project, could not be obtained at the time of project completion and ex-post evaluation. Some data required from the time of establishing ITSC and ITPM was also not available; this meant the ex-post evaluator could not measure the status of improvement at the time of project completion and ex-post evaluation. Therefore, for those indicators that lack quantitative information, the ex-post evaluator conducted the evaluation using quantitative and qualitative data from interviews and a beneficiary survey as supplementary information.

3. Results of the Evaluation (Overall Rating: A⁷)

3.1 Relevance (Rating:③⁸)

3.1.1 Consistency with the Development Plan of Laos

In the 6th National Social-Economic Development Plan-NSEDP (2006-2010), which was the Mid- and Long-Term National Development Plan of Laos at the time of planning of this project, the IT sector was a high priority, and one of the important strategies for investment and development. At the time of completion of the project, the promotion of the IT service industry and IT sector was also placed as a key policy in the 7th National Social Economic Development Plan (2011-2015). The ICT⁹ National Policy (2009), which was the policy for the ICT sector at the time of project planning and completion, envisaged that the ICT service industry and human resource development were key guidelines.

Therefore, the objective of the Project is consistent with Laos national development plan at the time of project planning and project completion.

3.1.2 Consistency with the Development Needs of Laos

At the time of planning the Project, there was high demand from Laos IT industry for training IT human resources to obtain advanced skills in database, network and application development. However, most people working in the IT industry had studied abroad, and the existing education system could not meet the demand.¹⁰ Even at the time of project completion, there were few Laotian IT engineers. There was a need to secure IT human resources with advanced skills to enhance market competitiveness in the IT industry.¹¹ The Project was in line with Laos development needs at the time of project planning and completion.

3.1.3 Consistency with Japan's ODA Policy

The 'Country Assistance Program to Laos' (September 2006) of the Japanese Ministry of Foreign Affairs at the time of planning emphasized human resource development at a higher level to strengthen the private sector as a key area. Therefore, the objective of this project, to develop IT human resources at a higher level for the IT industry, was in line with Japanese assistance policy.

⁷ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁸ ③ : High, ② : Fair, ① : Low

⁹ ICT stands for 'Information and Communication Technology', and is almost same meaning as IT (Information Technology). There are some cases that IT is defined as computer related technology, whereas ICT focuses more on utilization of computer technology. ICT, replaced by IT, has been widely used in Japan as well since ICT has become internationally familiarized (source: ASCII Digital Glossary <http://yougo.ascii.jp/caltar/ICT> accessed on 28 March, 2017)

¹⁰ Documents provided by of JICA

¹¹ Documents provided by of JICA

3.1.4 Appropriateness of Project Planning and Approach

The revision of the PDM during implementation of this project was appropriate. The Project applied a variety of approaches, including: 1) prioritizing capacity-building of lecturers at the IT Department, since there was a need for significant improvement in the capacity of lecturers specially on programing - the course started after strengthening the lecturers' capacity; 2) developing curricula after taking into account opinions from government and private sector; and 3) setting up fieldwork for practical training. These approaches were suitable to promote the education of IT human resources with advanced and practical skills, and to meet the needs of the government and private sector, which were the project objectives (Column 2 as reference).

In light of the above, the implementation of the Project was sufficiently consistent with Laos development policy, development needs and Japan's ODA policy, and the project approach was also in line with the needs. Therefore, the relevance of the project is high.

3.2 Effectiveness and Impact (Rating: ③)

3.2.1 Effectiveness

The Project aimed to develop human resources to meet the needs of the IT industry by ITSC, which later became ITPM, in the IT Department, Faculty of Engineering, NUOL. In the ITSC/ITPM, under the instructions of lecturers, several students formed a team for fieldwork, which was implemented with companies to provide students with an opportunity to obtain practical knowledge and skills. In addition, by setting up ITBU under the umbrella of the IT Department, the IT Department has provided part of the ITSC/ITPM course modules as a short-term course to IT industrial human resources outside the university. LIBIC also supported resident companies in start-up, including business planning. There was a public-private partnership with IT service companies and government organizations, through participation in the Curriculum Board Committee, dispatch of lecturers, etc. specially in the time of ITSC. The relationship of organizations is shown in Figure 1.

Indicator for Output 1	Status of Achievement of the Indicators at the time of Project Completion
necessary for effective implementation of ¹³ ITSC and ITBU are developed, and approved by the head of IT department. < Achieved >	
<u>Indicator 2</u> : The recruitment, selection, evaluation of learning results, and graduation approval of students are appropriately conducted. < Achieved >	Recruitment and selection of students, evaluation of learning results, and graduation approval in ITSC/ITPM had been conducted in accordance with NUOL internal standards. ¹⁶

< Output 2 >

Output 2 was “The IT Business Unit (ITBU) is properly operated at the IT Department of the Faculty of Engineering, the NUOL”. As seen in Table 3, Indicator 1 (proper project operation) and Indicator 3 (number of occupiers of incubator booth) had been achieved, whereas Indicator 2 (system development with receiving fee) was not achieved.

Table 3 Achievement of Output 2

Indicator for Output 2	Status of Achievement of the Indicators at the time of Project Completion
<u>Indicator 1</u> : The operation projects are ¹⁷ appropriately managed according to the plan of the ITBU, whose results are reported to and approved by the Head of IT department. < Almost achieved >	ITBU had been properly operated in line with the project plan and the status of operational management had been reported and approved by the Head of IT Department. The operational management had improved, particularly after ITBU manager was changed in 2012. Although the results of questionnaire survey targeted the trainees of short-term courses run by ITBU were

¹³ It is described as ‘operational guidelines of ITSC and ITBU’ in Japanese version of this report. However, the evaluator put ‘and others necessary for effective implementation of ITSC and ITBU’ as described in PDM in English.

¹⁶ According to an interview with the former Japanese expert, the Project aimed to establish the ITSC. The project produced two batches of ITSC graduates by project completion. The ITPM course was developed based on the ITSC curriculum to be a Master’s program, and it was opened during implementation of this project (January 2013). ITSC was dissolved after establishment of the ITPM. The first batch of graduates from ITPM was produced after completion of the project (September 2014). (Study period in ITPM is two years. However, the number of years of study for the first batch only was reduced due to a delay in the starting period.)

¹⁷ The operation project is described as singular in main text in this report, however, the evaluator indicated it as plural projects, as described in PDM in English.

Indicator for Output 2	Status of Achievement of the Indicators at the time of Project Completion
	not quantitatively summarized nor analyzed, the suggestions on teaching methods of lecturers had been useful for course improvement. ¹⁸
<p><u>Indicator 2</u> : The ITBU comes to be able to receive works on the system development from the government and industry for profits.</p> <p>< Not achieved ></p>	<p>At the time of project completion, there was no record of receiving orders of a fee-based system development. The key operation of ITBU was implementation of the short-term course. Fee-based system development was considered as a secondary objective.</p> <p>When undertaking a fee-based work for system development, lecturers have to take a huge responsibility until completion of the work. In addition, they were very busy in implementing numerous short-term courses, which provided them with secondary income. Therefore, it was not necessary for them to take fee-based business which is why this indicator was not achieved.</p>
<p><u>Indicator 3</u> : More than three¹⁹ incubation booths at ITBU²⁰ are occupied during the Project period.²¹</p> <p>< Achieved ></p>	<p>At the time of project completion, three booths were occupied by a restaurant search site operating company, web portal service company, and electronic free paper publication company.²²</p>

Fee-based system development was not regarded as a priority for ITBU, and no orders were confirmed. However, the short-term course, which was the major task of ITBU, was largely properly operated, the evaluation of ITBU's short-term course by trainees had been used for course improvement, and the incubation booths were utilized. Therefore, Output 2 was achieved to some extent.

¹⁸ Interview with the former Japanese expert

¹⁹ 'More than three' means at least four in English, while the project meant to achieve at least three (and more). The evaluator put 'more than three' as described in PDM in English.

²⁰ 'at ITBU' is not described in the Japanese version of this report. However, the evaluator used it as described in PDM in English.

²¹ Ditto.

²² Interview with the ITBU manager.

< Output 3 >

Output 3 was “Practical skills and teaching capabilities of lecturers in charge of the ITSC and master course that is planned to be established are enhanced in the field of the software engineering”. The achievement status of each indicator is shown in Table 4.

Table 4 Achievement of Output 3

Indicator of Output3	Status of Achievement of the Indicators at the time of Project Completion
<p><u>Indicator 1</u>: Satisfaction ratings (evaluation) of the lecturers are enhanced by students and trainees²³</p> <p>< Almost achieved ></p>	<p>At the time of project completion, the survey of satisfaction on lecturer performance (including lecturer evaluation) had been conducted by ITBU and the project. Survey results had been orally passed from the Japanese expert to the Head of Department, who had provided the lecturers with necessary instruction.²⁴</p> <p>In the beneficiary survey²⁵ at the time of the ex-post evaluation, an average of respective responses²⁶ showed that more than 90% of students (graduates of ITSC1, ITSC2) were ‘very satisfied’ or ‘satisfied’ with the lecturers’ performance. Based on this result, satisfactory rate at the completion of the project could be assumed high.</p>
<p><u>Indicator 2</u>: The number of the</p>	<p>This is an indicator for the number of success of fee-based</p>

²³ The PDM in Japanese language stated this indicator as “Satisfaction ratings (evaluation) by *trainees*”, although PDM in English states it as “satisfaction by students and *trainees*” as in Table 4. The beneficiary survey for the students and the graduates was conducted in the ex-post evaluation for studying the status of achievement of this indicator.

²⁴ Interview with the ITBU manager and the Japanese expert.

²⁵ Overview of beneficiary survey is shown below.

(1) Survey Method: distribution of questionnaire and collection, and interviews based on questionnaire.

(2) Number of target survey persons and number of valid answer:

		Questionnaire (Including Interview)			Interview results
		Total No.	Sent	Collected	
Students		70	60*	38	10
Graduates	Total number	168	114*	41	10
	(Savannakhet**)	(5)		(4)	(4)
Lecturers		12		6	6
Organizations/ Companies	Employing graduates		4	1	1
	Not employing graduates		13	5	5

*The questionnaire was distributed to 114 graduates and 60 current students out of a total of 168 graduates and 70 current students), whose email address were available.

**The ex-post evaluator conducted interviews in Savannakhet to observe differences in graduates who live in Vientiane city and local areas. The interviewees were all lecturers in the IT sector at National University of Savannakhet.

²⁶ There were four questions for evaluation of lecturers (1) Punctuality, (2) Scope of lecture, (3) appropriate explanation, and (4) appropriate instruction content.

Indicator of Output3	Status of Achievement of the Indicators at the time of Project Completion
success of the system development in the ITBU is increased. < not achieved >	system development. As indicated in Indicator 2 of the Output 2, there is no successful example ²⁷ due to no recorded fee-based system development.

Output 3 aimed to strengthen teaching capacity of lecturers. In the survey of lecturers of ITPM at the time of the ex-post evaluation, it was found that lecturers had continued to improve their skills, by aiming at passing various commercial examinations of relevant IT techniques from the project implementing period to the time of ex-post evaluation (Table5 and Column 1 as reference). Every kind of effort by lecturers to pass examinations is regarded as very effective in improving their practical skills and teaching capacity. Strengthening the instruction capacity of lecturers has been realized continuously.

Although there is no record or successful example of achievement of fee-based system development, the beneficiary survey revealed that the satisfaction rate of students for the lecturers was mostly high. Therefore, it can be regarded that the capacity of lecturers was strengthened to the expected level, and Output 3 was mostly achieved.

Table 5 Number of Lecturers who Passed a Commercial Examination and Certificate as Instructor (at the Time of Completion of the Project)

Commercial Certificate	(person)	
	Lecturer of NUOL	Visiting Lecturer
Oracle SQL 11g	4	3
Oracle OCA 10g	1	1
Oracle OCJP (Java)	2	1
Cisco CCNA4.0	3	0
Vmware ICM	1	0
Microsoft MTA:Software Development Fundamental	8	0
Microsoft MTA:Windows Server Administration Fundamental	3	0
Instructors' Certificate		
Cisco CCNA Instructor	5	5

Source : IT Department of the Faculty of Engineering, the NUOL

²⁷ According to the Head of IT Department.

Column 1 : Improving Practical and Teaching Skills of Lecturers

The project encouraged lecturers to obtain world standard qualifications to objectively show the level of instruction and practical skills in software engineering of ITSC lecturers to the government and private persons concerned with the IT sector, and to standardize the level of lecturers that should be maintained after project completion.

Up to the time of project completion, 10 lecturers (including visiting lecturers) obtained eight international standard qualifications such as Oracle SQL 11g, etc. It should be noted that one of them passed the VMware Install, Configure, Manage (ICM) examination, which requires advanced knowledge and techniques.²⁸

According to interviews of lecturers at the time of the ex-post evaluation, it was found that, the capacity of lecturers had improved through preparing for obtaining the qualifications and passing the examinations; and as a result, they were able to teach as a specialist of the relevant subject of which obtained a qualification.

Lecturers also pointed out that they could understand the relevant techniques in depth, and the range of instruction content was widened by the effort needed to understand English materials and prepare examples in Lao language. More students wanted to attend classes of lecturers with qualifications, and the lecturers' qualifications received positive evaluation from students.

In an interview in the ex-post evaluation, Lao ICT Commerce Association (LICA) which conducted the IT market survey in the private sector in this project, also commented in the interview that instruction by lecturers with specific technical standards was important to maintain the quality of education.

Besides obtaining qualifications, and designing and setting up a network for the IT Department's building, the lecturers also received an order from outside (free of charge) to develop a software program - a sketch map program for clearance of an unexploded bomb for UXO Lao²⁹ - with support from a Japanese expert. A lecturer worked as a project manager in

²⁸ For example, it costs about 500,000 yen for 4-5 days' training on the VM ware ICM program. (source: VM Ware Inc. website http://campaign.vmware.com/imgs/apac/jp_dwn/PDF/vmw-edu-cal-jp.pdf?elqTrackId=028421426a1c41c8a9b4c7ab43c98726&elqaid=199&elqat=2 accessed on 27 March, 2017). The lecturer passed the examination studying on his own, without taking this training (interview with Head of IT Department).

²⁹ Lao National Unexploded Ordnance Programme was established in February 1996 as a governmental organization which specializes in mine clearing under the Ministry of Labour and Social Welfare. UXO Lao's main tasks are interviews with neighboring residents, elaborate survey and information collection regarding location of mines based on the military plan in the past which was provided by US forces. Through these tasks, UXO Lao aims to decrease casualties due to unexploded bombs and to increase land that people of Laos can utilize for social and economic development and increase in food production.(source: UXO Lao Website <http://www.uxolao.org/index.php/en/organization/background> accessed on 27 March, 2017) The Japanese Government supports South-South cooperation between Laos and Cambodia on the unexploded bomb/mine sector and technical transfer in bomb disposal by providing Bachelor course and exercise to UXO Lao, and reconstruction of the Training Center for bomb disposal (source: The Ministry of Foreign Affairs of Japan website

these tasks, and this experience was effective for instruction to students and improving the capacity of the lecturer.

Instruction on software techniques to protect from viruses and cyber-attack in the short-term course for the National Computer Emergency Response Team was realized because of the enhancement of lecturers' capacity.

<Output 4>

Output 4 was "ITSC and master course, which is planned to be established, for the practical software engineering and business skills are developed". As summarized in Table 6, three indicators had been achieved completely.

Table 6 Achievement of Output 4

Indicators for Output 4	Status of Achievement of the Indicators at the time of Project Completion
<u>Indicator 1</u> : Satisfaction ratings (evaluation) of the overall ITSC are enhanced by students and trainees. < Achieved >	Satisfaction for overall ITSC by students in small groups of interview survey for the evaluation at the time of completion was high, with an average of 4.5 in five evaluation ranks. Questionnaires showed 95% on the average of the 15 ITSC graduates who responded to the beneficiary survey at the time of ex-post evaluation evaluated as 'very satisfied' or 'satisfied' with the whole course ³⁰ .
<u>Indicator 2</u> : The curriculums, syllabi, and learning materials are regularly updated. < Achieved >	At the time of transition from ITSC to ITPM, the curriculum had been revised. Afterwards, a private academic program ³¹ was utilized for the curriculum, which was renewed as a regular mechanism. Furthermore, under guidance from the Japanese expert, ITSC lecturers updated the syllabus, wrote a material, and obtained necessary techniques for development and updating of the syllabus and materials for ITPM course.
<u>Indicator 3</u> : The curriculum	From 2010 until 2012 the Curriculum Board was held

http://www.mofa.go.jp/mofaj/gaiko/oda/data/zyoukyou/ngo_m/e_asia/laos/141112.html accessed on 27 March, 2017).

³⁰ Questions were: (1) difficulty of the subjects; (2) curriculum suitability; (3) satisfaction with personal computer (PC), software, references used in the course; (4) whether capacity and knowledge had been improved. Overview of the whole beneficiary survey is given in footnote 25.

³¹ For example, the Project introduced ITSC a mechanism in which student can practice by web-based curricula that correspond to world standard qualification examination, on-line test, using real equipment/machine through 'Cisco-networking Academy' of Cisco System, Inc., which develops network systems. In addition, lecturers have an opportunity to continue education and establish a community with their peers using this mechanism.

Indicators for Output 4	Status of Achievement of the Indicators at the time of Project Completion
board is annually held with the external knowledgeable persons (from the government and industry). < Achieved >	every year with participation of relevant government agencies and private companies, and ITPM curricula were established. The Curriculum Board meeting was not organized in 2013 since it was immediately after establishment of the curriculum.

As indicated in Table 6, the course was highly evaluated by ITSC students at that time, and their satisfaction rate was high.

ITPM commenced as a continuation of ITSC, and a system was established so that the curriculum of ITPM would be automatically updated. Course lecturers could obtain necessary skills for development and revision of syllabus and materials, receiving guidance from Japanese experts. The Curriculum Board was conducted regularly the ITPM curriculum was established with participation of public and private sectors.

Therefore, it is regarded that the status of development of ITSC and ITPM, which was planned to be established, reached the expected level. It can be said that Output 4 was achieved.

<Output 5>

Output 5 was “Collaboration among the government, industry and academia is reinforced”. As summarized in Table 7, two indicators had been achieved at the time of project completion and an exchange with industry and government staff was realized, and it can be concluded that the Output was achieved.

Table 7 Achievement of Output 5

Indicators for Output 5	Status of Achievement of the Indicators at the time of Project Completion
<u>Indicator 1</u> : Joint seminars among the government, industry, and academia are annually held. < Achieved >	Joint seminars were organized with industry, academia and government every year until 2013, the time of project completion
<u>Indicator 2</u> : Lectures by the visiting lecturers from the government and industry are delivered at a constant rate. < Achieved >	By the time of project completion, five visiting lecturers from industry and academic institutions conducted lectures for ITSC/ITPM and 69 short-term courses.

3.2.1.2 Achievement of Project Purpose

Project Purpose was “Human resources are developed according to the IT service market through the ITSC by the IT Department of the Faculty of Engineering at the NUOL”. Level of achievement of the indicators is summarized in Table 8.

Table 8 Achievement of Project Purpose

Indicator	Actual						
<p><u>Indicator 1:</u> Evaluation of graduates and trainees working for the domestic IT service companies, government organizations, and IT user corporations is enhanced.</p> <p>< Achieved ></p>	<p>In the telephone interviews conducted by the Project in March 2013 with 11 major companies³² where ITSC graduates were employed, an evaluation of ITSC graduates by employer was 3.7 out of 5 ranks of evaluation.</p> <p>According to the former JICA expert, this project was highly evaluated at the time of project completion from the banks etc. which were the graduates’ major employers.</p> <p>Beneficiary survey at the time of ex-post evaluation revealed that all the ITSC graduates (15 persons) answered that the value of completion of the course was highly evaluated by their workplaces.</p> <p>In the interviews of companies employing many graduates conducted in the same survey,³³ there were comments such as ‘ITSC graduates are competitive with the persons who studied and came back from abroad such as Vietnam, Thailand, India, Malaysia in practical work’, and ‘Because of the contribution of ITSC graduates, the level of IT operation in the companies jumped. Practical techniques were applied in employment examinations which made the examination high level’. From these comments, the companies’ evaluation of graduates is regarded as very high.</p>						
<p><u>Indicator 2:</u> More than 80% of the graduates from ITSC will (re)start to work as the IT service engineers</p> <p>< Achieved ></p>	<p>As indicated in Table 9, at the time of project completion almost 100% of graduates could find employment in the IT industry.</p> <p>Table 9 Employment rate of graduates in IT service market</p> <table border="1" data-bbox="563 1615 1347 1715"> <thead> <tr> <th data-bbox="563 1615 719 1675">Year</th> <th data-bbox="719 1615 1042 1675">ITSC-1st batch (2010/11)</th> <th data-bbox="1042 1615 1347 1675">ITS-2nd batch (2011/12)</th> </tr> </thead> <tbody> <tr> <td data-bbox="563 1675 719 1715">No (%)</td> <td data-bbox="719 1675 1042 1715">34 (94%)</td> <td data-bbox="1042 1675 1347 1715">28 (96%)</td> </tr> </tbody> </table> <p>*Figures indicate the number of graduates, and figures in brackets</p>	Year	ITSC-1 st batch (2010/11)	ITS-2 nd batch (2011/12)	No (%)	34 (94%)	28 (96%)
Year	ITSC-1 st batch (2010/11)	ITS-2 nd batch (2011/12)					
No (%)	34 (94%)	28 (96%)					

³² 11 companies are private companies and public organizations with which 48 out of 59 graduates found employment.

³³ Interviews were conducted at Lao Development Bank (5 ITSC/ITPM graduates), BCEL (7 ITSC/ITPM graduates), Lao IT Development Co., Ltd (1 ITPM student), CP Laos Co., Ltd (1 ITPM graduate), 2 IT equipment sale/repair shops in Vientiane Capital and Savannakhet (no graduates work there). In order to confirm ITPM’s popularity, type of work of IT human resources, content of IT service and the need, a major sales/repair shop was selected for survey regardless of whether any graduates were employed there.

Indicator	Actual																					
	indicate employment rate in IT service market. Source : IT Department in the Faculty of Engineering, NUOL																					
<u>Indicator 3:</u> The number of trainees ³⁴ (attending the short -term course) of the postgraduate course ³⁵ is increased in the Lao PDR. < Achieved >	As revealed in Table 10, the total number of trainees ³⁶ of short-term courses at the time of project completion was 860 persons. The cumulative number of trainees for the same courses in Laos has increased every year. Table10 Number of short-term courses and trainees ³⁷ (person) <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Year</th> <th>No. of course</th> <th>No. of participants</th> </tr> </thead> <tbody> <tr> <td>2009</td> <td>1</td> <td>12</td> </tr> <tr> <td>2010</td> <td>15</td> <td>146</td> </tr> <tr> <td>2011</td> <td>18</td> <td>210</td> </tr> <tr> <td>2012</td> <td>26</td> <td>322</td> </tr> <tr> <td>2013</td> <td>18</td> <td>170</td> </tr> <tr> <td>total</td> <td>78</td> <td>860</td> </tr> </tbody> </table> Source : ITBU	Year	No. of course	No. of participants	2009	1	12	2010	15	146	2011	18	210	2012	26	322	2013	18	170	total	78	860
Year	No. of course	No. of participants																				
2009	1	12																				
2010	15	146																				
2011	18	210																				
2012	26	322																				
2013	18	170																				
total	78	860																				

As mentioned above, ITSC graduates were highly evaluated by the companies. The percentage of graduates finding a job in IT service companies exceeded the target, and the number of trainees on ITSC short-term courses increased. Three indicators of project purpose had been achieved. It can be regarded that human resource development to meet demand of IT service market through ITSC was realized as expected. Therefore, the project achieved its purpose.

3.2.2 Impact

3.2.2.1 Achievement of Overall Goal

The overall goal of the project was “IT service industry is well-developed in the Lao PDR”.

(1) Achievement of Overall Goal

Two indicators for the overall goal of this project were macro indicators. As shown in Table

³⁴ It is described as ‘ITSC (short-term course)’ in Japanese version of this report, however, the evaluator did not put ‘ITSC’ in accordance with PDM in English.

³⁵ There is no expression as ‘of the postgraduate course’ in Japanese version of this report, however, the evaluator put it in accordance with PDM in English.

³⁶ This project classified the trainees according to the following definitions: (a) Attendee: those attended more than 80%, but did not pass the final examination; (b) Disqualification: those attendance rate was 79 % or less than 79%; (c) Passer: Those attendance was above 80% and passed the final examination. The number of trainees in Table 10 is the total of (a)-(c).

³⁷ The number of trainees increased a lot in 2012 because the building of IT Department and short-term course was completed before that year. In addition to this, enrichment of equipment and training content were well known. The number of trainees decreased in 2013 because the lecturers were too busy, which limited the number of courses. IT Department seeks for a measure to increase its income without largely increasing the number of course. (Interview with the Head of IT Department)

11, at the time of the ex-post evaluation no existing data was available for utilization. Due to this, the status of achievement for the overall goal was not confirmed.

Table 11 Achievement of Overall Goal

Overall Goal	Indicators	Status of Achievement at the time of Project Completion
IT service industry is well-developed in the Lao PDR.	<u>Indicator 1</u> : The ratio of the IT services in the GDP is increased ³⁸ . < Achievement level is unknown due to lack of data >	GDP of Laos in 2013 was 11.18 billion USD ³⁹ . Growth rate was maintained about 7% during the past 10 years. ⁴⁰ There is no available data on the percentage of IT service industry in GDP. Therefore, the ex-post evaluator could not confirm the status of achievement of indicator.
	<u>Indicator 2</u> : The ratio of the people working for the domestic IT service industry in the working population is increased ⁴¹ . < Achievement level is unknown due to lack of data >	It is estimated that employment population of Laos in 2013 is about 3810,000 people ⁴² . There is no available data on the percentage of IT service employees. Therefore, status of achievement of indicator could not be confirmed.

As the Project only targeted NUOL for IT human resource development, the effect on macro indicators in Table 11 is limited. Therefore, even if there was available information that could be used for these indicators at the time of ex-post evaluation, it would be difficult to judge whether this project contributed to achievement or not.

Therefore, it could not say that the appropriate indicators were set up. On the other hand, through implementation of this project, the capacity of lecturers in IT Department, Faculty of Engineering, NUOL was improved and strengthened. In addition, ITSC and ITPM were established. ITBU which was established in IT Department has properly operated short-term courses, and numerous IT human resources have been produced every year. As mentioned above,

³⁸ There is no expression of 'is increased' in Japanese version of this report, however, the evaluator put it in accordance with PDM in English.

³⁹ Source: World Bank (<http://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=LA> accessed on 8 February 2017)

⁴⁰Source: CIA the World Factbook (<https://www.cia.gov/library/publications/the-world-factbook/geos/la.html> accessed on 7 February, 2017)

⁴¹ There is no expression of 'is increased' in Japanese version of this report, however, the evaluator put it in accordance with PDM in English.

⁴² Source: Japan Bank for International Cooperation 'Investment environment of Lao/July 2014' (http://www.jbic.go.jp/wp-content/uploads/page/2015/09/40674/inv_Lao191.pdf accessed on 7 February 2017)

an evaluation of ITSC/ ITPM course by trainees was mostly positive, and cooperation among private-academic-government was promoted by joint seminars and engagement of visiting professors from private and government sectors. Most ITSC graduates were employed in the IT industry and obtained significantly high evaluations from their workplaces. Short-term courses have taken place every year. These indicate that the project goal, strengthening and development of IT human resource, has been realized. The level of achievement of the overall goal could not be measured by the indicators due to no existing available data. Nevertheless, it can be said in this ex-post evaluation that the project contributed to the development of the IT service industry, which is the overall goal, for the following reasons. The ITPM course and short-term course continue to produce graduates. Almost 100% of graduates found jobs in IT-related companies or work in the IT-related division in organizations. The evaluation of graduates from their workplaces is very high. An improved level of IT-related operations in their companies and advanced scope of knowledge have been realized.

(2) Contribution of the Project to Achievement of Overall Goal

As mentioned above, the level of achievement of the overall goal could not be measured by the indicators. At the same time, several items that can be considered effects of the project were generated, continued and developed, and contributed to achievement of the overall goal to some extent. These have been confirmed in the ex-post evaluation as follows.

- The smooth establishment of the ITPM course can be cited as an impact of this project. At the time of planning of the project, NUOL planned to set up a Master's program in each Faculty, envisaging that it would establish the Master's course in the Faculty of Engineering. After developing the curriculum of ITSC established by the project, the ITPM curriculum was developed by the Curriculum Board that consists of IT Department's lecturers, government organizations, and private companies, and the ITPM was smoothly established. As a result, NUOL could establish the ITPM in January 2013 during implementation of the project, and received the first batch for ITPM at the same time.
- ITPM and short-term courses of ITBU have been maintained at the time of the ex-post evaluation. These courses produce a certain number of graduates every year. Applicants for short-term courses exceed the quota every year, and the number of enrollments to ITPM is stable. In addition, out of ITPM students (69 persons), 93% of 38 students in the beneficiary survey at the time of ex-post evaluation, evaluated 'very satisfied' or 'satisfied' on the lecturer performance.⁴³ Lecturers' practical skills and teaching competencies are

⁴³ The evaluation for the lecturers was conducted by setting four criteria, namely, (1)very satisfied, (2)satisfied, (3)middle and (4) no good.

well evaluated, since they continue to strive to pass commercial examinations as mentioned in Column 1.

- According to the beneficiary survey, 36 graduates, out of 37, who replied to the questions, worked in IT-related companies or working in the IT division in an organization.⁴⁴ The evaluation of these graduates by their workplaces was very high. They contribute to improving the scope of knowledge and upgrade the level of IT-related operations for their companies.⁴⁵
- The ITBU short-term course is maintained. From completion of the project until the time of ex-post evaluation, the accumulated total number of trainees on the courses was 1,330 persons, which shows that ITBU can receive large-scale order of training from outside.
- With the support of the project, IT Department, Faculty of Engineering, NUOL set up a test center that is able to conduct a Pearson Test of English Academy, a commercial software qualification.⁴⁶ At the time of the ex-post evaluation, ITBU has operated the implementation of this examination. The number of those taking the exam has increased year by year with a background that private companies are seeking a higher level of IT human resources. In addition to implementation of the short-term course, ITBU has been contributing to development of human resources for the industry development of IT field in Laos through implementation of the examination.

⁴⁴ Type of work of 36 ITSC/ITPM graduates as understood at the time of ex-post evaluation is shown below (multiple answers).

Job title	System Analyst	Network Engineer	Programmer	Web Programmer	Web Designer	IT Consultant	IT Trainer
No.	7	17	6	8	7	2	12
Job title	Graphic Designer	Server Administrator	Computer Engineer	Database Management	Database Programmer	Telecom Engineer	
No.	2	12	8	7	8	4	

⁴⁵ In addition to reference to Column 3, according to the interview to all three companies visited in the ex-post evaluation and beneficiaries survey to graduates, all 41 respondents answered that the graduates are receiving high evaluation from their workplaces.

⁴⁶ Commercial qualification test of IT series is conducted as CBT (Computer Based Testing). Before starting of the project, there was no CBT facility in Laos and people could not take the examination in Laos.

Column 2 : Student's Contribution to Society through Fieldwork

The majority of ITPM students have been sent by their companies. They are studying while working in their companies.

In the fieldwork as part of the course, Mr. Phorasim of the ITPM 1st batch, constructed a security system for an automatic payment system required by Lao Development Bank (LDB), where he was working. Specifically, he introduced the Virtual Private Network (VPN⁴⁷) to protect customer information.



Mr. Phorasim (second from the right)

The fieldwork team consists of three persons including Mr. Phorasim. The fieldwork took six months, including visits to pilot project sites. Since he studied at ITPM while working at the bank, it was difficult for him to adjust the schedule for the fieldwork. However, by conducting the operation at weekends, he completed the task within the time set.

By introduction of VPN, the security system for automatic payment system of the bank was greatly improved. In the four years since its introduction there has been no problem with security.⁴⁸

3.2.2.2 Other Positive and Negative Impacts

Negative impacts by implementation of the project were not found.

As stated above, the project purpose of development of human resources to meet the IT service market through ITSC has been achieved by implementation of the project. In addition, regarding the overall goal, it can be said that it contributed to the development of the IT service industry to some extent. Therefore, the effectiveness and impact of the project are high.

Column 3 : Outstanding Performance of Graduates in Their Company

The ICT Center of Banque Pour Le Commerce Exterieur Lao Public (BCEL) , which is one of the largest government commercial banks in Laos, develops network, security, programming and internet banking, and provides technical support to other departments of the bank. Expecting all their 42 employees assigned in the ICT Center to get a Master's degree, the bank has sent two

⁴⁷ VPN is virtual internal network constructed through public communication circuit of telecommunication operator. In addition, it indicates the telecommunication service that can construct such network. It is used for base-to-base connection of internal network, and can communicate with remote base station as communication within internal network of its own company.

⁴⁸ According to Mr. Phorasim.

or three staff to study ITPM every year. At the time of ex-post evaluation, there are seven ITSC and ITPM graduates working in the center.

The IT operations in the center are diverse, and ITSC and ITPM graduates are responsible for system development, network, web design, etc. using their expertise. Practical techniques are required for working in the center.

According to an interview with the Head of the ICT center, ITSC and ITPM graduates, who received practical education through lectures and fieldwork etc., are valuable staff for the bank. The Head of ICT Center pointed out there are staff in the Center who studied abroad - in India, China, and Malaysia. However, there is no difference between these staff and the graduates. The Head added that the staff who have four to five year's work experience in the bank can also improve their competencies further by studying at the ITPM.

One of the ITPM graduates is playing a key role in the team for construction of an internet banking network. According to the Head of the ICT Center, if the center had not had him the construction of the network would have been outsourced to foreign companies, or the center would have used a system constructed by foreign companies. Through his performance, the bank itself could develop a network which is suitable for Laos. In addition, the staff are now capable of dealing with operations which require advanced technology, such as development of a program for a gateway⁴⁹ to link with a security company.

3.3 Efficiency (Rating : ③)

3.3.1 Inputs

The plan and actual amount of inputs of the Project are listed in Table 12.

Table 12 Plan and Actual Amount of Inputs to the Project

Inputs	Plan	Actual
(1) Experts	7 experts Consider dispatch of short-term experts other than above mentioned experts	<ul style="list-style-type: none"> ● Long-Term (3 experts) ● Short-Term (13 experts including 4 Japanese experts and 9 experts from third countries)
(2) Trainees received	Training of counterpart personnel in third countries (number of participants is not indicated)	3 participants (Training in Thailand)
(3) Equipment	IT-related equipment and other	Equipment for network, PC,

⁴⁹ Gateway is a mechanism or device that makes possible intercommunication of data which has different specification (protocol) in network and system. (source: ASCII Digital Glossary <http://yougo.ascii.jp/caltar/ICT> accessed on 28 March, 2017 (Japanese language)).

Inputs	Plan	Actual
	necessity equipment	software, and office equipment
(4) Facilities	Construction of classroom and IT laboratory	Construction of lecturers' room, IT laboratory, and renovation of LJTIC ⁵⁰ in Faculty of Engineering, NUOL
(5) Others	Operational expenses: No figure mentioned.	Operational expenses: Total 40 million yen ⁵¹
Japanese Side Total Project Cost	Total 380 million yen	Total 345 million yen
Laotian Side Total Project Cost	<ol style="list-style-type: none"> 1. Assignment of counterpart officers 2. Expenses necessary for employment of visiting lectures 3. Provision of the project office and facilities necessary for the project implementation 4. Others: Administrative and operational costs, connection charge of high-speed internet, running costs for electricity, water, transportation cost, etc. 	<ol style="list-style-type: none"> 1. Assignment of counterpart officers for 28 persons (including office staff) 2. School building of IT Department, Faculty of Engineering, NUOL, Office space for JICA Experts 3. Local cost, payment of lecturers at IT Dept., electricity, water charges, and internet telecommunication costs for the office of the JICA Experts

Source: Internal document of JICA, the Ex-Ante Evaluation Report, the Report of the Terminal Evaluation, and interview at the Ex-Post Evaluation

3.3.1.1 Elements of Inputs

In addition to the Japanese experts, third-country experts invited from Thailand conducted the Microsoft MTA Training in Thai language, which is more familiar than English for Laotian people. A third-country expert from Singapore also conducted technology transfer which related to VMWare (software). In addition to the input indicated in the above Table, the Laos side bore the cost of purchasing 13 computers to replace those stolen in July 2010.

⁵⁰ Half of the Lao Japan Technical Training Center (LJTTC) building was repaired for utilizing as an incubator.

⁵¹ According to JICA exchange rate in FY 2016 (349,080 USD).

3.3.1.2 Project Cost

Actual Project cost was 345 million yen against the planning budget of 380 million yen, which was in 90% of planning ratio.

3.3.1.3 Project Period

The project period was 60 months from December 2008 until November 2013, which was implemented as planned (100% versus the plan).

In light of the above, both the project cost and project period were as planned. Therefore, efficiency of the project is high.

3.4 Sustainability (Rating : ②)

In order to measure sustainability of the project, the ex-post evaluation confirmed and analyzed several parameters to see the ITPM, established by the support of this project at Faculty of Engineering, NUOL, the project implementing agency, continue to provide education which meets the needs of industry. These parameters are whether policies were developed, if the management system of ITBU and LIBIC of IT Department, Faculty of Engineering, NUOL is well-established, if the techniques of the lecturers of ITPM is sufficient, and whether there are any problems regarding financing, etc.

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

At the time of the ex-post evaluation, the 'ASEAN ICT Master Plan 2020' - a policy goal of ASEAN 2016-2020 - highlights eight strategic promotion items, one of which is (5) human capital development to promote development of competitive ICT human resources through setting up qualifications and technology to fulfill the needs of IT human resources at present and in the future.⁵² Based on this master plan, the Ministry of Post and Telecommunication (MPT) in Laos is preparing a policy on IT called 'ICT policy (2016-2020)', with top priority on IT human resource development and promotion of IT infrastructure. These policies are expected to continue in the future.

The Ministry of Education and Sports (MOES) is preparing the 'ICT development strategy 2016-2020'. The objectives of this strategy are to strengthen the capacity of ICT lecturers and development of human resources that can use IT. The strategy will be approved by the Laos government soon. In addition, MOES regards ITPM of IT Department, Faculty of Engineering,

⁵² Source: 'The ASEAN ICT Master Plan 2020' (<https://www.sbs.ox.ac.uk/cybersecurity-capacity/system/files/ASEAN%20ICT%20masterplan%202020.pdf> accessed on March 27, 2017. ASEAN also indicated the importance for development of competitive IT human resources in 'ASEAN ICT master plan (2011-2015)').

NUOL as the only master course in the IT field in Laos at the time of the ex-post evaluation.

In the NUOL strategy for development of education (2016-2020), it is highlighted that NUOL will promote the ICT system development project at an international level, including the e-learning project, until 2030. In addition, the IT Department, Faculty of Engineering, NUOL plans to regularly revise the ITPM curriculum for IT human resource development, and to maintain the standard requiring commercial qualification for engagement as lecturers.⁵³

Therefore, the necessary policy system for continuation of the project effects is in place in NUOL and Laos.

3.4.2 Organizational Aspects for the Sustainability of Project Effects

The organization chart of the Faculty of Engineering, NUOL at the time of the ex-post evaluation is shown in Figure 2. The IT Department was established when this project started. Responsibility within the faculty is clear at the time of ex-post evaluation.

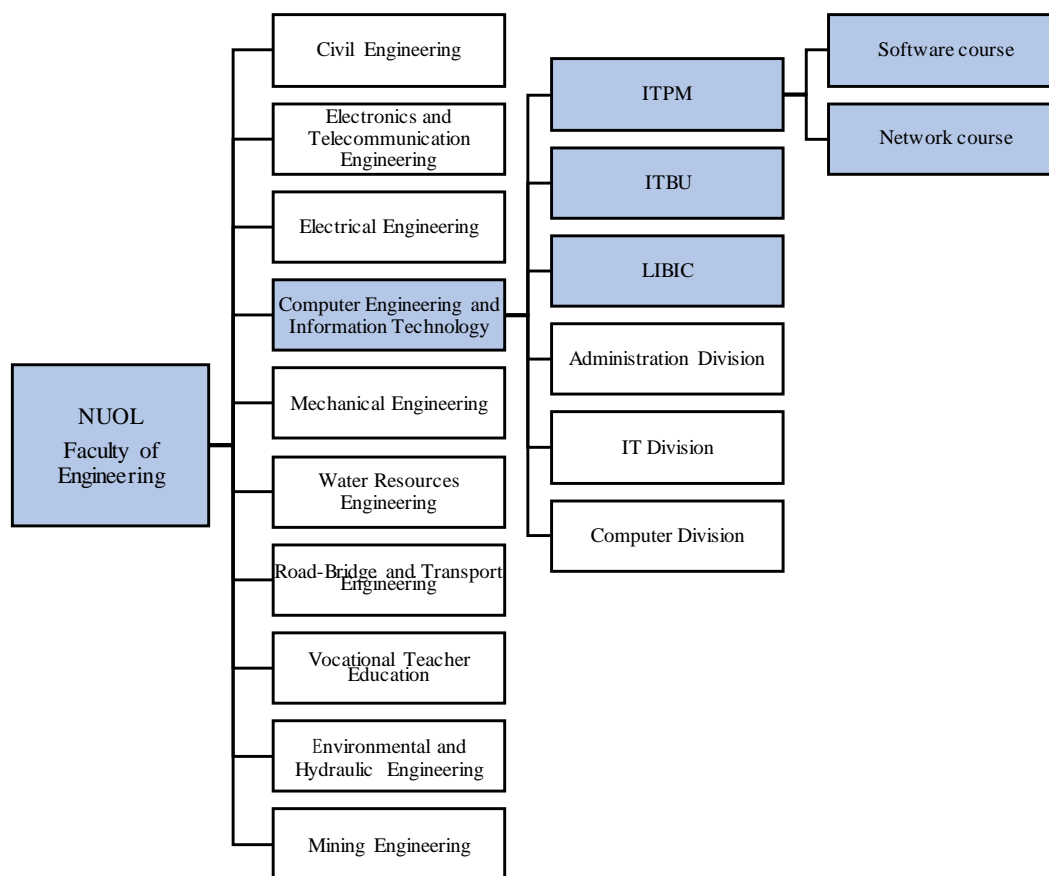


Figure2 Institutional Structure of Faculty of Engineering, NUOL and IT Department

Source : Edited by the External Evaluator based on the website of the Faculty of Engineering, NUOL

⁵³ The qualifications for lecturers who can teach a Master’s Program in NUOL are those who have a Doctoral degree or are an associated professor. These are not required to teach at ITPM of IT Department, Faculty of Engineering, while it is necessary to pass commercial certifications corresponding to the subject.

In 2016 ITPM reached the 5th year since its establishment and its implementation and management are firmly established in the Faculty. All the lecturers of ITPM at the time of project implementation are still working at the IT Department at the time of the ex-post evaluation. The salary (200 USD per month) that lecturers receive from NUOL is barely sufficient to sustain daily life; however, the ITPM lecturers in IT Department can obtain a higher salary (about 500-600 USD + 200 USD from short-term courses per month⁵⁴) when compared to other departments by having classes for ITPM, short-term courses of ITBU and ITPM, and lectures for undergraduates. This is similar to the salary of staff in private IT service companies, and leads to a high retention rate of lecturers.⁵⁵

LIBIC was established inside the IT Department six months before project completion, and a TV Program Production Company⁵⁶ occupied a booth from 2014 to 2016. However, all ITSC and ITPM graduates, 26 students (68%) out of 38 students who answered the questionnaire at the time of ex-post evaluation, did not know about the presence of LIBIC.

At the time of ex-post evaluation, the above-mentioned TV Program Production Company has paid the rent fee for LIBIC. However, business activity has not been generated, and according to ITBU, it seems that this company will leave before long. Thus, activity of LIBIC has stagnated, and the budget and staff are in a very fragile situation. There was a plan to increase staff, strengthen activities, and upgrade LIBIC to Department level in the Faculty of Engineering. However, there has been no progress due to the poor office procedure in NUOL. The allocation of budget is also insufficient. At the time of the ex-post evaluation, the Faculty of Engineering expressed its willingness to certainly move forward⁵⁷ with procedures for re-organization of LIBIC in fiscal year 2017. MOES also understood the importance of the incubator, and is considering supporting and promoting LIBIC. However, information regarding its feasibility has not been obtained.

Thus, no problem was seen regarding responsibilities in the Faculty of Engineering, NUOL, the number of lecturers who teach ITPM and their retention. However, there remains a problem with the systems of LIBIC inside the Faculty of Engineering.

3.4.3 Technical Aspects for the Sustainability of Project Effects

As mentioned in '3.2.2.1 (2) contribution of achievement to the project's overall goal', the technical level of lecturers of IT Department, Faculty of Engineering, NUOL, has been

⁵⁴ At the time of starting the project, it was approximately 100 USD per month (1st Progress Report of the project).

⁵⁵ Interview with the Head of IT Department.

⁵⁶ The TV Program Production Company was not very relevant to IT. However, the company was accepted upon requesting support in IT techniques. LIBIC provided the service for company registration, and introduced a financial support project for entrepreneurs from the Department of Small Medium Enterprise promotion of Ministry of Industry and Commerce (financial resource from New Entrepreneur Creation Project of ADB).

⁵⁷ Comment from the Dean of Faculty of Engineering, NUOL.

maintained and strengthened, and the evaluation of lecturers' technical instruction by the students is mostly high. Lecturers revise the syllabus by themselves every year, and have the necessary knowledge and techniques for revising the curriculum from 2017. Therefore, ITPM lecturers of IT Department have the necessary techniques for continuation of effectiveness produced by the project.

The IT Department expressed concern about the extension of the study period for students or declining the quality level of students in terms of assuring the quality of the IT Department. The followings are some more information about this matter, which seems to be important, although it is not clear how this will impact on sustainability of the project at the time of the ex-post evaluation.

Most ITPM students are sent from their companies. Students are working in the daytime, and struggle with time management to attend ITPM at night. The course takes 2 years. At the commencement of the course, all students completed in 2 years. However, recently a certain number of registered students have taken three years to complete.⁵⁸ According to the Dean of the Faculty of Engineering, it is one of the causes of extension of the course completion that many students do not have enough time to discuss the theme of their master's thesis with their lecturers, and they take longer time to select their theme, survey, study, and write their papers.

According to the lecturers and Head of IT Department, in terms of capacity level of students at the time of entry, companies had sent the most excellent people to study at the commencement of the course. However, the level of staff sent has gradually gone down. This has happened because of the thin layer of human resource in the companies. It is a frequent phenomenon in Laos. Declining quality at the time of entry could be one of the reasons that some students could not complete within 2 years. The lecturers are aware that it is crucial to have supplementary lectures for students who have lower capacity, but they cannot implement this because they are too busy.⁵⁹

Two points - know-how on management of incubation and lecturer's technical capacity to support the incubated companies - are necessary to produce the effect of incubation by LIBIC. The staff who is responsible for incubation management has some capacity and knowledge for management. Regarding capacity for technical support of lecturers to the entry companies - there were almost no records of support and no discussion on kind of capacity required; therefore, it is not clear whether problem exists or not.

⁵⁸ In NUOL regulations, in the case of unavoidable circumstances it is possible to extend one year in order to complete the course.

⁵⁹ ITPM lecturers have an average of 16 hours of lectures per week (10 hours for undergraduate, and 6 hours for ITPM). As reference, working time for Japanese University Professor is 8 hours per week (source: Ministry of Home Affairs, Statistic Department of Japanese Government

<http://www.e-stat.go.jp/SG1/estat/List.do?bid=000001017860&cycode=0>, accessed on 24 November 2016).

3.4.4 Financial Aspects for the Sustainability of Project Effects

The income of ITPM, IT Department, Faculty of Engineering, NUOL is increasing, as shown in Table 13. The salary of lecturers is not changed every year in the budget from the Ministry of Finance. However, through the implementation of short-term courses and lectures for undergraduate students, ITPM lecturers receive additional income which assures an incentive for continuation of their work. As the number of students taking 3 years for completion increases in fiscal year 2016, classrooms are not fully available, which leads to a reduction in new students and decrease in tuition fees. The enrollment capacity is 28 persons or 42 persons depend on capacity of the classroom. Based on this, the tuition fee income varies every fiscal year. There were 28 students in FY 2016, and the income from tuition fees decreased. However, it is expected that the income from tuition fees will recover in 2017, because 42 students will be enrolled.

Table 13 Financial status of ITPM

(Unit : Kip⁶⁰)

Income						
Year	2012	2013	2014	2015	2016	
Budget from MOF to IT Dept.	466,124,952	466,124,952	466,124,952	466,124,952	466,124,952	
Tuition	816,000,000	600,000,000	1,025,000,000	1,000,000,000	650,000,000	
Income of ITBU (Short-course)	NA	389,664,000	238,172,000	517,372,000	75,320,000	
Total	1,282,124,952	1,455,788,952	1,729,296,952	1,983,496,952	1,191,444,952	
Expenditure						
Year	2012	2013	2014	2015	2016	
Allocation to lecturers' payment from MOF budget	466,124,952	466,124,952	466,124,952	466,124,952	466,124,952	
Allocation to lectures' payment from courses	289,920,000	523,718,400	432,823,200	600,343,200	285,192,000	
Activities	342,080,000	332,129,600	591,935,800	604,885,800	312,278,000	
Maintenance (building, materials)	184,000,000	114,332,800	226,504,400	286,274,400	124,084,000	
ITBU Saving	0	19,483,200	11,908,600	25,868,600	3,766,000	
Total	1,282,124,952	1,455,788,952	1,729,296,952	1,983,496,952	1,191,444,952	
Balance of income and expenditure	0	0	0	0	0	

*The income from tuition covers two school years.

*Data on income of ITBU up to 2012 is not available.

*Balance of income and expenditure is zero in every year.

Source : IT Department, the Faculty of Engineering, NUOL

⁶⁰ JICA exchange rate in FY2016 (1 kip = 0.014470 yen).

Expenditure for purchasing and updating of equipment for ITPM is not included in the budget the Faculty of Engineering receives from Ministry of Finance, as shown in Table 13.⁶¹ This expenditure comes from internal revenue sources - the income from ITPM tuition fees and short-term courses as shown in Figure 3. In 2016, about 10%, one million yen, of internal revenue source has been allocated for that expenditure.

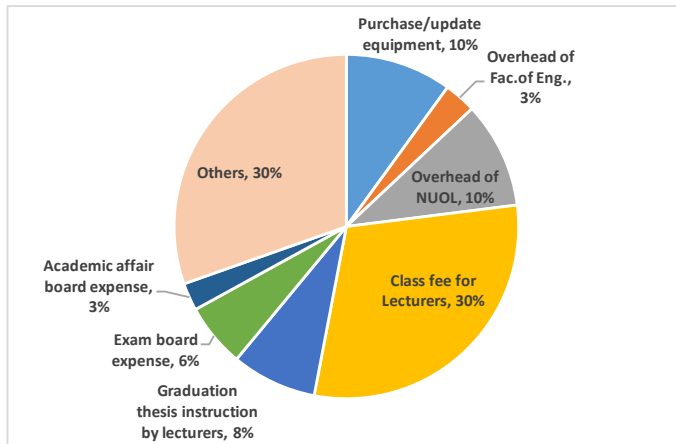


Figure 3 Allocation rate of tuition and income of ITBU (2016)
Source : IT Department, the Faculty of Engineering, NUOL

Most practical training equipment provided by this project has been used at the time of the ex-post evaluation. However, some equipment, such as the Cisco Router 1941, provided by the project as practical training equipment for the ITPM network course, has deteriorated due to frequent use, and the serial port can be damaged easily. To date, the IT Department has made efforts maintain as many equipment as possible in operational condition by replacing parts of the equipment. However, about half of the equipment was not operating at the time of the ex-post evaluation. At the commencement of the ITPM course each student could use one piece of equipment for practical training. However, recently two or three students have to share each piece of equipment. In addition, frequent use is avoided⁶² to prevent damage. The course aims to implement lectures that directly link to business practices. Therefore, shortage of training equipment is a serious problem.

The lecturers are also concerned that if such a situation continues, there is a possibility that the practical training cannot be implemented in the future. However, as mentioned above, the budget allocation for updating and purchasing equipment for the ITPM course is limited. Until now damaged equipment has not been updated.⁶³

The Faculty of Engineering recognizes the necessity of updating the equipment. The current income of the ITPM course is not enough to purchase, therefore, it is considering increasing tuition fees and the allocation of budget from Ministry of Finance for the cost of updating equipment. The idea is to find the way to purchase even one piece of ITPM equipment that has

⁶¹ Budget in Table 13 shows only lecturers' salary received from the Ministry of Finance. General operating costs, technical costs, fixed assets costs for operation, infrastructure maintenance costs, and so on, are mainly allocated for undergraduate. Infrastructure maintenance cost for ITPM course is generally covered by tuition fees income.

⁶² Interview with ITPM lecturers and ITPM graduates.

⁶³ For example, if Cisco 1947 is purchased in Thailand and imported to Laos, it will cost 700,000 to 800,000 yen, which is too expensive for the IT Department.

high priority to be updated each year.⁶⁴

Given the above findings, there is no problem in policy background and technical aspects, while some minor problems have been observed in terms of the organizational aspect and problems in financial aspect of the implementing agency. Therefore, sustainability of project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was implemented at NUOL with the aim of fostering human resources to meet the needs of the IT service market. At the time of planning and completion of the project, promoting the IT industry and fostering human resources for this were important policy targets for the country. The need for advanced IT human resources in the industrial sector of the country has been also high, and consistent with the country's development policy and needs. At the time of planning, the advanced level of human resource development for strengthening private sector was a key area in Japanese assistance policy to support Laos Government. Therefore, the relevance of implementation of this project is high.

Most graduates of the ITSC at the IT Department, Faculty of Engineering, NUOL have been employed by IT companies in the country, and have a good reputation in their places of work. Short courses have been conducted by ITBU every year. These courses are implemented as seminars for IT industry human resources outside the university, utilizing a part of IT related subjects (lecture modules) which consists of ITSC. This realizes the project objective of developing and enhancing IT human resources. Since this project also contributed to the development of the IT industry in Laos to some extent, which was its overall goal, effectiveness and impact are high. In addition, the project cost and period were as planned. Therefore, efficiency is also high.

The national policy and NUOL system to maintain the ITPM, which was established based on the ITSC, are expected to continue in the future. The operation system of IT Department in the Faculty of Engineering at NUOL is appropriate, apart from inadequate operation system of LIBIC.

The techniques of lecturers in ITPM have been maintained without any problem. There is a minor problem with financial operation, as no budget has been allocated to update equipment required for practical work in the ITPM network course. Therefore, the sustainability of effectiveness through implementation of this project is fair.

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

⁶⁴ Interview with the Head of the Faculty of Engineering.

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

(1) Updating Equipment for ITPM Network Course

About half of the equipment for practical training in ITPM network course provided by the project is damaged due to deterioration, and is not in a condition to be used. It has become an obstacle to practical work in the course.

If deterioration and damage of this equipment continues in future, it may threaten the practical training and continuation of the course itself. In order to solve this problem, it is expected that Faculty of Engineering, NUOL consider requesting budget from the government, together with seeking for ①increased income for the IT Department, ②increased contribution (donation) of equipment from outside, and so on. For ①, increased income from tuition fees can be considered by increasing ITPM tuition fees and increasing the unit price of short-term courses⁶⁵ with higher quality and market needs. Developing an e-learning system for ITPM and short-term courses in order to fulfill the IT education needs of human resources in local areas can also be considered. For e-learning, it could be effective to utilize the ICT center, which promotes ICT projects in NUOL, and the Research Institute for Development and Innovation,⁶⁶ which is planned to be established in NUOL with support from the 2nd Higher Education Enhancement Project (approved in September 2016) of ADB. In addition, undertaking fee-based services by ITBU through fostering collaboration with related government organizations and other projects supported by Japan can be one option to increase the income of the Faculty. For example, energy-efficient data center⁶⁷ was founded in November 2016 in Laos with support from the New Energy and Industrial Technology Development Organization (NEDO) of Japan, which supported a feasibility project. By enhancing collaboration with the Ministry of Science and Technology of Laos Government which operates the Center, ITPM lecturers may be able to join the feasibility project. It is recommended that ITPM lecturers upgrade their capacity by obtaining this kind of opportunity, and seek fee-based orders by ITBU in future. As for ②, LICA, graduates and companies which employ ITPM graduates can be asked for a donation to support the network

⁶⁵ Income from short-term courses is fixed as course hours X time unit price X number of participants.

⁶⁶ The Research Center aims to strengthen research and development in modern scientific technology, to share information with government and other organizations with responsibility in order to contribute to social and economic development of Laos. Environment research center, Lao-ASEAN Education Center, Incubation Center, and China research Center will be established in the Research Center. It seems that the relationship between the incubation center and LIBIC under IT Department, Faculty of Engineering of NUOL will be discussed in NUOL (interview with lecturers) .

⁶⁷ The high-quality and energy-efficient data center is a container type, which is possible to set in one-third construction period compared with a conventional building type data center. The data center in Laos is expected to be operated by 40% less energy consumption compared with the conventional one. In the feasibility project, NEDO will operate data center in appropriate way in Laos around for a year until February 2018 to verify the effect to reduction of greenhouse gas emissions by utilizing the Joint Crediting Mechanism (JCM). (source: website of NEDO, http://www.nedo.go.jp/news/press/AA5_100681.html accessed on 24 February, 2017)

course.

(2) Activation of Incubation at LIBIC

As the first place to operate an incubator in Laos, LIBIC had been set up in the IT Department, Faculty of Engineering, NUOL. At the time of the ex-post evaluation, however, the necessary budget and human resources were not allocated to LIBIC, and not even one company occupied the booth. Students do not know much about LIBIC, and very few graduates and private companies interviewed were familiar with LIBIC. In order to activate LIBIC, it is important to first allocate necessary budget and human resources. Public relations and awareness creation activities for students and entrepreneurs are also indispensable. For instance, ITBU can introduce LIBIC to students of ITPM and MBA course in NUOL as a future place to start business. LIBIC could publicize itself in some private events for incubators.

As for a collaboration with the above-mentioned Research Institute for Development and Innovation of NUOL, LIBIC can play a role in developing incubators in the Institute by utilizing its knowledge and experience. The manager of LIBIC has accumulated her knowledge and experience as the representative of Laos incubator by collaborating with incubators in and outside of Laos. On the other hand, other Faculties in NUOL have very limited experiences of incubators yet. It is considered that the incubator of LIBIC, the Faculty of Economics and Business Administration, and Laos-Japan Institute (LJI) established in NUOL will play a key role for new incubators. Sharing its knowledge and experience with the incubator of the Research Center, LIBIC is expected to enhance its programs such as start-up seminars and business support for students and young entrepreneurs.

LIBIC will be activated through these measures, which will accelerate development of IT entrepreneurs. It is expected that an activated LIBIC will contribute to empowerment of IT entrepreneurs and increase of human resources in the IT service sector, which will lead to development of the IT industry.

4.2.2 Recommendations to JICA

It is expected to support the utilization of the above incubator by other JICA projects in Laos, for activation of LIBIC incubator. For example, ‘The Project on Capacity Building for Supporting Private Sector Development and Japanese Investment in Lao P.D.R. through LJI of NUOL’ (September 2014 - August 2019) has provided instruction to students who aim to obtain an MBA. This project has considered collaboration with the incubator of LIBIC as one of its activities⁶⁸. The Japanese expert of the project has proposed providing necessary MBA-related training for

⁶⁸ For Output 1 of PDM of the project, ‘Capacity of LJI for private sector human resource development is strengthened.’, there is activity 1-8, ‘Collaborations between LJI and incubator function under the Faculty of Engineering to support their entrepreneurship development activities are considered.’

human resources who move into the incubator of LIBIC, wanting to start a business. JICA can positively support such a proposal by creating a system for those two projects can share their information periodically.

4.3 Lessons Learned

(1) Setting Realistic and Measurable Indicators for Overall Goal and Careful Consideration of Means of Verification

The indicators of the overall goal of the project (increased ratio of IT industry in GDP and increased ratio of population in IT industry) were too large to expect to be reached as the result of support to one national university. Means of verification were not available without additional surveys, which did not allow the evaluator to verify the achievement of the overall goal in the ex-post evaluation. Not only the time of planning but also in early stages of implementation it is necessary to have discussions on the overall goal, its indicators, and means of verification, and to set and revise these appropriately.

The project set an indicator as students' 'satisfactory rate is improved' to measure improvement of lecturers' competencies. During its implementation, the project conducted a questionnaire survey to measure the achievement of the indicator. However, the results of the survey were not compiled nor analyzed quantitatively due to cultural background in Laos in which it is not welcomed to evaluate lecture individually by his/her students. Therefore, quantitative analysis was not conducted. Nonetheless, alternative indicators or means of verification were not considered. It is important to propose alternative indicators and means of verification to measure the achievement of indicators appropriately in such cases.

(2) Ensure Updates of Equipment Provided to IT Sector

Half of the equipment for the network course provided by the project has been damaged due to deterioration, and is not available. If this continues, it may cause serious effects to practical parts of the course.

In a support to the sector, such as IT, in which technology progresses in high speed and requires continuous updating of training equipment, it is essential to facilitate the implementing agency to firmly recognize the importance of periodic upgrade of equipment during the planning and implementing periods. In order to make the periodic upgrade of training equipment possible, it is also important to secure budget for upgrade costs, and to facilitate income generation and seeking for support from outside by the implementing agency.

(3) Secure Long-term Effects by Taking Time to Enhance Lecturers' Capacity

After the commencement of project, it was found necessary to significantly upgrade the capacity of lecturers in the target university, especially that of lecturers who teach in the

programming field to develop the advanced level of IT human resources required by the private sector. Therefore, the project conducted intensive capacity-building of lecturers by providing instruction utilizing classes for two years, which was one year longer than the initial plan, and started the course in the 3rd year.

This decision resulted in lecturers being able to teach students in the last half of 3 years. However, at the time of ex-post evaluation it was identified that IT engineers were developed continuously in the course up to a level that meets the needs of the private sector.

The approach of the project for intensive capacity-building of lecturers can be regarded as important to secure long-term effectiveness. This approach can be a reference in cases to develop human resources to meet international standards in countries with a thin layer of IT human resources like Laos.

(4) Inclusion of Measures to Maintain Human Resources at School as a Part of Project Activities

In order to assure stable work for lecturers within the school, the project was planned to implement the short-term course besides the regular course, which enabled the lecturers to obtain supplementary income. The short-term course has been implemented as planned, and lecturers can obtain salary at the same level as IT engineers working in private companies. At the time of the ex-post evaluation, all lecturers who had worked in the project implementation period were still working. The level and instruction content of the course supported by the project has been maintained. The supplementary income from the short-term course became an incentive for lecturers to continue to work. The retention of lecturers who upgraded their capacity is crucial to maintain the effects produced by the project. Including measures for retention of lecturers as a part of project activity is one of the options.

End