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Skill Development for Vietnam's Industrialization*:

Promotion of Technology Transfer by Partnership between TVET Institutions and FDI Enterprises

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1. Introduction

Foreign direct investment (FDI) has drastically increased in Vietnam since 2004. This increase can even be seen as a second investment boom, following the first surge in investment during the latter half of the 1990s. The total value of approved FDI projects increased by 56% from 2006 to 2007, reaching US$ 21 billion[1] in 2007 (GSO, 2008). However, most of these FDI enterprises were attracted to Vietnam by the abundance of good and low-wage production-line workers. While this investment has contributed to the initial stage of industrialization, sustainable industrialization and economic growth will require high-level industrial human resources such as excellent technicians and production-line leaders who can improve production operations. Such workers are needed, not only for foreign subsidiaries that receive direct technology transfer through FDI, but also for local suppliers that may receive indirect technology transfer from the spillover effects of FDI enterprises. Local suppliers are very important for supporting industries together with FDI suppliers. Without the development of supporting industries, international competitiveness in the machine-manufacturing sector cannot be improved even if final assemblers are accumulated[2].

It is widely recognized that Vietnam has high potential for developing industrial human resources, but the shortage of technicians and middle managers has become apparent. For now, FDI assemblers are expanding their investment in Vietnam, but they may move to other countries with lower-wage production-line workers when the wages increase in Vietnam. For further industrialization, it is essential for Vietnam to develop highly skilled industrial human resources who can increase productivity and manufacturing value-adding before the country loses the advantages of a low-wage labor force.

One of the measures for skill development would be to accelerate technology transfer from FDI enterprises, taking advantage of Vietnam's better position to attract FDI. This technology transfer may happen in various ways including through on-and-off-the-job training within FDI enterprises, increasing business relationships between FDI enterprises and local suppliers, and interaction with schools which provide technical and vocational education and training (TVET).

Focusing on skill development in the machine industry, through the interaction between FDI enterprises and TVET institutions for advanced education, the main task of this paper is to address the question: *How can TVET institutions build partnerships with FDI*

[1] The figure is the total registered capital of licensed FDI projects. The value of implemented capital in 2007 was US$ 8 billion.

[2] The necessity of supporting industries is mentioned in Mori (2005), VDF (2006), and Thuy (2007).

enterprises in order to accelerate technology transfer in the electrical and electronics, motorcycle, and automobile sectors? In order to answer this research question, the following section will explore the demand for skilled industrial human resources. Section 3 reviews the structure of the TVET system in Vietnam. In Section 4, the good practices in Malaysia and Thailand are introduced. Section 5 explores emerging cases of interaction between TVET institutions and FDI enterprises in Vietnam. Section 6 analyzes how those TVET institutions in Vietnam have mobilized partnerships with FDI enterprises. Section 7 provides concluding remarks.

2. Demand for skilled industrial human resources

Despite the remarkable increase in FDI in Vietnam in recent years, there is no guarantee that this trend will continue. Advanced Association of Southeast Asian Nations (ASEAN) countries such as Malaysia and Thailand, which began industrializing much earlier than Vietnam, have become production bases for FDI enterprises' products of higher added value. Wage levels in these countries are higher than those in Vietnam but so are their technological levels. China and India have advantages over Vietnam in terms of their huge domestic markets and abundant low-wage labor forces. Latecomers such as Cambodia, Laos and Myanmar may also compete with Vietnam for FDI by offering lower-wage labor. Comparing dynamic competitiveness in East Asia, some FDI enterprises may consider restructuring their manufacturing operations in Vietnam. For instance, Sony decided to stop its manufacturing operation in Vietnam and has focused on sales and marketing activities since September 2008. Sony could no longer find competitive advantages in producing TVs, their main product, in Vietnam. This is because of market trends from cathode-ray tube (CRT) displays to liquid crystal displays (LCD), the difficulty in procuring LCD and other production parts in Vietnam, and tariff reductions for finished goods under ASEAN Free Trade Area (AFTA)[3]. Sony will import TVs from their factories in other ASEAN countries to Vietnam. Some more FDI enterprises might make the same decision that Sony has made in the future.

What should Vietnam do in order to avoid the capital flight of FDI enterprises? Protective policies for domestic market such as tariff barriers and local content requirements are outdated and unrealistic approaches, considering today's international trade and production systems which are built upon complex network of horizontal and vertical divisions of labor. It is virtually impossible to control import tariffs for protection of certain manufacturing sectors, because one product tends to be made up of various components, some of which need to be imported. Governments can not specify the items which can be produced locally, because the variety of goods and components

[3] Under AFTA, which Vietnam fully joined in 2006, the import tariff for electronics products should be 0-5%.

keeps changing frequently. In fact, Vietnam was required to remove such protective policies after joining the World Trade Organization (WTO) in January 2007. To achieve further industrialization, Vietnam needs to strengthen international competitiveness, which derives from endogenous factors.

To increase competitiveness led by endogenous factors, it is essential to develop high-level industrial human resources who will be able to receive and internalize up-to-date technologies transferred from FDI enterprises. However, more and more enterprises report the shortage of skilled labor these days. According to the Business Environment Sentiment Survey 2008 (Vietnam Business Forum, 2008)[4], both domestic and FDI enterprises in Vietnam face a shortage of skilled labor. Less than 15% of surveyed companies replied that there was improvement in labor availability from 2007 and more than 35% of them proposed improving education and training systems to improve the business environment.

Several other surveys pointed out the shortage of skilled workers, but they have not really examined which levels of workers or what kind of skills are lacking. Although it is difficult to generalize about labor and skill demand because it varies considerably depending on industrial sectors or individual enterprises, to some extent we can see an overview of the labor demands of FDI enterprises through the annual Japanese-Affiliated Manufacturers in Asia survey which is conducted by the Japan External Trade Organization (JETRO). Figure 1 shows that the percentage of Japanese manufacturers that reported difficulties in recruiting middle managers and engineers in Vietnam has gradually increased in the period 2003-2006. In contrast, the ratio of manufacturers that reported difficulties in recruiting general workers (production-line workers) is relatively low. In reference to Figure 2, it can be said that the shortage of engineers, technicians and middle managers is more obvious in Vietnam than in other advanced ASEAN countries such as Malaysia, Thailand, Indonesia and the Philippines. In addition, according to another JETRO survey which focused on labor forces (JETRO, 2006b), many manufacturers needed mechanical engineers (58.5%) and electrical engineers (41.5%) in Vietnam.

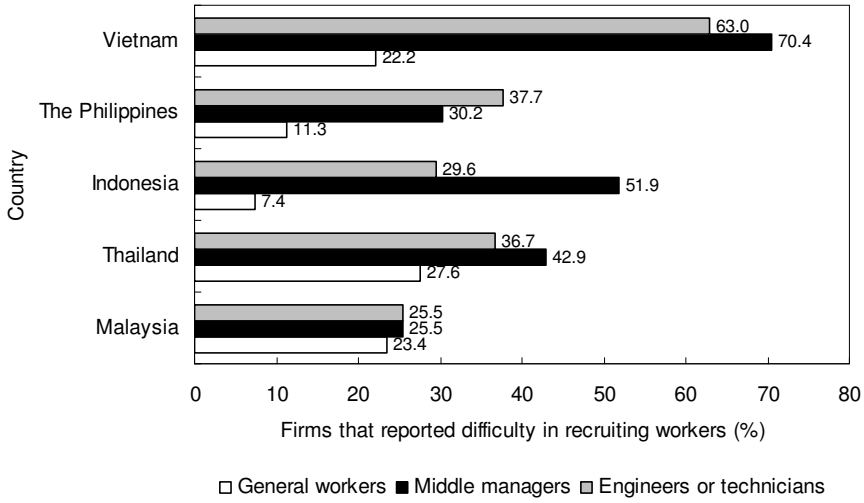
[4] The survey covered enterprises in Hanoi, Ho Chi Minh City and Can Tho. Of those enterprises that responded (254), 77% were domestic and 23% were foreign owned.

Figure 1. Difficulties in Recruiting Different Types of Workers in Vietnam

Source: Data drawn from Japanese-Affiliated Manufacturers in Asia, JETRO.

Note: Surveys in 2003 and 2004 did not include questions about recruitment of general workers.

Figure 2. Comparison between Vietnam and Other ASEAN Countries (2007)



Source: Data drawn from Japanese-Affiliated Manufacturers in Asia, JETRO.

The following will discuss middle managers and engineers, which are in high demand. In factories, the departments directly related to production operations include production control, production, production engineering and quality control and assurance. Although all of these are important, we will focus on the production and production engineering departments, which often require workers who have completed TVET.

A production department consists of production-line workers, production-line leaders,

and managers. As mentioned earlier, not many enterprises have difficulty in recruiting production-line workers. In addition, the production department tends to be the first department in a FDI enterprise's factory to have its management taken over by local staff. This is mainly because the main duties of production managers are to manage large numbers of local production-line workers - production managers have relatively less interaction with the enterprise's headquarters than do other managers. According to JETRO (2007), 50.9% of Japanese enterprises answered that the heads of their production departments were recruited locally. This, however, does not mean that Japanese enterprises are satisfied with the quality of production staff at all levels. Many enterprises are still seeking: (i) multi-skilled production-line leaders who can manage and improve the entire production process rather than remain limited to a specific one[5]; (ii) engineers or technicians who are skilled at high-precision processing in making metal, plastic parts, molds and dies[6]; and, (iii) middle managers who can lead day-to-day improvement of factory operations by identifying and resolving problems from a broad and long-term perspective.

In a production engineering department, workers are usually engineers or technicians who graduated from industrial colleges or technological universities. This department needs to communicate very closely with the product design department in the enterprise's headquarters, and thus needs more time than a production department to localize its management[7]. "Engineers" in JETRO's surveys should be considered production engineers who lead the improvement of factory layout, jigs, person-hours, and in-house logistics flows in close cooperation with the production and design departments of an enterprise's headquarters. Although many policy makers in Vietnam tend to regard "engineers" as being in high demand as product designers, local demand for product designers is not high because designing processes are concentrated in advanced countries.

The above analyses indicate that, for further industrialization, Vietnam needs industrial human resources who can initiate and manage the improvement of production operations, rather than those who can perform only standard tasks. Vietnam's ability to advance its industrialization by maximizing benefits from expanding FDI inflows is largely dependent on how TVET institutions are able to cope with the increasing demand for those high-level industrial human resources.

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[5] Prof. Fujimoto mentioned that this "multi-skill worker" is essential for an integral manufacturing system and that Vietnam has great potential to provide such workers. See Fujimoto (2006).

[6] In particular, supporting industries require human resources that possess high-precision processing skills. See Takabayashi (2006) and VDF (2006).

[7] According to JETRO (2008), 13% of enterprises responded that heads of production engineering department are local staff.

3. Overview of TVET system in Vietnam

Vietnam's TVET system has changed overtime, especially after the implementation of *Doi Moi* (renovation) policy in 1986. During the centrally-planned economy period, the government fully managed and financed the training for skills development, considering that production statuses, and the number of trainees usually corresponded to the number of workers, technicians and managers needed in state-owned enterprises (SOEs). During the early 1970s, education and training departments were created within various ministries to organize and manage the training and education activities of ministries at all levels. In 1978, the Department of Workers Training was separated from the Ministry of Labor and became the General Department of Vocational Training directly belonging to the Cabinet Council, and this Department became responsible for TVET. The number of vocational training schools reached a peak of 366 in 1980.

The 10 year period after Doi Moi was a depressed period for vocational training, where the number of vocational training schools fell down from 279 in 1987 to 129 in 1998. Demand on vocational trainees decreased because many SOEs closed down or laid off workers. In addition, when the first wave of FDI arrived in Vietnam, most TVET institutions could not respond to the demand from FDI enterprises for skilled workers at international levels. After the General Department of Vocational Training merged into the Ministry of Higher Education and Professional Secondary Education in 1987, and then into the Ministry of Education and Training (MOET) in 1992, TVET seemed to fall into oblivion, because educational bodies underestimated the importance of TVET and concentrated on traditional and familiar domains, namely higher education and general education. This trend continued until the General Department of Vocational Training (GDVT) was separated from MOET and shifted into the Ministry of Labor, Invalids and Social Affairs (MOLISA) in 1998.

Since 2001, the Vietnamese government has been working to strengthen the TVET system to respond to the increased demand for skilled workers. Vietnam's Socio-Economic Development Strategy for 2001-2010, approved at the Communist Party Congress in 2001, declared that the proportion of the workforce holding professional qualifications [8] should increase to 40%. In reference to this, the Socio-Economic Development Plan for 2001-2005 set a target for this proportion at 30% by 2005, and the Socio-Economic Development Plan for 2006-2010 aimed for the proportion to reach 40% by 2010. In addition, MOLISA announced a Master Plan for the Development of a Network of Vocational Colleges, Vocational Secondary Schools, and Vocational Training Centers until 2010, with a further vision to 2020. It mentioned

[8] Those with professional qualifications are those who hold certificates or diplomas from training institutions or who are recognized as crafts people by trade village associations.

that the number of students in technological schools who receive vocational training is targeted to increase by 11–12% annually. Also, the Law on Vocational Training in 2006 was promulgated. Due to the government's efforts in promoting TVET, the ratio of trained workers in Vietnam reached 31.55% in 2006, of which vocational trained workers make up 21.25% (VCCI, 2008).

In Vietnam, TVET is provided by various education and training institutions. According to Law on Vocational Training, Vietnam's TVET system mainly consists of vocational colleges (cao đẳng nghề), vocational secondary schools (trung cấp nghề), and vocational training centers (trung tâm dạy nghề) under the supervision of MOLISA. Other educational and training schools and centers such as universities, colleges, professional secondary schools, and employments service centers can also provide TVET programs if they register their programs.

Table 1. TVET System in Vietnam

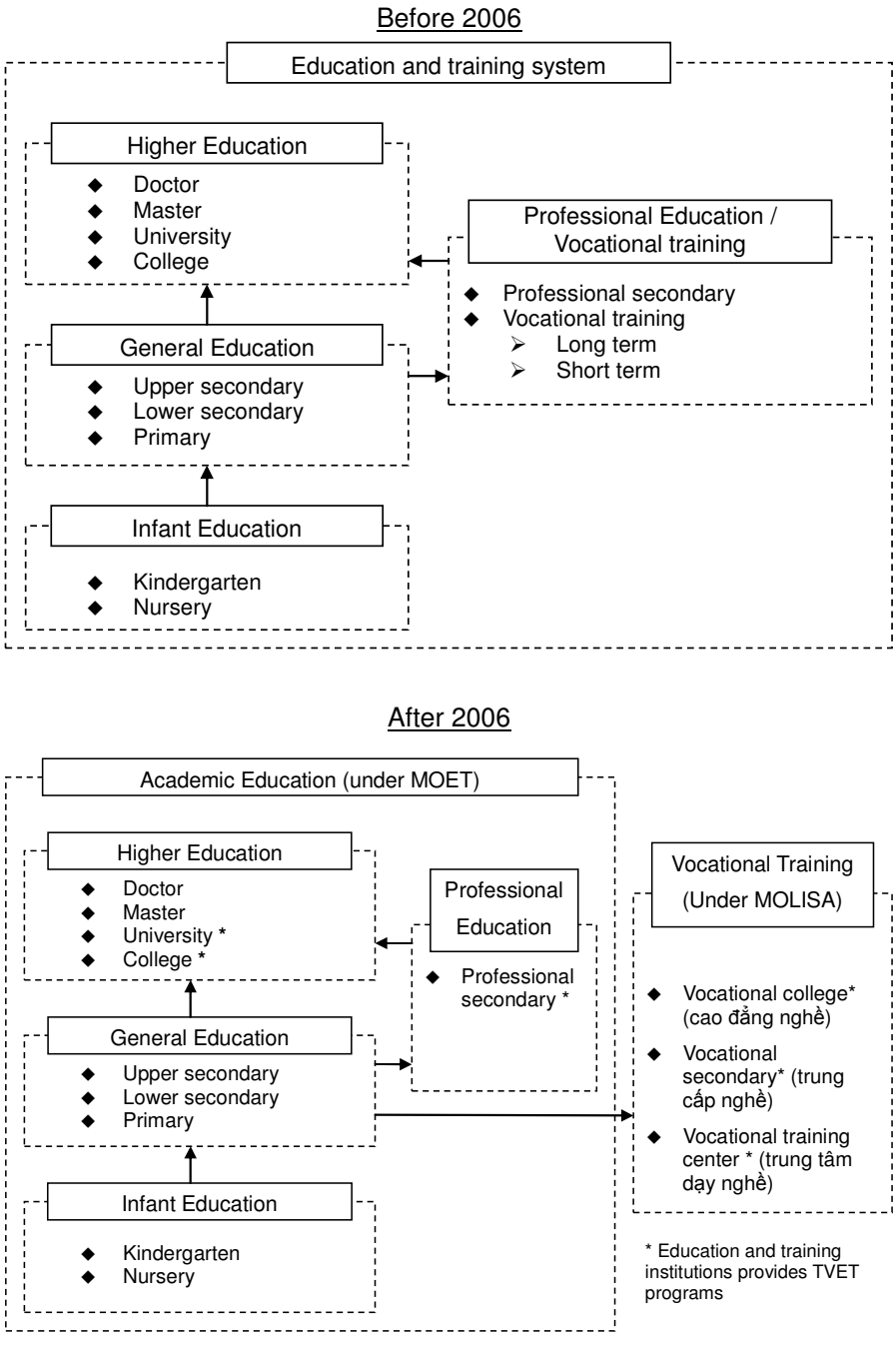
Level	Vocational Training Institutions	Other Education and Training Institutiions	Required Training period	Qualification	Certificate	Supervisory Authority
College	Vocational colleges	Universities, Colleges	1−2 years	Professional/ vocational secondary graduates	College diploma	Ministry of Education and Training (MOET); Ministry of Labor, Invalids and Social Affairs (MOLISA); Ministry of Industry and Trade (MOIT)
			2−3 years	Upper secondary school graduates		
Secondary	Vocational colleges, Vocational secondary schools	Universities, Colleges, Professional secondary schools	1−2 years	Upper secondary school graduates	Professional/ Vocational secondary education diploma	
			3−4 years	Lower secondary school graduates		
Primary	Vocational colleges, Vocational secondary schools, Vocational training centers	Universities, Colleges, Professional secondary schools, Employment Service Centers	3 months – 1 year	Youths, unskilled workers	Certificate	

Source: Draw from Law on Vocational Training (2006).

According to the Education Law amended in 2005 and the Law on Vocational Training promulgated in 2006, TVET programs are classified into 3 levels, namely college, secondary, and primary (see Table 1). The college and secondary level programs were called long-term vocational training before the promulgation of the Law on Vocational Training in 2006, while the primary level program was called short-term vocational training (see Figure 3). After graduation from upper secondary school, a graduate has to spend 2.5 years or 3 years to get a vocational college diploma, 2 years to get a vocational secondary diploma, and less than a year to get a primary level certificate. TVET institutions provide training in various subjects, many of them recently focusing on popular subjects such as electrical engineering, machine engineering, metal

processing, construction and sawing.

Figure 3. The education and training system in Vietnam before and after 2006



Source: Drawn from the Education Law (2005) and the Law on Vocational Training (2006).

Enforcement of the Law on Vocational Training and the shift of GDVT into MOLISA have contributed to the promotion of TVET. However, the shortcoming of the current system is the complexity between TVET and academic programs and unclear

demarcation of responsibility and accountability in vocational education and training between MOET, MOLISA, and other supervisory ministries such as the Ministry of Industry and Trade (MOIT). Let us take the Hanoi University of Industry (HaUI) as an example. HaUI is under the administration of the two ministries: MOET and MOIT. MOET is the state management body (cơ quan quản lý nhà nước) that supervises the educational activities of HaUI, while MOIT is the governing body (bộ chủ quản) which is in charge of making decision in terms of personnel and organization. In addition, HaUI provides academic education at university, college and professional secondary levels, according to the Education Law for which MOET is responsible. On the other hand, HaUI also provides TVET programs at college, secondary and primary levels, within the framework of the Law on Vocational Training, for which MOLISA has primary management responsibility. This complicated supervisory structure may cause difficulties in administration for both schools and supervisory authorities, and may impede the development of the TVET system.

Since Vietnam's TVET system has been changed frequently and has several supervisory ministries, it is difficult to get comprehensive statistics on TVET. According to our interview with MOLISA, as of 2008, Vietnam has 90 vocational colleges, 214 vocational secondary schools, 40 vocational schools which have not realigned into vocational colleges or secondary schools, and 684 vocational training centers. In addition, more than 1,000 other training institutions such as universities, colleges, professional secondary schools, and employment service centers provide vocational training. This group includes 8 technological universities[9], more than 100 colleges and professional secondary schools, which are under the supervision of MOET. The number of TVET institutions and students increases continuously every year (see Table 2).

Table 2. Number of Vocational Schools / Programs and Students (2005-2008)

		2005	2006	2007	2008
Number of training institutes		**> 1,640**	**> 1,869**	**> 1,936**	**> 2,028**
Vocational school	College	236	262	62	90
	Secondary			104	214
	Other			138	40
Vocational training center		404	607	632	684
Other		>1,000	> 1,000	> 1,000	> 1,000
Number of students		**1,207,000**	**1,340,000**	**1,436,000**	**1,538,000**
Long term	College	230,000	260,000	305,500	60,000
	Secondary				198,000
Short term		977,000	1,080,000	1,131,000	1,280,000

Source: Data drawn from meeting with MOLISA on 10 December, 2008.

[9] In Vietnam, 12 universities, including two newly established industrial universities in Hanoi and Ho Chi Minh City, provide technological courses. 8 among them provide TVET programs.

Multilateral and bilateral assistance has been an important factor for the development of TVET programs in Vietnam since the late 1990s. Various international organizations and bilateral donors have provided technical and financial assistances to develop human resource in Vietnam. In particular, Asian Development Bank (ADB), Germany, Switzerland, Korea and Japan have been actively providing Official Development Assistance (ODA) projects in the field of TVET.

ADB, together with the Agence Francaise de Development (AFD), the Japan International Cooperation Agency (JICA), and the Nordic Development Fund (NDF), have supported MOLISA in implementing a Vocational and Technical Education Project, which started from November 1998 and finished in March 2008. The project had 3 components: (i) improving the market orientation of TVET; (ii) upgrading the key schools by developing curricula and instructional materials and by improving equipment and facilities; and, (iii) introducing policy reforms in the TVET system through institutional capacity building (ADB, 1998). The project successfully established 15 schools, developed skills standards for 48 occupations, piloted labor force and education information systems, introduced an accreditation system, and piloted a national testing and certification program within MOLISA.

The Vietnamese government has requested ADB provide technical assistance to prepare another loan project entitled the Skills Enhancement Project. This project is financed through the Japan Special Fund and has been implemented for 1 year, starting from March 2008. This project is assessing current sector outputs and their relevance to the labor market, identifying critical issues in upgrading the level of vocational training, developing a long term strategy to improve skilled worker training, and completing a detailed design of the loan project by 31 March 2009 (ADB, 2008).

The International Labor Organization (ILO), in partnership with MOLISA, is going to contribute to skill development in Vietnam through the Labour Market Project. The project was launched in June 2008 with a budget of US$ 18.3 million funded by European Union. The project, which will run until December 2010, will focus on two purposes: (i) to support the design and development of centers of labor market information within MOLISA and authorities in selected provinces; and (ii) to strengthen the quality of teachers in vocational training institutions. The project is also planning to develop national skill standards in one selected industrial sector.

The German government, through the German Technical Cooperation (GTZ), is financing the Project on Promotion of Technical and Vocational Education and Training, which started in May 2006 and will end in May 2010. This project has attempted to

provide enterprises with sufficient access to a qualified workforce. The focus is on the provision of job market-oriented modules of vocational education and training and the further education of specialists. The project advises Vietnamese partners on labor-market oriented training and training of skilled workers for sectors with potential for growth and employment. It assists 11 selected model vocational schools, including 9 vocational schools and 2 training centers for vocational school teachers. These model vocational schools receive support and advice on: (i) reforming curricula; (ii) developing appropriate teaching and learning materials; and, (iii) developing appropriate basic and in-service training concepts for teaching personnel.

The Swiss government has assisted Vietnam in skill development by financing the project on Strengthening Vocational Training Centers (SVTC). The project has two phases. The first one was executed by the Swiss Development Cooperation (SDC) from 1994 until the end of 2004. In line with SDC's reorientation of its Mekong Region Program, phase II from January 2005 to December 2008 was executed by Swisscontact, partly with financial contribution from SDC. The project covered Hanoi, Ho Chi Minh City, Hai Phong, Dong Nai, Nam Dinh, Thua Thien Hue, and Da Nang. By the end of 2004, 27 vocational training centers received support. Up to 100,000 trainees continuously benefited from a better teaching-learning environment and 13,000 staff and teachers of vocational training centers and local authorities benefited from specific training. 750 instructors in vocational training centers were trained. 39 curricula charts, 15 curriculum guides and 4 handbooks have been developed and introduced. SVTC's publications were referred and utilized by other vocational training projects. The second phase aimed to strengthen 10 additional vocational training centers in the areas of school management, learning-teaching methodologies and equipment infrastructure.

The Korean government is actively promoting skill development in Vietnam. The Korea International Cooperation Agency (KOICA) implemented 4 projects on TVET from 1994 to 2008. KOICA has provided grants for the Qui Nhon Vocation Training Center Project and the Hanoi Vocational Training Center Project from 1994-1998. The two projects provided electronic, electrical, automobile maintenance, machinery, refrigeration, and computer equipment, trained 152 trainers and dispatched 10 experts. KOICA also supported the establishment of the Korea-Vietnam Industrial Technology Institute from 1997 to 2000. The project has constructed a technical engineering school with 6 departments (e.g., electronics and electricity), provided equipment, trained 30 trainers (e.g., construction personnel, management, instructors), dispatched 8 experts, designed curricula and compiled education materials. In addition, from 2007 to 2008, KOICA provided further support of US$ 2.3 million for this institute to strengthen educational capacity.

The Japanese government has also played an important role in skill development in Vietnam by providing ODA for many TVET projects. For example, the Hanoi Industrial College-Japan International Cooperation Agency project, implemented from 2000 to 2005. Section 5 will provide more details on this project. Besides, the Japanese government has constructed vocational centers and supplied equipment for vocational schools for many provinces in Vietnam including in Thai Binh, Vinh Phuc, Thanh Hoa, Quang Binh, and Kon Tum through the Grass-roots Human Security Fund.

Although the Vietnamese government has tried to strengthen the TVET system by receiving foreign assistances through ODA projects, Vietnam still faces a shortage of skilled workers such as technicians and middle managers. In 2005, 25% of Vietnamese workers held professional qualifications (CIEM, 2006). However, fundamental problems lie not in the number of workers with professional qualification, but the fact that graduates of TVET programs do not have the basic knowledge and enterprise skills required. In particular, FDI enterprises do not have high regard for the quality of existing TVET programs. These enterprises often say that they have hardly benefited from recruiting TVET graduates to improve factory operations. Moreover, some FDI enterprises say that they have to retrain these graduates after recruitment because their skills and knowledge are far below the required level. According to a MOLISA's report, 44% of FDI enterprises have had to organize re-training courses for their employees, and 25% of TVET graduates did not satisfy the skill and knowledge requirements in FDI enterprises (VIR, 2007). Several of the enterprises mention that they even prefer to recruit fresh workers and train them from the beginning rather than recruit TVET graduates who have got undesirable habits. The government often focuses on the number of training institutions or graduates, which is at odds with the desire of enterprises for improvements in the quality of TVET programs.

One of the ways to measure the quality of TVET programs and graduates would be to recognize the number of students who have learned standard skills, not only those who have received vocational training certificates. However, Vietnam does not have a reliable skill standard system. The current skill standard system, which was developed based on the Soviet system, became outdated and is not used anymore, either by domestic or by FDI enterprises. The enforcement of the Law on Vocational Education in 2006 may be a turning-point for the skill standard system in Vietnam. In 2008, MOLISA completed two Decisions relating to the skill standard system: one defines principles and process in designing national skill standards (Decision No. 09/2008/QD-BLDTBXH); and another stipulates the organization and management of evaluating and issuing national skill certificates (Decision No. 69/2008/QD-BLDTBXH). Until now, MOLISA has approved skill standards for 48 occupations, and is aiming to develop skill standards for 150 occupations in the period

from 2010 to 2020. Despite all those efforts, it would still take time to draft and issue reliable skill standard systems which both FDI and domestic enterprises can adopt in their actual production operations.

4. Cooperation with FDI enterprises to speed up industrial skills development

4.1. Upgrading TVET programs in partnership with FDI enterprises

The low quality of TVET programs is attributed to various factors including outdated training facilities, the undervalued social status of TVET institutions and their graduates, and unclear responsibility among relevant supervisory ministries such as MOET, MOLISA and MOIT.

All these factors are important, but the shortage of good instructors seems to be one of the most critical problems in Vietnam's TVET institutions. It is often said that many instructors with an engineering diploma can teach theories but cannot provide practical skills for students. To some extent, the shortage of instructors with sufficient knowledge and experience is understandable, because Vietnam only started to modernize its industries in the 1980s. Usually, up-to-date technology is first transferred to employees of FDI enterprises and local enterprises through business relationships, and then spills over to TVET institutions. Twenty years after the Doi Moi reforms through which Vietnam opened its economy and began to receive FDI, local managers in the country with a certain level of practical knowledge and experiences have begun to emerge in FDI enterprises. It would be desirable for those skilled people to move to TVET institutions in which wages are lower than in private firms[10], but this will happen only after average incomes increase, when the whole of society becomes better off or after retirement. More time will be needed for Vietnam to advance to that stage.

What would speed up the spillover of knowledge and technology from FDI enterprises to TVET institutions? One proposal is to carry out TVET programs in cooperation with FDI enterprises. The direct interaction between TVET institutions and FDI enterprises would shorten the time for technology spillover. It would also promote direct exchange of information about labor demand and supply. In this way, TVET institutions could adjust their curricula up to the needs of industry and produce graduates who are ready to enter the workforce.

[10] According to an interview, it is said that the average salary for an instructor is around VND 1 million per month. Even the graduates of vocational training colleges may get around VND 2 million if they get a job in an FDI enterprise. According to JETRO (2009), the average salary of middle-class engineers in Japanese FDI enterprises ranges from about VND 1.6 million to VND 3.4 million.

One challenge here would be getting FDI enterprises to cooperate. The fundamental goal of enterprises is to pursue profits, not contribute to society. Of course, many enterprises actively contribute to society, but the main premise for such contributions is the long-term benefit they bring for themselves. Therefore, to involve FDI enterprises in TVET programs, it is essential to recognize situations in which FDI enterprises have incentives to cooperate with TVET institutions and quickly seize those opportunities.

Three major conditions can increase the likelihood of FDI enterprises cooperating with TVET institutions. The first condition is that their basic factory operations need to become stable. Otherwise they cannot afford to deal with other affairs. Second, they need to increase local procurements to reduce production costs or need to find local subcontractors to expand their production capacity. In this case, strengthening TVET programs will improve the capability of local enterprises and then benefit FDI enterprises in return. The third condition is the necessary expansion of supply of skilled workers to address the serious shortage of skilled workers, which pushes up the wage level. The undesirable scenario is that demand for skilled workers increases, enterprises start to compete with one another for skilled workers by offering higher salaries, and the wage increase exceeds the productivity increase. To build cooperation with FDI enterprises, it is crucial for TVETs to recognize situations in which any of the above conditions exist, and from there begin to approach enterprises. The two cases where TVET institutions have successfully built partnerships with FDI enterprises in advanced ASEAN countries are introduced below.

4.2. Partnerships between FDI enterprises and government in Malaysia: Penang Skill Development Center[11]

The Penang Skill Development Center (PSDC) is a successful example of public–private cooperation in human resource development in Malaysia, achieved by the timely intervention of the national and state government. Responding to a request from FDI enterprises, the government established PSDC in 1989. Penang State has attracted FDI, in particular in the electrical and electronic sectors, since the 1970s. In the late 1980s when massive FDI flowed into Penang, many multi-national corporations (MNCs) faced shortages of labor, especially for skilled workers like technicians who could maintain and improve production lines. Then, FDI enterprises started to complete for skilled workers by offering higher salaries, which resulted in increased labor costs. In order to solve this problem, FDI enterprises, represented by American-affiliated firms proposed the establishment of a human resource development center. Both state and

[11] For further details on the PSDC, see Mori (2005).

central government supported this proposal and PSDC was established.

A notable feature of the PSDC is its management system. The general direction of PSDC programs is decided by its management council, which consists mainly of member companies' top management (Table 3). The chairman of the council is elected from the member companies bi-annually. As for the management of PSDC, government agencies only play supportive roles like supervision. Moreover, the details of training programs at PSDC are structured and periodically reviewed by the training committee, which consists of experienced staff in member companies' training departments. This system enables PSDC to provide up-to-date engineering and management skills for trainees, in synchronization with market demand.

Table 3. PSDC Management Council 2005-2006

Position	Title	Company Name
Chairman	Managing Director	Advanced Micro Devices Export (M)
Deputy Chairman	Managing Director	Fairchild Semiconductor (M)
Vice Chairman	Site GM	Intel Malaysia
	Managing Director	Bosch Malaysia
Committee members (2005-2006)	President	Agilent Technologies
	CEO	ENG Teknologi
	Managing Director	Motorola Malaysia
	Managing Director	Seagate
Committee members (2004-2005)	Managing Director	Komag
	Management	Leong Bee & Soo Bee Sdn. Bhd
	FC	OSRAM

Source: PSDC's presentation to the author on June 13th 2005.

These high-quality training opportunities for PSDC member companies, which account for more than 50% of employees in Penang's manufacturing sector, may have positive impacts on value-added activities and skill intensity in Penang. The annual manufacturing value-added in Penang grew steadily at an average of 8.7% between 1992 and 2000 (Imm, 2000). Analyzing firm-level data of domestic suppliers, Rasiah (2002) finds that Penang's machine tool suppliers generated more value-added than suppliers in the Klan Valley, another center of electronics industry in Malaysia, due to the effect of a better government-business relationship. Moreover, the skills intensity of Penang's manufacturing labor force has risen from 0.13 in 1980 to 0.23 in 1998, while the ratio of production workers in the total manufacturing workforce decreased from 74.3% in 1990 to 67.1% in 1998[12]. Rasiah (2002) found, in his survey, that machine tool suppliers in Penang owned better precision tolerance levels in grinding, milling, and stamping. This may be a result of increases in skill intensity in Penang.

[12] Skills intensity is calculated based on the ratio of management and technical staff in relation to the number of staff. Refer to Imm (2000).

Furthermore, PSDC has provided opportunities for domestic suppliers to learn about MNCs' quality requirements directly from their employees, particularly in the Global Suppliers Program (GSP), which started in 1998 in order to develop backward linkages through upgrading the technology of domestic suppliers. The program benefits not only domestic suppliers which hope to increase business with MNCs, but also those which have not yet obtained a business contract with MNCs. By October 2004, 385 domestic suppliers, much more than the number of member companies, were participating in the first initiative of GSP. 8 MNCs and 9 domestic suppliers are participating in the second initiative (see Table 4-1 and 4-2).

Table 4-1. SME's Participation in GSP (2005)

Program	No. of Participants	No. of SMEs
CoreCom 1	910	239
IS2	106	29
AS3	502	117
Total	**1,518**	**385**

Source: PSDC's presentation on June 13th 2005

Table 4-2. Participation in GSP Second Initiative

MNCs	SMEs
Advanced Micro Devices	Watas Holdings
Agilent Technology	Prestige Dynamics Industry
Fairchild Semiconductor	Industri Presawat Jaya
Intel Technology	Newtechco Engineering
Komag	Unimould Engineering
Motorola	AKN Technology
Robert Bosch	Leong Bee & Soo Bee
Unico Technology	ClassA Technology
	Mechwira Technology

Source: PSDC's website: http://www.psdc.com.my/

4.3. Grass-roots initiative by Thai scholars and experts trained in Japan: the Thai-Nichi Institute of Technology[13]

The Thai-Nichi Institute of Technology (TNI) was established as a private university in 2006 through the long term efforts of Thai scholars and experts, with assistance from the Thailand-Japan Technology Promotion Association (TPA).

TPA was established in 1973 by a group of people who had studied and trained in Japan. One main target of TPA is to develop scientific technologies for economic development in Thailand by promoting technology transfer from Japan. In the 1970s, an anti-Japanese sentiment was emerging in Thailand. Although Japanese FDI increased rapidly, people in Thailand did not feel that they were benefiting from expanding business by Japanese companies. In this situation, the Japan-Thailand Economic Cooperation Society (JTECS) was established in 1972, with the aim to promote FDI and

[13] This section is mainly based on the author's interview with TNI and TPA in November 2008, and the materials provided by TNI and TPA.

industrialization to benefit Thai people and Thailand's economy. At the same time, TPA was established as the counterpart of JTECs in Thailand in 1973, based on the alumni society of the Association for Overseas Technical Scholarship (AOTS). In partnership with JTEC and Japan's Ministry of Economy, Trade and Industry (METI), TPA has provided many training courses in the field of scientific technology, production management, business management and languages. In 2008, TPA provided training for around 60,000 people from both domestic and FDI enterprises. TPA has operated by utilizing ODA from the Japanese government, which accounted for 50% of the total budget in the early stages. TPA has gradually increased its self-financing given that financial assistance from the Japanese government will end in 2009.

The establishment of technical university has been a main agenda of TPA since its establishment, because many AOTS alumni found the need for practical training in Thailand. They also aimed to establish a private university, in view of its potential flexibility in management and curriculum development. TNI was finally established in 2006, although it took more than 30 years to realize, overcoming a lot of challenges and barriers. TPA funded all the initial capital with donations from Japanese enterprises and the Chamber of Commerce in Bangkok.

TNI offers 2 bachelor degree courses (automotive engineering and production engineering) in the faulty of engineering, 2 courses (information technology and computer engineering) in the faculty of information and communication technology, and 3 courses (industrial management, human resource management, and business association in Japanese) in the faculty of business management. TNI also offers a Master in Business Administration (industrial management). TNI accepts around 800 students annually, for all courses in total, but the number of students is expected to reach 3,000 by 2012.

TNI has very strong ties with both Thai and Japanese enterprises, based on TPA's network of more than 3,000 individual and 2,000 corporate members. Enterprises, many of which are members of the Japanese Chamber of Commerce, donated training equipment and provided the funds for scholarship. Many members of the executive boards used to work for enterprises as high-ranking officers. In turn, the training curricula are formulated in cooperation with enterprises. TNI also promotes a 4-month internship in enterprises, most of which are Japanese companies. Furthermore, TNI organizes practical training courses by inviting training experts from enterprises as visiting lecturers.

5. Emerging cases of cooperation between TVET institutions and FDI enterprises in Vietnam

Vietnam does not have as strong a partnership between its TVET institutions and enterprises as PSDC and TNI have, but it may have such an opportunity shortly. Many FDI enterprises in Vietnam have stabilized their basic factory operations within 5-10 years of establishment, and have started looking for skilled workers in order to improve their competitiveness further. The supply of skilled workers has not caught up with the increasing demands of enterprises, resulting in increases in wages and job hopping ratios[14]. Although this is an unfavorable phenomenon for enterprises, it also creates a chance for TVET institutions to build partnerships with FDI enterprises. The following sections will introduce 5 leading cases in the development of industrial human resources in Vietnam[15]. Examination of these cases may yield useful suggestions for promoting partnerships with FDI enterprises.

5.1. In-house training by a FDI enterprise: Muto Vietnam's training of mold-and-die technicians

When enterprises face a shortage of skilled workers, the first solution they consider is promotion of in-house training. Some FDI enterprises have developed in-house training programs. Muto Vietnam Co., Ltd., which has factories for molds, dies, and plastic-injection-molding parts in Bien Hoa Industrial Park and Long Binh Industrial Park in Dong Nai province, is one such enterprise. Many of their engineers are either colleges or professional secondary graduates. Since 1998, Muto Vietnam has provided occasional in-house training courses on designing and making molds and dies for their technicians. The past 6 courses have produced a total of 170 trained technicians. This program has improved skill levels and the retention rate of employees. Some engineers have been also sent to Japan for on-the-job training. As a result of this training, Muto Vietnam now produces all molds and dies in Vietnam, and sometime produces those used in their factories in Japan. Also, Muto Vietnam provided training for engineers for Muto Technology Hanoi which was established in 2005 as a production base in the Vietnam's northern regions. The engineers who were trained in Muto Vietnam contributed to early development and stabilization of Muto Technology's operation.

Human resource development in Muto Vietnam may move to the next phase, given the

[14] According to JETRO (2007), 68.7% of enterprises responded that increasing wages are a problem in employment. Moreover, it is reported that enterprises have started to compete for skilled workers by offering higher salaries in provinces surrounding Ho Chi Minh City (JETRO, 2006b, p. 71).

[15] The description of cases here is based mainly on interviews conducted by the authors from 2005 to 2008.

rapidly changing business environment in Vietnam characterized by increased job hopping and serious shortages of skilled workers. Muto Vietnam is now considering transforming their in-house training course to one which is open to engineers in other FDI mold-and-die producers in Bien Hoa. The primary purpose of this plan is to contribute to the standardization of mold and die manufacturing skills, introducing Japanese national standards as good practice. Currently, there are no national skill standards for mold and die manufacturing in Vietnam. This may impede the skill development of mold and die manufacturing, and may also make it difficult for enterprises to evaluate the skill level of workers in recruitment and promotion. Thus, Muto Vietnam's new training course can not only increase the number of skilled engineers, but also contribute to increasing the retention rate by providing appropriate benefits for skilled workers.

It would be ideal for all enterprises to have systematic in-house training programs. However, limited financial resources mean that this is not possible. Moreover, enterprises that currently provide such programs may not be able to run their training programs on a large enough scale to keep up with their expanding production. Given that in-house training cannot produce a sufficient number of trained workers, good TVET institutions to which enterprises can outsource training are needed.

5.2. Linkages with an industrial park: Vietnam–Singapore Technical Training Center / Vietnam-Singapore Vocational College

The Vietnam–Singapore Technical Training Center (VSTTC) was established in 1997 with technical assistance of about VND 60 billion from the government of Singapore. This ODA project was implemented based on top-level agreement between the Prime Ministers of Singapore and Vietnam in 1996. VSTTC is located in front of the Vietnam–Singapore Industrial Park (VSIP) in Binh Duong province, next to Ho Chi Minh City. The Binh Duong People's Committee directly supervises the operation of VSTTC.

VSTTC attempted to supply skilled workers to enterprises in VSIP. For this, the center provided 6-month (1,100 hours) training courses in 5 fields: (i) electrical maintenance; (ii) mechanical maintenance; (iii) machining; (iv) electronics; and (v) mechatronics[16]. In 2005, 230 students were enrolled in these courses, of which 95% were secondary school graduates and 5% were dispatched by their employers. Students gained training certificates after they fulfilled course requirements. VSTTC had 33 instructors, with engineering degrees and who were trained in Singapore for 9 months, as well as 8 staff

[16] The mechatronics course was added in 2005, in line with the high demand from enterprises in VSIP.

for administration. VSTTC held regular meetings with enterprises in VSIP and tried to adjust curricula and course designs to meet their labor and skill demands[17]. For instances, responding to an increasing demand for mechatronic technicians, VSTTC increased the enrollment capacity of its mechatronics course. As a result, all graduates found jobs—mostly in enterprises within VSIP— immediately after completing the courses.

After assistance from the government of Singapore ended in 2005, VSTTC merged with Binh Duong Technical School, which was established by the Binh Duong People's Committee in 2004, and became the Vietnam–Singapore Technical School in August 2006. The school was upgraded to the Vietnam–Singapore Vocational College in January 2008. Vietnam–Singapore Vocational College (hereafter called the College) has 3 courses as follows:

i. V*ocational college course*
   This newly-established course requires 3-years of study to obtain a college diploma. Around 200 students are accepted in this course every year[18].

ii. V*ocational secondary course*
   This newly-established course requires 2-years of study for upper secondary school graduates and 3 years for lower secondary school graduates to gain a vocational secondary diploma. Around 1,200 students are accepted in this course every year.

iii. V*ocational primary course*
   This course, which directly succeeded the course offered in VSTTC, requires 6-months training to gain a vocational primary certificate. Around 150 students are accepted into this course every year.

The total number of instructors increased from 39 in 2005 at the time of VSTTC to 60 in 2008 (see Table 5). Many VSTTC instructors remain at the College.

[17] VSTTC's Board of Governors consisted of representatives from the governments of Singapore and Vietnam, VSIP Joint Venture Pte. Ltd. and enterprises in VSIP.
[18] This course started in the academic year of 2008.

Table 5. Number of Students and Instructors in VSTTC and Vietnam–Singapore Vocational College (1997-2008)

Year	Number of instructors[1]	Number of students			
		Primary level[2]	Secondary level[3]		College level
		(6 months)	2 years	3 years	(3 years)
1997	n.a.	n.a.			
1998	8	50			
1999	19	167			
2000	19	176			
2001	19	281			
2002	23	337			
2003	29	339			
2004	37	410	159	n.a.	
2005	39	419	412	n.a.	
2006[4]	42	420	728	624	
2007	55	33	1,454	337	
2008[5]	60	39	1,055	872	167

Note

1. The number of instructors does not include visiting instructors.
2. From 1997 to 2006, Primary level trained by VSTTC.
3. From 2004 to 2006, Binh Duong Technical School provided secondary level training.
4. From 2006 to 2007, VSTTC and Binh Duong Technical School were merged into Vietnam – Sigapore Secondary Technical School, providing training at primary and secondary levels.
5. From 2008, the school was upgraded into Vietnam-Singapore Vocational College, providing training at three levels: primary, secondary and college.

Source: Data provided by the Vietnam-Singapore Vocational College.

The college and secondary courses increased the number of training fields from 5 at the time of VSTTC, to 9. The electrical maintenance and the electronics courses were both divided into industrial and household courses, based on MOLISA's guideline which newly included information on communication technology and automobile technology.

The College has been working to maintain good relationships with enterprises in VSIP. It has organized a job fair every year, sending the list of students to enterprises in VSIP. The graduates of the College are mostly recruited by FDI enterprises in VSIP, just as those from VSTTC were. In addition, the College is cooperating with VSIP Joint Venture (JV) Pte., Ltd., the management company of VSIP. A representative of VSIP JV is a member of the College board. With the assistance from VSIP JV, the College also conducted surveys in 2006 for enterprises which recruited VSTTC graduates and to help graduates to find work[19]. The demands of enterprises are reflected in the curriculum, but these do not exceed 20% of total curriculum hours, according to MOLISA's guideline[20].

[19] In the first trial, the College sent the questionnaires to 100 enterprises, but received only 3 replies. In reaction to this, in the second round, the College asked for cooperation from the VSIP JV Pte. Ltd. and received replies from around 60% of questionnaire recipients.

[20] To establish a new course or add training fields, the College needs to gain approval from MOLISA.

It seems that the Binh Duong People's Committee has actively supported both VSTTC and the Vietnam-Singapore College. The People's Committee established the Binh Dung Technical School, inspired by the success of VSTTC. It was the People's Committee who proposed merging the two schools later. Furthermore, the People's Committee implemented the policy to subsidize 80% of the vocational training fees in all provincial vocational training schools[21], expecting that the development of human resources will increase provincial competitiveness. The Department of Labor, Invalids and Social Affairs (DOLISA) of Binh Duong province also publishes the demand forecast for human resources every year.

Despite the Vietnam–Singapore Vocational College's persistent efforts to improve their training programs, they still face some challenges. It is still not easy to collect information about skill demand from enterprises in a systematic way. Also, even if the College finds demand for new technology, they may not find teachers and instructors who can provide appropriate training. Finally, the rapid increase of students may cause a shortage of training equipment and instructors. A critical challenge for the College is to better mobilize sufficient resources to purchase additional equipment and recruit competent instructors.

5.3. Interaction between higher educational institutions and enterprises: the Hanoi Industrial College (HIC) – JICA Project / Vietnam–Japan Center

With technical assistance from JICA, the Project for Strengthening Training Capabilities of Technical Workers at Hanoi Industrial College (hereafter called the HIC–JICA project) aimed to upgrade technological knowledge and skills of prospective engineers. As FDI from MNCs increased, the shortage of skilled labor gradually became an important issue in Vietnam. In particular, many MNCs looked for production engineers who could innovate and maintain production processes in their factories. Although some universities provide engineering education for students, there is a reputation that students who graduated from those universities usually do not have practical skills in production engineering. In addition, it is often said that engineers who graduated from those universities would prefer not to work on manufacturing sites: they prefer "cleaner" work such as product design, to "dirty" work in a factory.

In order to bridge the above gap between demand and supply of production engineers,

[21] For example, students in the secondary course of Vietnam-Singapore College pay only VND 80,000 per month, which is equivalent to 20% of the actual training cost. College course students at the Vietnam Singapore College pay VND 120,000 per month in the same way.

the HIC-JICA project was implemented from 2000 to 2005[22]. JICA did not select a university but an industrial college as a partner, in order to increase the number of production engineers who can work on manufacturing sites. By 2004, JICA provided a JPY 367 million (about US$ 3.11 million) equipment grant for 40 machines, JPY 98 million (about US$ 0.83 million) for administration expenses and 39 Japanese experts in total. The Vietnamese government provided 21 machines, land, building services and VND 3.74 billion (about US$ 0.02 million) for administration expenses (JICA 2004).

The HIC–JICA project consisted of two main programs: (i) engineering professional secondary education courses for HIC students; and (ii) short-term technical training programs for people who are currently employees of a company.

i. *Engineering professional secondary education courses*
The project provided HIC students with a 2-year engineering education in 3 courses: (a) machining processing; (b) metal processing; and, (c) electric control. Every year, the HIC received about 240 to 360 students (JICA 2004). Students who held an upper secondary diploma and hoped to participate in the project needed to apply and take the entrance exam, which differed from those needed for other HIC courses. In addition, the tuition fee was US$ 200 per year, which was US$ 80 higher than other HIC programs. In particular, this program emphasized practical training. 60 to 70% of the total course hours were allocated for practical training, while 30 to 40% was allocated for academic lectures (see Table 6).

Table 6. Time Allocation of HIC–JICA Project (2002-2003)

	Machine Processing (hour)	%	Metal Processing (hour)	%	Electric Control (hour)	%
Lecture	985	**38%**	806	**31%**	780	**33%**
Practical Training	1,640	**62%**	1,819	**69%**	1,560	**67%**
Total	**2,625**		**2,625**		**2,340**	

Source: JICA (2004).

The HIC–JICA project has provided intensive engineering education in a small capacity. The basic annual capacity of the project is 240 students, including 80 students in each of 3 courses. The actual enrollment in 2002 was 237 students and 253 in 2003, representing only 5% of the total number of students at HIC[23].

[22] Although the project was implemented in 2000, the short-term courses started from 2001 and the long-term (2 year) courses started from 2002.
[23] HIC had 17,739 students in total in 2003: i) 8.782 full-time students; ii) 7,367 short-term courses employees; iii) 1,100 IT and Accounting course students (in collaborated with an Australian University); and, iv) 490 students under the HIC-JICA program. Refer to: JICA (2004).

These small numbers made enrollments very competitive. The applicants to the project exceeded the enrollment limit in 2002 (757 applicants) and 2003 (1,354 applicants). However, the capacity of the project needed to be small in order to maintain good quality and enable intensive education. For example, on average 1 instructor supervises only 11-13 students. This was probably why the drop-out rate of students, at 3%, is very low. In order to administer 3 courses, a total of 20 instructors worked in this program[24]. Out of 20 instructors, 6 were specialized in machining processes, 7 in metal processing, and 7 in electric control. They were supervised by and cooperated with Japanese experts. In addition, by 2005, 25 instructors were sent to Japan for intensive training. The 6% turnover rate of instructors was due to 2 instructors leaving by 2004.

The project has also offered unique practical training, which combines academic laboratory work with actual manufacturing activities, based on manufacturing orders from MNC assemblers and domestic suppliers. Under the supervision of experts and instructors, students have produced jigs such as motor control machines and cutting machines, as well as spare parts such as motorbike cylinders. This activity enables students to learn practical skills in design and production, which are applicable to their jobs, once they are hired by firms. In particular, manufacturing activities based on orders from MNCs give students opportunities to learn the up-to-date technologies directly, because those technologies are usually innovated by MNCs in Vietnam. In addition, both students and instructors may understand MNCs' quality requirements through this activity. This promotes awareness of the international standards for high quality and on-time delivery. The project produced parts and equipment for more than 60 companies.

ii. *Short-term technical training programs for people who are currently employees of a company*

The second program provided 1-2 days of short-term training courses in machine processing, metal processing, and electric control for company employees and instructors of other vocational training schools. Basically, anyone can attend short-term training courses without an entrance examination. By 2004, around 1,300 people participated in a total of 74 short term courses. 840 of them were company employees, while 460 were instructors of other vocational training and educational institutes[25]. In addition, the project held open seminars in machine processing, metal processing, vocational training systems and work safety and sanitation. 545 people attended those seminars. Furthermore, the

[24] In addition to 20 full time instructors, there were 9 part-time instructors.
[25] For example, the Vietnam-Germany Training Center participated in the training course.

project twice organized technical competitions, in which 155 people participated.

Through the above programs, the project increased the supply of competent production engineers to the market, although the number of students continued to be small. The project had the first graduates in September 2004. It was predicted that most students would get a job immediately after graduation, because the projects had received two times more job offers from both MNCs and domestic supporting industries than the number of graduates[26]. In particular, students in the mechanical processing course were most popular with a job offered rate of 2.5, while the ratio for students in either metal processing or electric control is 1.78[27]. More than half of the job offers were from the project's customers, which ordered spare parts and jigs.

The HIC–JICA project was completed in March 2005, and the training program has continued as the Vietnam-Japan Technology Center (VJC) since April 2005[28]. In addition, Hanoi Industrial College was upgraded to the Hanoi University of Industry (HaUI) in December 2005 with around 42,000 students in all faculties. VJC basically succeeded the same course structure as the HIC-JICA course, providing practical technical education and training in the same 3 fields. After completing the 2 years of training, students receive vocational secondary diplomas as well as a VJC original training certificate acknowledged by MOIT. The students who apply to this course should already have upper secondary education diplomas. Since its establishment, the number of students in VJC has been increasing: 358 students enrolled in 2006; 454 in 2007; and, 545 in 2008. Around 180 students are now studying in each of the 3 fields, which is about three times the total number of students in 2004. In addition, VJC is promoting internships in enterprises and receiving manufacturing orders for jigs from enterprises, as the HIC-JICA course did. Thanks to the efforts of former project experts and the performance of graduates, VJC has very good relationships with certain companies. For example, one Japanese mold-and-die manufacturer has recruited 30 students from VJC every year.

VJC needed to increase the number of students to strengthen its financial sustainability, but this also imposed new challenges in the post-project period. For one thing, one instructor needs to take care of more students. The number of full time instructors increased from 20 in 2004 to 29 in 2008, even though the number of students is expanding much faster. VJC tries to maintain the quality (the appropriate ratio between

[26] Based on authors' interview with the HIC-JICA project in August 2004.
[27] Job offered ratio = number of job offers / total number of students.
[28] The authors are now conducting a survey to evaluate the performance of graduates from the HIC-JICA course and VJC in cooperation with JICA and HaUI.

instructors and students) and quantity (class hours) of practical training by utilizing more visiting instructors and separating course work into three shifts (morning, afternoon and evening classes). Another challenge for VJC is the limited capacity of training facilities. As the number of students increases, VJC needs more equipment but it is not easy to find the financial resources. Furthermore, VJC needs internal or external engineers who can maintain the latest equipment. Unfortunately, not many people can provide proper maintenance for the latest machines in Vietnam[29].

5.4. Training future instructors: the Vietnam–Germany Training Center

The Vietnam–Germany Center was established at the University of Technical Education at Ho Chi Minh City (the University) in 1993, with financial assistance of US$ 8 million (DM 12.4 million) from the government of Germany over 8 years until 2000[30]. The University is under MOET's supervision and had 25,000 students and 600 instructors in total in 2008. The Vietnam–Germany Training Center is one of 11 centers and institutes under the University. The main objective of this project was to improve quality of vocational training programs in Ho Chi Minh City and its vicinity by upgrading the training facility, improve the quality of instructors and develop standard curriculums. Accordingly, half of the grant was allocated for purchasing machines and equipment for training, while the rest was for inviting German experts to Vietnam and sending Vietnamese instructors to Germany. The first group of instructors (4 in the electrical engineering course and another 4 in the mechanical maintenance course) was sent to Germany for 14-months of training. They were expected to upgrade the training curriculums of the center after coming back to Vietnam. Another group of instructors was trained by German technical experts, first in the center, for 3-4 years. Then, they were sent to Germany for advanced training. In addition, the center built standardized curriculums according to the technical training model of Germany. In 2008, 18 instructors were working in the center, most of who had been trained in Germany. Even after the project was completed, the center has opportunities to send their trainers to Germany every year by forming friendships with vocational training schools in Germany. The turnover of instructors in this center seems low, probably because the well-organized training system provides them with incentives to remain.

The Vietnam–German Training Center (hereafter called the Center) provides 3 types of practical training programs.

i. *Training program for regular students under three faculties of the University*
   This program, which accounts for around 50% of the training capacity of the

[29] JICA is planning to provide an equipment maintenance expert for VJC in 2009.
[30] The project had the two phases. Phase I was implemented from 1993-1998 and phase II from 1998-2000.

Center, provides training for students in the 3 faculties: civil engineering and applied mechanics; electrical and electronic engineering; and, mechanical engineering. The training program is a part of the curricula of other faculties, which do not own sufficient facilities for practical training. The students will receive a university diploma when they fulfill all of the requirements, including training in the center, in 4 or 4.5 years. Of their entire course works, around 20% is allocated for practical training.

ii. *Training for engineers and technicians from enterprises and other schools*
This program, using about 30% of the training capacity of the Center, provides training for engineers and technicians who are currently working in enterprises and instructors in other TVET institutions. The program focuses on higher level practical training including the programming of computer numeric control (CNC) software. By completing the training which is around 1 week, the participants receive the training certificate issued by the Center. The majority of participants are working in FDI enterprises. The Center also provides customized training programs upon request from enterprises.

iii. *Professional secondary training course*
This course, which accounts for around 20% of training capacity of the Center, provides secondary-level professional training based on MOET's guidelines in the field of industrial electronics and mechanical maintenance. Around 400 full-time students in the 2 grades enroll in this course (see Table 7). They will receive the professional secondary diploma, after completing the 2 or 3 years of course work.

The Center has had impact not only inside the University but also upon other TVET institutions in Ho Chi Minh City and other provinces. The faculties in other departments of the University learned how to standardize technical training programs. Also, many students who learned in the center became instructors and introduced standardized technical training programs to other TVET institutions. Moreover, the Center trained instructors of TVET institutions such as vocational colleges, secondary vocational training schools and vocational training centers. For example, Cao Thang Technical College has conducted annual training courses for its instructors in the Center.

Table 7. Number of Students and Instructors at the Vietnam–Germany Training Center (1993-2008)

Year	Number of instructors	Number of students/trainees		
		University level[1]	Technical trainees[2]	Professional secondary level (2
1993	9	n.a.		n.a.
1994	10	n.a.		45
1995	15	n.a.		99
1996	15	n.a.		116
1997	16	n.a.		123
1998	18	n.a.		218
1999	18	n.a.		221
2000	18	n.a.	n.a.	125
2001	19	n.a.	694	160
2002	19	n.a.	833	214
2003	19	n.a.	813	212
2004	18	n.a.	750	169
2005	19	n.a.	778	216
2006	18	n.a.	618	275
2007	18	n.a.	721	315
2008	18	n.a.	411	396

Note

1. Although the training program for regular students accounts for 50% of the Center's training capacity, the number of students is not available because they are not counted as the Center's students but belong to the three faculties.

2. In 2000 the Center opened technical training courses as outputs of the two projects received from Siemens and MTS.

Source: Data provided by the Vietnam-Germany Training Center.

10 years after its establishment, it seems that the Center has gained a fair reputation among enterprises. Thanks to the networking efforts of former German project experts, the partnership with FDI enterprises is becoming a new modality to keep technology updated. Some large FDI enterprises have selected the Center as a training partner in Vietnam. For example, Siemens assisted the Center to set up a training facility for Programmable Logic Controller (PLC). Another German company, MTS, assisted the establishment of a training facility for CNC software. The Center is now developing partnerships with other MNCs such as Intel, Omron, and Rockwell Automation. In addition, the Center has tried to strengthen relationships with enterprises for the purpose of graduate recruitment. It has organized an alumni gathering every year in order to learn about the contemporary state of business and recruitment. The University also holds periodic "customer" review meetings with enterprises who have recruited graduates.

Despite the relative success in building partnership with FDI enterprises, the Center still has some challenges. For one thing, enterprises usually finance only a part of the investment and the Center has to mobilize the rest. For example, Siemens provided 40%

of the total cost (US$ 250,000) to set up the training facility, while the Center needed to mobilize another 40% from GWZ (the Agency for International Economic and Scientific Cooperation of Germany) and self-finance the rest of 20%. Similarly, MTS provided 40% of the total cost (US$ 480,000), while another 40% was financed by a German non-profit organization and the rest, 20%, by the Center. In addition, although the primary purpose of the Center is the training of instructors, many graduates may be attracted to work in FDI enterprises, rather than become instructors in TVET institutions, given the opportunities for learning and higher salaries.

5.5. Local initiatives for skills development: Cao Thang Technical College

The last case is a skills-development initiative that has taken place without ODA assistance. Cao Thang Technical College (the College), located in the center of Ho Chi Minh City, has more than one hundred years of history in providing technical education. It was established as the Asian Engineering School in 1906 during the French colonial period. The school changed its name to Cao Thang Technical School in 1956 and was upgraded to a technical college in 2004. The college offers regular educational and vocational training programs. The College is mainly supervised by MOIT, but it should also follow MOET's guideline for higher academic education programs and MOLISA's guideline for vocational training programs.

The College mainly offers 4 courses: (i) college diploma course; (ii) vocational college diploma course; (iii) professional secondary education diploma course; and,
(iv) vocational secondary education diploma course. The vocational college and secondary courses were newly established in 2006 after the promulgation of the Law on Vocational Training. Accordingly, the number of graduated students increased from 4,200 in 2001 to 7,500 in 2006 and reached around 10,000 in 2008.

i. *College diploma course*
   This course offers education and training in 10 fields: mechanical design and manufacturing; automobile mechanics; industrial electrics; industrial electronics; refrigeration thermo-electrics; information technology; telecommunications; electro-mechanics; automation; and accounting. The students receive a college diploma by completing 3 years of study. The College accepts about 1,500 students for this course each year.

ii. *Vocational college diploma course*
   This course was newly opened in 2006 and offers training in the same 10 fields that the academic college diploma course does. The differences between the two courses are found in the entrance examination system, type of diploma and the

curriculum structure. Also, the vocational college course allocates more time on practical training (around 70% of the total class hours) than theoretical education.

iii. *Secondary professional education diploma course*
This course offers education in 9 fields: mechanical repairing; mechanical design and manufacturing; automobile repairing; industrial electrics; industrial electronics; refrigeration thermo-electrics; information technology; electronics-telecommunications; electro-mechanics; and accounting. Graduates of upper secondary school require 2 years and graduates of lower secondary school require 3 years for completing this course work. The College accepts around 2,000 students for this course.

iv. *Secondary vocational education diploma course*
The structure of this course basically follows the secondary professional education course. The differences between the two courses are found in the entrance examination system, diploma and the curriculum structure. Around 1,000 students enroll in this course every year. Also, graduates of the vocational secondary training course need to have a diploma of upper secondary school in order to take entrance examinations for colleges and universities supervised by MOET.

The management of the College stresses that it is important to make students conscious of a target career and the required skills in all of the above courses. The College provides elaborate training programs which require the active participation of students. For example, for homework, students are asked to work on machines independently. This aims to improve their skills through individual initiative and by stimulating creativity. Practice workshops are often open, even after class hours. Students at the college level need to complete an assignment for graduation which requires them to independently design and make a product. Furthermore, the College promotes student internships over 6-7 weeks for students in academic programs and 20 weeks for those in vocational training programs. Many students have been recruited by the companies which accepted them as interns, immediately after their graduation.

In addition to the above courses for full-time students, the College offers short-term courses in the fields of: furniture and wood processing; metal processing; benching; lathe; milling; welding; forging; automobile repairing; industrial electrics; refrigeration thermo-electrics; industrial electronics and so forth. About 7,000 students every year do short-term courses. The College also conducts on-site factory training upon request from enterprises. 2,730 employees from 195 firms attended on-site factory training

programs in 2006.

The College's cooperation with FDI and domestic enterprises, such as through students internships, has been beneficial. Some enterprises have donated training equipment to the College. For example, Toyota has provided some automobile maintenance training instruments. One Vietnamese company provided a training facility for automation. For improving the curriculum, the College sometimes invites representatives from enterprises for comment, in particular when new programs start. However, cooperation with enterprises is not yet systematic. Cooperation has been ad-hoc efforts and depended upon personal networks such as alumnus or an instructor's personal connection. In addition, the College sometimes struggles to find partners for internships or on-site training, particularly when the economic situation is not good and there is a gap between the skill demand of enterprises and the popularity of gaining that skill for students. For example, many enterprises want to recruit those who are good at welding, but this subject is not very popular for students nowadays.

The Ho Chi Minh City People's Committee is trying to support cooperation between TVET institutions such as the Cao Thang Technical College and enterprises. Since 2007, DOLISA of Ho Chi Minh City has organized a program to promote practical on-site training for students through partnerships between vocational training schools and enterprises. This program depends on contributions from the People's Committee, enterprises and TVET institutions: the People's Committee provides financial support for materials purchased for practical training; enterprises prepare the training venue and parts of the materials (raw or otherwise) training; and TVET institutions provide certain amounts of co-finance. Nonetheless, it seems that this program has faced challenges. For instance, there is often a timing gap between when TVET institutions and enterprises want to conduct training. Another issue is the difficulty of securing financial resources, because the program continues to be more costly than expected.

6. How to build partnerships with FDI enterprises

The cases introduced in Section 5 have been relatively successful in developing industrial human resources in partnership with enterprises. Table 8 summarizes the means by which each TVET institution has built partnerships, including PSDC and TNI as benchmarking examples.

Table 8. Means of Mobilizing Partnership with Enterprises

Name of TVET schools	Country	Support of foreign experts	Regular meeting with Alumni	Short-term courses	Receiving orders from enterprises	Internship	Curriculum Review Meeting with Enterprises	Skill Demand survey	Enterprises' involvement in management
PSDC	Malaysia	-	?	○	-	?	○	?	○
TNI	Thailand	○	○	○	-	○	○	?	△
VSTTC/Vietnam-Singapore Vocational College	Vietnam	○	?	○	-	○	△	△	-
HIC-JICA/VJC	Vietnam	○	?	△	○	○	-	-	-
Vietnam-Germany Training Center	Vietnam	○	○	○	-	?	△	-	-
Cao Thang Technical College	Vietnam	-	○	○	-	○	△	-	-

Note
○: Used as a regular or main means or fully implemented
△: Used as a temporary means or partially implemented
-: Not or seldom used
?: Unknown

Source: Authors.

Except Cao Thang Technical College, the other three schools in Vietnam have started developing partnerships with enterprises for the implementation period of ODA technical assistance projects. In the case of VSTTC and the Vietnam–Singapore Vocational College, the industrial zone management company, VSIP JV Ltd. has bridged a gap between the school and FDI enterprises in VSIP. In the cases of the HIC-JICA project and the Vietnam–German Training Center, German and Japanese project experts actively connected with enterprises, taking advantage of their nationality and expertise. These connections have become a valuable asset for the schools after the completion of their projects.

Cao Thang Technical College has mobilized cooperation with enterprises mainly through its alumni network and instructors' personal connections, without assistance from foreign experts. For example, the College gained support from Toyota, because a graduate from the College won a gold medal in an internal Toyota skill competition. This has probably been possible due to the long history of College. Alternatively, other schools have needed the support of foreign experts to make connections with enterprises in the short term. The Vietnam–Germany Training Center also organizes annual meetings with alumni.

Providing short-term courses is a common tool used to strengthen relationships with enterprises, as well as improve financial sustainability. The Vietnam–German Training Center and Cao Thang Technical College have delivered short-term training courses, customized based on enterprises' training needs, for company employees. On the other hand, Vietnam–Singapore Vocational College and VJC are gradually shifting their focus to training students in regular and long-term courses rather than through short-term

training courses. This may be because the two schools need to allocate more resources for regular students, in order to cope with increasing numbers of students in regular courses.

Developing relationships with enterprises through short-term training courses, the above two schools received client enterprises' assistance for upgrading training facilities, as PSDC and TNI had done. This has helped the schools learn about up-to-date technologies and strengthen their financial sustainability. There are, of course, several challenges to overcome. In many cases, enterprises could only provide partial funding for training facilities. Although the Vietnam–German Training Center managed to collect co-financing by utilizing several options, constant fund mobilization is not easy. Moreover, some FDI enterprises are slightly suspicious about the effects of donating equipment to TVET institutions. They are afraid that schools may just use their equipment to earn incomes, and not for developing the skills of students.

The HIC-JICA project and VJC have been receiving manufacturing orders from FDI enterprises, but this measure would be controversial. Some enterprises wonder if receiving manufacturing orders really benefits students or just increases the incomes of schools, deviating from the original purposes of training and education. In addition, such measures may impede business activities of small and medium enterprises if they focus on taking mass-production orders, instead of those for an experimental purpose.

Promoting internships in enterprises is another common tool which all schools above have used. Students can improve their practical skills through internships, while the schools can strengthen their relationship with enterprises, in particular for graduate recruitment. In most cases, internship programs increase job opportunities for students. However, it takes a lot of time and human power to search for partner enterprises who can accept internships, because the most effective ways to achieve these is through company visits and face-to-face meetings. During the implementation period of ODA projects, foreign experts can work to build partnerships with enterprises through internships, taking advantage of their expertise, native languages and nationality. It is ideal that national staff take over coordination roles after the project is completed, but this may not happen all the time. In addition, current economic and business conditions may also affect whether enterprises choose to accept internships.

Among the Vietnamese schools introduced in Section 5, other means such as in-depth skill and labor demand surveys, curriculum review meetings with enterprises, and enterprises' involvement as management council members, are not regularly utilized yet.. While PSDC and TNI have embedded regular cooperation with enterprises into their systems by adopting those advanced means, the Vietnamese schools still depend

on ad-hoc efforts by project experts or school staff. Many people have recently started to emphasize that the TVET institutions should consider the skill demands of enterprises. Although it is known that enterprises want "skilled" workers from many general surveys, this information is not enough to improve TVET programs. Conducting in-depth surveys for skill demand may be needed, but not many enterprises tend to respond to comprehensive and detailed questionnaires. For example, when the Vietnam–Singapore Vocational College conducted a survey, only 10% of enterprises responded. Enterprises may explain that the survey format is not user-friendly or it is too difficult to forecast the skills needed. Furthermore, even if the TVET institutions receive detailed feedback from enterprises, it may be difficult to change their training and educational curricula drastically. The schools can usually modify their curricula within 10-20% of the total curricula under their discretion. If they want to change curricula by more than 10-20%, or establish new course fields, they need to go through the approval procedures of MOET or MOLISA. This often takes a lot of time and effort.

7. Concluding remarks: toward concrete policy proposals

Vietnam has made remarkable progress in economic development and FDI expansion, mainly because of its low-wage and good-quality labor force. However, if industrial human resources cannot be developed as expected, the potential for growth may taper off sooner or later. Vietnam's high potential in industrial human resources is widely recognized, but turning this potential into reality is a key challenge in promoting further industrialization in Vietnam. To promote collaboration, in particular with FDI enterprises, would be the most effective way to accelerate industrial skill development in Vietnam, by taking advantage of increasing FDI and promoting technology transfer from FDI enterprises. Recent shortages of skilled labor, rising wages and higher demands on local procurement, are bringing about more chances for collaboration between TVET institutions and enterprises.

This paper has provided an overview of labor demand, the TVET system and some good practices for cooperation with FDI enterprises in Vietnam. However, one important issue which this paper did not discuss is the role of government. The Vietnamese government has already realized the importance of demand-based skill development. What kind or roles should national or provincial governments play in strengthening the partnership between TVET institutions and enterprises? In principle, partnerships should be on a voluntary basis so that the governments cannot force either party to cooperate. Therefore, the government's role should be more for coordination, rather than through active intervention and reduction of barriers between TVET institutions and enterprises. Possible options for further research are listed below:

- *Promotion of internships in enterprises*: It may be helpful to provide assistance for TVET institutions who want to promote internships in enterprises. In Ho Chi Minh City, DOLISA has implemented an assistance program, although it seems that the program faces difficulties. The lessons drawn from this trial will be useful for further improvement of the program in Ho Chi Minh City and other provinces.

- *Development of incentive schemes which urge enterprises to use TVET programs*: The national and provincial governments may consider the effects and feasibility of incentive schemes such as tax exemptions for enterprises who urge their employees to take external learning courses. It would be beneficial to learn about the structure and effects of other countries' incentive policies, such as the Human Resources Development Fund (HRDF) in Malaysia. HRDF operates on the basis of a levy/grant system. Employers who have paid the levy will qualify for training grants from the fund to defray or subsidize training costs for their Malaysian employees[31].

- *Skills and labor demand survey*: It would be useful to support TVET institutions by conducting comprehensive surveys for skills demand. Surveys conducted by government are able to capture an overview of labor demand, but may not collect detailed enough information for TVET institutions to improve their training programs. Therefore, rather than conducting in-depth surveys alone, it is proposed that the government helps TVET institutions to conduct individual surveys for clients by providing feasible survey methods and promoting information exchange among different schools.

- *Increasing flexibility to improve curricula*: The government may consider how TVET institutions can reflect the demands of enterprises in its curricula. Standard curricula are needed, but it may also be beneficial to establish more efficient evaluation and approval procedures for new courses, as well as the review mechanisms for curricula revisions in order to catch up with the demands of enterprises.

The role of ODA technical assistance projects is mainly to assist TVET institutions to develop their capacity in terms of both hardware and software, and to support the government to facilitate cooperation between TVET institutions and enterprises. Several

[31]Manufacturing companies, which employ more than 50 workers or employ more than 10 workers and have capital of more than RM 2.5 million, contribute an amount equivalent to 1% of an employee's monthly wage to this fund. The remaining companies contribute an amount equivalent to 0.5% of an employee's monthly wage. Refer to: MIDA (2005).

ideas are listed below:

- In addition to donating equipment and capacity building for instructors, it would be beneficial to provide foreign experts who can strengthen relationships between enterprises and TVET institutions. Moreover, it would ensure better sustainability of projects if foreign experts can train school members as their successors before projects finish.

- ODA projects may assist TVET institutions to conduct comprehensive skills and labor demand surveys. It takes time and money to establish survey methodologies through trial and error and thus, TVET institutions tend to hesitate in conducting surveys regularly. Thus, it would be beneficial if ODA technical assistance projects provide technical advice and finance for several pilot surveys, although sustainable survey methods should be established during the projects.

- Good practices for cooperation between TVET institutions and enterprises should be widely disseminated. Although there is no grand method which can be applied nationwide, it is still useful to promote experience sharing among TVET institutions in different provinces and cities. The ODA project may support national or local government to facilitate dissemination of grass-roots good practices.

This paper has reviewed the current state of TVET programs in Vietnam and examined emerging cases of cooperation between TVET institutions and FDI enterprises. In order to draft more comprehensive policy proposals, further research is required into what kind of policy options can be effective in the context of Vietnam, in view of the experiences in more advanced countries,

References

Asian Development Bank (ADB). (1998). *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Vietnam for the Vocational and Technical Education Project*, retrieved on December 28, 2008 from http://www.adb.org/Documents/RRPs/VIE/rrp-R19098.pdf

_____ (2008). *Socialist Republic of Vietnam: Preparing the Skills Enhancement Project*, retrieved on December 28, 2008 from http://www.adb.org/Documents/TARs/VIE/41339-VIE-TAR.pdf

Central Institute for Economic Management (CIEM). (2006). *Vietnam's Economy in*

2005. Hanoi, Vietnam: National Political Publishers.

Fujimoto, T. (2006). "Architecture-based Comparative Advantage in Japan and Asia" Ohno, K. and Fujimoto, T. eds. *Industrialization of Developing Countries: Analyses by Japanese Economists*. Tokyo, Japan: National Graduate Institute of Policy Studies (GRIPS).

General Statistics Office (GSO). (2007, 2008). *Statistical Yearbook of Vietnam*. Hanoi, Vietnam: Statistical Publishing House.

Japan External Trade Organization (JETRO). (2004, 2005, 2006a, 2007, 2008). *在アジア日系製造業の経営実態—ASEAN・インド編 (Japanese-affiliated Manufacturers in Asia: ASEAN and India)*. Tokyo, Japan: JETRO.

_____ (2006b). "Comparative Survey of the Labor Environment in ASEAN, China and India". *Overseas Research Release* No.366. Tokyo, Japan: JETRO.

_____ (2009). *Cost Comparison in Main Cities*, retrieved on January 5, 2009 from http://www3.jetro.go.jp/jetro-file/cityCmpDetail.do

Japan International Cooperation Agency（JICA）. (2004). *ベトナム社会主義共和国ハノイ工科短期大学機械技術者養成計画終了時評価調査団報告書 (Final Evaluation Report on the Project for Strengthening Training Capability for Technical Workers in Hanoi Industrial College)*. Tokyo, Japan: JICA.

Imm, Anna Ong Cheng. (2000). "Penang's Manufacturing Competitiveness" *Briefing Paper to the Penang State Government.* Penang, Malaysia: Socio-Economic and Environmental Research Institute (SERI)

Malaysian Industrial Development Authority (MIDA). (2005). *The Costs of Doing Business in Malaysia*. KL, Malaysia: MIDA.

Ministry of Labor, Invalids, and Social Affairs (MOLISA). (2007). *Mot so thong tin ve trien khai Luat Day nghe (Information about the implementation of the Law on Vocational Training)*, retrieved on October 30, 2007 from http://www.molisa.gov.vn/frmdocchitiet.asp?mbien1=01&mbien2=103&mbien3=9168

Mori, J., Nguyen T.X.T., and Ohno, K. (2008). "ベトナム: FDI誘導型成長を支える工業人材育成を目指して (Vietnam: Aiming at developing industrial human resources for FDI-oriented growth)". Okada, A., Yamada, S., and Yoshida, K. eds. *産業スキルディベロプメント: グローバル化と途上国の人材育成 (Industrial Skill Development: Globalization and Human Resource Development in Developing Countries)*. Tokyo, Japan: Nihon Hyouron Sha.

Mori, J. (2005). "Development of Supporting Industries for Vietnam's Industrialization: Increasing Positive Vertical Externalities through Collaborative Training." *Master Thesis*. MA, USA: Fletcher School, Tufts University.

Nguyen, Thi Xuan Thuy. (2007). "Supporting Industries: A Review of Concepts". Ohno, K. eds. *Building Supporting Industries in Vietnam* - Vol.1. Hanoi, Vietnam: Vietnam Development Forum (VDF).

Overseas Vocational Training Association (OVTA). (2006). *ベトナム No.2: 職業能力開発政策とその現在の実施状況 (Vietnam No.2: Vocational Capacity Development Policy and Current Situation of Implementation)*, retrieved on September 21, 2007 from http://www.ovta.or.jp/info/asia/vietnam/pdffiles/enforcement.pdf

Rasiah, R. (2002). "Government-business coordination and small enterprise performance in machine tools sector in Malaysia" *Small Business Economics* 18. Maastricht, Netherlands: Kluwer Academic Publishers.

Takabayashi, J. (2006). *東アジアの工業化と技術形成―日中アセアンの経験に学ぶ― (Industrialization and Skill Development in East Asia – Learn from experiences in Japan, China, and ASEAN -)*. Tokyo, Japan: Minerva Shobo.

Vietnam Business Forum (2008). "Report on Business Environment Sentiment Survey 2008". *Proceeding for the forum held on 1st December 2008*. Hanoi, Vietnam: Vietnam Business Forum.

Vietnam Chamber of Commerce and Industry (2008). *Vietnam Business Annual Report 2007 – Labor and Human Resource Development*. Hanoi, Vietnam: VCCI.

Vietnam National Assembly. (2006). *Law on Vocational Training* No.76/2006/QH11. Hanoi, Vietnam.

Vietnam Development Forum (VDF). (2006). "Supporting Industries in Vietnam from the Perspective of Japanese Firms". *VDF Policy Note* No.2. Hanoi, Vietnam: VDF.

Vietnam Investment Review (VIR). (2007). "New Labour is Hard Work". The edition on 19-25 March 2007. Hanoi, Vietnam.

Annex A. List of TVET institutions visited and their contact addresses

No.	School	Contact address
1.	Vietnam-Singapore Vocational College	Highway 13, Thuan Giao Village, Thuan An District, Binh Duong Province, Vietnam Tel: +84-(0)650-382-0655; Fax: 84-(0)650-382-0812
2.	Vietnam-Germany Training Center, University of Technical Education	01-03 Vo Van Ngan Street, Thu Duc, Ho Chi Minh City, Vietnam Tel: +84-(0)8-3896-4575; Fax: +84-(0)8-3896-6046
3.	Cao Thang Technical College	65 Huynh Thuc Khang Street, District 1, Ho Chi Minh City, Vietnam Tel: +84-(0)8-3821-2361; Fax: +84-(0)8-3821-5951
4.	Vietnam-Japan Center, Hanoi University of Industry	Minh Khai, Tu Liem, Hanoi, Vietnam Tel: +84-(0)4-3765-5407; Fax: +84-(0)4-3765-5409