CHAPTER

6

Skill Certification and Development in Thailand: A Case Study of Skill Certification Systems for the Automotive Industry

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1. Introduction

Thailand is regarded as one of the successful cases of industrial development among emerging and developing countries. Behind this success, the country has concentrated on overall human resource development to make its industries internationally competitive. In particular, skill development has been pursued by the efforts of private firms and formal education institutions. As discussed in this chapter, development cooperation from Japan has contributed to supporting such efforts.

In the case of the automotive industry, even if it is required to advance their technology for 'connected, autonomous, shared and service, electric' vehicles, there is still a need to achieve further skill development for production. Skills development can play an important role for human resource development in combination with practical working experience. This is necessary because each employee needs to improve their productivity to cope with labor shortages, higher wages, and increased competition with other emerging and developing countries. To achieve human resource development efficiently and effectively, it is a major challenge to create a skill certification system in addition to skill development, because the establishment of a certification system needs a more deliberate effort by the private and public sectors.

The Thai government and the business community have established several skill certification systems. The most comprehensive system so far is the National Skill Standards and Tests system implemented by the Department of Skill Development (DSD), Ministry of Labor and Social Welfare, with more than 200 skill standards. In addition, under the Prime Minister's Office, the Thailand Professional Qualification Institute

(TPQI) was established in 2011 and has implemented a competency-based professional qualification system to cover the areas that have not been implemented by the DSD's system. However, there are overlaps between the two.

This chapter focuses on the Skill Certification System for the Automotive Industry (SCSAI), a project implemented as a part of Japanese development cooperation from 2006 to 2011. The project activities and their consequences are investigated from the perspective of translative adaptation. SCSAI was one of the sub-projects of the Automotive Human Resource Development Project (AHRDP) that aimed at human resource development in the industry. Thailand Automotive Institute (TAI), an agency responsible for supporting the development and promotion of Thai automotive industry, was a counterpart organization. By the completion of the SCSAI sub-project, a system had been established for skill test and related training for 17 operational types in the industry. Note that the related training was explicitly built into the system, to substantiate the skill test under the condition of insufficient skill development among its main target, the local lower tier of auto parts manufacturers. Moreover, the Japanese National Skill Test was referred in order to introduce the Japanese 'comprehensive skill certification system.' The resulting system is much smaller in scale compared with the skill certification systems of the DSD but requires a higher level of skills for satisfying the demand from industry, particularly from Japanese affiliated companies.

A bibliographic survey and field research were conducted for the study. For the former, reports by experts and documents from related organizations were reviewed. For the latter, the author visited Thailand in late November to early December 2019 and conducted 13 interviews with the parties concerned. These included TAI, the counterpart organization, and the Automotive Human Resource Development Academy (AHRDA) that was anticipated would implement the skill certification and development. Furthermore, to make clear the features of SCSAI, information on some of the other sub-projects under AHRDP as well as the National Skill Standards and Tests of the DSD and the professional qualifications of TPQI was collected.

The collected data were analyzed qualitatively by utilizing the 'proposed process of translative adaptation' and the matrix of the 'target objective and delivery mode' discussed in Chapter 2 as the analytical framework for

the book. After this introduction, the 2nd section of the chapter elaborates on the achievements by SCSAI and other sub-projects focusing on skill development under AHRDP. The 3rd section analyzes their sustainable implementation after the project period. In these two sections, SCSAI and the other sub-projects are compared in terms of their common scope: skill development. In the 4th section, other skill certification systems in Thailand will be referred to for comparative purposes and to explore their potential coordination with SCSAI. The 5th section is for discussion about applying the data and information collected into the analytical framework explicitly. The final section presents the conclusion of the chapter.

2. The Skill Certification System for the Automotive Industry (SCSAI) and the Automotive Human Resource Development Project (AHRDP)

2.1. Overview of AHRDP

Among the past support projects for industrial human resource development by the Japanese government, AHRDP was one of the most conspicuous from the point of view of the number of experts and the time spent. Also, we should note that it was implemented through a public-private partnership between the Japan External Trade Organization (JETRO), the Japan International Cooperation Agency (JICA), and Japanese companies.

In AHRDP, three Japanese automakers, Honda, Nissan, Toyota, and a mega-supplier, DENSO took charge of the sub-projects, respectively. The project provided a total of 7,601 persons with the opportunity to acquire knowledge and skills relevant to the industry. A cascading system was used to realize this number, that firstly developed Thai trainers and then supported them to train Thai trainees. More specifically, the main target of training by the Japanese experts was to upgrade core human resources such as the master trainers involved in the training of trainers, general trainers, and examiners for the skill tests. The Thai trainers were in charge of training Thai trainees, with the support of Japanese experts in some sub-projects. The activities were conducted in four fields: (i) management and manufacturing training, (ii) mold and die training, (iii) the skill certification system (SCSAI, skill test and related training), and (iv) the lean production system (see Table 6.1 for more details). Considering that the number of workers in the automobile industry at that time was approximately 400,000, it was calculated that nearly two per

Table 6.1. Outputs of the Sub-Projects under the Automotive Human Resource Development Project

Sub-project	Organizing firm	Output
Management and manufacturing training	DENSO	11 training courses were conducted, with a total of 2,703 participants (of whom 60 were trainer course participants and 2,643 were general trainees)
Mold and die training	Honda	Based on 4 curricula, 24 metal processing courses were organized with a total of 2,122 people participating in the training (of whom 26 people were trainer course participants, and 2,096 were general trainees)
Skill certification system (SCSAI, skill tests and the related training)	Nissan	Lecture courses were organized on 17 different topics, with the participation of 774 people (of whom 132 participated in examiner training, 189 in trainer training, and 453 participated as general trainees)
Lean production system	Toyota	2,002 people participated in five courses (of whom 43 were trainer course participants and 1,959 were general trainees)
Total		7,601 people participated in the training projects

Source: Mitsubishi Research Institute (2017).

cent were participants in this training, and the magnitude of the impact is outstanding as a single project.

2.2. Learning and translative adaptation in SCSAI

Before starting AHRDP, Japanese manufacturers were dominant in the Thai automotive industry, accounting for more than 90 per cent of the production volume. For this reason, Japanese assemblers and parts manufacturers tended to believe that the Japanese way of production and management is the ideal way to enhance efficiency and effectiveness of the industry, though adjustments were necessary to reflect the situation in Thailand, such as the existence of more labor-intensive production technologies because of relatively cheaper wages. On the other hand, local Thai second- and third-tier suppliers had the motivation to learn the Japanese way, as they expected to acquire and expand transactions with Japanese-affiliated companies, even if it was challenging and not feasible at least in the short term. In that regard, it is considered that the industry was accommodating the Japanese way. At least at that time, the Thai public-private sector also naturally accepted the transfer of Japanese-based technology and know-how.

The SCSAI was no exception. Just like the other projects in the automotive industry supported by the Japanese public and/or private sectors, it depended mainly upon the Japanese way—in particular, Japanese National Skill Tests with 'comprehensive skill certification.' The system though, was modified and translated according to the situation in Thailand to some extent.

Before AHRDP, the skill certification system was developed in 2003 and 2004 for five operations in four jobs, supported by Japanese development cooperation. Relationships between Japanese organizations and Thai local organizations were established at that time and they were useful for restarting the project described in this Chapter. From that time, the skill certification system has been operating at three skill levels, equivalent to the Japanese National Skills Tests 1, 2, and 3. For the Thai automotive industry to further enhance its international competitiveness, these levels should be set as targets, and it was considered that this could be sufficiently feasible in the mid- and long term. However, the skill levels of the DSD's system are lower than those corresponding to actual automotive manufacturing, which may require higher precision.

The following section summarizes the process entailed in the SCSAI sub-project based on the literature review of the project reports made by experts (JETRO 2006, 2007, 2008). At the start-up stage, on the basis of discussions with Honda and DENSO, who were in charge of different training sub-projects at the same AHRDP, the experts selected 12 types of operations in eight types of jobs for skill test development. When combined with the five operations in four jobs that were established before the start of the sub-project, the whole system when launched contained 17 operations in 11 job categories, as shown in Table 6.2 (the job type 'machining' was implemented in both projects). For the previous project, technical committees were established for each job type, to implement activities with local ownership. Also, for SCSAI, technical committees for new job types were added, each with five to six people from private companies and two to three from public institutions including the DSD. For each of the 11 job types, TAI staff were assigned. Unfortunately, the TAI facilities were not qualified enough for the activities. Therefore, as an examination site, the National Institute for Skill Development (NISD, currently Samutprakarn Regional Institute for Skill Development: SRISD) was selected because of the low start-up cost, and sufficient instructors' qualifications as candidates to be examiners and trainers. There was also

Table 6.2. Skill Certification System for Automotive Industry by Job and Operation Type

Project	Job	Operation
Assistance for Developing a Skill Certification System for Automotive Industry (2004-05)	Metal press work	Stamping
	Plastic injection	Plastic injection
	Ferrous casting	Ferrous casting
	Machining	Lathe
		Milling
Skill Certification System for the Automotive Industry (SCSAI) (2006-11)		Lathe with numerical control
		Milling with numerical control
	Finishing	Die and mold finishing
		Mechanical assembly finishing
	Electronics device assembly	Electronics device assembly
	Electrical device assembly	Sequence control (PLC)
	Mechanical drawing	Mechanical drawing by Hand
		Mechanical drawing by CAD
	Pneumatic circuits and apparatus devices assembling	Pneumatic circuits and apparatus device assembling
	Hydraulic system adjustment	Hydraulic system adjustment
	Maintenance	Mechanical maintenance
		Electrical maintenance

Source: JETRO Bangkok Office (2016).

the idea that it would be a steppingstone for future integration of SCSAI into the National Skill Standards and Tests of the DSD.

For this discussion, practices indicating policy borrowing are introduced first. For most types of operations, all the test questions, evaluation criteria, etc. were transferred from the Japanese National Skill Tests. Also, in all of the four operations (lathe with numerical control, milling with numerical control, die and mold finishing, and mechanical assembly finishing) that were carried out for the first time under SCSAI, the applicants were required to deal with a broader range of exam questions, including ones in areas not undertaken by the production-related employees of many local companies in Thailand. This broad range was set according to the direction of skill development based on the practices at Japanese production sites. In this regard, the aspect of policy borrowing seemed to be very strong.

This idea was also applied to the selection of job and operation types. From the second year of the sub-project, areas related to maintenance and design, rather than direct manufacturing skills, have been actively taken up. Specifically, there are eight operations: electronic device assembly, sequence control (by programmable logic controller, PLC), mechanical drawing by hand, mechanical drawing by computer aided design (CAD), pneumatic circuits and apparatus device assembling, hydraulic system adjustment, mechanical maintenance, and electrical maintenance. These are considered to be basic skills for the maintenance and management of equipment.

Many local companies were interested in the skills directly related to the products they made, but were indifferent to the skills required by their peripheral support, and relied on equipment and machinery manufacturers for these. Thus, with their focus on developing human resources in the industry over the medium to long term, the Japanese experts deliberately stepped into areas where local companies did not feel it very necessary to be, though applicants from those firms were expected to expand and be a major part of their development in the future. For example, the method of mechanical drawing is a common language for the manufacturing sector in Japan, and the drawings are master information resources that everyone ultimately stands by. However, this type of 'common sense' found in Japanese manufacturers was not observed in the Thai manufacturing industry. Therefore, the experts also added the operation of handwriting. Even though CAD was already widely used in Thailand, they thought that the experience of actually writing lines and symbols with one's own hands was essential in the initial stage of skill development.

Contrary to the points mentioned above, there are some aspects where translative adaptation was observed. For example, concerning the skill test questions, it was not possible to utilize those in the Japanese skill tests for pneumatic circuits and apparatus devices assembling, hydraulic system adjustment, and mechanical maintenance. This was because the essential idea of the Japanese national skill test is based on the 'goodness of mind theory.' These three operation types have a common characteristic that can be distinguished from the others. It is that the tests cannot be made without setting very specific task patterns to complete the test process within a reasonable time. On the other hand, in workplaces the examinees face a much greater variety of task patterns. The potential dark side of this

is, even if the skills of the examinees as a whole do not reach the level of the grade, if they focus on the specific test task and learn that effectively, they may pass. In Japan, supervisors and senior peers would prevent the examinees from undertaking this kind of misbehavior, but in Thailand the experts could not be optimistic and feared that the examinees would obtain inside information on the task. Therefore, the Japanese experts and Thai counterparts agreed to require the examinees to practice multiple tasks at the test. As a result, the tests on the three types of operations necessitated a wider range of content than those taken in Japan.

Another more general aspect of translative adaptation was found in the training for the examinees before taking the skill tests. In Japan, companies mainly support the improvement of skills at the individual level. Furthermore, it is common for examinees to study on their own initiative while receiving support such as using the facilities of the company. In Thailand, especially for local auto parts manufacturers (so-called tier-2 and tier-3 manufacturers) that have no direct transactions with automotive manufacturers, it is difficult to rely on in-house on-the-job training and off-the-job training. When the Japanese experts exchanged views during company visits, they got requests to create opportunities for learning in preparation for tests. The interviewees at the firms were afraid that the examinees from their firms may not be able to pass the tests without prior learning and the Japanese experts and their Thai counterparts felt the same way. As a result, training was implemented prior to skill tests for the sub-project.

Moreover, to further spread the skill certification system, collaboration with other sub-projects of AHRDP, management and manufacturing training, and mold and die training was also achieved. Specifically, when selecting the type of jobs and operations at the time of launch, the Japanese experts decided to give priority to areas closely related to the training in the two other sub-projects. SCSAI also had the idea that the trainees of the other sub-projects would have to take their skill test, but this was not put into action due to a mismatch between the relatively higher level of test (starting from level 3) and the lower level of the trainees, especially in the early stage of AHRDP.

Finally, choosing TAI under the Ministry of Industry as a counterpart might have led to higher levels of translative adaptation compared with selecting other organizations, even though there has been room for

further improvements. From the Japanese government's perspective, the entire AHRDP was designed and implemented by an initiative of the Ministry of Economy, Trade and Industry, and JETRO, hence the Ministry of Industry is their counterpart in the Thai government. On the other hand, there were a large number of Japanese experts dispatched to the TAI, not only for the skill certification system development project in the previous stage, but also for roving expert technical support and so on. Thanks to these achievements, the local firms in the automotive industry recognized the presence of TAI. Therefore, to start the skill certification system development in the industry more smoothly, it was likely the best option to ask TAI to be a counterpart. Meanwhile, it is also necessary to pay attention to the integration of SCSAI with the national skill test system or at least seek their effective coordination in the long run. For this, they made efforts to have the participation of the DSD as a member in the steering committee of the sub-project and in the technical committee for each job type. The utilization of the facilities of NISD was also decided partly due to the same purpose. JETRO (2008) also stated that since the signing of the MOU with the Ministry of Labor in March 2007, there had been a positive attitude towards support for the sub-project, making it easier to carry out activities.

One important point to note is that the above-mentioned adjustment was carried out mostly by the initiatives of the Japanese side, especially by the experts. TAI and the Ministry of Industry did not have the experience of developing and operating skill certification systems. In that sense, within the main activities of SCSAI the Japanese experts recognized that they were dealing with a greenfield situation. On the other hand, the study found that the Thai counterpart's active engagement with the Japanese experts enhanced their learning. It is expected that such learning process enabled internalization of the acquired knowledge, leading to sustained utilization of the skills in each institution as mentioned in Section 3. A potential disadvantage was that 'insufficient' translative adaptation by the counterpart organizations would lead to a problem when they need to make further adjustments to the systems by themselves.

2.3. Skill development in other sub-projects of AHRDP

Commonly, the core part of AHRDP lies in the training of Thai trainers. Focusing on this point, this sub-section examines whether or not translative adaptation was seen in the process of implementation of some of the other

sub-projects of AHRDP.

First, mold and die training was conducted at Honda Thailand for large molds in the 1,000-ton class, covering all processes of mold development and manufacturing. Specifically, a curriculum was adopted that targeted all four types of jobs, including design, CAD/computer aided manufacturing (CAM), machining, and finishing. Trainees learned the basic contents of all jobs beyond the boundaries of their own job. To give an example, before moving on to specialized training for each job, everyone participated in training on finishing beyond the basics. In the 'Finishing basics' area, they were requested to make adjustments to test pieces by cutting and welding, whereas, in the more advanced 'Finishing' area, they made trial stampings with three processes using a semi-finished medium-sized mold for the rear door panel. The mold was to be finished by checking the shape of the trial product. A plan for scheduling and costs was also created so that the process could proceed like the actual manufacturing operation. At first the trainees wondered why they had to learn skills beyond their specialization. During the course, the Japanese experts explained to them the importance of understanding the process as a whole, hence they are required to learn the skills that are not directly related to their specialization. After the trainees were given this explanation, they were able to understand the intention behind the training curriculum/course.

The Honda headquarters in Japan used to adopt the same method for their employees in the mold and die section generally, but it had become difficult to continue this method due to the progress of the division of labor resulting from busier work in the 1990s. In that sense, it is considered that the training at Honda Thailand adopted the ideal training curriculum for the training of trainers, by taking advantage of the opportunity provided by development cooperation.

One more point is the efforts of the successor organization. The Thai-German Institute (TGI) was in charge of the training by the Thai trainers who had learned from the Japanese experts. For the training of trainers, TGI could not provide their facilities due to the unavailability of 1,000-ton class stamping machines. Therefore, Honda Thailand provided the facilities in their factory. Training by Thai trainers began in 2007 as in-house training for colleagues, and from 2008, TGI adapted the training at Honda Thailand to 25 courses of training with a smaller size of stamping machines. Honda was not involved in the training conducted in this way

and TGI operated independently. TGI's application can be understood as translative adaptation and that was possible as they already had a lot of experience in mold-related training management.

Next, management and manufacturing training by DENSO consisted of seven courses. For management, Total Quality Management (TQM), Training Within Industry-Job Instruction (TWI-JI), Training Within Industry-Job Relation (TWI-JR), and Workmanship Training Course (WSTC) were made available. For manufacturing, a general course (safety, quality management, 5S, *Kaizen*, Total Productive Maintenance (TPM)), a machinery course, and an electrical course were implemented.[1]

Since the Japanese experts had utilized the same teaching material for DENSO Thailand, the translative adaptation process was considered to have been completed as a result of trials and errors before starting the sub-project. But the Japanese experts were also flexible enough to improve their procedures when a better idea became available. For example, TWI-JR covers the human relationship between supervisors and subordinates and therefore needs to rely on the social and cultural background. The experts had already prepared the material for explanations based on the case of Thailand, but they added another case based on the discussion with their trainees who would be trainers for Thai trainees. Specifically, the trainees were required to learn the practice of 'asking why five times in a row' to reach the real cause of a problem. For this learning, the examples of the human relationship issues at Thai workplaces were prepared by the experts. However, the discussion led the Japanese experts and their trainees to at first use 'the reason why the then King Bhumibol was respected and loved by the Thai people,' because this was a familiar example and easily understood by them.

[1] The 5S approach consists of: (i) sorting; (ii) setting in order; (iii) shining; (iv) standardizing; and (v) sustaining (JICA 2018). It is widely recognized by enterprises as a useful means to improve productivity and work environments. The core value of *Kaizen* is placed in creating an attitude shared among all members of an organization who consistently pursue advanced levels of quality and productivity, and not just applying its management method. *Kaizen* is a comprehensive system that consists of broad technologies such as 5S, 7 Quality Control (QC) tools, Total Quality Management (TQM), Toyota Production System (TPS), Lean Production System, etc. to pursue activities under this core value. See JICA (2018).
Total productive maintenance (TPM) is 'the productive maintenance carried out by all employees through small group activities', where productive maintenance is maintenance management which recognizes the importance of reliability, maintenance and economic efficiency in plant design. See Nakajima (1988).

3. Deployment after the Project Period

3.1. Current status of and scaling-up from SCSAI

During the implementation of the sub-project, Japanese experts hoped that SCSAI would be integrated into the National Skill Standards and Tests of the DSD. However, in reality, this idea did not proceed. As a result, integration between the two systems has not been achieved as is described below.

For SCSAI, TAI as the local counterpart organization decided to utilize the facilities of NISD in consideration of the limited space. After the completion of AHRDP, the mechanical equipment was therefore transferred to NISD's management, but they did not involve in skill certification as mentioned later. TAI came to be in charge of the succeeding Automobile Human Resource Development Institution Project (AHRDIP) and they had no available resource to continue implementing skill certification. However, from 2017 (after the end of AHRDIP), TAI started implementing 4 out of the 17 operation types created by AHRDP again. These are all related to automation (mechanical assembly finishing, sequence control (PLC), pneumatic circuits and apparatus device assembling, and hydraulic system adjustment), and this was done with the support of the Ministry of Industry. Since the funds came from a budget for promoting Thailand 4.0, a policy aiming at industrial sophistication to get out of the 'middle-income trap,' only operations related to automation were supported.

Current training and certification are conducted at SRISD, the former NISD, where mechanical equipment is installed, just like TAI did for SCSAI. During the time of AHRDP, not the SCSAI trained trainers and examiners, but Japanese experts were in charge of all the preparation for skill standards and the tests. For this reason, even after the completion of the SCSAI sub-project, the tests continue to be implemented with the same test questions and scoring standards as at the beginning. The experts' 'excessive' involvement in SCSAI was necessary to implement the planned activities effectively due to the time and resource constraints in TAI, while that was the very reason why policy and institutional learning was not widely possible. Also, because training and certification is conducted within the budget and without any financial burden on the trainees, it is limited to small-scale implementation and is not widely used in the entire industry. The current TAI staff in charge of skill certification are afraid that the examinees will not participate if TAI asks them for

payment. Judging from the current status of SCSAI, there is no substantial prospect of integrating it into the National Skill Standards and Tests of the DSD, therefore, it is reasonable for TAI not to be very active in related activities.

At SRISD, the DSD established the Automotive Human Resource Development Academy (AHRDA) in 2014 as a training institute for the automotive industry. It was intended to succeed the activities of SCSAI and the management and manufacturing training under AHRDP. The academy came to own the machinery and equipment used for SCSAI. Moreover, in fact, the DSD (and AHRDA) did not intend to take charge of skill certification, although SCSAI (or at least its Japanese experts) hoped to transfer this activity, too. Indeed, skill certification was not within the scope of AHRDA's mission. The fact that the DSD operates the National Skill Standards and Tests is considered to be the reason why their mission does not include this kind of activity. There seems to be a perception gap between AHRDA and the Japanese side. According to JETRO Bangkok Office (2016), since AHRDA is a government agency under the DSD, they are also focusing on skill certification, and in the future, they will implement the DSD's skill tests for the automotive industry as an implementation agency.

Regarding the skill certification restarted by TAI, AHRDA receives a request for permission to use the machinery from TAI every time. The related training and tests are conducted solely by TAI, and AHRDA only issues permission for this request. Consumables are also brought in at TAI's expense. In addition to this, AHRDA is engaged in test operations that are regularly made for equipment maintenance. The machinery and equipment were used for the academy's activities, too. For example, a JICA expert for AHRDA utilized PLCs transferred from SCSAI in his training for sequential control skill development. Thanks to this training, the PLCs have been relatively better utilized. In fact, the JICA expert mentioned that the training he conducted for local trainees was for developing a national skill test (JICA 2017). However, when confirming with AHRDA, they replied that testing is outside their domain and their focus is on training only. Moreover, the training by the expert took five days that was longer than three days for the skill test by the DSD. According to their understanding, the training was too much for the applicants for a skill test.

Based on the information above on TAI, AHRDA, and SRISD, no substantive scaling-up could be observed regarding SCSAI. Although TAI has implemented skill certification and related training, their activities are not likely to be sustainable without specific support from a new project. One limitation of the argument in this sub-section is potential knowledge and skill spillover as 'informal scaling-up' from all types of participants in SCSAI (examiners, trainers, and all the level of trainees) to their peers and subordinates in their organizations. In terms of the size of impact, this spillover can be larger than the direct transfer from the local trainers to their trainees.

3.2. Current status of and scaling-up from other sub-projects of AHRDP

In this sub-section, the implementation and transfer status of mold and die training to TGI and management and manufacturing training to AHRDA are elaborated.

First, regarding mold and die training, three lecturers of TGI participated, and one of them still works as a trainer for TGI. TGI has not provided training for large-scale molds as in the mold and die training of AHRDP, but the TGI trainer could apply the training to TGI's smaller and medium-sized mold and die training with modifications. Moreover, 26 trainers in total developed by the mold and die training still have regular trainer meetings. Among them, eight members including the TGI trainer above are engaged in activities such as holding seminars at companies. They share problems daily in a LINE[2] group and work together to solve them. The group is considered to fulfil a certain function as a community of practice that is defined as 'a group of people informally bound together by shared expertise and passion for a joint enterprise' (Wenger and Snyder 2000). Beyond the exchanges among the members, they sometimes teach employees in their organizations, too. One reason for this relatively strong commitment by the trainers is they are limited in number, compared with SCSAI having hundreds of examiners and trainers. At the same time, TGI has supported such activities by providing their facilities. Consequently, the involvement of TGI and its trainers functioned more easily.

Among other sub-projects, this case showed a better result in terms of

[2] A popular social media application for instant messaging in Thailand.

sustainable mutual learning among the trainers. One reason is that TGI has played the role of a focal point because of the strong commitment by the trainer who has worked for TGI. He has also been supported well by the top management. The other important point is that all the trainers had the experiences of learning together, thanks to the curriculum that required them to learn all the processes in mold and die development and production, especially finishing. Beyond better communication, their comprehensive experiences may have enhanced collaborative activities, including problem-solving.

Next, the handover status of AHRDP management and manufacturing training can be investigated at AHRDA. Many of the management and manufacturing training contents have been well transferred to the AHRDA's trainings (AHRDA 2016), which is better than their application of SCSAI trainings and tests. For instance, training related to manufacturing was incorporated into the 'Super Blue Collar' training[3] that is currently conducted, thanks to the in-house trainers' extensive efforts. In that respect, it can be judged that the know-how transferred has been continuously utilized. One problem is that trainers developed by the management and manufacturing training have not been involved in AHRDA's training sustainably. Although both types of trainers—SRISD in-house trainers and those from outside—learned from the same management and manufacturing training by DENSO, there are no cases where the latter became instructors in the AHRDA training system. There were cases where trainers in the TWI training system for supervisors became trainers at SRISD after the completion of AHRDP, but this has not been seen since the establishment of AHRDA.

The long-term goal of the sub-projects was to raise the knowledge and skill levels of the whole industry, including tier-2 and tier-3 local suppliers, by disseminating what the trainers learned from AHRDP. The TGI has implemented training in a similar form. Although it has not reached the expected scale yet, we can anticipate continuous implementation in the future. The AHRDA, as the transferee of the management and manufacturing training, is less effective than TGI, especially in terms of sustainable commitment of trainers developed. However, as in the case of

[3] Its main objective is to cultivate front-line supervisors with overall management skills including self-, human resource, and organizational development based on 'blue collar' skills regarding safety, quality, and operations.

SCSAI, it is not possible to fully grasp the activities of trainers developed by the two sub-projects other than those of the counterpart organizations. The spillover effects may be occurring by the trainers.

4. Other Skill Certification Systems in Thailand: Their Relationships with SCSAI

4.1. DSD and TPQI

As mentioned in Section 1, Thailand has two standards for skill certification, namely, the skill standards of the DSD and the occupational standards of TPQI, both of which are accommodated under the Thailand National Qualification Framework (TNQF), together with general and vocational education. This is different from the national qualification frameworks (NQFs) of several European countries, Australia, and New Zealand that emphasize vocational qualifications. The TNQF focuses on competency-based work experiences, as does the NQF in the United Kingdom (Garchotechai, Tulwatana, and Naulsom 2018).

First, the DSD is responsible for the development of National Occupational Skill Standards and provides occupational skill training and testing. The curriculum is developed at a national level through the DSD, but individual providers can also develop their curricula. It is a mix of both. The system was expected to introduce competency-based standards supported by technical cooperation from the Asian Development Bank (ADB 2003). However, in implementation, their skill standards are narrower in scope than the competency-based standards (Korea World Bank Partnership Facility: KWPF 2015). As of October 2018, there were skill standards for 2,407 occupations (JTB 2020). According to the JETRO Bangkok Office (2016), a skill certification is conducted by written exam and practical tests, and in 2015, 66 tests were carried out. Most of the work was done at the lowest level 1 only, 18 tests were at level 2, and Carpenter Construction was at level 3. There are two types of skill standards: National Industrial Skill Standards (NISS) with the cooperation of the Federation of Thai Industries (FTI) and National Occupational Skill Standards solely formulated by the DSD. Regarding the division of labor, the areas that cannot be covered only by teaching staff in vocational schools and universities are taken charge of by NISS.

As a formal system, the skill standards have the potential to be utilized by the private sector as well as by educational institutions, although

skill tests need to be developed for most occupations. However, in the interviews during the author's field research, Thai companies and university professors in related fields said that the skill tests were not being utilized due to insufficient information. A TWI trainer trained under the management and manufacturing training system of AHRDP mentioned that 'the skill tests are actually at an individual operation level, and therefore it is difficult to make a selection of appropriate ones for their employees, compared to a competency-based job level framework such as TPQI's professional qualification. Many companies cannot determine which tests should be taken. That may cause a problem to permeate the entire industry.' Also, even though this TWI trainer's company is relatively active in utilizing the skill test, they will not let their employees take the highest level, Level 3. This is because the content of the skill test is too advanced and has little relevance to tasks at their workplace.

The other institution involved skill certification, TPQI, is a public organization under the supervision of the Prime Minister, and was officially established in 2011. According to KWPF (2015), TPQI is responsible for developing the national professional qualifications system, including professional qualifications and occupational standards. For this purpose, the institute supports industrial and business sectors in developing occupational standards and accredits assessment centers for the assessment of competencies and issuance of qualifications under its remit. The centers must meet the requirements of ISO/IEC 17024:2012. According to its website, the occupational standards for 59 sectors and more than 500 detailed occupations and levels have been established.

During the process of developing occupational standards and professional qualification systems, TPQI has had cooperation with international partners, such as the People 1st Sector Skill Council (UK, for tourism and transportation) and Innovation & Business Skills Australia (in areas such as business services, financial services, information, and communication technology). TPQI (2020) also engages in active cooperation with regional partners. In ASEAN, the Technical Education and Skills Development Authority (TESDA) of the Philippines is a collaborator to ensure compatibility with the standards of the automobile service industry and logistics. Together with the National Institute for Vocational Training (NIVT) in Vietnam, they aim at making occupational standards in mechatronics compatible. Both are in preparation for the ASEAN Economic Community. Moreover, they have worked with

the Information-Technology Promotion Agency (IPA), Japan, and the Ministry of Science and Technology, Thailand to create occupational standards for IT equipment repair companies. With the Human Resources Development Service of Korea (HRD Korea), they developed the process of qualification and its examination in the field of mechatronics.

JETRO Bangkok Office (2016) reported that the DSD and TPQI had decided in principle that there should be no overlap in the creation of standards in the vocational sector, which means that TPQI is supposed to develop the standards that the DSD has not yet developed. However, in practice, some of them overlap in multiple occupational fields. In fact, DSD is involved in the activities of NPQI. For example, an executive-level official of the DSD is a member of the NPQI board. The two organizations established a working group to compare the standards established by TPQI and the DSD and to establish professional standards together. Although, at present, not all the standards are distinguishable, there are two examples of a clear division of labor. One is auto parts manufacturing-related operations in the DSD and automotive repair and maintenance services in TPQI. TPQI develops professional standards for automotive service, engine repair, and underbody repair for those who work in after-sales service centers. It should be noted that this qualification does not overlap with the standards of the parts industry created under the NISS of the DSD with the cooperation of FTI. The other example is for molds and dies. Mold and die manufacturing is one of the categories of NISS with all levels 1 to 3. TPQI has created standards for the industry relating to the upper 4th to 7th levels in cooperation with the Thai Tool and Die Industry Association.

4.2. Relationship of DSD and TPQI with SCSAI

As shown in the previous sub-section, Thailand has developed its skill certification systems mainly by the activities of the DSD and TPQI. The two systems aimed to make a good division of labor and the attempt has been successful to a considerable extent, though there are some room for further coordination. Compared with the effective division of roles between the two systems, SCSAI has not created good relationships with either of them. There is particularly a concern over the link to the National Skill Standards and Tests of the DSD.

According to JETRO Bangkok Office (2016), a senior official of the DSD

stated that they believe Thai skill standards must be equivalent to international standards. For example, in the field of welding, international standards such as European, American, and ISO standards are used. The Japanese standards are too high-spec and so it seems very difficult to perform a Japanese equivalent standard certification test for Thai skilled workers. That was the main reason for the difficulty found in integrating SCSAI into the DSD system or realizing good coordination between them, though that is potentially the most effective way of scaling up SCSAI. A tip is found in the coordination of the DSD's and TPQI's systems. For the mold and die skills/competency, they share the levels as mentioned above; the lower levels by the DSD and the higher levels by TPQI. It does not seem to be possible to easily match skills and competency, but they could complete the task through careful coordination. SCSAI may take the same path to establish the division of labor within the DSD's system, for which TAI can be a major training and test implementation organization.

5. Discussion

Based on the information in the previous sections, project implementation and their deployment after the project periods are summarized for SCSAI and other sub-projects of AHRDP by utilizing the translative adaptation model (Table 6.3).

The main focus, SCSAI, was evaluated and adaptation of skills and knowledge by the Thai side was found to some extent, such as rearranging the skill test tasks of some operation types and incorporating training components. The adaptation was made mainly by the Japanese initiative, which raised the effectiveness of the project implementation at that moment but might have led to less experience of substantial decision making by local counterparts. Due to this, they might be less likely to make a sustainable adaptation when necessary, after the sub-project was completed.

More generally speaking, this donor-led adaptation is related to the development of knowledge and skills for problem finding and solving, and for continuous improvement. Ultimately, we should learn and utilize how to develop such knowledge and skills continuously by ourselves, or meta-learning to sustainably operate the translative adaptation process. In this regard, to facilitate smooth adaptation process, selecting TAI rather than the DSD was strategically an appropriate decision. However, mainly

Table 6.3. Summary of the Analysis on the Sub-Projects of AHRDP Studied

Sub-project	Learning	Adaptation	Scaling-up
SCSAI (Skill Certification and Related Training)	• Trainer/examiner by training and certification • Curriculum for training (Excluding skill standards and test questions)	• Rearranging the skill test tasks of three operations • Incorporated training into the system	• Both skill tests and training have not been reflected in the skill tests by the DSD • Spillover in the trainers' own organization?
Mold & Die Training	• Trainer • Curriculum (1,000t class)	• Curriculum development for medium and small types additionally	• Forming a community of practice? • Spillover in the trainers' own organization?
Management and Manufacturing Training	• Trainer (none in AHRDA) • Curriculum	• Included the case of King Bhumibol	• Reflected into 'Super Blue Collar' Training • Spillover in the trainers' own organization?

Source: The author.

due to resource constraints, TAI could not exploit the learning opportunity fully and develop their staff for sustainable adaptations as well as achieve the scaling-up as anticipated.

The specific features during the adaptation stage might have influenced the scaling-up stage. No substantial scaling-up was observed for SCSAI. In fact, compared with other sub-projects, scaling-up is more difficult for SCSAI. This is because the DSD had already established skill standards and tests at the time of starting SCSAI, although the DSD's system had not satisfied the needs of the automotive industry then. Therefore, different from the stage of adaptation, SCSAI had no green-field conditions. More seriously, due to the gap in terms of the skill level required, simple integration was not promising. However, as discussed earlier, the DSD succeeded in cooperating with TPQI to coordinate the two systems in some cases. Although this cooperation was possible because TPQI is under the Prime Minister's Office, it was harder between two ministries having a more horizontal relationship.

Other sub-projects have achieved some kind of scaling-up but not to their full potential, but rather being limited within the range of the specific direction of expansion opportunities. In the case of both 'mold and die

training' and 'management and manufacturing training,' the expected full-scale may mean at least frequent training by the trainers and its development by the sub-projects inside and outside the counterpart organizations. The current level does not reach this scale, unfortunately. However, even if such scaling-up cannot be realized, the author wants to emphasize that a community of practice is formed among the trainers developed by the mold and die training system. This is indispensable as a social infrastructure that makes the overall skill development system more effective, as in the case of Japan.

6. Conclusion

This chapter investigated the translative adaptation process of SCSAI, which is a sub-project of AHRDP supported by Japan aimed at developing a skill certification system including skill development training to satisfy the high level of requirements for the Thai automotive industry to attain sustainable international competitiveness. According to the analysis, although Japanese experts had the initiative from the process of adjusting the Japanese system, TAI staff did achieve some degree of translative adaption. That was possible especially because the sub-project consists of skill tests as well as skill development and so needed to cover a broader and different scope of activities compared with the other sub-projects of AHRDP that focused solely on skill development. However, scaling-up cannot be observed in either the counterpart organizations or with the National Skill Standards and Tests. Compared with the other sub-projects of AHRDP focusing on skill development, their performance has not been superior.

The present study has persuasively argued in the discussion of the project case from the perspectives of the translative adaptation model. But there are suggestions for further areas of research. First, primary data was collected mostly on the recent status of the projects. Although the reports by the experts supply rich and detailed information on their candid views, particularly on SCSAI, it was found better to collect information on what happened during the project period from the former Japanese experts, the members of the steering committee and technical committees, and lecturers who developed the Thai version of the learning material.

Second, a sample survey of local trainers may be effective to grasp the spillover effects from the trainers to their organizations or anywhere

else other than the counterpart organizations. Finally, comparison with other sub-projects of AHRDP was fruitful with regard to the process of formulating a skill development system, but a similar kind of comparison was not made with the DSD and TPQI in terms of the process of establishing a skill certification system, as the information regarding translative adaptation was not obtained. Future studies can clarify the process better by paying attention to these points.

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