

# **Industrial Human Resource Development in Vietnam in New Stage of Industrialization**

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## **Introduction**

Vietnam will soon shift to new period of industrialization in coming years and asks for more resources for growing. Experience of successful developing economies in the twentieth century indicates not only the critical role of general human resource development during the industrialization but also the importance of strategic industrial human resource development. It means that the development of human resource must respond to the requirement of firms, industries and economies in different levels of growth. Besides this, the fierce changes in the world's business environment bring new context for the development of latecomer developing economies in the twenty first century that brings increasing difficulty for later developing economies. Inasmuch as human resource is the key for long-term and stable development, a critical question for Vietnam today is how to develop its human resource, particularly in industrial field.

This chapter aims at arguing some key issues in industrial human resource development in Vietnam in coming period based on a framework developed from experiences of developing economies and the analysis of new context in recent world's business environment. Some suggestion on industrial human resource development in Vietnam in coming period will also be built from the experiences of successful pilot projects in industrial human resource development in Vietnam in recent years.

## **1. Economic development in developing economies and the role of human resource development**

### ***1.1. Four steps of economic development in developing economies and human resource development requirements***

The late twentieth century witnessed the marvelous development of a group of developing economies in the East Asia such as Japan, Korea, Taiwan and then Thailand, Malaysia. The development in these economies is also known as the process of accumulating technological capabilities. To become an advanced industrialized economy, developing economies need to pass four periods, i.e. pre-industrialization (or *start-up*), *assimilation*, *accumulation*, and *innovation*<sup>1</sup> (adapted from Hobday 1995, Kim and Lee 2002, Xie and Wu 2003, Kim 2004). In the start-up process, like Vietnam at present, is the process of economic transformation from agricultural economies toward industrialization. Factors are formed and foreign firms start investing in the country. The assimilation period is specified by the quick enlargement of firms and industries and firms assimilate technologies from abroad through various ways such as subcontracting with foreign direct investment (FDI), joint-venture or pattern purchasing. In accumulation periods, local firms become more active in technological improvement to adapt to their internal condition. When they have enough technological

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<sup>1</sup> Some authors combine start-up stage to assimilation stage. These paper separate these two stages to clarify the current position of some new developing economies, such as Vietnam (see more Pham 2007).

capabilities, firms switch to innovating new technologies. The economies join in the club of developed economies, where innovation is the key for global competitiveness.

Along with the development of these developing economies is the improvement of human resource, which is one of core elements building technological capabilities (Barney 1991, Bell and Pavitt 1995). Experience of successful developing economies in the twentieth century has affirmed the critical role of technological capabilities building in developing economies (Hobday 1995, Mahmood and Singh 2003) such as the cases of Japan after World War two, Korea and Taiwan, Singapore in the 1970s, 1980s. Meanwhile, it is still a bit early to say that Thailand and Malaysia have got success to get off from developing economies (Ohno 2005).

While the vital role of human resource development or technological capabilities building is undeniable for developing economies, how to develop it, precisely, which kinds of capabilities must be built in different stages of development is the key factor for the success of some economies but not some others. There are some countries can develop their economies rapidly and stably in long term while many developing economies stuck at a level of development where they cannot become independent from the technological transfer from abroad or cannot escape from the “glass ceiling” due to the low capabilities of their human resources (Ohno 2005). In fact, each stage of economic development asks for a level of technological capabilities (Table 1). While in early stages of development, more workshop floor or operational skills are needed, the condition for a developing economy stably develops to higher level is the availability of human resource with engineering capabilities and then innovating capabilities.

To have appropriate policies for industrial human resource development, it is important to define where Vietnam is in its development. Table 2 shows some key economic indicators of selected Asian economies. Although Vietnam has impressive development in recent two decades, there is still a remarkable gap of development level between Vietnam and other ASEAN’s tigers such as Thailand and Malaysia. These countries, in turn, are in lower economic development level compared to Korea and Taiwan. These two newly industrialized economies have developed significantly in the 1980s, 1990s and reach to innovation level recently. Meanwhile, Japan is the only Asian country get to the top level of innovative economies in the twenty century (Figure 1).

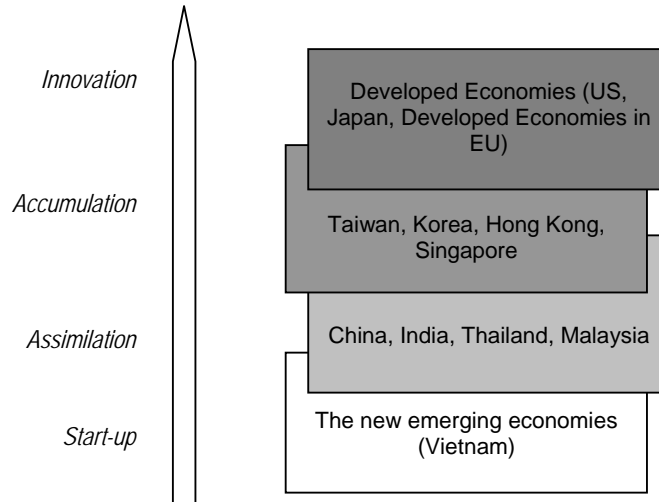
**Table 1. Four Periods of Economic Development and Human Resource Requirement in Developing Economies**

<b>Step</b>	<b>Stage</b>	<b>Human resource requirement</b>	<b>Human resource development</b>
1	Start-up	Workshop floor labors with basic production skill	Develop vocational school to train farmers to become workers
2	Assimilation	Good-skill work floor labors, workshop floor managers and engineers	Improve vocational school system
3	Accumulation	Labors with technological (and managerial) search, improvement capabilities	Develop the system of universities (both in engineering and managing) as well as research institutes

4	Innovation	Labors with innovation (both technological and managerial) capabilities	Improve the system of universities and research institutes both in application and basic studies fields
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Source: created by the authors

**Figure 1. Technological Capabilities of Firms in Different Economies**



Source: Pham 2007

**Table 2. Some key indicators of some Asian economies 2006**

<b>Indicators</b>	<b>Japan</b>	<b>Korea</b>	<b>Taiwan</b>	<b>Singapore</b>	<b>Malaysia</b>	<b>Thailand</b>	<b>China</b>	<b>Vietnam</b>
GDP in 2005 (USD Billion)	4,534.0	787.6		116.8	130.3	176.6	2,234.3	52.4
GDP per capita in 2005 (USD)	35,484	16,309	13,451	26,893	5,142	2,750	1,713	631
Population in 2005 (mill)	127.8	48.3	22.8	4.4	26.1	64.8	1,307.6	83.1
Share of Major Sectors (Agriculture / Industry (Manufacturing only) / Service) in GDP in 2005 (%)	1.8 / 32.4 / 65.8	3 / 34 (25.3) / 61	1.8 / 24.6 (21.1.) / 73.6	0.1 / 32.5 (26.2) / 67.4	8.4 / 49.8 (29.4) / 41.8	9.9 / 41.1 (34.7) / 46	12.5 / 47.3 (41.8) / 40.3	20.9 / 41.0 (20.7) / 38.1
Share of Employment in Agriculture / Industry / Service (%)	n.a.	8 / 19 / 73 (2005)	6 / 27 / 67 (2005)	0 / 21 / 78 (2005)	15 / 20 / 65 (2005)	43 / 15 / 43 (2005)	49 / 12 / 39 (2003)	57 / 13 / 30 (2005)
Population in Poverty in 2006 (%)	n.a.	3.6	0.8	n/a	7.5	9.8	3.1	19.5
Universal Primary education (%)	100 (2005)	99 (2005)	98 (2004)	96 (1990)	93 (2003)	85 (2003)	99 (2003)	93 (2002)
Human Development Index / rank in 2006	8	9.901 / 28	n/a	0.907 / 25	0.796 / 61	0.778 / 73	0.755 / 85	0.704 / 108
WB Knowledge Economy Rank in 2007	17	27	19	138	40	56	75	97
WB Knowledge Economy Index (KEI) in 2007	8.46	7.74	8.37	n/a	6.23	5.41	4.42	3.1
WB Knowledge Index (KI) in 2007	8.62	8.27	8.35	n/a	6.14	5.28	4.46	3.37
WB Innovation Index in 2007	9.17	8.44	9.1	9.4	6.74	5.95	5.09	2.79
WB Education Index in 2007	8.2	7.7	6.96	n/a	4.45	5.19	4.09	3.89
WB ICT Index in 2007	8.47	8.67	9	9.12	7.23	4.71	4.21	3.41
Global Competitiveness Index Ranking 2005	7	24	13	5	26	35	54	77
Innovation Capability Index 2001 (UNCTAD)	11	19	15	26	60	54	74	82

Source: Created by the authors based on World Bank ([www.worldbank.org/kam](http://www.worldbank.org/kam)); IMF's World Economic Indicators ([www.imf.org](http://www.imf.org)), ADB's Key Indicator 2006, World Economic Forum (<http://www.weforum.org>)

## ***1.2. Variation of production structures and HR capabilities' requirements***

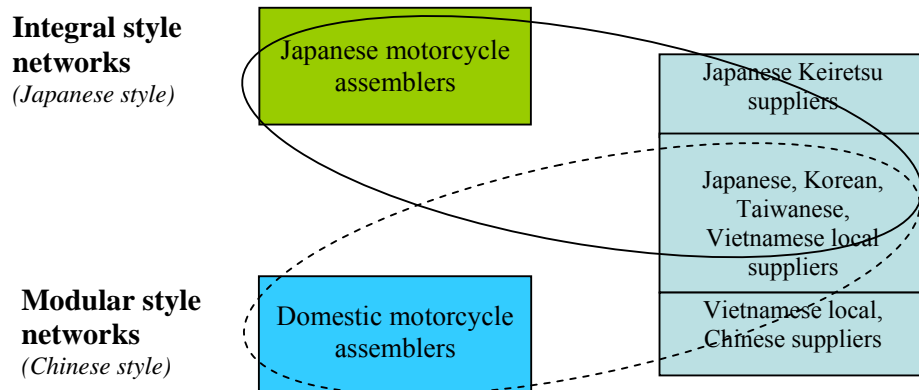
Nowadays, new developing economies are growing in the world's economic condition with significant changes since the late twentieth century. That is the impressive development of many developing economies which upgrades their role in the global economies, particularly in later developing economies. Outward FDI from developing and transition economies, mostly from the older developing economies, has risen from 2% of total world's outward FDI in 1975 to 6% in 1990, 11% in 2000 and 18% in 2005. Specially, the south-south investment has been increased rapidly (UNCTAD 2006).

The take-off and influences of newly industrialized economies or even China to new developing economies is another noteworthy condition. During their development, the newly industrialized economies and China have built their specific production structures. The increase of global competition sharpened these structures and made them be competitive weapons of the firms in those countries. Two significant models of production structures are *integral* and *modular* (Fujimoto et al. 2001, Ulrich 1995). Integral production system can be seen Japanese firms, where a group of firms in a production chain have closed, long-term and trust-based business relationship. In this system, satellite (or subcontracting) firms are strongly depended on the core firm because their products can normally be provided to the core firm only. Meanwhile, in modular production system, firms in a production chain are more independent since they have relatively independent products (and/or components). These products, i.e. component parts, of a firm can be an input of different firms. This production system is popular in American companies (Helper and Sako 1995) but also in Taiwanese companies and particularly in Chinese ones with *imitation production* (Shintaku et al. 2004).

These two kinds of production systems appeared in newly developing economies, such as Vietnam, when these countries receive FDI from abroad. In one industry, such as in Vietnam's motorcycle industry, the two production systems are co-existing (Pham 2005). Firms participate in these systems are required for different capabilities such as more workshop floor skill in integral production system and more independent new product (and/or component) development (and/or imitation) in modular production systems (Pham 2006).

With the developing economies which are at low level of economic development like Vietnam currently, FDI and particularly technologies coming with FDI are the vital element for the economic growth in the coming periods. However, competition within developing economies to obtain FDI is increasing and more incentives are given to foreign investors. In these incentives, human resource is one of the key elements. In the earliest stage of economic development, less-skillful but low-priced labor is the most attractive factor of developing economies. But then, more skillful technical and managerial labors are required to attract FDI flow continuously. FDI firms also increasingly ask for collaborative partners, both local and other FDI firms.

**Figure 2: Co-existence of the Two Kinds of Supply Systems in Vietnam's Motorcycle Industry**



Source: Pham 2005

Another important thing for developing economies is how to diffuse technologies from abroad, through FDI and enlarge the spillover effect of foreign factors. Moreover, under nowadays condition of rapid globalization, firms in developing economies need to find a way to participate in and exploit international production networks. With various styles of production structure, firms in developing economies need to have different capabilities to respond to requirement of collaborative partners. Human resource development in Vietnam needs to fulfill these various requirements of different production system structures in order to nurture industrial development.

## 2. Current Vietnam's education system

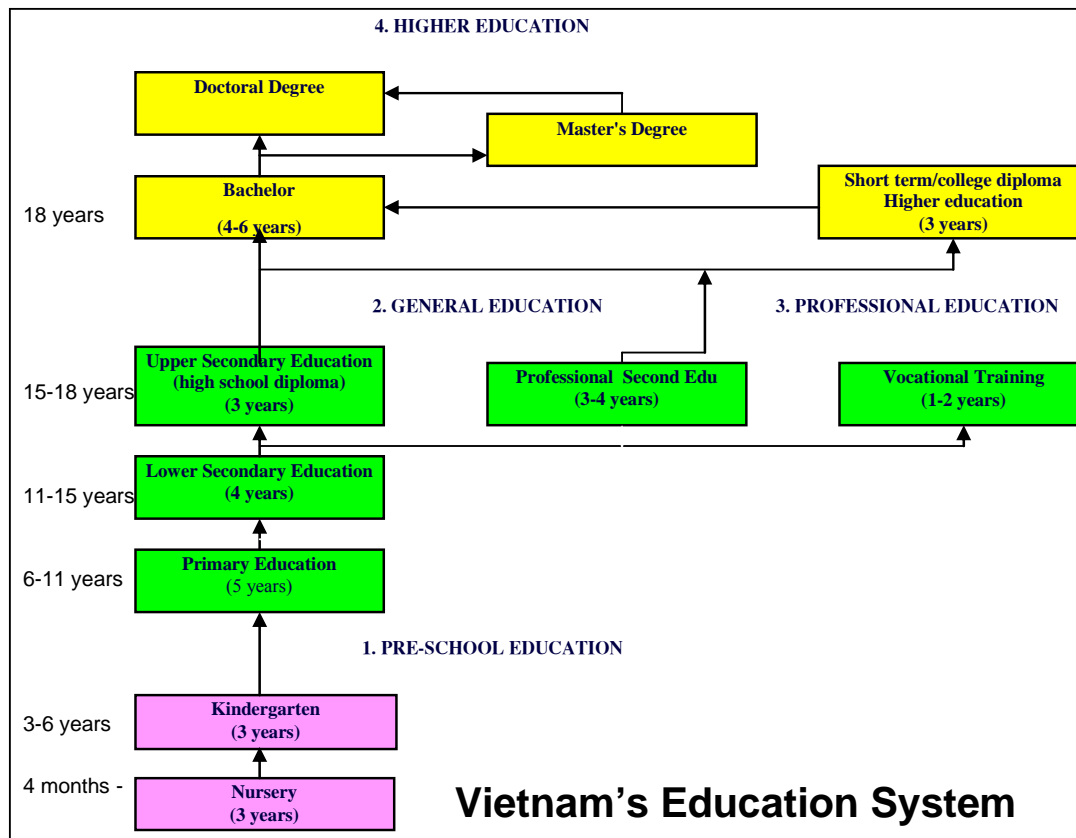
### 2.1. An overview of education and training system of Vietnam

The Education law of Vietnam in 2005 regulated that the national education system of Vietnam includes permanent education and frequent education. The study levels and the training levels of the national education system (see Figure 2) include:

- Nursery level includes kindergartens and nursery schools;
- General education includes primary schools, secondary schools and high schools;
- Professional education includes professional secondary education and vocational training;
- Tertiary education includes colleges, university and graduate education (master and doctor levels)

Moreover, there are some other education schools apart from national education schools. They are (i) kindergartens; (ii) independent nursery classes: nursery class, eradicating illiteracy classes, foreign language teaching classes, IT classes, poor and/or disable children classes, votional training classes in workshops and vocational training centers; (iii) vocational training oriented technical classes; vocational training centers, frequent education centers, community education centers; (iv) science research institutes are assigned to train doctors, cooperated with universities to train at master level.

**Figure 3. Vietnam's Education System**



Source: Ministry of Education and Training

The education system of Vietnam has some outstanding successes in the recent years. The education success of Vietnam is impressive in comparison with other countries with the same development level. Vietnam has an adequate education system with all levels in all areas of the country. The system also has many different types of classes and schools. The number of enrollments increase every year. In the school year 2005-2006, there were more than 22.5 million pupils and students studying in more than 37,000 schools and training centers<sup>2</sup>.

In 2000, Vietnam was successful in popularizing primary schools, and in eradicating illiteracy. Since 2005, the rate of literate people aged above 15 was 90.3%. Teaching local minority languages has also been developed in many areas. And therefore the rate of illiterate minority people decreased significantly. Primary education is popularized in every area of the country. Vietnam is highly evaluated in making progress compared with other low income countries in the world in reducing gender gap and in increasing the enrollment rate at the right age level.

If the indexes of HDI is analysed, the general education related indexes compared with other countries are ranked at 105<sup>th</sup>.

<sup>2</sup> Ministry of Education and Training Statistics Report

**Table 3. Some Indicators Related to Human Development Index of Vietnam (2005)**

<b>Some indicators</b>	<b>Rank (point)</b>
<b>Human Development Index</b>	<b>105</b>
Life expectancy at birth (years)	56 (73.7)
Adult literacy rate (% ages 15 and older)	57 (90.3)
Combined primary, secondary and tertiary gross enrolment ratio (%)	121 (63.9)
GDP per capita (PPP US\$)	122 (3,071)
Human Poverty Index (HPI-1) 2004	73 (15.2)
Probability of not surviving past age 40 (%) 2004	98 (6.7)
People without access to an improved water source (%) 2004	70 (15)
Children underweight for age (% ages 0-5) 2004	30 (27)
GDI as % of HDI	9 (99.8%)
Life expectancy at birth (years) 2004 Female as % male	140 (105.3%)
Adult literacy rate (% ages 15 and older) 2004 Female as % male	87 (92.5%)
Combined primary, secondary and tertiary gross enrolment ratio 2004 Female as % male	146 (93.5%)

Source: Created by the authors based on Human Development Report 2007/2008

Tertiary education is more opened in scale. Facility for education is improved and newly invested. The curriculum is improved. Although the tertiary education of Vietnam still has some shortcomings compared with developed countries, it can meet the demand of global requirements and the society demand.

The investment for education in Vietnam is increasing in recent years. National budget for education, which account for a large part of the whole country's investment, increases by more than 20% annually, i.e. 2.5 times higher than GDP growth. Noticeably, vocational training started draw attention of policy makers. Investment from national budget for this kind of training increases by about 40%, 2 times faster than general education (Table 5). This figure shows a shift of policy in investing on human resource development. Responding to the requirement of industrial sector, more resource is concentrated on vocational training.

**Table 4. University and College Education in 2000 - 2006**

	2000	2002	2003	2004	2005	Prel. 2006	Increase '00-'06
<b><i>No. of schools (school)</i></b>	<b>178</b>	<b>202</b>	<b>214</b>	<b>230</b>	<b>255</b>	<b>299</b>	<b>168%</b>
Public	148	179	187	201	220	253	
Non-public	30	23	27	29	35	46	
<b><i>No. of teachers ('000 pers)</i></b>	<b>32.3</b>	<b>38.7</b>	<b>40.0</b>	<b>47.6</b>	<b>48.6</b>	<b>53.4</b>	<b>165%</b>
Public	27.9	33.4	34.9	40.0	42.0	45.6	
Non-public	4.5	5.3	5.1	7.6	6.6	7.7	
<b><i>No. of students (('000 pers)</i></b>	<b>899.</b>	<b>1020.</b>	<b>1131.</b>	<b>1319.</b>	<b>1387.1</b>	<b>1666.</b>	<b>185%</b>
	<b>5</b>	<b>7</b>	<b>0</b>	<b>8</b>		<b>2</b>	

Public		795.6	908.8	993.9	1182.0	1266.7	1456.7
Non-public		103.9	111.9	137.1	137.8	160.4	209.5
Of which:	Full-time training	552.5	604.4	653.7	729.4	836.7	917.2
	Public	452.4	493.8	529.6	601.8	698.4	754.9
	Non-public	100.1	110.6	124.1	127.6	138.3	162.3
<b>No. of graduates ('000 pers)</b>		<b>162.5</b>	<b>166.8</b>	<b>165.7</b>	<b>195.6</b>	<b>210.9</b>	<b>230.0</b>
	Public	149.9	152.6	152.6	180.8	195.0	214.0
	Non-public	12.6	14.2	13.1	14.8	16.0	16.0

Source: General Office of Statistics of Vietnam

ODA projects in education spent most of their budget for basic education, tertiary education. And the total budget of these projects is as much as hundreds millions USD. Organizations like the World Bank, the ADB are lending hundreds millions USD to expand and improve the quality of Vietnam education system. For example, the support of ADB in basic education improvement and the support of the World Bank in improving education and training qualities in Vietnam universities. Vietnam is also implementing a special project named "Primary education project for disadvantaged children" to provide opportunities for disadvantaged children to go to schools.

**Table 5. National Budget for Education 2000-2007**

	Unit: Billion VND							
	2000	2001	2002	2003	2004	2005	2006	2007
<b>Total</b>		15609	20624	22795	32730	41630	55300	66770
Annual growth		-	132%	111%	144%	127%	133%	121%
Capital Expenditure		2360	3008	3200	4900	6623	9705	11530
Regular expenditure	10356	12649	16906	18625	27830	35007	45595	55240
Target program	600	600	710	970	1250	1770	2970	3380
Vocational training		90	110	130	200	340	500	700
(Annual growth)			122%	118%	154%	170%	147%	140%
Normal education		415	495	725	925	1305	2328	2333
Professional secondary		20	25	30	35	35	37	50
Higher Education		75	80	85	90	90	105	297

(Source: created from <http://www.edu.gov.vn>)

It should be noted that the State budget to develop vocational training center system is increased significantly. Compared with the budget invested for vocational training in 2001, this total investment in 2007 increased 8 times, from 90 billion VND to 700 billions VND. It reveals that Vietnam considers vocational training as an important part of the human resource and the labor resource for the whole society. It was also partly shown through the

Industrialization and modernization strategy, in which the education in general and vocational training and technical training in particular are stressed.

## ***2.2. Human resource for industrial development: Current gaps***

In spite of its noticeable improvement in recent years, Vietnam's education has still become one of most controversial topics of Vietnam's National Assembly and the whole society recently. It is a good signal to show that the education system has not updated to respond to the requirement of the society, particularly in the coming period.

Related to industrial human resource, two levels of education have direct influences are higher education, including university and college levels, and vocational training. Recent analysis of the higher education sector showed the difficult and strained relationship between demand and supply in higher education in Vietnam. This supply and demand gap is related to:

- Lack of qualified effective management in higher education, both at system as well as at institutional level;
- Necessity to reform curricula, syllabi and teaching/learning methods;
- Outdated materials and facilities are important factors of poor teaching quality;
- Lack of proper quality assurance system. This need has been reflected by recent establishment of the Directorate for Testing and Quality Assurance at MoET;
- Poor cooperation among institutions. This results in wastes of resources and lack of synergy;
- Imbalance in enrolment rates, geographical distribution of students;

The above mentioned aspects were also mentioned during the workshops with representatives of MoET and the Universities in Vietnam and The Netherlands. The result of this workshop is illustrated in the *Problem Tree of College and University in Vietnam* (Figure 4)

From the views of foreign investors, who have a lot of experience in human resource development in various developing economies, human resource of Vietnam has still many disadvantages compared to other countries in the region such as Thailand, Malaysia or China (JETRO 2005).



### 2.3. Educational and training strategy in new period of economic development

Since 1998, the National Assembly, the government, and the Ministry of Education and Training have issued many legal documents. And many of them have marked the basic development in both quality and quantity of Vietnam education system. Many legal documents have mentioned conditions and standards to ensure the education quality in general and in vocational training in particular.

**Table 6. Current key legislative documents related to education and training in Vietnam**

Decision	Dated	Period	By	Main contents
Education law	02/12/1998		National Assembly	Education law
Education law	06/14/2005		National Assembly	Adjusted Education law
Decision number 47/2001/QĐ-TTg			Prime Minister	Education development strategy approval, 2001-2010
Decision number 14/2005/NQ-CP	11/02/2005	2006-2020	Government	Basic and profound reform of Vietnam tertiary education
Resolution 121/2007/QĐ-TTg	07/27/2007	2006-2020	Prime Minister	Master plan for university and college network
Decision number 65/2007/QĐ-BGDĐT and 66/2007/QĐ-BGDĐT	01/11/2007		MOET	Regulation on evaluation standards for university and college quality
Decision number 76/2007/QĐ-BG	12/14/2007		MOET	Regulation on process and time to investigate the education quality at college, university and vocational training schools
Decision number 750/TCCB-BGDĐT	01/31/05		MOET	Regulation on establishing vocational training centers and schools

The network of university and vocational training schools is developed as planned nationwide. The network is diversified in many types, ownership and training programs. Training capability of the vocational training centers has been improved, and the professions trained in these centers are adjusted to meet the real demand of the manufacturing industries, service industries and the demand of labor market. The vocational training schools have introduced many new programs that the market needs. Total budget for the national project on improving vocational training school up to 2010 is 5,500 VND billion with main objectives:

- Upgrade teaching and learning facilities, capacity building and curriculum development for 60 selected vocational schools in each province in Vietnam. Three pilot schools will be given priority to become international accredited school by 2010;
- Develop and establish qualification framework, accreditation;
- Assist vocational schools in reviewing the requirements of labor market vis-à-vis vocational education which is to be translated in adequate education policy

There is a need to formulate and implement National Policy Framework for development of a Profession-Oriented Education system and convert most of existed universities to professional higher education to meet the labor market demand. Professional Higher Education is new in Vietnam. Professional Higher Education means training people for higher professions in companies or (none) government organizations. This means that it is the ‘World of Work or Labor market’ that co-determines the content of the courses. It is a very much a demand driven type of education and therefore a really strong relation with the World of Work is required and it means getting the teaching staff away from their safe university into the companies of NGO’s.

This National Policy Framework for Professional Higher Education is based on 5 fundamental elements:

- A system that makes it possible to connect the curricula with the always changing educational and training needs of the productive sector, the service sector and its labor markets
- A system that gives the staff the instruments to improve constantly the technical and didactical quality of the academic programs for education and training
- A way of organizing the learning-teaching process that creates a continuous relationship between the learning process at the institute and the productive and socio-economic reality of the primary sector and the communities
- Necessary didactical spaces within the universities for learning on technical-productive abilities (skills), entrepreneurship, and industry and business management.
- An experimental basis, it will teach us how best to implement this new way of education

### **3. Current issues in industrial human resource development – vocational training case analyses**

Industrial human resource development has become a priority of Vietnam for sustain its stable development. In recent years, vocational training has become one of the focal points in innovating the education system in Vietnam. There were several pilot projects of vocational training system that obtain certain successes. Most of these projects are supported by foreign countries, specially Japan and German. Besides these, there are some vocational training schools in Vietnam developing rapidly nowadays from its scale to quality. The successful development of these projects and schools has shown some important issues for industrial human resource development in Vietnam at present, particularly in vocational training. This session will argue about six significant issues of industrial human resource development in Vietnam nowadays, based on the authors’ field-based research to the successful vocational institutions in 2007.

**Table 7. Introduction of five analyzed vocational training institutions in Vietnam**

	<b>Period</b>	<b>Location</b>	<b>Foreign partner</b>	<b>Budget size</b>	<b>No. of students</b>	<b>Courses</b>
Cao Thang Technical College	1905-	HCMC	No	Self finance	7,500 in 2006 (plus 7,000 per year in short courses)	30 industrial majors with clear career orientation and practical workshops
Vietnam-Germany Center at HCMC University of Technical Education	1993-2000	HCMC	Germany	7 mil USD	400 per year	Standardized programs to train teachers in electrical-electronics and mechanics, with modern equipment
Vietnam-Singapore Technical Training Center	1997-2005	Binh Duong	Singapore	5 mil USD	500 (in 2002)	Electrical-electronics, mechanics, mechatronics, customized courses; in cooperation with VSIP
Vietnam-Japan Technical Center at Hanoi Industry University	2000-2005	Hanoi	Japan	6 mil USD	720 per year (plus 1,300 in short courses in 5 years)	Machining, metal processing, electrical control; using modern equipment and teaching good attitude
Vietnam Japan Cooperation Center	2000-2010	Hanoi, HCMC	Japan	n.a.	2,000 in 6 years	Business administration and strategy, production management, etc. for top and middle managers

*Source: Created by the authors based on interviews*

### ***3.1. Career orientation: from targets to training methodology – Cao Thang Technical College***

Cao Thang Technical College has more than 100 years of history and trains students in 3 study grades with 30 studying majors at present. The number of graduated student of permanent program in 2001 was 4,200 and 7,500 in 2006, those of on-factory training programs was 2.730 from 195 firms in 2006 and learners of short-term courses was about 7,000 each year. The advantage of the school is that most of its students get job right after graduation, even when the mechanical industry was at difficult situation and graduate students were hardly to find a job. It is because the Cao Thang College's students have to undergo a hard training process, particularly in the majors of forging and welding. Graduates can meet the requirements of enterprises of practical skills and have good working attitude. Clear career orientation is the key factor deciding the success of Cao Thang Technical College. The orientation is reflected in the approaching methodology and the training targets of the college, in its curriculum, and in teacher team and facility development.

The training target of the college is clearly identified. It is to train technical workers to meet the recruitment demand of enterprises. The college strategy is to make the college become the "cradle" of technicians and skillful workers for Vietnam in general and for Ho Chi Minh in particular. Then, the strategy is concretized into the training guidelines. The message for both teachers and students is clear. It is "Students of Cao Thang Technical College must have clear career orientation at the beginning. Profession study is very hard, and the students must do their best always. If they do not have a clear orientation, they cannot finish the course. However, if they can undergo this hardship, they can get a good job after graduation." – Mr Dao Khanh Du, the college rector emphasized. The college builds the working-in-factory environment in its classes which provide students with serious working behavior, attitude in improving technology and team work ability.

The profession oriented training strategy of the college is concretized in developing its curriculum, teacher team and facilities. The significant initiative in curriculum is to strengthen the active attitude of students in practical training. Homework asks students for independently working on machines. Besides the time of training classes with instructors, practical workshops are often opened so that students can come to self-train and do homework. This helps to stimulate the creativity and hard and professional working skills of students. Graduation theses also require student, particularly those are at college level, to independently design and produce technical models of products that asks students to spend a lot of time in workshops. Beside this, the college also have a "double program" in which student are trained both at the school's workshops and at some cooperative factories. Many students can get job at those factories right after their graduation.

Instructors force is also often improved by short-term courses at universities about new technologies. About a half of the instructors are practical trainers. Many of them were high-skilled workers recruited from factories. In its development strategy, the college always focuses on building and improving workshops and equipment system. Most of the facilities are developed by the college, using their accumulative money and without any big assistance project from abroad. Instead of this, the college actively exploits cooperation of firms under their donations on modern equipments. This cooperation brings mutual benefits, through which firms can advertise their new products (with machinery producers) or lean on the college to train students with new technologies. The facilities in the college can respond to the need of both practical instructing and self-learning of students. Specially, the college has

equipped many advanced electric, electronics and mechanical facilities which are effectively used at the college.

### ***3.2. Training the trainers as a kick-off project: the case of Vietnam-Germany Center at Ho Chi Minh City University of Technical Education***

Vietnam – Germany Center was established in the University of Technical Education in 1993, funded 12.4 million DM Germany in 8 years to improve training vocational teachers and high skill workers in the Ho Chi Minh and vicinity. A half of the grant was spent on purchasing machines, equipment for teaching. The rest was on improving the capability for teachers by inviting German experts to come to Vietnam to teach them and sending Vietnamese teachers to Germany to study. There are two majors at the center, which are electric –electronics and mechanics. At present, the center can receive 400 learners at one time. Learners of the center are vocational training teachers from college, technical college, students from other faculties of the college like Mechanical Faculty, Construction Faculty, Applied Mechanics Faculty, Electronics and Electrics Faculty, working technical workers and students from the secondary college level of the university.

After 10 years of development, the Vietnam – Germany has prestige in Ho Chi Minh City and in the South for technical worker training. The quality of trainees from the center is highly appreciated by enterprises. The German partner also evaluated that this was a successful center among other cooperation centers in foreign countries of Germany. Some big companies of Germany like Siemens have chosen the center as their training partner in Vietnam to support machinery and cooperate in training.

The general purpose of this technical cooperation project is to support in building the capability of the current vocational training system in Vietnam to develop and provide market-oriented education and training for young people. One target of the project is to develop a plan building team included equipment experts, technical experts and trainers. The project aims at creating a complete training system and a team of trainers of trainers. Therefore, training teachers and building standardized curriculum is the first step implemented in the Vietnam – Germany Center.

The first 8 teachers (4 in electrics and electronics major and 4 in mechanics major) of the center were sent to Germany to study in 14 months before coming back to Vietnam to build the training curriculum for the center. New teachers are trained in the center for 3 to 4 years, where they can learn from dispatched German technical experts at the center, and then sent to Germany for further training to expertise their skills. The dispatched experts are also the source for new technologies transferred to the center.

Related to curriculum, the center built a standardized curriculum according to the technical training model of Germany to use in teachers training. This curriculum is built in standard of Germany in vocational training with the equipments which are imported from Germany. This way of curriculum development is a bit different from those of other project where there are some *hybrids* for the context of Vietnam. With the feature of high precision of electric-electronic and mechanical industries, this model is highly effective.

Located in the Ho Chi Minh University of Technical Education, the Vietnam – Germany Center produce a significant spill over effect not only inside the university but also in other technical education institutions in Ho Chi Minh City and in other provinces. In the university,

the Vietnam – Germany Center becomes an outstanding model for a standardized technical training system in developed countries like Germany. Other faculties and departments of the university can learn from that model and apply to their cases. Besides this, many of these students became teachers in other colleges or universities and are highly evaluated by vocational training institutions. The German standardized technical training system introduced in the center is a prototype for other vocational training systems.

Another group of trainees of the center are the permanent teachers of other vocational training locations like colleges, secondary vocational training schools or vocational centers. The demand for re-training to upgrade the technical and technology capability is rather high in these vocational training institutions. Some schools like Cao Thang Technical College, conduct annual training courses for its teachers and Vietnam – Germany Center is always chosen to implement such courses. The center also becomes a hub to receive foreign technologies (especially from companies and education organizations of Germany) and then disseminates to technical teachers, engineers and workers in enterprises. Digital technologies like CNC, CAD-CAM, Pro E, compressed air technology, hydraulic power in mechanics or TIA technology in electricians are designed in short courses for those who want to upgrade their technology.

The center is a good example for vocational training projects with a focus on training trainers. It also introduced an approach and adopted a modern technical training system of a developed country and applied in Vietnam. According to this system, a standardized technical system was developed to be a model for teachers and other training locations can learn from. The spill over effect of the Vietnam – Germany Center project is not only as small as in a training location but also as large as in the whole technical training field.

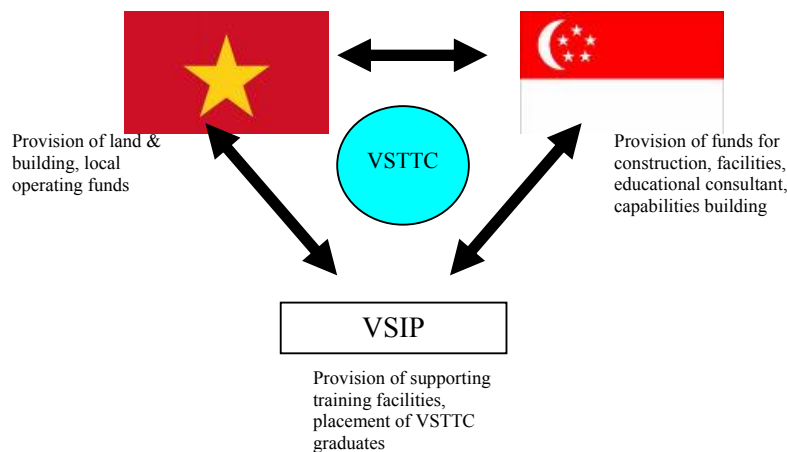
### ***3.3. Collaborative training following the investment flow: The case of Vietnam Singapore Technical School***

The Vietnam Singapore Technical School, used to be Vietnam Singapore Technical Training Center (VSTTC) is a technical training center in Binh Duong established in 1997 with the grant of about 60 billion VND from Singapore government. The center is located the center of many industrial parks (IP), especially the Vietnam – Singapore IP (VSIP). In this project, besides two main partners of Vietnamese and Singaporean governments, the third partner of the project is VSIP who contributes equipments as well as practicing conditions for learners. The target of the Vietnam – Singapore training project is to develop the industrial human resource for Binh Duong, particularly to respond to a high demand for high quality technical human resource of foreign investors in Vietnam.

The curriculum of VSTTC includes 6 month technical training courses, with 44 hours per week for learners graduated from high schools, and related courses in the majors of electricians – electronics and mechanics and customized courses for firms. After graduation, the learners will have technical certificate of third grade over 7-grade according to the standard of vocational training system of Vietnam. At present, the school has four training majors, including *mechatronics* which requires high technique. The number of student enrolled at the school was 200 in 2000, 500 in 2002 and suddenly increased to 1200 in 2006 after being merged to be the Vietnam – Singapore Technical Schools. Until 2006, 70-80% of the graduates were recruited right after graduating from the center. The graduate students of the school are highly appreciated by enterprises. As expected, VSTTC has become a high quality technical training center and a pioneer model in technical training in the South of Vietnam.

The effectiveness of the model of VSTTC is not only in attracting abroad investment into vocational education but also contributing in attracting foreign direct investment capital into production in Vietnam and fulfilling the gap between demand and supply. One part of the fund for the center is from VSIP and related enterprises in Vietnam. Besides the consultancy from Singapore, VSIP has also direct consultancy for the school in teaching curriculum and program, provides practical training location, and recruits students after their graduation. This trilateral cooperation contributes to ensure that the grant achieve its purpose of technical support of Singaporean government side. From the private sector side, and here is VSIP, the cooperation can effectively provide them high quality human resource that they are in need of, solve the usual difficulty for investment project in industrial parks. From Vietnam's side, this model can address the problems of the vocational training in Vietnam, which are the shortage of facilities, equipment, high quality teachers, effective curriculums, and the labors cannot find job after graduation.

**Figure 5. Trilateral cooperation in vocational training at VSTTC**



Applying the training program of Institute of Technical Education – ITE in Singapore, VSTTC has built is training system targeting at the working ability right after graduation of learners. When the school was under the management of a Singaporean director, the number of learners was limited to ensure the ITE requirement in practicing, which was 70% of the studying time must be for practicing on machines. Beside equipment, Singapore side also provides on-going training for teachers in Singapore for specific new technologies, such as mechatronics, in short courses of 4-9 months. The management of the center by Singaporean ensures the best cooperation between the school and the industrial park, reduces the language and culture barriers and provide on-the-job training for Vietnamese people to master the new training system.

The development process of VSTTC goes together with the demand of VSIP. The scale and number of majors also increased according to the demand increase of enterprises. When new firms using modern technologies invested in VSOP since 2002, the project of VSTTC was extended and enlarged with more facilities and new majors such as mechatronics, CAD-CAM. Almost learners were recruited in VSIP after graduation. In the early time, 90% of the graduated learners are working in VSIP. This rate decreased to 70-80% in the recently years because the demand for technical workers in Binh Duong, not only at VSIP, was getting higher and the technical labors spread to various industrial zones. By providing practical training location for VSTTC's learners, factories at VSIP can select good learners to recruit.

In short, the success of VSTTC is a good example for the trilateral cooperation among sponsor providers, sponsor receiver, and enterprises in vocational training development in developing countries. This model can address the weaknesses in vocational training in developing countries, from investment capital source to training model, training quality and training targets. This model can also increase the effectiveness of using sponsor capital from developed countries. Cooperating with enterprises of financing countries is a good way to utilize the direct investment source of enterprises in training and to promote the financing process of donors. The more important thing is that the trilateral cooperation could create an effective framework to develop the human resource together with the real demand of the society and of the producers as well as of the industrialization of a developing country.

### ***3.4. Spillover effects of a pilot project: The case of Vietnam Japan Technical Center in Hanoi Industrial University***

Vietnam-Japan Technical Center in Hanoi Industry University (VJC) was established as the outcome of the Project for strengthening training capability for technical workers in Hanoi Industrial College (HIC) (now is Hanoi Industrial University) granted 660 million Japanese Yen (about US\$ 6 million) by Japan International Cooperation Agent (JICA) from April 2000 to March 2005. The overall objective of the project was to strengthen vocational training in the field of mechanical industries in Vietnam, particularly to enhance technical workers training capability of Hanoi Industrial College in developing and conducting courses of machinery processing, metal processing and electric control.

The machinery that equipped by the project is the most comprehensive and modern ones in Vietnam such as numeric control lathe, 3D flexible measuring machine, air plasma cutting machine. These equipment are appropriate for conducting the training courses in the center that can respond to the demands of manufacturers, particularly FDI ones. Another noteworthy result of the project is to develop a system of training curriculums for the three majors of machinery processing, metal processing and electric control. The curriculum is designed for 2-year training courses, and other shorter training courses applied the curriculums of Japan. When the project completed in early 2005, the number of graduates enrolled long-term (2 years) course is 240. This annual graduates increased to 720 in 2007. During the project, the total number of participants for short-term training courses is 1300 persons, including 840 workers and 460 instructors in various educational institutions.

The new vocational training system in VJC is highly evaluated by manufacturers particularly the Japanese firms. The graduates from the center have not only good practicing skill but also good attitudes which are often strongly required by the Japanese firms. Many firms contact with the center to host its student for internship. After 3 month internships, many students were recruited by the firms. The center's students can quickly get job after their graduation. Therefore, entrance exam has become very high despite the high enrollment fee, which is three times more than the fees for other departments in the university.

Training trainers is one of the main content of the project. 27 teachers of VJC, who come from machinery processing department, metal processing department and electric control department, were trained in short courses in Vietnam, and in 1 to 3 month courses in Japan. 19 full time instructors of the center were trained in 3 technical courses. 8 part time teachers were trained in training management courses. Beside these courses, there are 17 one-month business missions of Japanese experts coming to Vietnam for various technical and technological courses. Three other permanent experts (apart from the chief expert and

coordinator of the project) stayed in Vietnam for 5 months. Significant improvement of teachers' capabilities was not only evaluated by JICA in its report but also by graduated full-time and short-courses learners and Japanese companies, which frequently provide the center with internship locations at factories. With their good capabilities, after the project, the teachers of the center conduct many projects and production activities, doing applied research for the need of firms.

Besides the target to build an excellent center for technical training, the VJC project also aims at enhancing the training capabilities for technical workers of HIC. Moreover, the JICA-HIC project has also produced a significant spillover effects to outside technical vocational training institutions. In the university internally, the project has become a pilot model for vocational training management, vocational training curriculum development and teacher capability building. Two among six targets of the project is to establish the enrolment system at the new center. Some education management courses were designed in Japan and Vietnam in which both managers of the center and the college participated. The integral teaching model at VJC, in which the theory and practice systems are integrated right in the workshop, is applied in the center. Some new issues in vocational training like working attitude training, and industrial working attitude of Japanese were also acknowledged through the project. Then, in various conferences, these knowledge and experience were discussed and disseminated both within and outside the college. The spillover effect of the center is larger when the teachers in the center also participate in teaching and supervising or doing applied research in other faculties. The workshop and facilities of the center are also used by other students from other faculties of the college.

Concerning to external spillover, in 5 year of implementation, the project has held 24 different conferences included technology related and technical training related ones. Moreover, there are 73 short courses for 840 workers of companies and 460 teachers from 83 vocational training schools nationwide. These activities contributed to improve the capability of teachers of various vocational training schools and introduce a good training model for vocational training with three two-year vocational training curriculums for three majors, translated and edited books.

The Vietnam – Japan Center funded by JICA is a successful project not only in building a effective technical training center but also in its spillover effect to vocational training in Vietnam. It can be said that while the vocational training situation in Vietnam is still backward, the spillover effect of a pioneer project like this project has created a new trend and improvement in the vocational training system.

### ***3.5. Education and technical training as a wheel for promoting local and international production integration: The case of Vietnam Japan Cooperation Center (VJCC)<sup>3</sup>***

The VJCC is an ODA granted education joint project between Japan, represented by Japan International Cooperation Agency - JICA<sup>4</sup>, and Vietnam, represented by Foreign Trade University of Hanoi in 5 years (2000-2005) and then extended from 2005 to 2010. The center operated in March 2002 in Hanoi and May 2002 in Ho Chi Minh City. The key objective of the VJCC is to develop the human resource in business administration, such as personnel management, business strategy, financial management, Japanese production organization,

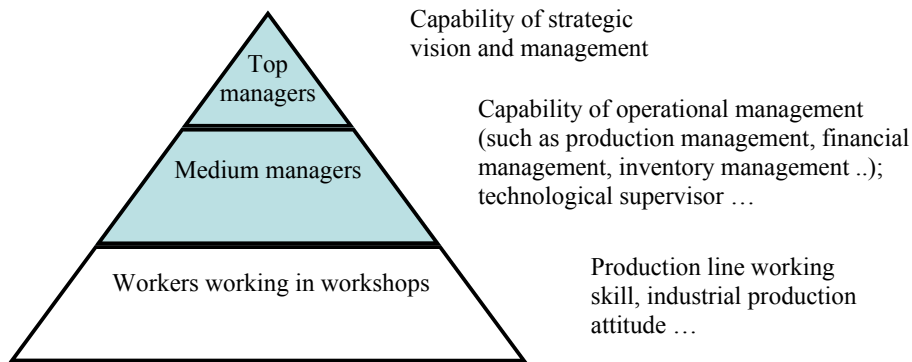
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<sup>3</sup> <http://www.vjcc.org.vn/>

<sup>4</sup> [www.jica.go.jp/vietnam/index.html](http://www.jica.go.jp/vietnam/index.html)

Japanese business culture. The common courses are 2-3 day or 7-10 day courses, including annual 20 periodical courses in Hanoi and Ho Chi Minh City for about 2000 learners. Teachers are Japanese experts coming to Vietnam to teach for 1 to 3 years and some Vietnamese consultant experts. VJCC Hanoi also has some activities like Japanese training and Japanese culture exchange activities.

**Figure 6. Three levels in Human resource**



VJCC was established to meet the training demand and knowledge upgrading for managers at medium level (supervisors) and high level in Vietnam. There exists a fact that in many firms, managing labors, including supervisors, managers and leaders of enterprises may be skillful, experienced and good at technology but lack of knowledge and experiences in managing technological, financial, human resource or innovation systems. High quality managing labor is scarcer than technical and skillful labor, particularly in developing countries like Vietnam. While Vietnamese workers' quality is highly appreciated by foreign enterprises, managing and supervising labors are not highly assessed in quality, and the number of managers and supervisors is not enough. Therefore, VJCC has two targets in its training system. The courses for strategic managers of companies, especially small and medium size ones in Vietnam, provides comprehensive managing knowledge and transparent business development strategy in enterprises. The courses for supervisors, on the other hand, focuses on managing techniques in each area of an enterprise, especially in production area, and on the personal skill for the long-life development of the supervisors themselves.

One of training subjects of VJCC is to provide Vietnamese firms with business knowledge about philosophy and culture of foreign enterprises, especially Japanese ones, so that they can adapt to requirements of foreign business partners. For instance, when selling products to Japanese companies, the first requirement is QCD (quality, cost and delivery). Quality and Delivery are always the weaknesses of Vietnamese enterprises. Furthermore, Japanese companies often want to have partnership with firms sharing the same business philosophy so that there exists a barrier for Vietnamese firms to cooperate with Japanese firms. To address this issue, improving the technical skills of workers is not enough, but the capability and managing method of the companies should be improved, and sometimes, the companies must change their own philosophy and business culture. Unfortunately, few Vietnamese enterprises can understand and apply this. By providing business knowledge and philosophy of Japan, VJCC's courses help Vietnamese enterprises to innovate their production system and business philosophy in order to cooperate with Japanese enterprises and to participate into their production system.

The training model of VJCC suggests two important factors in the human resource development currently. First, technical skills training must go together with production managerial skills training and technical managerial training although the demand for the latter is not high as that of the former. Second, when the business models are becoming more and more diversified, effective human resource development becomes a driving force for the linkage of domestic companies with foreign investors and for the global production integration.

### ***3.6. Sustaining collaborative vocational training project: Multiple cases analyses***

In the field of vocational training in developing countries, especially for high technology fields requiring huge investment in facilities like mechanics training, foreign supported training projects play an important role to build breakthrough training system responding the demand for increasingly high quality human resource of foreign investors as well as of local growing industries. Many collaborative vocational training projects in Vietnam, which are consulted and managed by the foreign partners from developed countries such as Germany, Japan and Singapore, have contribute remarkably in industrial human resource development in Vietnam. However, sustaining the vocational training centers after the projects' termination and the centers are transferred to Vietnam side became important.

#### *Expanding the targets of the training centers*

Due to the requirement of good equipment in industrial vocational training, many foreign supported vocational training projects partly focused on buying modern teaching tools and machines used in factories. In projects like the Vietnam – Germany Center or Vietnam – Japan Center, the sponsored equipments were all most modern at that time, which can be used not only for training but also for other works such as researching, consulting and developing production. When assistance projects are finished and management is transferred to Vietnam, some centers have expand its activities from training to researching or consulting to exploit the facilities more effectively.

One of the examples of the Vietnam partners doing this way is VJC. After the project terminated, with the improved technical capability and trained teacher team, VJC extended its activities into doing consulting services and production development service. VJC implemented some projects like researching and developing water pressure testing system, material measuring and mixing system, control system for Nghi Son cement factory , jigs and drags for Canon Vietnam Company, processing mobile phone covers ...

The consulting projects like this can have two effects. First, doing consulting projects will help teachers to do further research and improve their technical capability. Second, these projects will provide practical exercises for learners to practice. In some majors, like mechanical processing, materials are expensive. Providing services for outsiders is also a chance for the center to get material for learners to practice. Furthermore, some equipment gets to be outdated quickly like the equipment in mechanics, electrics and electronics fields. Exploiting equipments quickly and then re-investing may be a good orientation. More important thing is that by doing this way, the teachers' capability could be improved significantly to respond to the firms' requirements, so that they can provide students with good practical skills. However, how much the centers can exploit their equipment and facilities for non-training purposes, and how to maintain the two targets of improving teacher capability and vocational training quality are still questions to be considered.

### *Utilizing equipment supported by enterprises*

Since equipments in electronics-electrics and mechanics become outdated rapidly, it is necessary to often equip new machines to maintain the effectiveness of vocational training. However, with current limited conditions in Vietnam, government investment in this field is still very small. Another way to re-equip facilities for teaching activities is to mobilize the enterprises' supports. There are two potential enterprises can sponsor equipment for vocational training centers. The first are the machinery producers, who want to sell their products to Vietnamese enterprises and need to cooperate with a Vietnamese partner to introduce their products, and to train workers to use new machines. The second are companies who have demand for professional labor for a certain machine or equipment. To reduce the training time for workers at their workshop, they can support equipment for training centers or schools to let the teachers there teaching workers how to use the equipment. Foreign collaborative vocational training centers often have prestige among enterprises so that they have advantages to call for enterprises' cooperation.

A typical example for calling supports from enterprises is *Vietnam – Germany Center*. After the project termination, the center had built its prestige among German mechanical machinery producers. Some German companies came to cooperate with the center to invest in building new labs and equipping new machines. Siemens Automation, for example, sponsored the center equipments valued at more than 11,000 Euro and a PLC S7 – 300 practicing room valued at 250,000 USD. The Berlin Software and Technical Company presented the center a thematic room CAD – CAM/CNC including equipments and software. This up-to-dated equipments were not purchased during the project (1993-2000) but are highly needed for technical training at present.

*Vietnam – Singapore Technical School (VSTS)* has also the collaboration with industries such as with Festo (Singapore) Pte Ltd. and Mitutoyo Asia Pacific Pte Ltd. These two leading multi national companies have set up the special laboratories in the Center that are FESTO-VSTTC Prematics Laboratory and Mitutoyo-VSTTC Metrology Laboratories. These facilities are for training students in the industries latest technologies in electrical maintenance and machining course respectively. The collaboration includes equipping up-to-date machinery and upgrading the instructors' technique and skill in these fields.

### *Keeping the donors and utilizing their support*

Another way to maintain and develop the results of the projects is to enhance the follow-up activities with old donors and to seek for new donors. In *Vietnam – Germany Center*, these activities were implemented by exploring the cooperation with German partners. For example in 2003, three year after the project, the center received training support from the Ministry of Culture, Youth and Sports of Baden Württemberg State (Germany) to train teachers, and to maintain and repair the old machines and equipment. The support lasted until 2006. The German side also sent their experts and teachers to Vietnam frequently for a time of 2 to 3 months to instruct the center staffs in new technologies. This support responded to the difficulties of the center in finding teaching equipment's part and repairing services in Vietnam. The same difficulty can be seen in VJC in Hanoi but this center could still not have any significant contact with a foreign donor. Follow-up activities ensure to sustain and effectively utilize current equipments and facilities as well as frequently to improve teachers' capability to meet the requirements of new technologies.

Besides the direct success we can see from vocational training projects, maintaining and developing its effectiveness in long term is a problem for projects and a requirement for vocational training schools and centers in Vietnam who directly benefit from the projects. The experience of some projects with huge investment revealed that after the projects terminated, the training centers must conduct follow-up activities which are not as simple as keep exploring the results of the projects, but also to maintain the initiatives of the projects in the context of changing technology. Before waiting for government investment, the pilot centers must take initiatives in exploring and even opening a new development way to maintain and promote the effectiveness of the projects.

#### **4. Policy recommendation for Vietnam**

##### ***4.1. Roadmap for Strategic Industrial Human Resource Development***

Section one of this paper has summarized a framework of economic development and industrial human resource development in developing economies. Training in general and vocational training in particular is always an important part in the industrial and economic development strategy in developing countries. In their long road of economic development, developing countries need to have an effective strategy for industrial human resource development so that the human resource sustains its role of condition for economic development. In different stage of economic development, industrial human resource has different requirements. For newly developing countries, which are in earliest stage of economic development like Vietnam, the development of vocational training is critical. Vocational training keeps its important role in coming decades.

However, the stagnant of some developing countries like Thailand, Malaysia due to the shortage of high level human resource (Malmoed and Singh 2003) suggests a broader view of human resource development. While fulfilling the requirement of human resource in current stage of development, the governments in later developing countries needs to have plan to prepare the human resource for the coming tens years, when the economies move to new stage of development.

From this framework and the current situation of Vietnam, industrial human resource development in Vietnam should consider the following issues. First, *the development of human resource should go together with the demand of FDI firms in Vietnam during their growth*. At present, the foreign invested sector in Vietnam plays an important role, especially in the fields that requires high technology and the fields which have international competitiveness. The growth of earlier developing economies prove the critical role of foreign firms in the process of industrialization of host developing economies (Hobday 1995; Kim 1997a,b; Lall 1992). When Vietnam can meet the requirements of foreign companies, it will have conditions to attract more foreign investment capital, and to build domestic technical capability for industrial development.

Second, *there should be a clear positioning strategy in human resource development following the positioning strategy of Vietnam's industry*. The positioning strategy of Vietnam's industry can be based on different criteria, especially on *production models of foreign firms*, or *fragmentation of international production to various sub-industries*. For example in mechanics, molding, stamping, casting are the fields that can be encouraged to participate into the regional and global production system. The sub-industry priority orientation will be the foundation for human resource training and developing activities.

Third, *the development of human resource should have long vision to avoid stagnant trap due the slow upgrading education level compared to the speed of economic development.* At present, Vietnam is lack of labor event with the basic skill. Some firms have started complaining about the shortage of the middle level skillful workers in Vietnam. This complaint will increase rapidly in the coming years when labor cost increases. Therefore, even now, it is necessary to start targeting the high skill vocational training. In coming years, besides the requirement of skillful worker, the demand for engineer will rapidly expand not only for FDI firms but also for domestic firms. For 10-20 year period, a plan of industrial human resource development must concentrate on engineer and manager level education, who have the capabilities to control and improve production system in factories.

#### ***4.2. Expanding and Improving Existing Successful Technical Training Models***

The Vietnam government has set the target of increasing the number of trained workers. Many vocational training models have been developed recently and achieved many successes. Examples are the projects mentioned in this paper. Although the number of pilot projects is still limited, they can be pioneer model to be multiplied.

It will require a huge resources and reasonable implementation. First of all, there should be a proper evaluation on the success and the lessons learnt from models. This report mentioned the typical issues of the success of the models. These are demand-based and professional-based strategy of training institutions, strengthening spillover effects of pilot project, strengthening collaboration in vocational training, multi-level industrial human resource development and sustaining after-project vocational training. Besides these, more detailed studies on the implementation method, arising problems during the project implementation, and the suggested solutions... can also be a reference source for projects on education development and vocational training projects in the future.

The next problem to be addressed is the investment capital. In previous years, the main capital source was from foreign grant. In recent years, the domestic capital source for training and vocational training has been increased. For example, the investment projects on labs valued at about 140 billion VND are on implementation process. The equipment and facilities for teaching as well as the curriculum are improved in many vocational training center and schools nationwide. Capital can be mobilized through cooperation with enterprises like some vocational training schools did.

#### ***4.3. Promoting collaboration in industrial human resource development***

Collaboration in industrial human resource development between Vietnamese government, enterprises and donors is an important orientation to develop the industrial human resource for Vietnam. On one hand, it can mobilize the finance of the partners, especially of the international organizations, and enterprises. On the other hand, the participation of various partners will ensure the training quality and effectiveness to meet the demand of enterprise recruitment. The curriculum, practicing method and the practical location are improved.

The trilateral cooperation between training institutions, donors and enterprises is a good implementation method, especially in the context of Vietnam, when it still receives capital grant from international organizations and other developed countries. The trilateral cooperation will improve the capital using effectiveness. The projects can disburse the grants. The projects can meet the demand of stakeholders and achieve the targets of sustainable

development for Vietnam. The trilateral projects can be developed are those of international financial organizations, government cooperation, industry development support of other countries, NGOs, enterprise associations, MNCs, production services and training centers.

#### ***4.4. Upgrading the Basic Education of the Workforce and Expanding Post-Secondary Technical Education and Training***

At present, Vietnam is highly evaluated by foreign investor in term of basic education of workforce. But this evaluation is only by comparing with other countries in the same level of development. The working skills of Vietnamese labor actually only can meet the requirements of simple production like assembling and low value added part production. At higher production level, enterprises require more skillful labor to increase the working productivity and to produce high value added products and parts. For instance, in some production companies producing metal components of Japan who have global competitiveness, the workers must be able to product products with high fidelity on each square micrometer. To do so, besides being trained at the workshops or in the factories, workers must be equipped with proper industrial attitude in vocational training system.

Improving the labor attitude must be an on-going task, and frequently conducted. The improvement should go together with the absorbing ability and the practicing attitude of the labor. In addition, with the fast development of technology, the labor should be able to absorb and learn new technologies and techniques. Therefore, labors can get skills only when they have a firmly basic knowledge. The industrial human resource development strategy should be placed in the common context of the human resource development strategy of the whole society.

Moreover, the vocational training orientation towards to society demand is important when the demand for technical worker training is high. With the current speed of industrial development, Vietnam will lack more and more technical workers. Expanding vocational training activities to meet the demand of vocational training is an indispensable condition to develop the industry in both the short term and long term.

#### ***4.5. Promoting professional education in higher education system***

Together with the development of the country, Vietnam education system is influenced by the education system of the Soviet Union, especially in curriculum, and training programs. In universities, students still have too few practising opportunities. The lecturers are in shortage of practical experience. The curriculums are still unreasonable. And it should be improved and renewed to develop skills and knowledge of students to meet the demand of labor market. Therefore, improving education strategy to change some part of the university education into professional training is a right strategy, and should be applied soon. The development of vocational training schools will open more opportunities for students these schools to study higher in colleges and universities.

Vietnam (MOET) should form a group of universities to develop a profession-oriented approach in higher. Profession oriented higher education is demand driven and responds to ever changing needs from society at national and the regional level. These specific characteristics and possibilities of profession oriented higher education as a new phenomenon, and requires careful awareness raising and sharing of information with many groups in society: politicians at national and regional level, employers, employment services, potential

new students and their parents, managers in education institutes at secondary level, as well as traditional universities.

The selection of these universities has been based upon the following criteria: a mix of experienced established universities and recently upgraded colleges and a crosscut of different sectors in higher education. Besides research universities, a system of profession oriented universities will contribute to the process of modernization and industrialization of Vietnam suitably. Contrary to traditional, research based universities, that very often are supply driven in their educational programmes, institutes for profession oriented higher education:

- provide answers to education and training needs of a population;
- are able to meet the fast changing requirements for skilled labour from companies and organisations, as well as for self employed people in small enterprises;
- create effective links between the world of work and the world of learning;
- prepare people for a career during the 40 years of their professional life;
- contribute actively to the modernisation of enterprises and organisations, as well as innovation in a knowledge based society and economy.

Profession oriented approach in higher education requires a structural, organised co-operation between universities and the labour market – such as in curriculum development, practical placements, applied research. The establishment of functional networks and public-private and public-public partnerships will therefore form an essential element to achieve the envisaged results.

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