"Project Formulation Survey" under the Governmental Commission on the Projects for ODA Overseas Economic Cooperation in FY2013

Summary Report

Kingdom of Thailand

and

Republic of Indonesia

The Survey on Human Resource Development by Overseas Universities in Cooperation with Japanese-Affiliated Companies

March, 2014

CeFox Co., Ltd & Global Link Management Inc.

Executive Summary
Introduction

This survey aims to develop a framework of the Official Development Project (ODA Project) using the proposed products/services developed by CeFox Co., Ltd. in order to solve the development issues in the Kingdom of Thailand and the Republic of Indonesia. At the end of the report, the survey team will propose the program of ODA Project to improve a) engineering education at higher education institutions and b) the situation of recruitment and development of high-quality engineers at Japanese affiliated companies in the targeted countries.

I. Description of the current situation and development needs of the concerned development issues in the surveyed countries

The survey has identified two universities with high possibilities of implementing the proposed ODA Project: King Mongkut's University of Technology Thonburi (KMUTT) and Sirindhorn International Institute of Technology (SIIT) in the Kingdom of Thailand.

The survey team suggests that the ODA Project which develops an educational program and consortiums among university, industry, and government be implemented in the Kingdom of Thailand first so that a model can be established. The model can be eventually applied in neighboring countries including the Republic of Indonesia.

1. Engineering education at higher education institutions in the Kingdom of Thailand

The team conducted the field survey on the following items targeting seven universities with faculties of engineering:

➢ General information on engineering education
➢ Situation of career services for students/graduates
➢ Situation of university-industry collaboration
➢ Introduction of e-learning
➢ Willingness to participate in the proposed ODA Project

Main findings are the following:

1) Universities are trying to cultivate internationally competitive human resources with high morals, broad perspectives, practical knowledge and skills, and ability of research.

2) Undergraduate students need to complete 140 or more credits in accordance with the guidelines set by Council of Engineers. On average, students are required to earn 20 credits

more than those enrolled at Japanese universities.

More than half of the universities consider that their curriculums do not meet the needs of industry. Main reasons are that the course works in specialized subjects dominate the curriculum thus the courses on liberal arts and research are minimal. Universities are trying to complement the deficiency by running internship programs.

3) Top universities such as Chulalongkorn University have equipment for education and research.

4) Universities are aware that the students have acquired academic knowledge but not enough research skills.

5) The educational challenges that universities are facing are: not enough courses are available to improve students' critical thinking, soft skills and research skills; the level of students' English ability is low; limited number of liberal arts courses has resulted in difficulty in broadening students' perspectives.

6) The employment rate of graduates is very high. Universities provide various career services for students/graduates. However, universities are interested in increasing the number of students employed by Japanese affiliated companies.

7) Universities have engaged in various collaborative activities with industry. They are eager to strengthen the relationships with Japanese affiliated companies.

8) The majority of universities have adopted some degree of e-learning. However, what they call e-learning is the portfolio system to manage students' educational records, and upload/download educational materials.

9) The universities with high possibilities of implementing the ODA Project are King Mongkut's University of Technology Thonburi (KMUTT) and Sirindhorn International Institute of Technology (SIIT) based on the evaluation results on progressive educational program, degree of pro-Japanese, willingness to participate, available equipment, introduction of e-learning, site location and possibility of cost share.

2. Engineering education at higher education institutions in the Republic of Indonesia

The team conducted the field survey on the following items targeting four universities with faculties of engineering:

➢ General information on engineering education

➢ Situation of career services for students/graduates

➢ Situation of university-industry collaboration

➢ Introduction of e-learning

Main findings are the following:

1) Universities aim to produce internationally competitive human resources.

2) Universities require undergraduate students to complete 144 credits which are at least 20 credits more than universities in Japan. The course works in specialized subjects dominate the curriculum thus the courses on liberal arts and research are minimal. Universities are trying to provide an educational program in complying with the guidelines set by an overseas accreditation board for an engineering education program.

3) Universities have some equipment for educational and research equipment.

4) Universities are aware that the students have gained academic knowledge but have not gained enough research skills.

5) Some universities have educational challenges that the number of courses on entrepreneurship, foreign languages, and practical courses in laboratories is limited.

6) Surveyed universities have good rates of employment. All new graduates get employed in three to four months after graduation. Universities provide career services and conduct tracking surveys.

7) Universities have been involved in activities with industry and are eager to strengthen the relationships with Japanese affiliated companies.

8) Universities have adopted some degreed of e-learning system.[1]

9) Universities have shown their interest in collaborating with Japanese affiliated companies and implementing Project-Based Learning (PBL). However, they do not think there is a high possibility for Japanese-affiliated companies to participate in the ODA Project considering the current situation that the majority of Japanese-affiliated companies do not have Research and Development (R&D) or Design functions.

3.   Japanese-affiliated companies in the Kingdom of Thailand

The team has conducted the field survey targeting Japanese-affiliated companies who employ local engineers in the industries encouraged by Thai government. The team has sent questionnaire to 100 Japanese-affiliated companies in the encouraged industries and received 38 valid answers. The team also conducted interviews with seven companies.

Japanese-affiliated companies consider it necessary to improve the engineering education at universities through team collaboration for experiment and research like PBL along with learning the basics of manufacturing and process   flow, and to strengthen students' soft skills.

Main findings are as follows:

1) 77% of the companies have been able to hire the necessary number of engineers. Companies in construction or IT/communication tend not to be able to hire the necessary number of

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[1] The e-learning situation is similar with that in Kingdom of Thailand. What they call e-learning is the portfolio system.

engineers.

2) 67% of the companies are satisfied with the newly hired engineers' knowledge and skills. However, 50% of IT/communication and 40% of construction companies are not satisfied.

3) 53% of the companies are satisfied with the engineers' soft skills and 45% are not satisfied. Specific soft skills that need to be improved are English, problem-solving skills, and basic communication skills (reporting, contacting, consulting etc.).

4) Regarding collaborative activities with the industry sector, more than half of the companies have received interns from universities but only a few have conducted collaborative research.

5) Companies expect universities to raise the level of knowledge and skills in specialized fields and basic academic skills.

4. Japanese-affiliated companies in the Republic of Indonesia

The team has conducted the field survey targeting Japanese-affiliated companies with engineers in pioneer industries set by Indonesian government. The team has sent questionnaire to 120 Japanese-affiliated companies in the pioneer industries and received 17 valid answers. The team also conducted interviews with six companies.

The majority of Japanese-affiliated companies have production lines in the Republic of Indonesia but many never had R&D or Design functions yet. Therefore, the level of knowledge and skills local engineers need to have is not very high at the moment. Thus Japanese affiliated companies do not have urgent interests in collaborating with local universities.

Main findings are as follows:
1) 87% of the companies have been able to hire the necessary number of engineers.
2) 88% of the companies are satisfied with the newly hired engineers' knowledge and skills.
3) 63% of the companies are satisfied with the engineers' soft skills and 44% are not satisfied. Specific soft skills necessary to be improved are problem-solving skills, English and basic communication skills.
4) Regarding collaborative activities with the industry, few activities have been conducted except internship.
5) Companies expect universities to raise the level of knowledge and skills in specialized fields, basic academic skills and global perspectives/ways of thinking.

II. Possible applicability of the SME's products and technologies, and prospects for future business development

What CeFox Co., Ltd. will provide in the ODA Project is "the program to develop high-quality

engineering skills". It is a collaborative educational program involving a university and the industry sector which include courses on collaborative experiment/development, learning the diversity of society, technology management, learning global technologies, and career planning. CeFox Co., Ltd. will provide the e-learning system and contents in the program and dispatch experienced researchers from companies in Japan and engineers from Japanese-affiliated companies. The program will contribute to development of engineers who can manufacture the products using advanced knowledge and skills, designers who have acquired systematic management methods and greater competencies, technicians who understand the diversity of society and different cultures, next generation technology leaders with global perspectives and high level engineers with their own future visions and dreams.

The two targeted markets are 1) local universities with science and engineering departments and 2) Japanese SMEs which have local manufacturing or design engineers.

The planned timeline for future business development is as follows:
2014-2016: Preparation phase: CeFox Co., Ltd. will test the program at two local universities in the Kingdom of Thailand, verify the educational results and improve the program.
2017: CeFox Co., Ltd. will start the operation officially.
2018: CeFox Co., Ltd. will expand the operation in the Kingdom of Thailand.
2020 and onwards: CeFox Co., Ltd. will expand the operation to Myanmar, Laos, Indonesia and other ASEAN countries

III. Verification of adaptability of the SME's products and technologies to the surveyed countries (Demonstration and pilot survey)

The survey team presented the contents and tested the performance of CeFox e-learning system in each target university utilizing the internet system and PCs on campus. The survey team confirmed that the contents with movies and animations ran smoothly as most of the universities use optical fiber network.

The survey team also found that most of the universities in the Kingdom of Thailand and the Republic of Indonesia already adopted e-learning systems, which have been developed and operated by each university. There is a university which utilizes Moodle. These universities, however, do not provide digital learning contents through the systems; their systems only allow teachers to upload learning materials made by "Word" or "PowerPoint", and students to download them. Therefore, teaching staff showed great interests in our various digital learning contents. Moreover, they evaluated our system highly because our e-learning contents provide

students with learning experiences equivalent to face-to-face lectures in terms of quantity and quality, and teaching staff can easily identify students with insufficient learning hours and low achievements because the system enables students and teaching staff to review learning records. However, it is still necessary to prove the effectiveness of our system for improving students' knowledge, skills and competencies.

At the same time, the survey team introduced Thai and Indonesian universities some of the examples in which Japanese universities successfully enhanced their values by optimizing their e-learning systems. For example, universities provide pre-entrance e-learning education for new students by cooperating with high schools in order to receive applications from good students. The other example is that universities specializing in different fields collaborated and established a common e-learning system in order to develop human resources, which are in line with the needs of the industry sector. The survey team emphasized that e-learning is not merely a learning tool used on campus but it is rather a social platform, which can enhance values of universities, provide benefits for communities, produce extra revenues for universities, and promote new R&D activities. These ideas were eye-opening to the universities in both countries, and they took a great interest in our e-learning system. The survey team plans to visit KMUTT and SIIT again in April 2014 in order to make more detailed presentation to the management teams of the two universities.

IV. Expected development impact and effect on business development of the proposing SME(s) in the surveyed country(ies) through proposed ODA projects

It is expected that the proposed ODA project will enable the target country: (1) to develop human resources with advanced knowledge and skills, who can lead the industry sector shifting from labor intensive industry to high-value added industry; (2) to promote industry and enhance competitiveness by engineers who are equipped with knowledge on Japanese high technologies, management methods, and development know-hows, and (3) to reinforce research capacities of universities, national education/research network, and collaborative research between industry and university through establishing industry-university-government consortiums.

Meanwhile, the proposed ODA project will enable Japanese-affiliated companies to: (1) secure quality human resources with skills needed by the companies, (2) create new business by employing engineers with high skills, which were not available in the past, and (3) gain popularity among universities, including students, and other research institutions.

Moreover, CeFox Co., Ltd. will be able to enhance reliability and brand image of the products by gaining official support from Japanese and Thai governments. Also, CeFox Co., Ltd. will be

able to advertise its products through seminars planned to be held in the proposed ODA project.

V. Proposals for formulating ODA projects

Given that the Kingdom of Thailand is already newly industrializing economies and a donor for less-developed ASEAN countries and Africa, the survey team proposes an ODA project under the scheme of "Pilot survey for disseminating SME's technologies". Because this scheme enables us to improve compatibility of the product to the needs of the target country and spread it nationwide, the scheme is appropriate for the proposed ODA project, which aims to develop an education program with universities/research institutions upon needs of each university, try out the program and revise it based on feedback obtained. OHEC (Office of the Higher Education Commission) will be the counterpart agency of the proposed project, and KMUTT and SIIT will be the target/implementing universities. The Project Purpose is "to establish the foundation to strengthen engineering education in Thai universities in cooperation with Japanese-affiliated companies", and the project duration will be three years. Four outputs will be as follows: (1) The system to implement education program with Japanese-affiliated companies is established in each target university; (2) Students in target universities take e-learning and face-to-face lecture courses, which were developed to meet the needs of each university; (3) Project-Based Learning is conducted in each target university in cooperation with Japanese-affiliated companies, and (4) The foundation for Industry-University-Government network is established. The project coordination unit, which is chaired by OHEC, and participated by STI (National Science Technology Innovation Policy Office), Japanese Chamber of Commerce Bangkok, KMUTT, SIIT, Japanese experts and JICA Thai Office, will develop a project framework and a plan, and will be responsible for monitoring the project.

JICA has been implementing ASEAN University Network/Southeast Asia Engineering Education Development Network (AUN/SEED-Net) projects. As SIIT is one of the member institutions of AUN/SEED-Net, it will be possible that this proposed project links with AUN/SEED-Net. Specifically, teaching staff who participated in AUN/SEED-Net training on university-industry collaboration could utilize what they have learned not only in AUN/SEED-Net activities but also in the proposed ODA project. Moreover, AUN/SEED-Net and the proposed project could share information and outputs, which will maximize outcomes of both projects. It will be also possible to organize joint seminars regarding industry-university-government collaboration in order to produce greater outcomes with smaller inputs. Furthermore, teaching staff who studied abroad or conducted research activities through AUN/SEED Net and acquired high-level research skills can join and lead the proposed project. This way, he/she can newly establish collaborative linkages with Japanese-affiliated companies, which will enhance his/her education and research activities. The survey team also proposes to

disseminate the information and outcomes of the proposed project widely to other universities in Thailand and encourage them to participate in related seminars organized by the proposed project so that they can also have chances to collaborate with Japanese-affiliated companies and start projects of their own.

The survey team interviewed with Deputy Secretary-General of OHEC twice. He took great interest in the proposed project, and mentioned that OHEC would be able to provide human resources support for this project, and to financial support in terms of updating internet equipment and facility. Moreover, STI is also enthusiastic about the proposed project, and suggested that STI would be able to introduce Japanese-affiliated companies to universities utilizing their own database, to propose prospective research topics, and to introduce research centers with necessary equipment.

The survey team had also interviewed with the Director of SIIT twice, and confirmed their strong will to participate in the proposed project. He explained that it is possible to implement the proposed education program as one of the courses offered in the present curriculum in which students can obtain credits. The survey team presented a detailed project plan to a professor in KMUTT and obtained his strong will to participate in the project. To start with, the proposed education program will be implemented as an extra-curricular course in KMUTT, but the university will examine the possibility to incorporate it in the present curriculum after examining the results of the extra-curricular course. The survey team will visit the university again during the first half of 2014 in order to present a detailed proposal to the Dean and the President, and discuss about details.

Japanese Chamber of Commerce Bangkok also confirmed that they are ready to provide assistance if the proposed project is approved as an ODA project. The survey team also identified some of the Japanese-affiliated companies, which are willing to participate in the project.

Attachment: Outline of the survey

<u>Project Formulation Survey</u>
<u>Kingdom of Thailand and Republic of Indonesia</u>
<u>The Survey on Human Resource Development by Overseas Universities in Cooperation with Japanese-Affiliated Companies</u>

SMEs and Counterpart Organization

- Name of SME：CeFox Co., Ltd.
- Location of SME：Chitose-shi, Hokkaido
- Survey Site・Counterpart Organization：Kingdom of Thailand, Republic of Indonesia・Ministry of Education and universities

Concerned Development Issues

<u>Kingdom of Thailand</u>
- Human resource and system development to promote industry
- Promotion of high-value added industry
- Matching needs between universities and industry

<u>Republic of Indonesia</u>
- Improvement of business environment and development of highly-skilled human resources
- Development of high-value added industry
- Improved international competitiveness

Products and Technologies of SMEs

- Education program to develop highly-skilled engineers in cooperation with industry through blended learning
- e-learning system and education contents of high quality, which are supervised by Japanese universities and Japanese companies
- Experienced lecturers who are ex-researchers of Japanese companies

Proposed ODA Projects and Expected Impact

- Proposed ODA project: The project will operate in Thailand in cooperation with Japanese-affiliated companies, and: (1) implement education program through e-learning and lecturers, and (2) establish foundation of university-industry-government network
- Expected outcome: Sustainable platform for engineering human resource development in Thai universities is established in cooperation with Japanese-affiliated companies