No.

Data collection survey on human resource development for heavy chemical industries in Vietnam

Final report

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Japan International Cooperation Agency

UNICO International Corporation

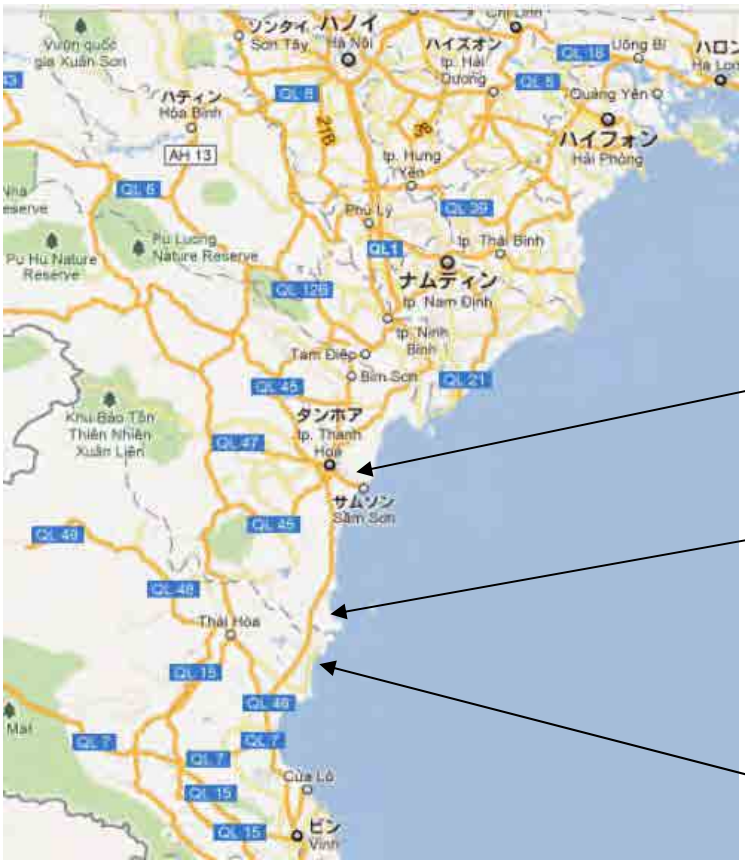
VTO
JR
12-62

Currency exchange rate

	1US$→JPY	1US$→VND
As of January 24, 2012	77.62	20,670

MAP

Thanh Hoa



HUI-TH

Nighi Son Refinery Construction Site

KOBELCO IRON NUGGET Construction Site

Abbreviation

	Abbreviated name	Official Name
A	APEFE	Association pour la promotion de l'education ed de la formation a l'etranger
D	DANIDA	Danish international development agency
	DOET	Department of Education and Training
	DOIT	Thanh Hoa Department of Industry and Trade
	DoLISA	Department of Labor - Invalids and Social Affairs
	DPI	Department of Planning and Investment
E	EDCF	Economic development cooperation fund
H	HR	Human Resource
	HRD	Human Resource Development
	HUI	Ho Chi Minh University of Industry
	HUI-HCMC	Ho Chi Minh University of Industry, Ho Chi Minh Main Campus
	HUI-TH	Ho Chi Minh University of Industry, Thanh Hoa Branch Campus
I	InWEnt	Capacity building international
	IP	Industrial Park
L	Lux-Development	Luxembourg Agency for Development Cooperation
M	MOET	Ministry of Education and Training
	MOIT	Ministry of Industry and Trade
	MoLISA	Ministry of Labor - Invalids and Social Affairs
T	TH	Thanh Hoa
	TVET	Technical and Vocational Education and Training

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Executive Summary

Summary overview

JICA survey was conducted with the purpose to collect and confirm basic information related to personnel training for the development of heavy industry in Vietnam.

In the heavy and petrochemical industryi of Japan, the key technical people (technician) are the person in charge of the core industrial activities. In Japan, the model of key technicians is that after graduating from lower secondary school, they will be trained about theory and practical skills in 5 years at the Industrial Upper Professional College established by the demand of the industry and will start working at factories in the age of 20. On this model, due to policies focused on quality the technical colleges are counted only 0.83% of all school students the same age. However, the College is the training basis of technician with practical skills, who will become key technicians in the future, so these schools have become rare training institutions, an indispensable necessity in the cause of human resource training for heavy and petrochemicals industries. There are many dormitories built of the college where the students will be educated seriously by senior students and dormitory manager about personality. In Japan's production plants, to create a good working environment, improve employee morale, increase productivity at work, prevent production errors, improve safety in the workplace, the slogan 5S (Seiri: neat, Seiton: tidy, Seisou: cleanup, seiketsu: Clean, Shitsuke: Polite) are complied thoroughly .Many enterprises have expressed a high appreciation to staff graduating from technical upper college for their habit of complying strictly all regulations and orders set out and this is the reason of high rate of recruitment. On the other hand, the content of teaching in colleges is almost similar to the teaching content of the industrial universities. There are many teachers who have a PhD degree and actively do research and make colleges become an educational research institutions equivalent to universities.

The graduates from such technical upper colleges are not only trained to be able to complete the assigned work, but they also have their own ability to create jobs and modernize it.

For example Idemitsu Kosan case, the company is planning to invest in Nghi Son, Thanh Hoa, in total about 2,000 employees in operating and maintenance department, there are 600 employees who have graduated from Technical upper college hired to work as technicians holding a key role. These employees are becoming a core staff of refineries companies.

During this survey, we chose the Ho Chi Minh University of industry, Thanh Hoa campus (HUI-TH), the unique industrial university in Thanh Hoa province, as a model to investigate. During the investigation, we have chosen Akita Technical Upper College, where they are ongoing training of human resources for heavy industry and petrochemicals, as the standard (benchmark) to conduct a comparison with HUI-TH. The survey comparable results are summarized in the table below.

Compare items	***Faculty of Technology HUI***-TH	***Akita Technical*** Upper ***College***
Training policies	Not clear	Training of technicians equipped with rich knowledge and high professional qualification
Number of students	3,225 people	926 people
Teachers	PhD: 0, Master: 22 people, Bachelor: 16 people, Total: 38 people	PhD: 57 people, Master: 9 people, Bachelor: 0, Total 66 people
Compare the number of faculty with student numbers	1:85	1:14
Curriculum	Theory: Practice=30:70, mainly practice	Theory: Practice =60:40, mainly theory
Teaching Resources	Mainly teaching materials used in practice, directly related to actual work	Mainly teaching materials used in the experiments, support for understanding theory
Guide jobs	Not available	Guide jobs
Investigate career paths of students	Not available	Annual survey
Relations with industry	Almost none	Intimately linked, such as organizing field trips for students, apprentices, etc ...

As the results of the conducted groups discussions with faculty, students, the information from industrial companies shows that in Vietnam, the percentage of students to university quite low, only 10%. The university graduates form the elite of society. This class difference is quite clear about the salary, about the treatment regime if compared with non-elite class. This is also reflected quite evident in both the

staffing and career development plan... of business.

There is a hierarchy among professional managers, engineers with university degrees and qualified technical college or lower, even they are excellent technicians, they could not be promoted to the engineers... This prompted the will of the school pupils to university students. From lower colleges level down tend to focus on the practical training and much less theory training and this trend is believed to affect the higher education system.

In industrial manufacturing enterprises such as heavy industry and petrochemical industry, one cannot operate machinery with just only the managers and engineers.

In manufacturing enterprises such as heavy industry and petrochemical industry, cannot operate machinery if only the managers and engineers. Those who operate the machinery basically they are technicians. The manufacturing enterprises diferent from other production enterprises, human resources they are looking for should be not only the technicians, trained on profeswsion in the training establishments they should also be the "creative person", "qualified person" had been learnt the knowledge, basic principles in school, able to catch that knowledge and judgment. Regarding the schools, there is the need to dig into the content as "how a good technician is like?", "How to train such good technicians like that?" and then launched "training philosophy" as "What are the people the schools want to train?" and consider whether to prepare the system for training for how higher education.

The survey results showed that the curriculum and the training program themselves in Vietnam are considered equivalent to the level of technical upper colleges in Japan, but lack of time allocation over the content, and they pay attention too much on the practical application training ... there is much room to improve.

In the long term, need to refer to the good points of the technical upper college regime in Japan, and think about the curriculum, teaching facilities and modes of education and training needed in Vietnam. In the short term, should enhance the exchanges between schools with industrial faculties, recommend the strengthening measures the industry find necessary fsuch as enhanced the content such as training, strengthen management, training trainers, curriculum improvements, additional teaching facilities, ...

Chapter 1

Status of Education and Training in Heavy and Petrochemical Industries in Japan and support policy for Vietnam

1 Status of Education and Training in Heavy and Petrochemical Industries in Japan and support policy for Vietnam

1.1 The actual status of education and training applied to a heavy chemical industry

The concept of "technicians" in Japan appeared about in the Meiji time (the 1890s). Technicians at that time are graduates of industrial universities (now the Faculty of industrial engineering in university) and the industrial Upper Colleges (now the industrial lower colleges). Until then recruitment is mainly for state sectors, but from around 1990, when the number of students that graduating from Upper Colleges exceeds the number of students graduating from University, the technicians in private sectors were increased sharply. Industries using technicians were mining. In 1910, textile and shipbuilding became leading industries; from 1920 onward the leading industries were the chemical industry and heavy industry which had developed during the First World War as mechanical industries / metallurgy industry / electro-chemical industries.

Since the Industrial Universities were introduced, education and training of technician become "as per industry’s requirement." The same with Industrial Upper College, with the aim of "Training for those whom Industry needs", the training of key staff for the factories as production director, engineer, technical director has been set out and the education curriculums in schools become "as per industry’s requirement." and practical.

After World War II, the Law on Promotion of industrial education was issued in 1951, mainly setting up the regime related to using state budget to provide special support to vocational training in the upper secondary schools, focused to equip training facilities to the vocational lower colleges, Institutionalizationing the vocational training (the key of occupations) into to the activities of state organizations. And from that, it was defined as "occupational education ". The issue of vocational training set out has contributed to the development of the Japanese economy thru Training and then Supply as per requirement of the fields.

In 1961, "scheme of increasing income" is set out, it liked as the school education managed by the Ministry of Education-Culture-Sport-Management Sciences and Technology, "Technical Upper College" was prescribed in Chapter 10 Education Law, "Criteria for the establishment of Technical Upper College " is considered as the basis to promulgate the Law of Technical Upper College. In the Technical Upper College it became essential that the entry requirement of Technical Upper College is mainly the graduates of Lower secondary schools and course duration is 5 years. This is the training establishment, providing technicians training with practical knowledge which have been done by occupational training for technical and industrial sector. Graduates may be called pre- bachelors. Total standard number of class in technical upper college is a lot more than the total standard number of class in secondary school and short-term university, and furthermore a little bit more than the total standard number of specialized

subjects in the university system.

Almost all graduated students from 5 year training courses choose to work. Number of students applied for job is several times higher than ones from secondary school /university, and employment rate is nearly 100%.

There are many dormitories built of the college where the students will be educated seriously by senior students and dormitory manager about personality. In Japan's production plants, to create a good working environment, improve employee morale, increase productivity at work, prevent production errors, improve safety in the workplace, the slogan 5S (Seiri: neat, Seiton: tidy, Seisou: cleanup, seiketsu: Clean, Shitsuke: Polite) are complied thoroughly .Many enterprises have expressed a high appreciation to staff graduating from technical upper college for their habit of complying stricly all regulations and orders set out and this is the reason of high rate of recruitment.

At the time of 04/01/2011, there were 57 Technical upper colleges of which 51 were state schools, 3 private schools. Faculty wise, all state Technical Upper colleges have basically one faculty and one class (according to the standards of technical upper college establishment stipulated by the Ministry of Education-Culture-Sport and Sciences and Technology, each class has 40 students). According to ”Basic survey of schools” by Ministry of Education-Culture-Sport and Sciences and Technology, the number of students at all Technical Upper colleges public, state and private over the country in 5/1/2009 including basic faculties (5 year training system), specialized faculties (2 year training program after passing the basic faculties) and the preparatory students, PhD candidates ... are 59,386 people of which 55,853 people were from basic faculties, 3,453 people were from specialized faculties. And the number of graduates from basic faculties in 3/2009 was 10,474 people (8.769 male and 1.705 female) of which 4,504 people followed University Transitional courses (included also specialized faculties) to 4.504 people, 5,610 people went to work, the number of students going further with specialized education or training aboard is 155 people.

Of the 7,162,230 students of the University, the short term University, technical upper colleges, professional lower college, the type of training schools, upper secondary schools, students of technical upper colleges 59.200, up only 0.83%. Number of staff to be recruited is in excess than the number of people wants to work (more than 50%). Ministry of Education Sports and Culture, Science and Technology set a target to maintain quality of the students, limiting the number of students; the reason is because of the ability to recruit in manufacturing industry is lower than with production industry. However, the Technical upper colleges prepare the team of technicians with practical skills, which will be technical key staff in the future, holding prominent positions in the training industry and is highly appreciated by the industries.

About the teachers, below the Rector are the professors, associate professors and teaching assistants to conduct the teaching and lecturers and technicians were also utilized for teaching. In addition, teachers in

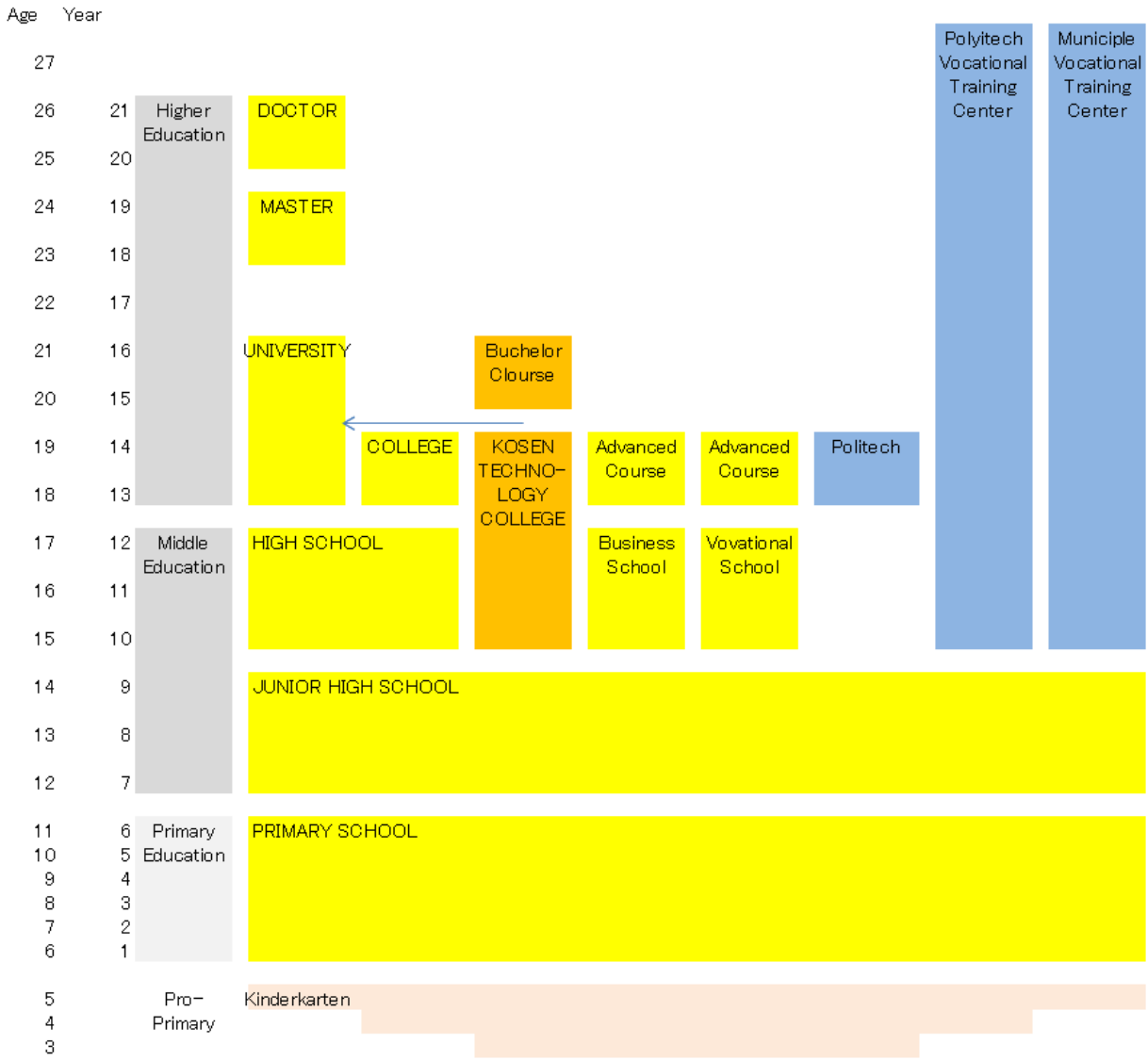
other universities or technicians came from the business; there were contract lecturers in charge of lecturing. There were the cases when Teachers at Technical Upper colleges did teaching at other universities. Teachers at specialized faculties did both research and teaching activities and supervise and advise the 5^{th} year students' graduating thesis's and students in specialized faculties. . According to the standard of establishment of Technical Upper colleges, master degrees, PhD degrees or equivalent achievements and research in education and technology are qualified as teachers.

Nowadays, at the Technical upper College under the Association of Technical Upper College, there are many people having a doctoral degree represented around 80%. Here, research activities are very exciting, and is becoming research and training institutions comparable to the University.

Teachers of Technical Upper colleges (high level of education) would not need such teacher degrees. However, the teachers of basic subjects (especially the humane society system) are also transferred from other colleges are required to have teaching certificate, having knowledge in guiding student of lower grade.

Outline of vocational training system and the professional training system in Japan as below. The professional college is marked in orange

Chart 1-1 The Education system and Occupational Training system in Japan



(Source: Ministry of Education - Culture - Sports - Science and Technology of Japan)

Overview of the education establishments in 2011 are described in Table 1-1 below.

Table 1-1 Number of students in each training system in Japan

Classification	Number of schools	Number of students	Number of teachers	Number of employees
University	780	2,893,489	176,684	210,139
Short-term University	387	150,007	9,274	5,038
Technical Upper colleges	57	59,220	4,357	2,550
Professional Lower colleges	3,266	645,834	40,509	16,214
Training School	1,426	122,636	9,168	3,580
Upper Secondary	5,060	3,349,255	237,526	47,686
Lower secondary	10,751	3,573,821	253,104	32,240
Primary	21,721	6,887,292	419,467	77,035
Kindergarten	13,299	1,596,170	110,402	20,045

(Source: Ministry of Education - Culture - Sports - Science and Technology of Japan)

1.2 The actual status and the achievement in the support for training establishments of the private business in heavy and chemical industries.

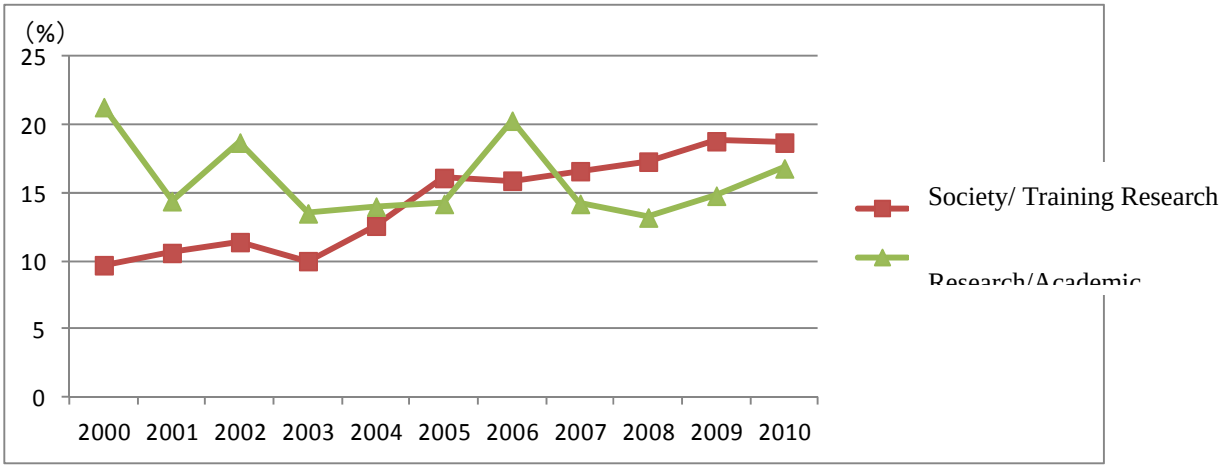
From the second half of the 1990s, the Japanese industry focused on product manufacturing, the Industry for which the domestic manufacture as the main focus was developed rapidly. The fundamental Law that encouraged basic manufacturing technology to make products is evidence of that trend, and with the provisions of this law, it not only promoted manufacturing field but also created dramatic changes in other industries. In this section, the summary of the support from business in heavy and chemical industries and training support from businesses inside Japan is presented.

1.2.1 The assistance from enterprises to education and training establishments

With a the issue of mass job dropping in the time of population explosion, and there was a need to promote the training of new generation of technicians, the supporting the training institutions from domestic enterprises becomes more extensively, and a lot of support provided for training have gradually done. Currently there are many ways to support such trainings in Japan such as donate the tools and machinery used for experimentation or practice, or invite technicians from enterprises to provide special lectures in specialized faculty, provide scholarships to support great efforts in schools, etc.

According to the statements of the Japanese Economic association in Chart 1.2, the ratio of actual costs for social contribution activities of enterprises is split in 15 areas (including also other areas), the expenditures relating to "Education and social education" are recognized to be highest in 4 consecutive years, followed by the "Academic / Research" ranked in second in two consecutive years, the trends can be seen that support of enterprises for training has increased year by year[1]. Table 1-2 describes one such example.

Chart 1.2 The expenditure rates of social contribution of Japanese enterprises



(Source: Japanese Economy Association in 2010)

Table 1.2 Illustrate actual performances in training support in Japan (one example)

Supporting	Supporting	Support title / Enterprise name	Targeted institutions

[1]Operating Expenses Survey for Social Contribution in 2010, mode survey (except for contents related to earthquakes east of Japan.) Actual answers is 425/1304 companies (32.6%)

Content	Year		
Scholarship	2007	scholarship of Amano engineering research center (Technical Research Center)	Upper Technical Colleges
Assistance money	2007	Money supporting students studying abroad TADANO (TADANO)	Korikawa Technical Upper colleges (Inside the Takamatsu)
Offering courses	2007	Industrial Engineering Materials (Nichia Chemical) Course	Anan Technical Upper College Course
Offering research Department	2010	Technical research department of water use (Nikkousei manipulating center)	Numazu Technical Upper College
〃	2010	Department for research and development of living environment system (air conditioning machine Enterprise)	Sen dai Technical Upper College (located in Natori College)
〃	2009	Department for research and development of control systems (Mimaki Engineering)	Nagano Technical Upper College
Special Lecture	2011	Technical Trends of Network system engineering integration (the Mitsubishi Electric Research Center of Technology Information)	Tokuyama Technical Upper College
〃	2011	Industrial Theory (Idemitsu Co.)	Tokuyama Technical Upper College
Practical Machinery	2011	PLC 40 units、synthesize Programming Tool 40 units、Notebook/ PC 10 units（Omron Auto System）	3 industrial lower colleges in Shiga Prefecture
〃	2008	Document learning 138 set (Omron)	For Technical upper colleges

(Source: Speaking of *schools and information of public professional colleges*)

(Source: *Self made based on information from the Takamatsu Industrial Upper College - 2008, The National* Technical Upper *Colleges - in 2009, Tokuyama Industrial Upper College - 2010, Saga prefecture - 2011, Idemitsu Corporation - 2011*)

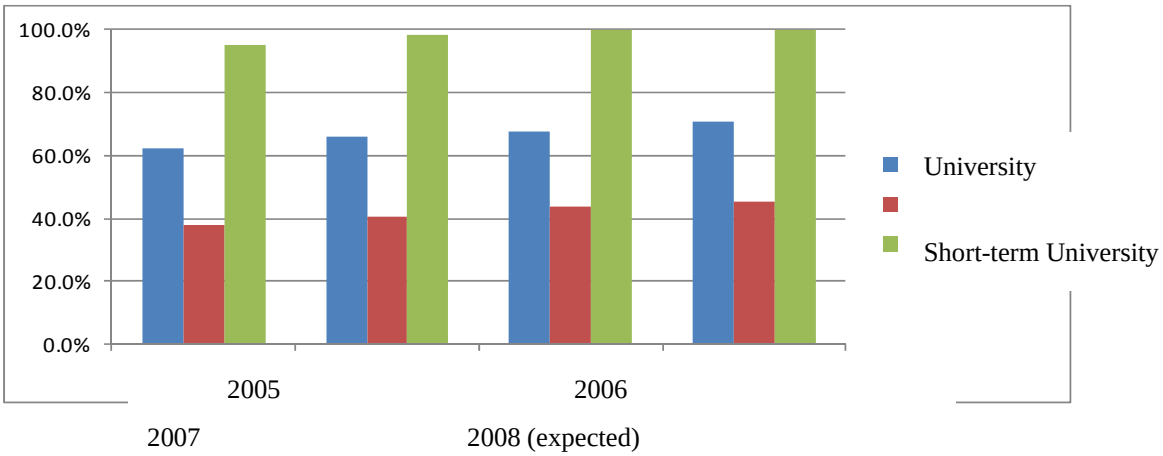
1.2.2 Support for internship

Internship program in enterprises was supported by large and small businesses and this kind of suppor had tendency to increase. For businesses, it can introduce specific job requirements to students and for training institutions and students can get experiences of practical work at enterprises prior to job commencement. In 1997, Resolution of “Action plan aiming at the innovation and reformation of economic structure" was promulgated, in the past 10 years; this policy has been implemented outstandingly. And in recent years, some companies have incorporated CSR activities in internship program at enterprises to promote their image, they had shown consistently their social contribution by doing this, and this may be considered as a supporting way which can be easily implemented by enterprises.

According to the status of implementing internship program at enterprises in which there were 745 universities, 390 short-term university and 61 Technical upper colleges across the country (Chart1.3), the number of school applied this regime is increasing and all colleges followed to this regime. In the Technical upper colleges, the implementation of internship program in state school[2] are shown in Chart 1.4. The graduates of Technical upper colleges are trained to become a core workforce in the enterprise; the actual experience in the enterprise during learning has good impact in term of society and should be implemented as soon as possible. Also, as shown in Table 1-3, 1-4, the oil companies, petrochemical companies are also actively apply the receipt to actual students.

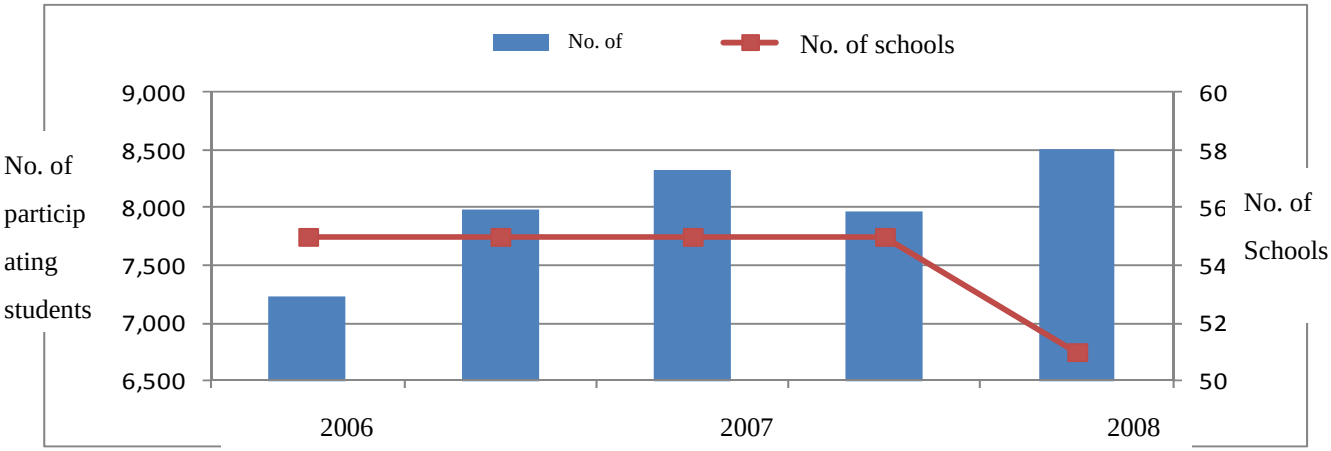
2 At the time of 1st April 2011, there were 57 Technical Upper colleges across the country including 51 state schools.

Chart 1-3 the ratio of implementing internships in enterprises in Japanese training system (2007)



(Source: *Ministry of Education - Culture - Sports - Science and Technology of Japan, 2008*)

Chart 1.4 Number of students and number of National Technical Upper colleges in Japan [3]



(Source: *Self made based on information from the National Professional Colleges* –in *2007, 2008, 2009, 2010, 2011)*

3 As per the Intensive Restructuring Plan of the National Technical Upper College towards the establishment of the "Super Technical Upper College," published in 2008, in four regions across the country, in each region will merge two Technical Upper colleges into a school, so in 2010 decreased 4 schools.

Table 1-3 Receive training in enterprises of the major enterprises of oil refining industry in Japan

Company name
Idemitsu Co.
KYOKUTO Oil Industry
JX NikkouNisseki Group
ShowaShell Oil Co.
Seibu Oil Co.
Taiyou Oil Co.
TOA Oil Co.
TonenGeneral Oil Co.
Nansei Oil Co.

(Source: *Self made based on information from the Legal Public Petroleum Conference - in 2011, 2009; Akita Industrial Technical Upper College - 2011*; *Okinawa Industrial Technical Upper College - 2008 ; Yonago Industrial Technical Upper College - 2011*; *Showa Shell Petroleum Corporation - 2011*)

Table 1-4 Actual achievement in internships at enterprises in the heavy and chemical industries (In parentheses is the number of recipients)

Companies in Chemical sector	Mitsubishi Chemical（2、Mitsui Chemical（2、Mitsui Chemical （1)、Ube Industry （1）JSR（2)、ToSoh（1)、Toray（1)、Kaneka（2)、Tokuyama（2)、Chisso（3)、Nippon Zeon（2)、Sumitomo Bakelite（1)、Fujifilm（4）
Companies in Engineering sector	Nikki （５）、Chiyoda Construction Co. (2), Toyou Mechanical（3）

(Source: Workshop *on Chemical Industry* of *Union of Legal public utility workers, 2011*)

Based on above situation, the support provided to different training and education institutions depends on each business type not only scale but is being executed in four criteria which are “capital”, “equipment”,” knowledge” and “experience”. And the business’s donations to the training institution in each field are considerable. On material support, some products of the enterprises can be used in professional lectures at

training institutions, and this kind of support is the most popular. That is easier way than giving the money, and is applied in long-term basis at schools and also aiming at promoting their products to students. Additionally, even though it is not part of the formal training program, are also organized supporting programs, relating to knowledge such as discussion on experiences roles, with participation of teachers, speeches of graduates from that school.

In the enterprises of heavy and chemical industries, the support by providing internships to students who have the ability to work at that enterprise seems to be popular. In the case of industry sectors which require working at the field such as crude oil refining industry, the actual experiences that are difficult to get at school are very important and it caused great excitement to the students. Depending on business, the following patterns might be organized: internship in group, lasting for a couple of weeks, meeting to wrap up / report on the content experiences at field (in factory). The establishment of the groups which comprised of unknown people and working experiences are very useful for enterprises also, in the same time, creating interesting programs for both training schools as well as students.

However, regarding the areas of internship implementation in enterprises, there are both cases, they may create for the students to be excited and interested to work in enterprises, or there are also cases when real practice content not relevant to students and not much supported for training. This means that there are also cases when the business content for practice is not for the purpose of improving technology, we can see only a handful of enterprises implemented realistic, practical content. To improve the ability to understand business and later while working at the enterprise will become the core force it is necessary to change the practical training at business which are aimed at final year students, or follow the otherwise methodology the "Japanese version of dual system" which is implemented as a typical pattern in Japan as an example. It can be considered the possible modes of education through practical training at an early stage at enterprises from an early attending school (On the Job Training-OJT) which is one way to solve the above problems.

1.2.3 Japan supporting activities to the Oil and Gas Industry of foreign countries

JCCP - Japan Cooperation Center, Petroleum is currently working on the Human Resources Training Program for the oil producing countries, since its establishment in 1981 has been training for about 19,000 people. There are training course for operating managers of the oil refinery, oil sales management in Japan; regular training course every year with around 20 technology areas such as improving the quality of heavy oil for technicians. There are also courses "Training Management” for Professional Education for in charge personnel of the Oil Companies. Professional Education in charge personnel of the Petro Vietnam has also participated in this training.

Petro Vietnam has joined the Human Resources Training Program of the JCCP for 21 years. When

constructed the Dung Quat Oil Refinery (the first oil refinery in Vietnam) there are also JCCP Training Human Resources supports. In addition, in 8/2011, Petro Vietnam has signed "Agreement on a special support project" with JCCP, helping to further promote human resource training from Japan. There were 3 batches of Japanese experts to Vietnam to train Vietnam side and held 4 training in Japan.

JOGMEC - Japan Oil, Gas and Metals National Corporation since 1989 has organized many training programs such as the Management Training Course on oil drilling, for oil company's staff of gas oil-producing countries; the Technical Workshop on the Petroleum Stratigraphy Techniques, Mining Geology, Mining, etc... Have provided training for some 2,000 people from 44 countries.

In Japan there are agencies receiving training such as JOGMEC, JCCP, the Trade Promotion Organization of Japan (JETRO), and the Information Center for Petroleum Exploration and Production (ICEP), etc... Related to Iraq War recovery, Japan has received training to over 1,000 technicians to restore Petroleum Oil and Gas Equipment. There are many training contents such as: Training for technician of the oil refinery process, For Technician of Engineering Control, For Economic Analysis Management etc... In addition, the Yen loan projects to modernize the oil refinery south of Iraq, Private Consultancy Company organized training on techniques related to heavy oil filters and catalysts.

1.3 Particular support policy for Vietnam

In this section we will review the general guideline of Japan's support to Vietnam in compliance with "Plan of particular support for Vietnam" established in July 2009.

1.3.1 Values

Economic development in conservation of Japanese security and prosperity in harmony with other Asian countries toward cooperation and common development in Southeast Asia, ensuring security and peace in the region, maintaining and promoting close ties with Japan based on the similarities between two countries are very important contents. Vietnam has a population of over 80 million people and the high potential of high economic growth. Vietnam plays increasingly important role in promoting cooperation and integration with other economic areas to encourage the development of the Mekong Delta region.

After joining the WTO, the following years is an important period for Vietnam to decide to go out of low-income groups, with or without a stable way of development, to establish and confirm the market economy, to integrate into and be part of the global economy, to exist in the world competition. It can be said that not only Japan but also the development of the whole of Asia is an important element affecting whether Vietnam can solve these problems in this period or not

In the view of expansion of trade / investment between Japan and the Mekong Delta, Vietnam will serve as a base for production, base for energy supply, natural resources and potential export markets of Japan. By the Japan-Vietnam agreement in economic cooperation, the economic links with Vietnam tends to be more closely in the future. In that situation, through investment, trade, preparation of commercial environment or industrial cooperation, one can hope the support of Japan will bring a good economic circulation between Japan and Vietnam and between Asian countries.

Moreover, Vietnam is a country received greatest part of supporting funds having a stable development among countries in Southeast Asia and could become a base for delivery of international aid. In 2009, GDP per capita exceeded US $ 1,000, it can be considered that Vietnam escaped from group of low-income countries; on the other hand however, the income levels in rural areas are still low as before, still remain a poor class which is found mainly in areas of minority ethnic. And the negative side of the industrialization and urbanization (domestic income gap, the difference between city and rural areas, environmental pollution, traffic congestion in cities) is also spreading. Vietnam is also striving towards achieving Millennium development goals (MDG) including removal of those issues. Japan has actively supported this effort of Vietnam and is expected to contribute in setting up security and safety for humankind.

1.3.2 The basic guidelines of the Aid

Based on the above contents, Japan has decided the key supporting policies as follows.

Japan has set out supporting targets for development of Vietnam on 3 areas: Ccountry industrialization (until 2020) after going out of group of low-income countries (goal for 2010), implementation of social justice and improvement of people’s life, sustainable development. To achieve these objectives, autonomy of Vietnam government should be respected more and more support Vietnam keeps continueing the development process which Vietnam has been successful with "The eradication of poverty by economic growth."

Additionaly, ffocus on strategic relationship between Japan and Vietnam, set priorities when consider large-scale infrastructure projects, meeting the socio-economic development. The key projects could be listed: the north-south highway, north-south high-speed rail line, Hoa Lac hi-tech IZ, taking these contents to consider in the view of the long term cooperation. “Promotte the economic growth, enhence the internatonal competition capabilities”, “Ungrade the social life, adjust the gab”, “Ensure the Environment safety”, “Management strenthening (which is a foundation of 3 above mentioned aspect).

On plan of particular support for Vietnam, Japan will support four key areas as follows.

- “Promoting economic growth / boost international competitiveness”

- “Improve social life and remove gap between rich and poor"
- "Environmental protection"
- "To promote management- (basicc, suporting for 3 areas above)"

1.3.3 The promoting fields related to this survey

In three key areas above, the areas relating to this survey is “Promotion of economic growth / To boost international competitiveness”. Specifically, Japan's assistance to the enterprises with foreign investment as well as local enterprises to actively invest; conduct and support in setting up systems and personnel training toward formulation business environmental viable and feasible the stable operation of enterprises develop the private sector including the job Training resources for supporting ocuppations push for economic development in the future.

More specifically the above two aspects Support: Development of small and medium enterprises, including the active efforts by Vietnam as well as supporting ocuppations toward developement of private sector (Draw up proposals and policies advanced skills of implemetation amendments, support for local enterprises, raise the quality of Human Resources, including technician, Improved access to capital for small and medium enterprises); Manpower training (technician, manager) for the Industry.

In the Declaration signed in October 2011, “The common voice of Japan-Vietnam” Vietnam Government stressed the urgency of the training of human resources in industrialization and modernization Plan. In May, the government of Vietnam has submitted to the Japanese embassy list of required cooperation in personnel training with the aim of strengthening / expansion of vocational schools and universities which both MOET and MOLISA jointly prepared

1.3.4 The position of this survey

Area of Training Personnel for Heavy and Chemicals Industryies in Vietnam (the object of this survey) corresponds to "Training Human Resources for Industries" to "promote economic growth, raise high international competitiveness "(which is a key sector in particular Planning aid for Vietnam noted above). Regarding the implementation, should endeavor to implement aid projects based on improved conditions applied for Japanese Business. On form and develop the project, should actively take the experience and technology that the Association of National Technical Upper College has been established on the implementation of ODA projects, active exchange ideas through an analysis pole with the Association of National Technical Upper College established (Association of Kosen).

1.4 Guiding principles for each relevant issue in the JICA related areas

Issues and contents should be included in areas of higher education / education and technical training / training for industrial sector of the JICA occupations training as follows.

JICA provided 4 major issues of Higher Education Development include:

- Reform of education activities
- Enhancing Research Skills
- Encouraging Contribution to Society
- Management Reform

In the Development problems above, the Goals for Training Personnel for Heavy and Chemicals Industries in Vietnam (the object of this survey) are mainly located in the issue of "Reform of Education activities". The Education and Training of key technicians for the operation of the Heavy Industry and Chemicals act as support for diverse training needs through the Diversifying the Higher Education establishment. Specifically, the need to improve the quality of education activities such as enhancement of teacher quality, curriculum improvement, improves teaching methods, teaching materials improvement, and infrastructure and equipments improvement. In addition, to strengthen links with the Ocuppations they need to improve employment for graduates through the methodes such as: Understanding Human and work needs of enterprises build a mechanism linking between higher Education establishments and businesses, improve the curriculum to the needs of the Industry, Implementation practice and internship of Students at the Enterprises.

In addition, to expand education and training to support the needs of enterprises of great change, JICA is implementing support the principal contents should approach such as "Training Personnel for the Job" "Expanding opportunities to improve life" aims to raise the income and poverty alleviation (through the project for improvement of regulations relating to Technical Education and Vocational Training for Industry in the country, Improving the curriculum at professional schools and the Technical Training school - is the important base, strengthening school management, etc. ...).

1.5 Typical example of cooperation related to Human Resources Training for the industry by JICA so far.

In cooperation projects in the field of training manpower for the industry, JICA has taken steps like the follwoing approach.

- Supports creating a policy framework: strengthening the strategic planning function, enhanced function adjustment period of the central, strengthening the regulation of complete structure related to quality assurance, in relation to the structure regulations and approval.
- Support the public education and training establishments : improve efficiency through enhanced management support and promotion of cooperation with industry, ...
- Support the education and training of teachers, lecturers: improving teacher training course, uniformity of quality of teachers by qualification test mode, use the teachers in private sector, interact with businesses,...
- Support cooperation between public establishments and private establishments: the investigation of business needs and then review the training program, along with local businesses to conduct training, conducting production by order of business, sending employees to training in enterprises, In addition, putting the practice content in the business into training programs, organization of practical workshops focusing on businesses, setting up departments / units connected with the institution of financial enterprises, implementation of active self-generated income, ...

To make it JICA has carried out the structure and organization for required curriculum. Today, to be able to see the results in a short time, it is required an appropriate cooperation so that it can be expected to ensure the independent development and its effects.

These examples listed below illustrate the cooperation related to manpower training for industry in which the object of JICA projects is middle income countries in Asia.

(1) The Hanoi University of Industry (HaUI), [4], Vietnam

Provide training courses focusing on practice, guide to train students to have a disciplined attitude to meet the needs of the human possessing both knowledge and practical skills, enthusiasm for the work of production enterprises (private enterprises, enterprises with foreign investment). In phase 1, the University has made short-term training courses, through which communicate the methods and technical training in Japan. In phase 2, the University is taking to change the methods to improve training programs to suit the needs of industry. Electronics Industry Polytechnic Surabaya, Indonesia

(2) At the Polytechnic, thanks to an office setting for employment support, that "active employment arrangements" which are not so popular activity in Indonesia have been shaped. Ministry of Education, Department of Higher Education was interested in this activity, and there was action taken to put it into a work of the National University

4 Before converting into the University in 2005, the Industrial Upper College of Hanoi (HIC). At the time of Phase 1 is HIC

(3) The Ubon Vocational Training Center (UBISD), Thailand.

To improve the superficial awareness of this center on the needs of the business, set up measures such as employment assistance office establishment, mandatory visit of business, mode of observing of the graduates, deployment tours of local situation has been made. As a result the center has provided training model closer to the business needs

(4) Center for foreign Training CEVEST, Indonesia

To improve the situation although located near the industrial zone, but the link with business is inadequate, the Center can conduct activities such as visiting businesses, direct mail, send center documents referral, brochures, organizing short training workshop, build channels associated with the business through participation in meetings of the Group businesses, investors, implementation of training needs of enterprises.

(5) Vocational School Alatonia, Turkey

Trustee of the JICA Project for the Japan Association of Public Technical Upper College "Plan of universal training of automatic control in Turkey." In Phase 1, from 2003 to 2007, 14 teachers of the Public Technical Upper College experts were appointed to (1) writing the curriculum for teacher training, (2) conduct training and evaluation, (3) planning, (4) monitoring the universal schools for two campuses of the Anatolia Vocational Training School - Turkey Izmir University and the School of Konya.

Association of National Upper College of Technology organized a training course for Teachers of Training School Anatolia at the Tokyo Technical Upper College, Kisarazu, Nara, Kumamoto Denpa, organize training for vocational training Rector Anatolia College of Engineering at Gifu. In Phase 2 from 8/2007 9/2010, focusing on technical training for automatic control in Turkey, and meet human resource needs is control technicians in the industry this country, the Association has considered the completion of the training policy in "teacher training centers (TCC)" the purpose of the project, conducted to support the development of vocational training system capable team of key technician.

Additionally, the specific links content with Private establishments are: (1) carry out surveys of business needs with the revision of curriculum, (2) The training links with local businesses, (3) To inplement the production activities receiving orders from companies, (4) Send the students as apprentices to Business ... Objects in technology collaborative projects are the teachers with very high proportion of 83.3% (Bureau of international general research- Japanese international cooperation agency (JICA), 2005)

Chapter 2

Issues related to personnel training in the field of chemical and heavy industry in Vietnam.

2 Issues related to personnel training in the field of chemical and heavy industry in Vietnam.

2.1 The Plans, Achievements and Problems of development of the heavy and chemical industries in Vietnam

2.1.1 Development Plan for heavy and petrochemical industries Sector in Vietnam

Since the start of Renovation policy in 1986, Vietnam has not stopped economic growth and maintaining political stability. The result is the percentage of poor population in 2008 compared with 1993 has decreased from 53% to 15% as described in Table 2-1, the average GDP per capita in 2008 exceeded 1,045 USD. Thus, Vietnam has developed from the low-income countries status have become a low medium income levels. In 2011, Vietnam has developed strategic planning with the goal of becoming an industrialized country towards modernization in 2020.

Table 2-1 Main Economic indicators of Vietnam

Parameter	2001	2007	2008	2009	2010	2011
Economic Growth rate (%)	8.9	8.5	6.3	5.3	6.7	5.9
Pricing growth rate (%)	0.8	8.3	23.1	7.1	11.8	18.1
Unemployment rate (%)	-	4.6	4.7	4.6	4.4	-
GDP (billion USD)	33	71	91	97	102	-
GDP per capita (USD)	415	835	1046	1103	1188	-
Population (million)	79	84	85	86	87	88

(Note: *the achievements in 2011 are expected to achieve. Created by ADB documents Statistical Office of Vietnam)*

In 2007, the government of Vietnam has announced development plans for 2025, will produce local goods to be able to provide full 90% of domestic demand. And to achieve that goal, Vietnam has planned to build nine oil refineries. Also, it is promoting the development of heavy industry and petrochemical industry such as steel manufacturing, cement, shipbuilding, power generation, etc...

In recent years, Vietnam has succeeded in economic growth with average annual growth rate over 7%, but to continue the economic growth, the industrial modernization work is an urgent need to immediately

implement. Manpower intensive training is considered a critical problem of Strategy of economic and social development for 2011-2020 projects, which are the growth strategies for 10 years that has been set out in the 11th Communist Party congress of Vietnam January 11, 2011.

"Strategy for socio-economic development for 2011-2020" was in place with the goal of becoming a modern industrial country in 2020 with the specific objectives as in the Table 2-2 below

Table 2-2 The main objective of the Strategy of Social and Economic Development for 2011-2020

Parameters	Target	Reference
GDP growth rate of per capita GDP	7~8%	from 2001 ~ 2010 is 7.2%
GDP per capita (USD)	3,000~3,200	in 2010 is $ 1.200
The GDP rate of the industry & Service	85%	
The rate of production of high-tech and Production industry	45% GDP	
The rate of industrial products	40%GDP	
Energy-saving	Reducing 2.5 ~ 3% of GDP annually	
Urbanization rate	More than 45%	Modernization 50%Commune
Population growth rate	1.1% annually	
The average life expectancy	75 years	
Number of beds /10,000 habitants	26 beds	9 doctors
Income	3.5 times in 2010	
rate of Fixed residential floor area	70%	Average area of floor 25 ㎡

(Source: *Strategy for Socio-Economic Development 2011-2020*)

To create a breakthrough in the economic growth as the implementation of policies of economic reform to the market economy oriented socialism by taking part in competition and structural reforms, modernization of urban infrastructure such as transport, communication, utilities, information, promotion

of high technology education, vocational training is considered the policy to support economic growth of the strategy for socio-economic development for 10 years 2011-2020. The specific objectives are as described in Table 2-3 below

Table 2-3 The primary goal of the Education, Vocational training Sector in the strategy for Social and Economic Development 2011-2020

Parameters	Targets	References
Number of higher education students	450 people	in 10,000 people
Number of participants in training new professions	every year 1,800,000 people	In which 1,000,000 people are local
Skillful rate	Over 70%	equivalent to 44,000,000 people .In 2010 is 40%
The rate of participants of vocational training	55%of total employees	
Unemployment rate	4.0%	Urban area: the target in 2015

(Source: *Strategy for Socio-Economic Development for 10 years, 2011-2020*)

In this strategy, the training issue has been clearly described being a priority issue in Vietnam. To improve the quality of human resources, there is a need to reform quickly in current training mode. Therefore, must be implemented the plans for human resources as required from enterprises in the private sector whose center is the leading Industries and technology. Estimated budget for education and vocational training for 10 years is USD 103,000,000,000 dollars, equivalent to 12% of GDP.

The Government of Vietnam has launched the "reform agenda of higher education for 2006-2020" in 2005, stating the goal of improving quality and expanding the number of institutions of higher education, improves management capacity and research capacity of universities. In “Strategy of human resources training 2011-2020" has been approved by Prime Minister in April 2011 and "the Master strategy of human resource training in Vietnam (2011-2020)" was approved in July 2011, the key areas are: human resource preparation for industries with international competitiveness, strengthen technology research areas, strengthening personnel training with international standards.

Based on Strategy of social and economic development as shown in Table 2-4, the Ministry of education

and training, and Ministry of Invalids and Social Affairs have set up a plan to establish universities, colleges and vocational schools. The total estimate budget is up to U.S. $ 63 billion.

Table 2-4 Plans for the construction of Education, Vocational Training Establishments

Items	Newly established plan	References
University	259	To 2020
Upper Colleges	314	To 2015
Vocational Training School	540	To 2020
Vocational Training Centers	1,050	To 2020

(Source: Self-made based on *Plan Human resource Training 2011-2020* of *Ministry of Education and Training, Minister of Labour, Invalids and Social*)

2.1.2 Oil refining industry

Vietnam's economy is developing rapidly, but the development of key industries as chemical and heavy industry until the present time is still incomplete, still has to import fuel and main raw material for industry. In particular, although Vietnam is the oil production country, crude oil exports, but imports of gasoline and petroleum products and this is economically inefficient. To solve the foreign currency losses issue, petroleum products production to meet domestic demand, the construction of additional crude oil export processing zones is urgent.

Crude oil production in Vietnam from 1990 onwards continued to increase, in 2005 has reached to 400,000 BPD, from then on, Bach Ho- the main oil fields have reached the limit and gradually lower the production, 2009 production is 340,000 BPD. Crude oil from Bach Ho oil field is 39 API densities, sulfur content is 0.03%, melting temperature is 33 C, the percentage of heavy oil is 47% and this is good quality crude oil having slightly higher fluorescence. U.S. Energy Information Administration (EIA) recognized that crude oil production in Vietnam by 2030 could reach 400,000 BPD.

On the other hand, the consumption of petroleum products from 1990 to present is a steady increase and reached 30 thousand BPD. Until February 2009 there is no export processing zones, all crude oil were exported out, and is used to buy foreign currency. But oil production is dependent on total imported quantity.

September 2007, the government of Vietnam announced plans to build nine oil processing areas (as

described in Table 2-5). It was expected by 2025 will ensure 90% of domestic demand in the export processing zones in the country, then the target number of crude oil processing capacity of the export processing zone is 111-121 thousand BPD. Content specified in the plans is to build nine crude oil export processing zones. The Vietnam's first export processing zone located in Dung Quat, Quang Ngai province went into operation in February 2009 was the first. The ability to process crude oil export processing zones is 650 thousand tons / year (13 thousand BPD), have the ability to meet one third of domestic demand (30 thousand BPD). So far EPZs are still operating smoothly.

Table 2-5 List of oil refinery in the plan

No.	Refinery locations	Refined quantity（BPD）
1	Dung Quất	130,000
2	Nghi Sơn	200,000
3	Long Son	200,000
4	Dinh Vu	20,000
5	Nhon Hoi	200,000
6	Phu Yen	80,000
7	Quang Ninh	140,000
8	Van Phong	200,000
9	Can Tho	40,000
Total		1,210,000

(Source from Petro Vietnam's statement)

Following the EPZ Dung Quat is the subject of this investigation, includes the export processing zone of Nghi Son (capable of handling 200,000 BPD, located in the north of Thanh Hoa province) and Long Son export processing zones (capabilities 200,000 of BPD, located in southern Ba Ria-Vung Tau). These two EPZs targeted to go into operation in 2014. If counted processing capability of the three export processing zones Dung Quat, Nghi Son and Long Son, it can reach to 510,000 BPD. When completed in 2014, they could almost meet the demand for oil in the country

2.1.3 Investment Situation of Japanese enterprises in Vietnam in the heavy industry and petrochemical industry, especially in Petrochemical Industry

Regarding the development of oil processing industry in Vietnam, back to the period before Bach Ho oil field exploitation, this is Vietnam's first oil field discovered under the sea far from HCM City 125 km southeast. Bach Ho oil field, which was discovered by Mobile Company of America, the company was granted by then South Vietnam government for exploitation rights, but the southern government, was overthrown, the exploitation was suspended etc ... and until 1986 the operation was resumed. Crude oil from Bach Ho oil field is to be moved to Ba Ria Vung Tau province by oil pipelines under the sea then was taken to the Dung Quat oil refinery or exported abroad. And since then, Ba Ria Vung Tau province has become the Center of Oil and Gas Industry of Vietnam. In this Section we are to summarize the situation of the Enterprise Investment boom in investment in the 2nd, etc. ... in Vietnam after 2000.

2.1.3.1 Investment in Vietnam and enterprises from Japan

In 1986, Vietnam's implementation and innovation policy has brought strong economic growth, real GDP growth rate at 6.8% in 2010, total GDP was $ 971.8 million, and the economic growth rate that is amazing. In particular, related to oil and gas industry accounts for 30% of GDP. The enterprises from Japan are also increasing, turnover of approved investments from Japan in 2008 reached $ 76,540,000. This includes investment in the construction of oil refinery of Idemitsu Co., Mitsui Chemical Company ($ 6.2 billion). In 2008, the year when the financial credit crisis Lehman took place, and 2009, total investment and number of licensed investment projects is reduced, but from next year the picture is bright again, as shown in Table 1-6, the situation of Japanese investment keep increasing strongly

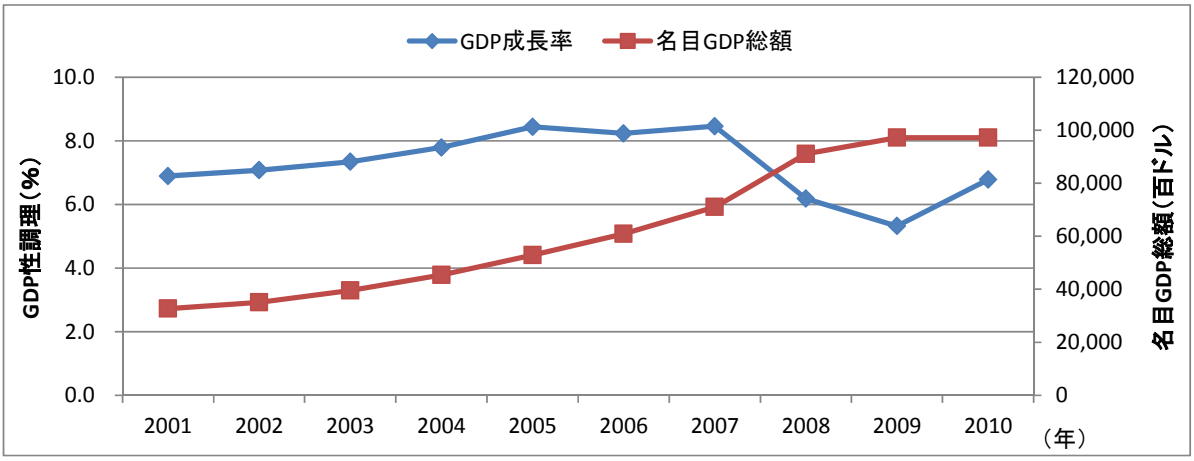


Chart 2-1 GDP growth rate of Vietnam

(Source: Trade Promotion Organization of Japan (JETRO), 2011)

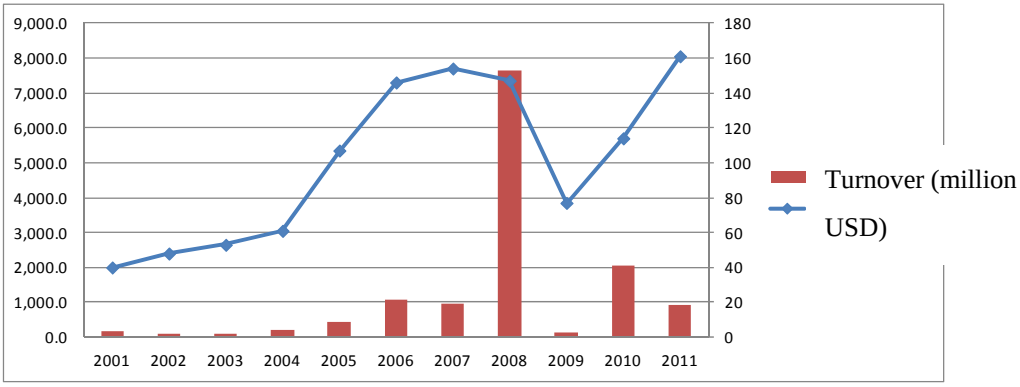


Chart 2-2: turnover and number of FDI projects approved of Japan (2011 figures are estimates)

(Source: JETRO Hanoi, 2011)

Thru the ssummary of Investment Situation in Vietnam market of the Japanese Business in the past 10 years, it can be seen the situation change through Table 1-6 above. Number of corporate entity in Vietnam from 158 companies to date of 2001 has increased to 454 companies in 2010, 2.9 times (Number of foreign enterprises to invest in companies is 408) [1]. The reason for the increase in business investment in markets like this one taken from survey results[2] include: (1) Ability to future development of the local market, (2) cheap labor, (3) skilled Manpower etc. ... in particular, small and medium enterprises who want to use the above advantages have come to Vietnam very crowded, thanks also to the effects of the earthquake in eastern Japan last year or the evaluation of Yen status in the long run, the establishment enterprises seeking overseas activities increased with improving business operations in Vietnam.

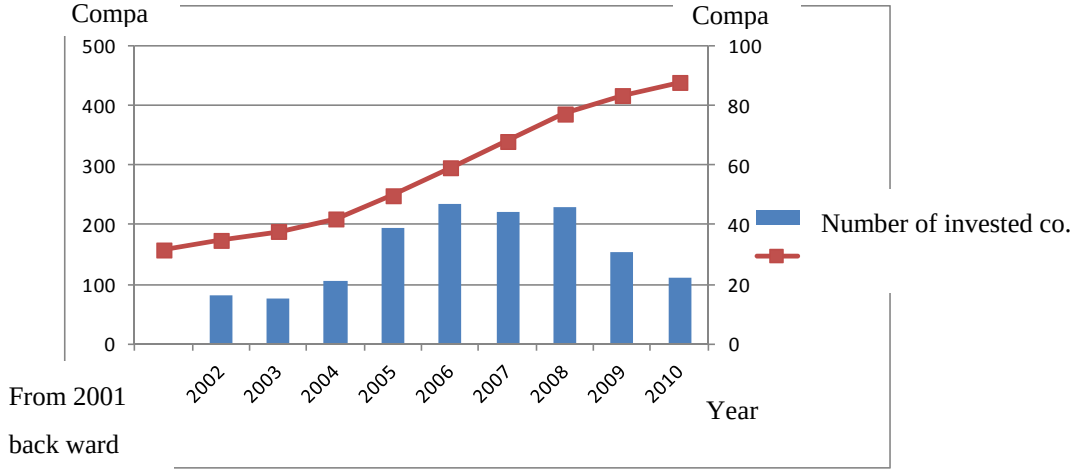


Chart 2-3: Number of Japanesse Business legal entities in Vietnam

(Source: Self made based on information from Toyo Economic Magazine (Toyo Keizai Inc...), 2011)

1 Survey results with subjects Japan entities in Vietnam total investment rate above 10%. On the other hand, according to survey released February 1, 2012 Teikoku Data Bank, as at January 31, 2012 there were 1,542 Japanese enterprises investing in Vietnam.

2 JBIC Susumu Ushida and al., 2009, " Survey Report on Japanese manufacturing enterprises deploying overseas activities."

2.1.3.2 Situation of the Japanese Enterprise Investment in Heavy and Petrochemical Industries

Types of heavy industry and petrochemical industry can be cited as: Steel, Mechanical, Petrochemical, Shipbuilding etc ... Table 1-5 describes the list of major enterprises in heavy industry and petrochemical industry of Japan in Vietnam. Cement Corporation NM is the Japanese company investing into Nghi Son Cement Company (operating in Nghi Son Economic Zone) with capital from the two companies Cement Joint Stock Pacific (Taiheiyo Cement Corporation) and Mitsubishi Material Corporation.

Table 2-6 The major enterprises in the Japanese Heavy and petrochemicals industry in Vietnam

- Idemitsu JSC	- Cement NM JSC
-Chemical Sumitomo JSC	- Nikki JSC
- Kaneka JSC	- Shipbuilding Mitsui JSC
- Kureha JSC	- Yamatake JSC
- JSC Sakai Chemical Industry JSC	- Yokogawa Mechanico-Electric JSC

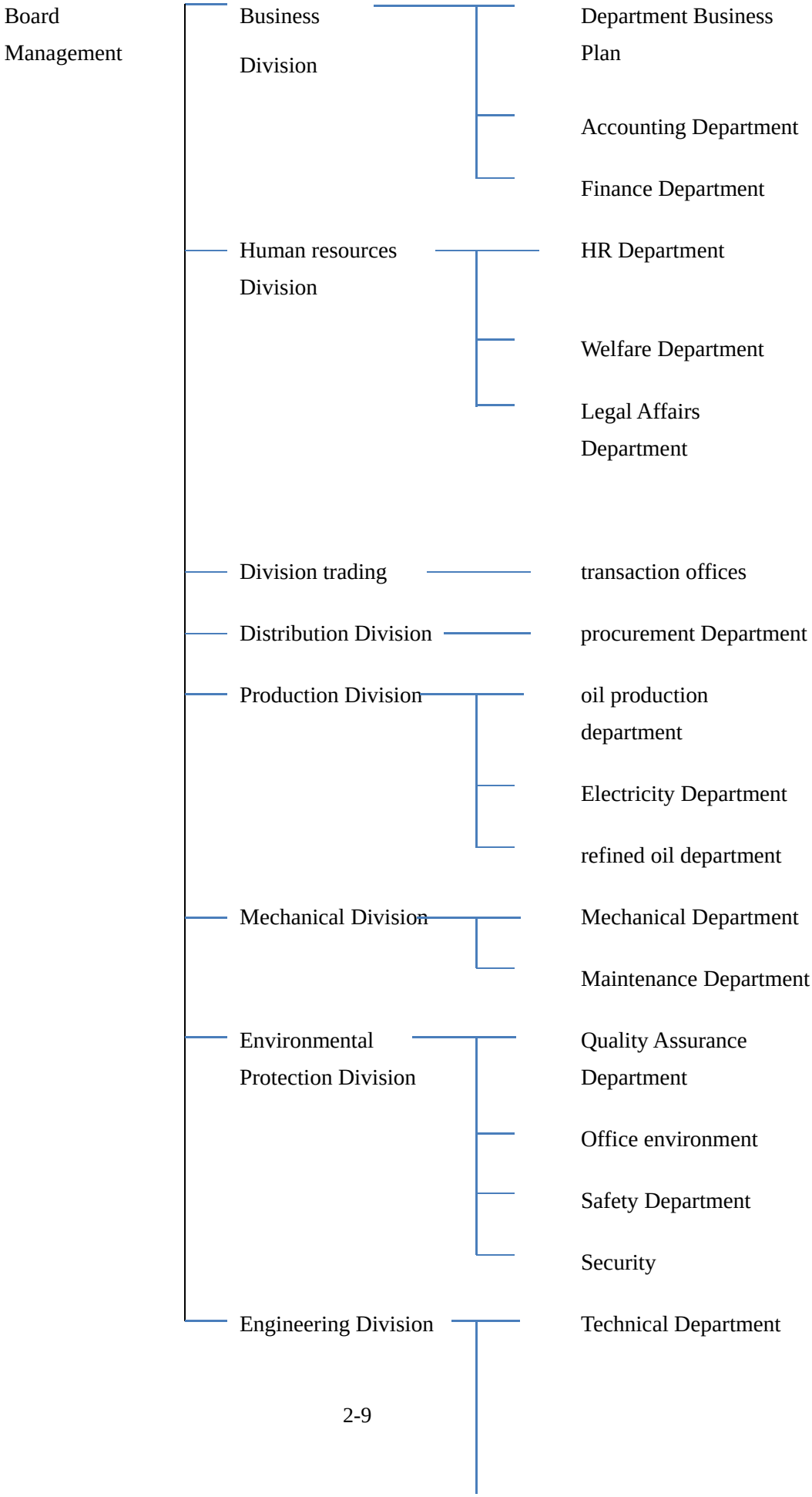
(Source: Self made based on information from the Economic Court Toyo (Toyo Keizai Inc...), 2011)

At present, inVietnam there are the Groups related to Oil Refining industry Enterprise of Japan investing in oil exploitation such as Idemitsu Corporation with Idemitsu Oil Company, JX Group with JX Nippon Oil & Gas Exploration Corporation. However, this is the Upstream Business in oil exploitation on the sea, different from the Down stream business at the plant and production of oil refinery, which is regarded as the Investment Enterprise in oil refining industry the only Idemitsu with Head office in Hanoi.

2.1.4 Categories of occupations and skills needed for heavy and petrochemical industries in Vietnam

To manage the operation of crude oil refinery plant after the construction or the chemical machinery it should have a lot of manpower for control systems and electrical engineers or equipment maintenance engineers related to maintenance management.

In Japan, the organization of the EPZs is often structured by following parts: Business division in charge of the business plan or financial accounting, human resources unit in charge of personnel, labor, welfare, department in charge of regulating the distribution of raw materials ... department in charge of products selling transactions, production department in charge of oil production, electricity and refined oil, Mechanical Department in charge of equipment maintenance. Environmental protection department in charge of quality assurance, environmental management, safety management, protection ... technical division in charge of test plans, testing, research and development of equipment, product and materials. Table 2-4 shows sample of organization


Board Management
Business Division
Department Business Plan
Accounting Department
Finance Department
Human resources Division
HR Department
Welfare Department
Legal Affairs Department
Division trading
transaction offices
Distribution Division
procurement Department
Production Division
oil production department
Electricity Department
refined oil department
Mechanical Division
Mechanical Department
Maintenance Department
Environmental Protection Division
Quality Assurance Department
Office environment
Safety Department
Security
Engineering Division
Technical Department

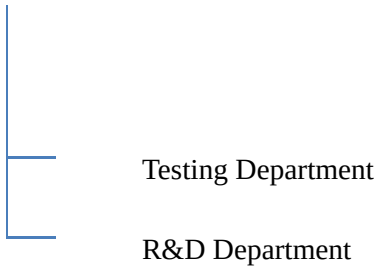


Chart 2-4 Sample organization chart of oil companies in Japan

(Source: Unico International Corporation)

Idemitsu Company put its investment in oil refining unit in EPZ projects in Nghi Son. This company owns the Chiba oil processing plant of the same processing capacity of 220,000 BPD as Nghi Son plant. The Chiba EPZ has 540 employees. Mitsui Chemical Company is to invest in division of petrochemical. This company owns Ichihara plant with production capacity of 55 thousand tons of ethylene with 1.400 employees. Total number of employees of both plants Ichihara and Chiba is 1940 employees. Except those common units such as business unit, transactions department, coordination department, mechanical department, engineering department, one can estimate number of workers for Nghi Son plant also exceeded 1,000 people. With asumption 10% labor dropped out, annually it should have a plan to recruit 100 employees regularly.

Key units in Japan oil processing operations are oil processing room, power room, refined oil room and production department. These typical equipments in produce oil refining normally have continuous operation of 300 days a year, so that the working regime of the production department employees are shift-work-regime. Equipment in plant is subjected to high temperatures and high pressures, sometimes used for toxit substances, so that when emergencies occur, they must respond expeditiously in accordance with regulations, the sense of compliance with operating safety of the employees must be high. This type of industry requires skills and techniques as well as technical understanding, to develop their own judgement and treatment of work.

In Japan, there is no clear distinction in education level, but for those parts of such high skills required, the college students with a high discplines sense are allocated. For example, in Idemitsu Co., until the present time are using about 600 college students.

According to reports on activities of members equipped with the overall capacity of professional associations, professional capacity development centers of Japanese Ministry of Labor in March 2008, thr centers of which are members of the Petroleum Association of Japan and the oil companies, the professional capacity of the oil processing industry is defined as follows.

Overall structure of the evaluation criteria professional capacity in oil processing applied to the status of operations oil industry is as in Table 2-7 below.

Table 2-7 Overall structure of the Evaluation Criteria for Professional competency in refined oil industry

Profession	Position	Level 1	Level 2	Level 3	Level 4
Planning and processing petroleum	production Plan				
Quality Management Plan	Quality Management				
Facilities Plan	plan to set up new one/ modification				
	Equipment design				
equipment Management/ maintenance	check equipment				
	equipment Management/maintenance				
Safety management and environmental production management	Production safety.				
	Environmental Management				
oil refining	Management of oil refining equipment				
	Operation of oil refining equipment		In Table 2-8 it shows the standard		
Management / Monitoring	Management / Tracking				

(Source: Report on crude oil refining activities of the Commission for preparation of assessment modes of General professional competency, Association of general professional capacity development centers of Japanese)

The review the division of the level still left empty in the structure table above is shown in the Table 2-8 below.

Table 2-8 Division of level of professional capacity in refined oil industry

Standard Level	Level division criteria	Position		
		Technical System	Technical System	Management System
Level 4	*Management System* Manager of large scale organization or influential, and make general judgments range or ideological decisions, have the necessary capacity to perform creative work, giving the benefits for business. *Technical System* Having high technical level, correct performance and efficiency of work in greater detail, and in view of the business and find ways to reduce costs / increase the value of products, possessing capabilities to direct subordinates	The professionals having a high technical level.		Production Manager Group Head
Level 3	*Management System* Manager of the organization of average size or influence generally, based on the directions of supervisor perform management activities, planning, complete tasks, solve problems, have the capacity to perform works bringing benefits for business. *Qualified technical / operation skills* Having high performance efficiency and accuracy of detail work, have the capacity to offer increased service value. On the other hand, as the leaders, have the capacity to implement the directive, judgment and management activities of	technical professionals	skilled persons and head of shift Group Head	Department Head Group Head

	the organization			
Level 2	Having the role of the group center, focused creative ideas, capable of self-judgment, improve and give the initiative to complete the work.	Technical personnel of high grades	Highly technical work performers	
Level 1	Having sufficient capacity needed to complete the work under their assignment based on the directives of their superiors or consultants	Technician	Skill operator	

(Source: Report on *activities of the Oil Refining of the Committee* for *preparation of Methods of Professional Capacity Assessment,* Association of *Central Career Development Capacity*)

The Table 2-5 following figure illustrates the typical jobs in the oil refining industry.
In case of recruiting graduates, they areat the level 1 when started the company, depending on their capacity and actual performance they will advanc up to level 4.

The Japanese companies have traditionally lifetime employment, seniority regime, a regime of recruiting new graduate students, and trained them in business, and enabling them step by step promotion. Regarding the labor structure of Vietnam, the carrier is determined by professional education, the promotion has been limited, there's no carrier roadmap like Japanese style.

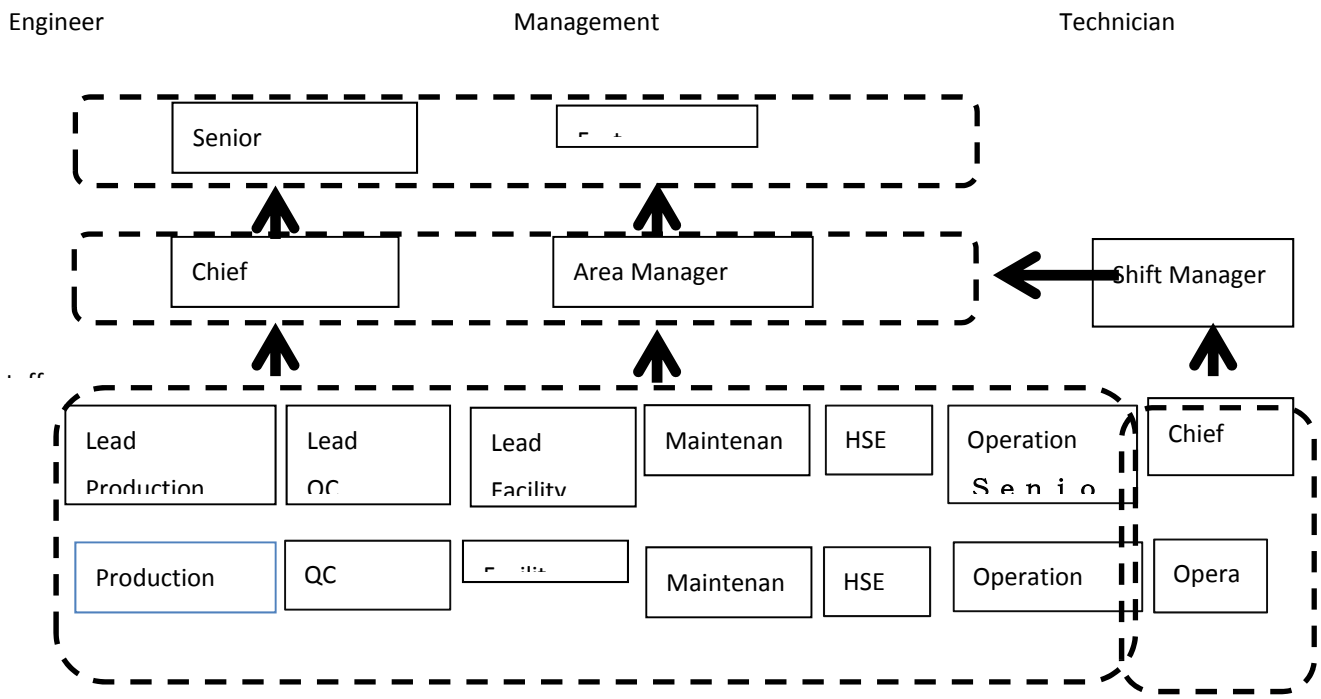


Chart 2-5: The typical business in Petroleum Refining fields

(Source: Report on *activities of the Oil Refining of the Committee* for *preparation of Methods of Professional Capacity Assessment,* Association of *Central Career Development Capacity*)

The Table 2-9 below illustrates the necessary knowledge and standards to complete the work: the capacity at the "level 2" of Profession of operating of oil processing machinery in the oil refining type of work which is subject of this survey

Table 2-9 Standards and knowledge necessary to achieve Level 2 Profession operating oil refining equipment

Types of jobs	Oil refining
Profession	Operating activities of the oil processing machinery
Level	Level 2
Summary capacity	The capacity to manage the operation of machinery oil processing

Detailed capacity	
Awareness and the steps taken by professional management equipment and processing petroleum	Having basic knowledge about the process of oil processing equipment and oil processing, the process of perception, types, methods, testing methods, sampling ... Aware of the management of occupational safety, environmental management related to machinery oil processing. Understand the content of production planning, work order planning, quality control of processing equipment oil processing. Understand the methods of process management or control of production machinery oil processing Understanding the actual arrangement and of the equipment or operations or employed labor. Understand the treatment method of gas generated. Understand the amount of materials needed, be in charge of the supply of raw materials in a timely manner Able to explain the yields test method or reduce the cost of machinery oil processing. Able to explain the methods of computer control of machinery oil processing.
Enforcement of professional management for equipment oil processing	Perform an appropriate way to support the management and production management in the process of machinery oil processing. Perform validation activities for appropriate status of oil processing equipment Burn gas generated appropriately. Provide an appropriate amount of water as needed. Make improving the productivity of oil processing and consideration of cost constraints. Make links related to production and other departments, the certification of status of operations, equipment management and

	oil refining equipment management The adjustment of the information from the operating machinery oil processing equipment, accurate judgment and give status indication as to control ... Arbitrary adjustments made related to technical, stage, production and other parts, equipment management and management of oil refining equipment.
Evaluate and improve the management of oil processing equipment	When problems arise in the operation of oil refining equipment, find out the cause, exchange, review and implement the improvement plan. Self-assessment appropriately improving professional management of oil refining equipment has been implemented or not and conduct business improvements. Consider carefully to see whether the waste water affect the environment or not, if cases arise then consider how to improve and expedite the process in time. Where can it have any effect on production and review process, the changes and adjustments to the relevant department? Application of new technologies, improve professional review or improve techniques.
Knowledge required	Knowledge of the chemical reaction process. Items, test methods of machinery and equipment. Electricity Terms of electricity, using instruments, electrical equipment & tools Basic electric circuits of the electrical control equipment. The relevant rules Knowledge related to maintenance of electrical systems. Mechanical- electrical, electro-mechanical Electrical Circuit, electronic circuit Detect cause and type of defects arising in electrical parts

	Wiring, wire connecting, test method Methods of machinery system maintenance Planning machine maintenance, repair and renovation of machinery Methods for recording activity cost table General knowledge related to production management system The production process Allocation and method of production planning General knowledge related to materials distribution plan Allocation and method of distribution planning materials General Knowledge related to management of production processes Allocation and planning methods manufacturing process General Knowledge related to schedule management Production, design, distribution, manufacturing, order and time of processing General knowledge related to adjust production Information necessary for setting the adjustment chart Perspective, the adjustment chart setting method Skills workflow

(Source: Report on *activities of the Oil Refining of the Committee* for *preparation of Methods of Professional Capacity Assessment*, Association of *Central Career Development Capacity*)

According to the content above, the knowledge needed for the technician in the oil refining industry is the theoretical knowledge cannot grasp in vocational training, so need to be trained in training courses of higher technical education equivalent to university teaching programs.

In addition, general skills for the whole work such as absolute safety, environmental issues considerations, law and regulations compliance (flexibility), pay attention to technology trends and gather information, solve problem with activities improvement, job links and exchange of required information, the technicians are required to have additional skills to manage the operating oil processing equipment in addition to the skills mentioned on.

2.2. Actual achievements and problems of education and training contribute to the industrial sector in Vietnam

2.2.1 Number of schools and students for each level of training in Vietnam

As described in Table 2-6, the training system in Vietnam is as follows, the primary training from 6 ~ 10 years old in 5 years, lower secondary schools from 11 ~ 14 years old in 4 years, the upper secondary school from 15 ~ 17 years old in three years, vocational training / training from 3 ~ 4 years, then higher training is the lower and upper colleges and universities. The compulsary education includes a 5-year primary school and lower seconday school four years, a total of 9 years.

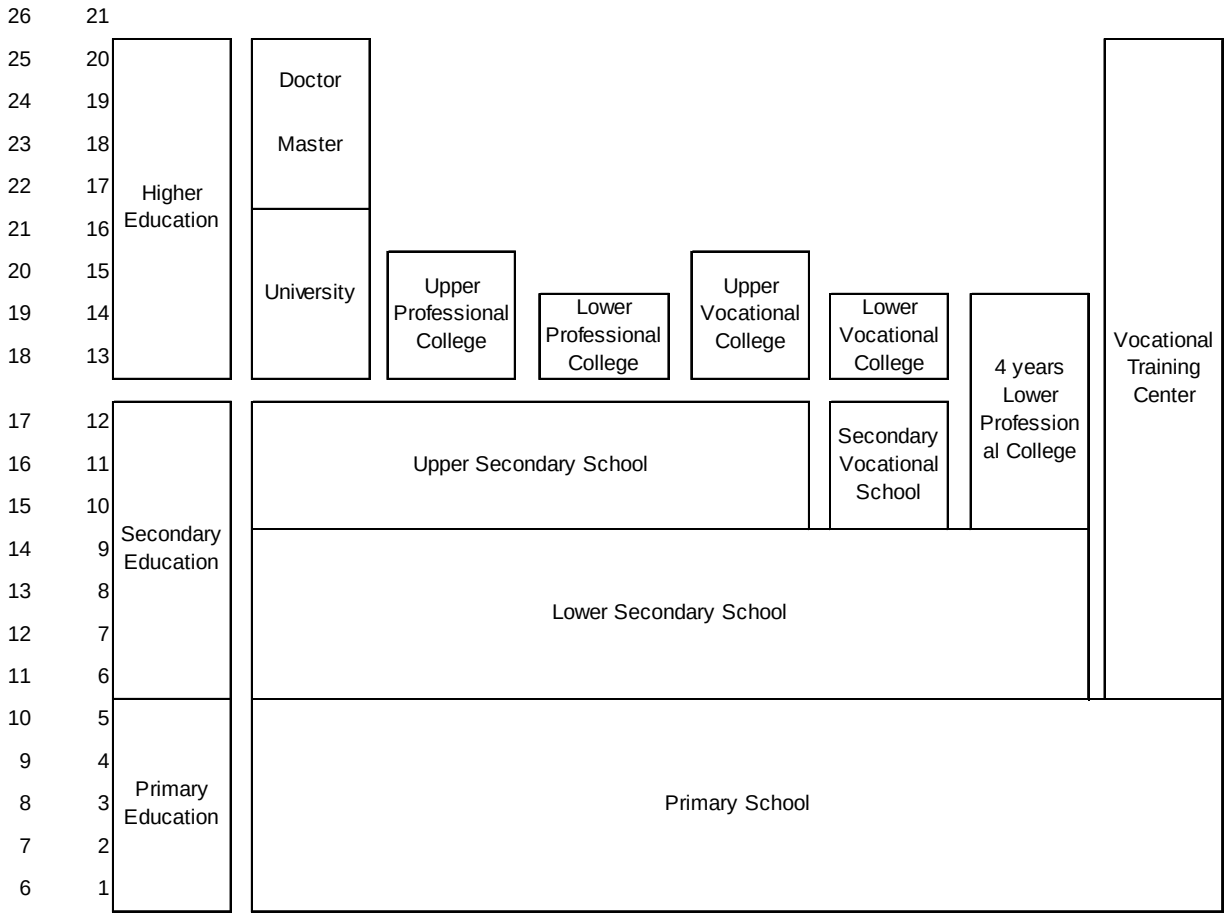


Chart 2-6: Mode vocational training schools in Vietnam (Compact)

(To be established based on the material of the MOET, MOLISA)

2.2.1.1 Training of primary / secondary level (primary, lower secondary and upper secondary)

In Vietnam in 2008 in term of the rate of primary school between cities and rural there is no difference, around 90%, the rate of total attendance is 100 % almost reached universal primary education. Lower secondary school attendance rate and the total attendance were 95% and close to universal education. The

upper secondary school attendance rate was of 54% in 2008.

As shown in Table 2-10, in Thanh Hoa province, following the 2010 data, the school attending in primary education, all three school levels one, two and three are higher than national average. In Thanh Hoa province there is rich and-poor gap and gab between high-income areas and low-income areas, especially in upper secondary school with odds ratio (17.2%) higher than the difference between rural and city in the country (15.8%).

Table 2.10 Total attendance rate and the rate of the net training school at Primary and Secondary level of Thanh Hoa and nationally (2006, 2008, 2010) (%)

		Whole County				TH	
		Gross Enrollment Ratio		Net Enrollment Ratio			Net Enrollment Ratio
	(%)	2006	2008	2006	2008		2010
Primary	Urban	101.2	101.1	89.7	89.2	Lowland	97.8
	Rural	106.0	105.1	89.1	88.1	Highland	94.6
	Whole Country	105.0	104.2	89.3	88.3	District	96.5
Lower Seconodary	Urban	96.7	96.9	82.8	82.6	Lowland	91.0
	Rural	95.8	95.6	77.7	77.1	Highland	84.0
	Whole Country	96.0	95.9	78.8	78.4	District	88.6
Upper Secondary	Urban	85.7	86.9	66.3	66.4	Lowland	61.0
	Rural	70.1	70.0	50.3	50.6	Highland	43.8
	Whole Country	73.6	73.8	53.9	54.2	District	55.8

Note:

Gross Enrollment Ratio is the ratio of the total schooling population divided by age group.

Net Enrollment Ratio is the ratio of the number of people who go to school in an age group divided by the population of that age group

Source: General Statistics Office of *Republic of Vietnam Socialist Republic of Vietnam,* 2008

As described in Table 2-7, the number of primary schools in whole Vietnam's 15,000 schools and tends to increase slightly. There are 10,000 lower secondary schools, 2,288 upper secondary schools in 2009, compared to 1,952 in 2005 or up 17%. About the Professional Upper Secondary School, in 2005 there were 227 public schools and decreased to 199 cases in 2009, compared to the public school the private school is 57 and has risen to 91 schools. Secondary schools number including lower secondary schools and upper secondary school presents a decreasing trend.

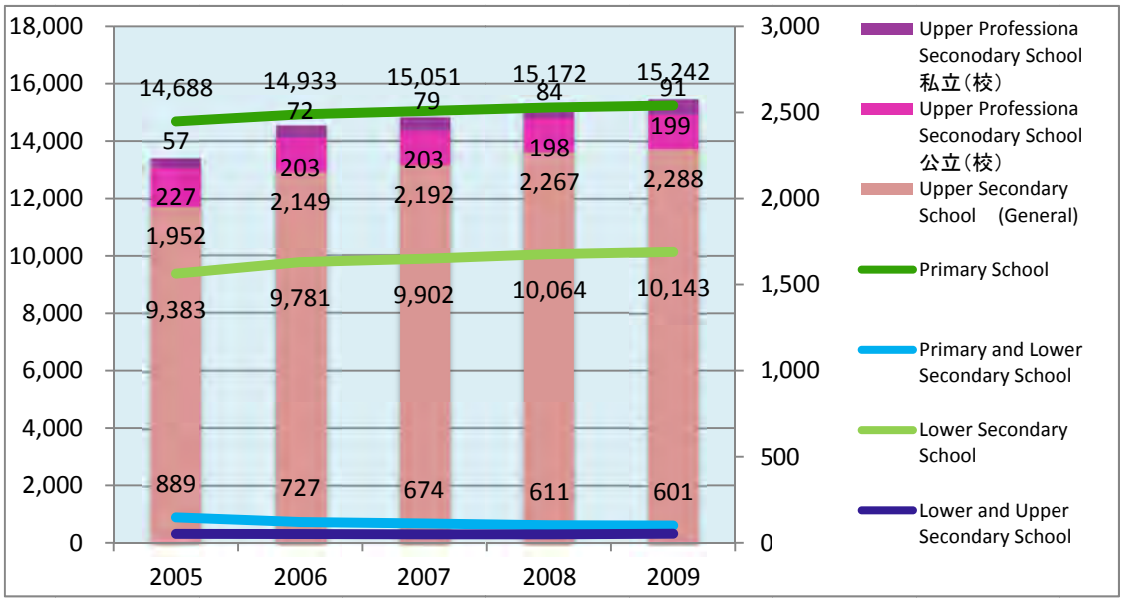


Chart 2-7 Number of schools at the level of Primary and Secondary Education (General system) (2005-2009)

NOTE: The upper secondary (bar graph) is the right column axis,

The graph with broken strokes is on the left axis

(Source: Vietnam General Statistics Office, 2011 (2), Thanh Hoa Statistics Office, 2011)

As described in Table 2-8, the total enrollment of Primary and Lower secondary tend to decrease. Due to the low level of training almost achieved universal for primary education, the above mentioned tendency can be attributed to the reduction of the school population from 0-14 years. On the other hand, in Thanh Hoa province, the population aged 0-14 years is predicted to show tendency to decrease 79 thousand people in 2009 and 67 thousand people to the year 2034 (Vietnam General Statistics Office, 2011) [3].Number of pupils in upper secondary school tends to decrease but the Professional secondary School (under MOET), both public and private ones tend to increase[4].

3 According to the population forecast, population of the age of 0-14 will decrease from 20 million in 2009 to 19 million in 2049. However, it will increase from 5.4 million to 13 million in City, but it will decrease from 15 million to 5.7 million in Country.

4 Number of students in professional training schools also includes students which have gone to work and come back to enroll as continuous education.

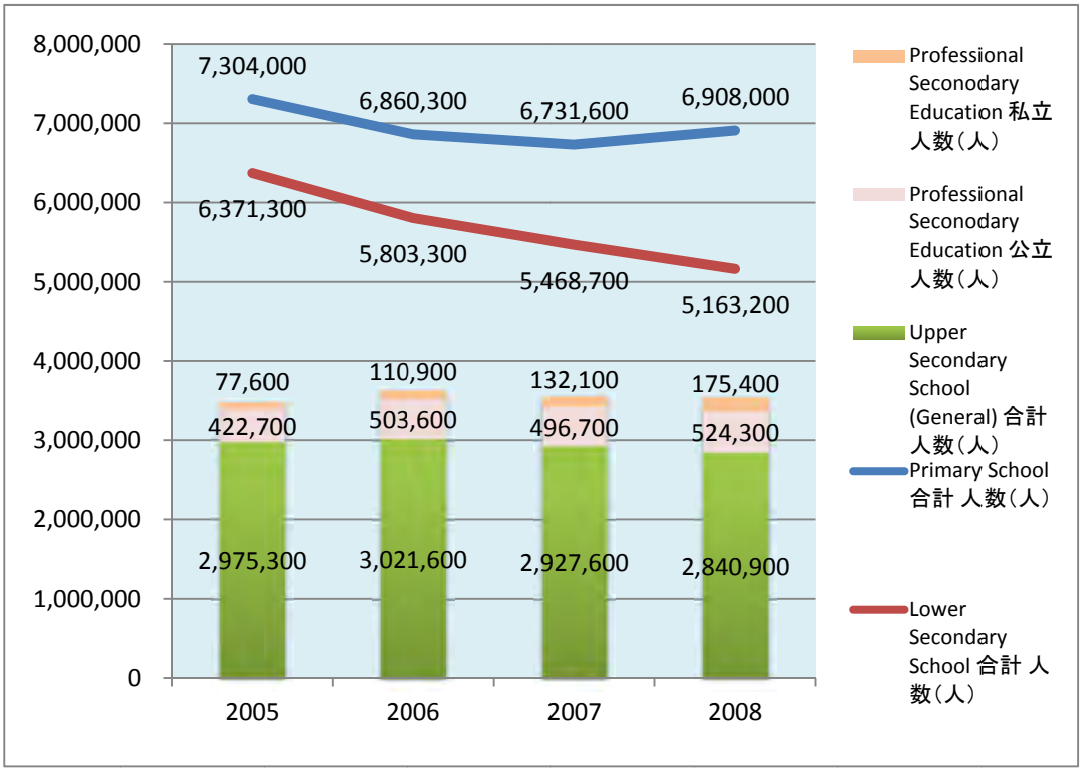


Chart 2-8 Numbers of pupils in the Primary and Lower Secondary level of all of Vietnam (2005-2010)

Note: Professional Secondary Education is Upper Secondary schools

(Source: *Vietnam General Statistics Office*, 2011 *(*2), *Thanh Hoa Statistics Office*, 2011)

2.2.1.2 Higher education (From Lower College, Upper College, University or higher)

In recent years, Vietnam reached a degree of social and spiritual education to higher education. The number of universities newly established increased rapidly. From the Table 2.9 it can be seen that the number of set up universities and colleges is big and peaked on 2005 ~ 2006. In Vietnam, so many public schools, 8 times compared to private schools in 2005. (Public School 243, private schools 34), then the rate of increase of private schools growing up, so in 2009 reduced four times (Public schools 334, private schools 80). From 2009-2010, there are 149 universities (Public schools 103, Private schools 46), number of Upper Colledge and Lower Colledge school has increased 1.5 times to 227 schools (Public schools 197, Private schools 30)

The rate of increase in the number of teacher / student reached the peak in 2008 for private schools.

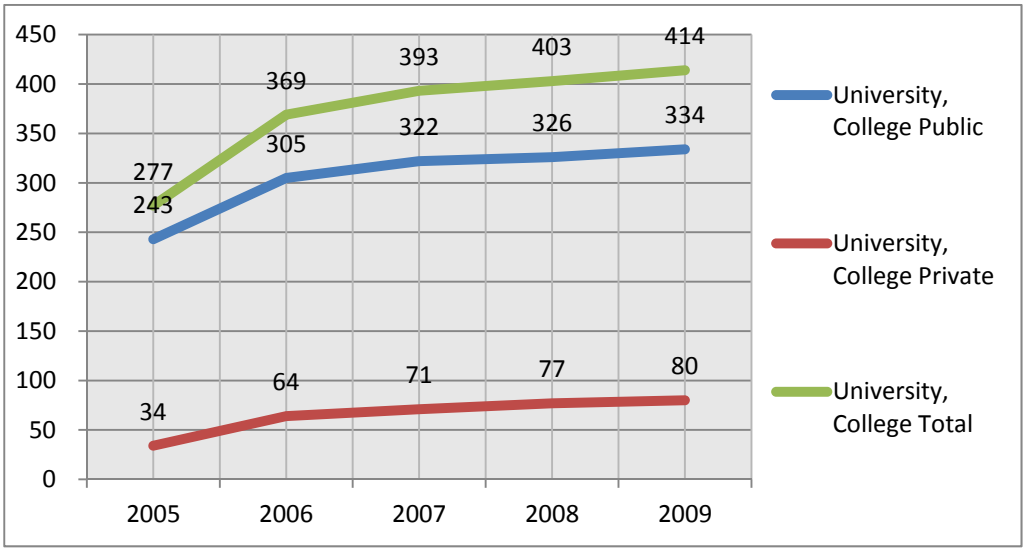


Figure 2.9 Number of the public and private universities

Upper College and Lower College of all of Vietnam (2005-2009)

(Source: *Vietnam General Statistics Office*, 2011 *(*2))

As can be seen in Table 2-10, the number of students of higher education (University, Upper College and Lower College) was as follows, in 2005, 1,300,000 people; in 2000 it had risen to 2,100,000 people. Number of public school students a lot more. But the number of private school students also set up very stable.

The number of teachers also increased in the total. In the private schools in 2005 is 6,600 but fell to 4,800 people, but then in 2008 increased 36% over the previous year.

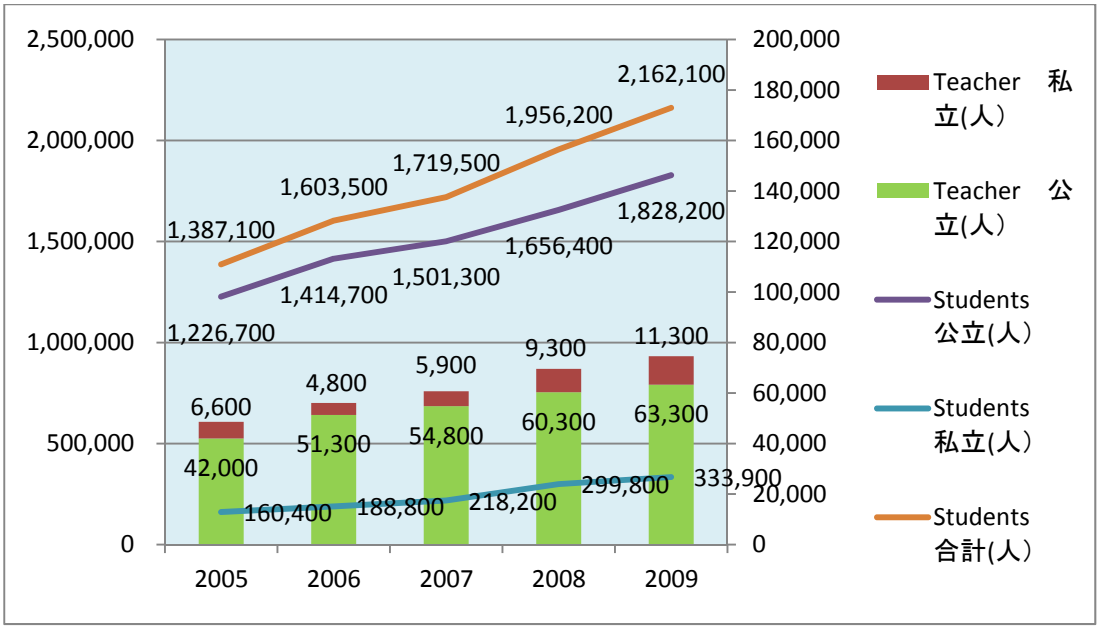


Chart 2-10 Number of Teachers, Students of the public and* private universities, *upper colleges and

lower colleges in Vietnam (2005-2009)

(Source: *Vietnam General Statistics Office*, 2011 *(*2))

2.2.1.3 Learning history of working labor

As described in Table 2-11, the resume of training / vocational training of workers aged 15 and older at the time in 2010: there were 69.4% and 91.5% in urban areas in other regions respectively did not do any training course[5]. Those with a bachelor's degree or higher in urban areas is 15.6% but only 1.9% in rural areas difference more than 10%. Nationally, too, people of age 15 or over have attended training and education work could not exceed 14.5% (See the illustrative table below).

If you look at the average monthly income can see the difference between participants with and without training. Those who have graduated from upper colleges their salary are around 1,000 yen ($130[6].)

	Ratio(%)			Average Monthly Income(VND)		
	Urban	Rural	Country	Male	Female	Country
No qualification	69.4	91.5	85.4	2,270,000	1,844,000	2,108,000
Short-term training	6.4	2.8	3.8	3,092,000	2,466,000	2,944,000
Vocational school	5.6	2.6	3.4	2,621,000	2,352,000	2,472,000
College	2.9	1.2	1.7	3,023,000	2,725,000	2,835,000
University and over	15.6	1.9	5.7	4,256,000	3,722,000	4,018,000
Total(%), Average Income(VND)	30.5	8.5	14.6	3,248,000	2,297,000	2,519,000

Table 2-11: Profile of learning and the average income of workers (2010)

(Source: *Vietnam General Statistics Office*, 2011 *(*2))

2.2.2 Vietnam's Education system

In Vietnam, since the 1986 innovation policy (Đổi mới), along with economic development, with the aim of preparing the personnel already trained and trained to meet manpower needs, have made education reform education / training / technical.

The system of education and vocational training in Vietnam is complicated. In this context, Vietnam has attached importance to training and establishment of courses, schools, and then resume study of graduate students are focused and created the phenomenon of abuse history study. In term of schools, vocational training establishment is a good point to be able to proceed to upper colleges and universities. This concept becomes common, and all courses are set up but just to proceed to higher levels.

5 Including the ones not attending Primary school, Low Secondary schools (it equivalents to Low Secondary school and Upper Secondary school in Japan). The ones only graduating from Upper Secondary school (General system) then going to work are considered as non-degree.

6 Exchange Rate applied on 24 Jan-12：1US$=20,670 VND、1Yen =266.3 VND

To ensure the quality of students, MOET (Ministry of Education and Training) has directed not to be established the new Professional courses[7].

MOET was changed in 1990 and established from the Ministry of Education and the Ministry of Higher Education. Founded from about 19 departments and sections, the scope of responsibility is to accept the policies specified in the overall training includes training before going to work, training of lower, middle and high grade, teacher training, labor training, and formal courses, vocational training, sustainability training, distribution of textbooks, school management, infrastructure maintenance, delivery of personnel, developing training plans, set out the rules related to the establishment of new universities, establish policies such as abroad training for talented individual ... Department of vocational training in the MOET controls professional school including Professional Secondary School, is the body to issue technical certification / diploma / certificate.

2.2.3 Management Content by MOET, MOLISA

Under the constitution in 1992 and a resolution on education in 2001, Education Law was enforced in 2005. It includes regulations on education (see 3.2.3), schools and training institutions and operating organizations, conditions related to trainers/lecturers, students training between school and family, society and government, regulations on rewards and punishment.

Since then, the national training regime of Vietnam is composed of formal training and continuing training. There are 4 types as follows: (1) Training before going to work, (2) Primary training, lower secondary training and upper secondary. Professional Education[8] includes (3) Professional and Vocational Training Secondary Education, (4) Middle Training. In particular, (3) and (4) include also vocational training and job training. In (3), MOET controls Professional Secondary Education and MoLISA controls Vocational Training. MOET uniformly Departments composed of Sector Review Council for Programme of Professional Upper Secondary Education, is responsible for decision of profession which is the subject of professional education and training, the number of subjects, completion time, structure a thesis / or internships.

Based on Law on Vocational Training (2006), the Vocational Training system (TVET) in Vietnam has the formal courses of the -Vocational Elementary, teaching level -Vocational Secondary, vocational and college levels-Vocational Diploma (College). MOLISA is responsible to create the links, unify all the vocational establishments.

Definition of Vocational Education / Training (TVET) is just like all of the content of public education, private training, formal training, no formal training, practical content, content of textbooks related industries that irrespective of who provides education and training especially in the formal training of TVET, MOET manages mainly Professional Course in professional training, MoLISA (Ministry of Labor

7 However, if having a request from business, it may be considered.

8 Professional Education implies continuous education and full-time education, having a narrower meaning than TVET

- Invalids and Social Affairs) mainly controls Vocational Training. In Vocational Training, the practical content is 70% and 30% theory.

Both MOET and MOLISA are holding Upper College, Lower College. The title of the Diploma certificates has the difference Upper College Professional Diploma and Vocational Upper College Diploma, Lower Professional College Certificate and Lower Vocational College Certificate but they were at similar levels, and they can be forwarded to Transitional Course program to obtain a bachelor's degree in the university system. The instructional content is 20-30% of the practice skills and theory 70-80%. About 20% of those professional schools under MOET management and 30% of Vocational Training School under MOLISA management are private schools.

2.2.4 The State budget for Education

As described in Table 2-12, Vietnam's state budget in 2011 was 7,256 billion VND. In the total cost, the cost of Education / vocational training which is to invest in new development is 249 billion VND; amout from budget is 1,101,300 million VND, accounting for 18.6% of the total budget.

歳入 Revenue	Unit: VND billion	amount	rate(%)
	Domestic Revenue	382,000	52.6
	Crude Oil Revenue	69,300	9.6
	Import and Export Revenue	138,700	19.1
	Non-Refundable Aid Revenue	5,000	0.7
	Revenue Transferred to 2011 from the 2010 Central Budget	10,000	1.4
	State Budget Deficit	120,600	16.6
	Total State Budget Revenue	725,600	100.0

歳出 Expenditure	Unit: VND billion	amount	rate(%)
	Development Investment	152,000	20.9
	Education, training and vocational training expenditures	24,911	3.4
	Science and Technology expenditures	5,069	0.7
	Debt payment and aid	86,000	11.9
	Regular expenditure	442,100	60.9
	Education, training and vocational training expenditures	110,130	15.2
	Science and Technology expenditures	6,430	0.9
	Wage reform expenditures	27,000	3.7
	Supplementation of financial reserve funds	100	0.0
	Contingencies	18,400	2.5
	Total State Budget Expenditures	725,600	100.0

Table 2-12: Vietnam State Budget for 2011

(Source: *National Assembly of the Republic of Vietnam Xã*, 2010)

In addition, as described in Table 2-13, for details about the Vietnam State Budget between the central budget and local budgets are as follows: central budget revenues are 25-26% and 74-75% of the local. Budget expenditures for capital (fund) are 17-19%, 41-46% of the Central and the local is 53-58%. Budget expenditures for normal cost are 80-82%, 20-22% of the Central and the local is 80-82%.

Amount Unit: VND billion

	2009		2010		2011	
	amount	rate(%)	amount	rate(%)	amount	rate(%)
Revenue Income Central	23,834	25.2	27,216	26.0		
Revenue Income Local	70,801	74.8	77,559	74.0		
Revenue Income Total	**94,635**	**100.0**	**104,775**	**100.0**		
Capital Expenditure Central	7,450	46.1	8,416	41.5		
Capital Expenditure Local	8,710	53.9	11,859	58.5		
Capital Expenditure Total	16,160	17.1	20,275	19.4	24,911	18.4
Recurrent Expenditure Central	16,384	20.9	18,800	22.2		
Recurrent Expenditure Local	62,091	79.1	65,700	77.8		
Recurrent Expenditure Total	78,475	82.9	84,500	80.6	110,130	81.6
National Expenditure Total	**94,635**	**100.0**	**104,775**	**100.0**	**135,041**	**100.0**

Table 2-13: The details of Vietnam's education budget.

(Source: *MOET, 2009, 2010, (2011), National Assembly of Socialist Republic of Vietnam, 2010*)

2.2.5 Policies and regulations related to Education and Vocational training

Thie section is explaining the laws, regulations and strategies… manitly besides the content stated under 2.2.3

2.2.5.1 Education Development Strategy 2001-2010 (Released in 2001)

In 2001 time, when has adopted a innovation policy for 15 years, on national HRD (Human Resource Development) Strategy and SED (Socio-Economic Development) Strategy, recognizes the importance of the improvement / strengthen education and training, Strategy for Education Development in 2001-2010 are set. In particular, the weaknesses of education in Vietnam pointed out that the weakness of management at each level. There are many changes in nature correlation between supply and demand, and utility costs and utilization, power centralization and decentralized local ... In education and training also have inappropriate guidance or a specific policy and it has been criticized that methodology and management in education has been unable to respond fully (MOET, 2001).

Regarding education towards 2010 as in Table 2-14,, the percentage of lower secondary school attendance will be approaching 100%, for the regular 3-level formal schools. Professional course under management of MOET, Vocational course managed by MoLISA there was a plan to increase the attendance rate.

In this strategy, the estimates rate for education and training of the national budget in the plan is 20% in 2010 (4.2% of GDP) but the reality on as shown in Table 2-13 above the estimate in 2011 was up to 18.4 %

Table 2-14: Planning to increase the attendance rate of lower and upper secondary schools in 2010

(%)	2000	2005	2010
Lower Secondary Student	74	82	90
General	38	45	50
Professional (MOET)	5	10	15
Vocational (MoLISA)	6	15	25
Upper Secondary Student	49	70	90

(Source: MOET, 2001)

2.2.5.2 Strategy for Education Development in 2009-2020 (Released in 2008)

Implementation time of Strategy for Education Development in 2001-2010 was over 8 years, so need to be adjusted. In 2008, the Strategy for Education Development in 2009-2020 was created. Regarding the result of 8 years, compared with 2000-01, in 2007-08 students of Secondary Education Professional is 2.41 times, the number of upper college and universities students 1.83 times. Number of universities and institutions students 2.48 times, number of employees already trained and training increased from 20% to 31.5%.

Number of private schools also increases. In 2007-08 the percentage of students in private Professional Secondary schools as is 18.2%, Vocational Education is 31.2%, Lower and Upper Colleges is 11.8%.

In this strategy, education and training is defined as knowledge workers (people employed). Existing conditions are already at work, you may see a constructive training strategy is not. The employee has knowledge (persons employed) is defined as to make the actual work effectively, the person must have the honesty, rationality, critical thinking, creativity, problem solving capacity and with technical skills.

In 20 years to come, to become a developed country towards industrialization and modernization, the target should be a modern training structure.

Quantity and quality objectives are given at each level of training. In Primary and Lower secondary education, it is striving to achieve Universal Education (attendance rate 100%). In training and vocational training strives rate of 60% of graduates have jobs, 30% continued to higher education. In higher education (College, University), striving in 10,000 persons, 450 persons employed. The rate of private schools is 40%. It is striving to be 5% of graduates get a certificate at the same level of well-known Asean universities, 80% are employed.

2.2.5.3 Operation management and University Budget- Law to have an independent profit

In the Government Decree No. 85/2003 and No.166/2004, MOET presented a long term local education programs for the authorization and responsibility for local education and business. Especially for

universities, Self-Management policies of Funding to enhance the autonomy in term of finance are given. Since then there is the power of financial self-determination regardless state or public establishment.

In 2005, the Resolution on the Fundamental and Comprehensive Reform of Higher Education in Vietnam from 2006 to 2020 is given, the plan for self-funding implemetation of the university become clearer. The stage budget set is limited below 10%, in fact approximately 8% [9]of each of the Management Board and University or College overseen by MOET, is responsible for preparing business plan and performance plan.

2.2.5.4 Regulations on tuition fees in the National Education Regime

In the public school / state the maximum amount of annual tuition fees is set by state decision. Because the estimated profit of the university should be subject to the ceiling therefore only way to increase revenue is by increasing numbers of student.

In the table is the maximum tuition fees in 2014-2015 due to government regulations were established in 2010. In high inflation countries such as Vietnam, the maximum tuition fees in 2014-15 than 2 times in 2010-11 (Except Vocational Course).

Table 2-15 The maximum tuition fees of Higher Education in Vietnam (per student/month)

Unit: thousand VND /month /student

Year		2010-11	2011-12	2012-13	2013-14	2014-15
University		310	395	480	565	650
Professional	Lower College	217	277	336	396	455
	Upper College	248	316	384	452	520
	University (Transitional)	310	395	480	565	650
Vocational	Lower College	400	430	450	480	510
	Upper College	440	470	500	530	560

(Source : Government of Vietnam, 2010)

2.2.5.5 Innovation in Higher Education

In Vietnam it has made "Innovation in Higher Education the period 2006-2010) based on the" Agenda for Renewal of Higher Education in Vietnam "in 2005, under the responsibility of MOET. The goal by 2020 is reformed system of Higher Education (HE - Higher Education) by international standards (Government of Vietnam, 2005).

After that, the World Bank has analyzed the situation of Higher Education (World Bank, 2008); the Asian Development Bank (ADB) is given to prepare reports for HESDP - Higher Education Sector Development Project (ADB, 2010).

However, after 9 years since the "Education Development Strategies 2001-2010" was published, the

9 Information from MOET

report released in 2009 by the MOET (MOET, 2009) pointed out that the problem improvement Speed higher Education a slow and low quality human resources is the perennial problem and has not improved.

Also outlined the weaknesses in the management of the Central Government as given for policies (such as compiled programs meet the needs of the industry) not appropriate and, the weaknesses in the Self-Management University, College and Intermediate. In 2010, the "Action Plan on Innovation Management for Higher Education 2010-2012" (Action Plan for renovating Higher Educational Management in the Period 2010-2012) set out, currently in execution time.

2.2.6 Classification of technician

According to the JICA classification, level of training and technical training before they go to work to be classified as follows (International center for experimental and cooperation / Japan International Cooperation Association (JICA), 2005).

① "engineer level (professional)" means personnel have been trained through the goal of obtaining the bachelor's degree at institutions of higher education colleges.

② “technician level (technician)": Labor with field management or have skills trained in the short term university or polytechnic.

③ "The key technician level (trades)": Labor trained through the goal of obtaining the certification of skills in the technical training establishments of middle stages.

④ "Workers (Artisan)": Labor trained through education at the secondary education / low level education

Vietnam's differences with the above mentioned contents, is the word "professional" which is used to designate positions in education and vocational training under MOET, labor with engineer level are called " Engineer "[10]

Polytechnical institute is defined as follows. Polytechnic indicate public higher schools specialized in that it can capture the technical and deep knowledge related to the profession. Unlike universities, polytechnic school focuses on the practical course. Depending on the country where polytechnics have different positions[11]. For example, École Polytechnique in France only specialized training in natural sciences and very popular. In Vietnam, application of the French regime, the leading natural science institutions as the Polytechnical University of Ho Chi Minh, Hanoi University of Technology and Danang University of Technology. These 3 establishments have only university programs (no programs under management of MoLISA College or Vocational). So the polytechnical institutions in Vietnam included in (1) rather than (3).

10 In Vocational training, MoLISA manages training education (Vocational).

11 In Finland, New Zealand, if one graduated from Polytechnic can be obtained Bachelor Degree, irrespective of Polytechnic or University. In Japan, there are establishments by Employment Support Organization for the Elderly, People with disabilities and who need a job set up and operate, other than the School regulated by the School Education Law, which is vocational training establishment under the Law for Promotion of professional development capacity, so do not get a Bachelor Degree.

2.3 Nghi Son economic zone - Thanh Hoa

Thanh Hoa Province has geographical position in Northeast Vietnam, and is the most populated after the population of Hanoi and Ho Chi Minh City. The cement industry in the early development of Nghi Son and Nghi Son economic zone established in 2006 has grown more plants of the industry such as freight industry, processing industry case cell, Manufactures fiberglass, etc ... However, oil production plant, oil refinery or power plant in a new large class are under construction, and expansion of companies of the mining industry, the plastics processing industry is being planned. People's Committee of Thanh Hoa province was soon aware of the importance of education while promoting the development of the provincial economy. And in 2008, the province has attracted University of Industry in Ho Chi Minh. Department of Planning and Thanh Hoa industrial planned "Planning human resource development in Thanh Hoa province 2011 - 2020" in 2008, and are preparing the manpower supply in accordance with the needs of industry.

Vietnam is promoting the preparation of institutional regulation for self-powered system. The construction of oil-processing plants is one example. The first export processing zone located in Dung Quat, Quang Ngai province went into operation. Production of this export processing zones is 130,000 BPD, may meet one third of domestic demand. To increase supply sources, the export processing zones located in Nghi Son, Thanh Hoa is planned to build. Nghi Son EPZ using both crude oil that export processing zones in Dung Quat is using, but also oil imported from Kuwait and it is intended to combine petrochemical plant and oil chemistry. But this is not a complete plan has been decided, but the book as a general plan for the future of export processing zones. Specifically, depending on the economic situation however still exists in the 9th planification. In this chapter, the scope of export processing zones that plans are being specified, predict the effects of the staffing plan to personnel training of the country, light up on a problem of labor force supply for the refinery plant.

2.3.1. Overview of Nghi Son economic zone, Nghi Son Industrial Zone

Nghi Son economic zone is the only economic zone in Thanh Hoa Province, the land area is 18,611 ha [12]. Nghi Son economic zone now has 41 investment projects with total investment of $ 9.3 billion. Some investment projects were decided as: Project Nghi Son oil refinery, Nghi Son Thermal Power Plant, Nghi Son cement factory, steel plant Cong Thanh, factory fiberglass reinforced pipe, the fiberglass plant, water plant, hydropower plant, automobile plant, (steel plant) Pomido etc. ..

At May 2/2012, the Nghi Son Economic Zone has five industrial parks which are multi-functional IP (Le Mon, Northwest Ga, Lam Son and Bim Son) and inside are three other industrial parks are scattered individual plants, a total of eight industrial parks. Nghi Son economic zone is under the management of Thanh Hoa. In Thanh Hoa province, outside the Nghi Son economic zone also has three industrial parks

[12] According to regulation, each province only has maximum of one economic zone. There are 14 economic zones all over Vietnam.

scattered is a versatile and Industry Industrial Park is in the Plan, the industrial park is under the management of the Central Government.

Nghi Son Economic Zone plays a very important for Socio-Economic Development of Thanh Hoa. In particular, Nghi Son Industrial Park was built about the same time when began construction of Nghi Son economic zone in 2005 so it gets overlooked.

Plan 2020 will have an additional 5 Industrial Park and 1 Tech Park. Nghi Son economic zone is currently building two ports with handling capacity of 3 million tons / year.
Currently, the number of workers in Nghi Son is 24,375 people. The number of young workers aged 18-45 accounted for 85%., 3.9% unirversity or higher graduates, 6.5% are upper college graduates, 7.0% were lower college graduated, 10.4% were vocational lower college graduates, 40.2% were over basic vocational training, 32% had trained with other forms (including the training course within 3 months) (DPI Thanh Hoa, 2011).

The Map of Plan for Nghi Son EPZ as presented in the Figure 2-11 below. The refinery plant and related utilities were divided into four parts in the downtown area.

The left side is the land of oil refinery Plant; it is intended to be built area of 400 ha. To the right of export processing zones is the land to oil storage.

Figure 2-11 Development Plan Map of the economic zone of Nghi Son, Thanh Hoa province

(Source: The Management Board *of Nghi Son Economic Zone, 2007*)

Figure 2-12-Map of planned oil refinery Nghi Son Economic Zone, Thanh Hoa province

Figure 2-12-is an overall map. This image displays petrochemical facilities beloing to first plant. Second plant is to be located on the left side of equipment group.

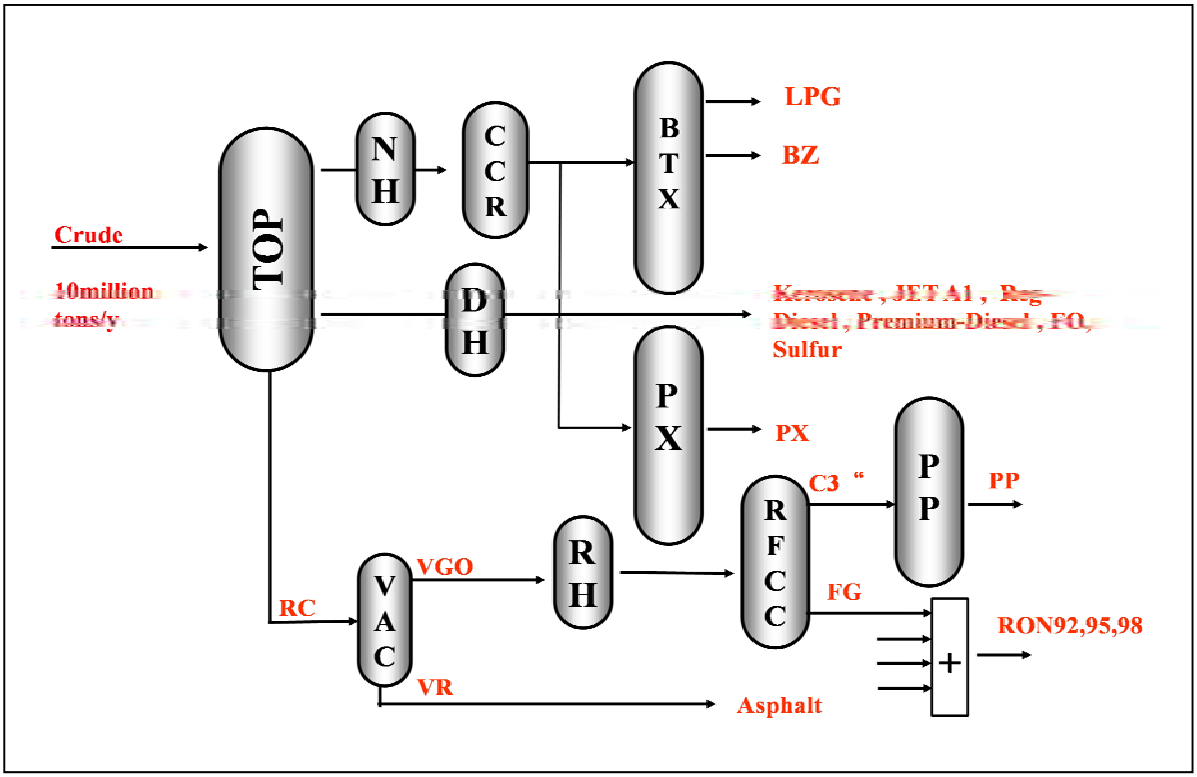
2.3.2 Overview of Nghi Son refinery plant

EPZ projects in Nghi Son has the ability to process approximately 200,000 BPD of crude oil from Kuwait and plans to be structured by the petrochemical equipment.

Processed products are a range of products such as LPG, RON 95, and RON 98, Jet A1, priume Diesel, Regular Diese, heavy oil and sulfur. There are also petrochemical products such as benzene, polypropylene, p-xylene. To produce this product needs a lot of equipment is shown in Figure 2-13

Petroleum equipment needed BTX distributaries, separation filter, CCR equipment, and osmosis separation proxylene. Ethylene equipment using Propylene is made from RFCC devices of the Hi-conversion type, providing raw material for polypropylene equipment. These devices will create the link between oil and refined oil, compared with Dung Quat export processing zones, the scale will be bigger.

Chart 2-13 Configuration of system of petrochemical equipments



(Source:by International UNICO Corporation)

To operate this facilities System requires a lot of technical manpower, specifically, the human resources belonging to the chemical, mechanical systems, electrical systems. Furthermore, the human resources needed are qualified engineers, qualified technicians, and qualified workers. In particular, key personnel are engineers, the training and providing human resources is an important issue. From the export processing zones using a lot of toxic chemicals or the need to explain the system of modern machinery, to do so must be fully documented basic practices, methods or practices constituting of curriculum, level and content of practical training through the link closely with business is crucial.

In this chapter we estimate the number of employees needed to operate effectively and safety systems and equipment, to clarify issues in order to implement a particular way.

2.3.3 Nghi Son Cement

In Nghi Son economic zone there is a heavy industrial plant-Nghi Son cement plant had gone into operation. Please be summarized a number of issues based on what has been heard on the situation of labor in this factory.

Nghi Son Cement Company began operations in 1995, is a joint venture with Japan's capital 65% and 35% of Vietnam's capital. There are two investment units are: NM Cement Company (joint venture between Pacific Cement and Mitsubishi Material Corporation) and Cement Corporation of Vietnam. The

plant began operation in July 2000, so have been running for 12 years. In 2011, another factory was built, production increased from 2.15 million tonnes in 2011 up to 4.3 million tons. Currently, the number of employees is 600 people, including 485 people working in Nghi Son plant. The number of Japanese staff person assigned as 7, up 3 short-term employees working for the factories to build more. As the Factory is located in remote areas should have the dormitories for staff. The collective model is becoming the basis of welfare and is favored by the local people who ever got stuck on housing issues. Among the employees of the Company, regarding the General Administration Sector (Engineers, who have university, Master degrees), initially many of them came from other places outside the province of Thanh Hoa and they were recruited by the Vietnam Cement Corporation. However, at the halfway up, there is the staff of the Corporation dropped out or come back to the head quarter making the Thanh Hoa staff origine gradually increased. Employees work at the factory construction site (graduates of vocational training schools, graduated from upper secondary school), the majority from the beginning was from the Thanh Hoa and Nghe An-the province nearby. Currently, the non-Thanh Hoa staff is less than 50 people, and account for less than 10%. From this trend can be seen to consider employment conditions Employment is not just the elite but also should be from local Human Resources. The Thanh Hoa people also tend to focus on job choices in Thanh Hoa province than in the far from home. In Vietnam, the local mind set is very strong; we can say that Thanh Hoa is a world. In Thanh Hoa province just a few workers change jobs in the province, is basically all that local spirit. Those who quit are mostly not come from Thanh Hoa. As a result, most new employees recruited for a newly established plant are from Thanh Hoa, the company preferential employment of new personnel is the Thanh Hoa. Most Company employees married well with people in the province, and in the cement industry in Vietnam, almost no move to work in other provinces. According to traditional thinking of the State Enterprise of Vietnam, who university graduated are more likely to be higher, but a vocational upper college graduate (in Japan is the Technical Upper College) is the only technician, this divided clear boundaries. University graduates often do not do the work of technicians (hereinafter called the Technical Upper College). The period when the plant first went into operation, the Company complied with the regime of the Cement Corporation of Vietnam: the operation of central control room assigned to graduates of the University, while the lower operating by the Technical College graduates. However, a university graduate is becoming a managing staff; wages are also higher, so now the company is gradually replaced by graduates from Technical Upper College. Test results replaced by the Technical College graduates showed virtually no change in quality operation. It can be seen that without purpose of promoting the diversification of the operation team early it is sure to come a time of more competition. The small number of well trained personnel and appropriate department and gradually limit fixed costs is necessary for enterprises. At the Nghi Son Cement Company, the staff who are not graduates, including professional upper college graduates or vocational upper college shall also be treated the same. It is also known as education and training content diffent in different programs, but it can still be said that the fundamental forces of both 2 Studies 2groups of Human Resources is the same, and the level is not much different. But the Japanese do understand that there is a

clear difference in the level of University and College Graduation.

2.4 Demand and Supply of human resources for heavy industry and petrochemical industry in the province of Thanh Hoa

In this chapter will first conduct the forecast in view of the survey team on human resource requirements of the factories of heavy industry and Chemistry at Nghi Son economic zone such as: cement plant, power Plant, oil refinery, and food safety, clean water factory, iron manufacturing plants, etc... In next paragraph will present predictions of Thanh Hoa Department of Planning and Investment on labor demand, supply manpower for the entire province of Thanh Hoa and Nghi Son economic zone. Labor demand of Nghi Son economic zone

2.4.1 Labor demand of Nghi Son economic zone

Oil and Gas Facility is the center of Nghi Son economic zone, but it is planned to build the factories and other Thermal Power Plants. The project, including the establishment related to oil and gas can be evaluated as follows:

(1) Cong Thanh Cement Plant (5 million tons / year)

(2) Thermal Power Plant No. 1 (600 MW)

(3) Thermal Power Plant Cong Thanh (300 MW)

(4) The Nghi Son oil refinery (200,000 BPD)

(5) Water supply Plant for the Nghi Son Economic Zone (90,000 m3/day)

(6) Steel rolling plant in Nghi Son (750,000 tons of billet / year + 500,000 tons of rolled steel / year)

In this survey report on the concrete projects namely: Cement (Project (1). Thermal Power Plant (Project (2) and (3)), the petrochemical refinery complex (project (4)). About the Plans not clear yet it is estimates based on the following assumptions:

(1) Engineers at the level of 10% of staff needed.

(2) Outsourced support unit with structure 50% are technicians, 50% are key technicians.

(3) Calculation of the number of employees is estimated based on the information and data collected, plus comparison with the situation of the domestic enterprises.

Table 2-16 shows the results estimated the number of staff for Heavy Industry Petrochemical Industry in Nghi Son economic zone based on these assumptions. The numbers shown in the table are estimated from information heard from enterprises to invest in the economic zone.

Table 2-16 Number of personnel needed for the enterprises of the project objectives

(Unit: person)

Name of Projects	Capacity	Unit	Human Resource for Main Companies		
			Engineer	Technician	Total
① Cong Thanh cement plant	5,000,000	t/y	50	450	500
② Thermal power plant No.1	600	MW	30	270	300
③ Cong Thanh thermal power plant	300	MW	30	270	300
④ Nghi Son refinery petrochemical complex	200,000	BPD	100	900	1000
Total			210	1890	2100

(Source: International Unico Co. created based on materials of the Nghi Son economic zone)

Personnel working in enterprises related to oil and gas are not all the official staff of the enterprise, but there are also many units of professional support (Support Company). The support of the specialized units is essential and indispensable. As Table 2-17, the personnel of support Unit is half technician, half key technicians. Because this structure rate will vary depending on each purpose it should be recruited according to the average.

Regarding the Cement Production and Thermal Power Plants, as they do not need a lot of professional HR as in the Petroleum sector, one should assume technician ratio at 20%.

Table 2-17 Number of personnel required for the professional support unit of the objective project

(Unit: person)

Name of Projects	Capacity	Unit	Human Resource for Support Companies		
			Technician	Trades	Total
① Nghi Son cement plant	4,300,000	t/y	100	100	200
② Cong Thanh cement plant	5,000,000	t/y	100	100	200
③ Thermal power plant No.1	600	MW	50	50	100
④ Cong Thanh thermal power plant	300	MW	50	50	100
⑤ Nghi Son refinery petrochemical complex	200,000	BPD	1000	1000	2000
Total			1300	1300	2600

(Source: *Unico International Corporation set up*)

Based on these results one can survey technician training, the training must follow the rules and regulations most standardized. Consider hiring engineer midway or foreign engineers it is difficult or proper complying with rules and regulations, so in this survey would be omitted. In addition, the level of workers can be easily recruited.

From illustrateded Table 2-16 and 2-17 it show clearly the needed number of technicians. Please be discussed from the total numbers and the ability to build on the supply side of personnel. Here's the premise set out for petrochemical equipment items, considered as the items personnel needed most.

(1) Ensure personnel when construction start and Key personnel for training at 30% level, and brought to Japan for training.

(2) Ensure that the operating personnel fluent in both domestic and overseas to operate the first period after completion of construction, operation and conduct training.

(3) Normal recruitment within ability so that labor can be rubbed from the construction period (with the staff already recruited).

Table 2-18 Number of Technician personnel for the needed objects project

Name of Projects	Capacity	Unit	Human Resource of Technician		
			Main Companies	Support Companies	Total
① Nghi Son cement plant	4,300,000	t/y	450	100	550
② Cong Thanh cement plant	5,000,000	t/y	450	100	550
③ Thermal power plant No.1	600	MW	270	50	320
④ Cong Thanh thermal power plant	300	MW	270	50	320
⑤ Nghi Son refinery petrochemical complex	200,000	BPD	900	1000	1900
Total			2340	1300	3640

(Source: Unico International JSC)

Number of employees as Table 2-18 above, take this number compare with construction period, assumed in Table 2-19 and then estimate the number of staff recruited each year as shown in Table 2-20.

In general, the petrochemical plant is the central stage. The power plants had been completed before petrochemical plant. The cement plant is basically following petrochemical plant. The figures in the illustrated table show the personnel continueing to be recruited for the first phase based on the assumption that 10% of staff has left the job. This job leaving problem has not been reviewed in the HR Planning before going into formal operation. Figure 2-14 describes the movement.

Table 2-19 The construction Plan of Nghi Son Industrial Zone

Name of Projects	Capacity	Unit	Construction					
			2012	2013	2014	2015	2016	2017
① Nghi Son cement plant	4,300,000	t/y						
② Cong Thanh cement plant	5,000,000	t/y						
③ Thermal power plant No.1	600	MW						
④ Cong Thanh thermal power plant	300	MW						
⑤ Nghi Son refinery petrochemical complex	200,000	BPD						

Project → Operation →

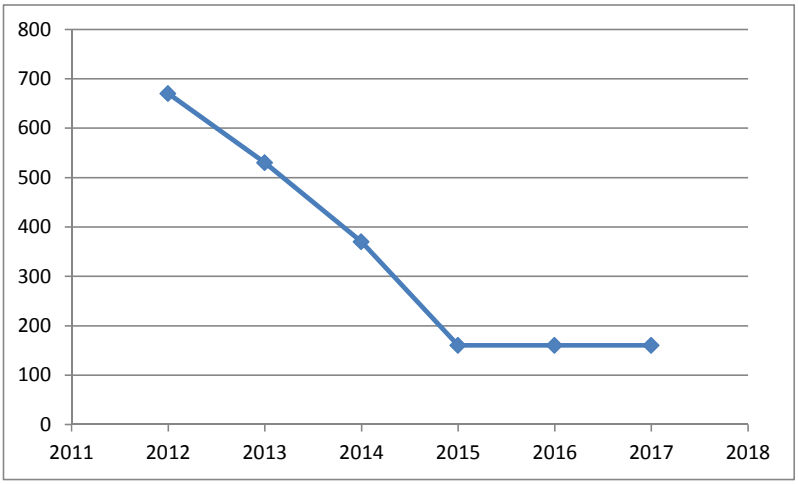
(Source: Unico International JSC)

Table 2-20 The HR Planning of Nghi Son Industrial Zone

Name of Projects	Capacity	Unit	2012	2013	2014	2015	2016	2017	Total
① Nghi Son cement plant	4,300,000	t/y	70	30					100
② Cong Thanh cement plant	5,000,000	t/y			70	30			100
③ Thermal power plant No.1	600	MW	50						50
④ Cong Thanh thermal power plant	300	MW	50						50
⑤ Nghi Son refinery petrochemical complex	200,000	BPD	500	500	300				1300
Total			670	530	370	30	(160)	(160)	1600

(Source: Unico International JSC)

Figure 2-14 Number of employees needed for the Nghi Son Economic Zone



(Source: Unico International JSC)

From the above results it can be clearly seen the staff training scale for heavy industry and petrochemical industry at technician level in the area of Thanh Hoa. The change index may be more or less depending

on the fluctuation of the year as planned, however it can be said that the necessary number will not change. Among the indicators of this essential staff should consider the field of Chemical, Mechanical and Electrical which are the professional fields and in this report does not discuss the details of each field.

Regarding the operation of machinery and equipment is very necessary the operators are able to judge, so the number of staff here are just numbers and not merely synonymous with operation aspect. This means that when recruiting for the first period is not necessary to recruit sufficient number of staff. In contrast, in the construction phase and operation phase shall be very busy with many things; it will not be much time for training.

The actual training of personnel on a planning perspective from the point of training is extremely important. The training of personnel for a large construction phase of the PJ or early commissioning of machinery and equipment will be limited both in time and quality, so can not confirm that the training is effective. In particular, to ensure the Human Resources is the main force in training establishments such as University of Education, etc... One should organize education programs more practical.

In the estimated table it is mostly for grouping of staff needed. Training efficientcy in reality is discussed in another chapter. In this Chapter referred to Human Resources issues are based on the reviews of training issues and problem of Personnel graduating from the education and training establishments.

In Figure 2-10 it shows the results of estimated number of employees needed to operate the project in Petrochemical and Heavy Industry in Nghi Son Industrial Zone with the peak period required at most 600 people. However, one can understand that if the restrictions under this plan can be recruited after a few years. However, as stated in the first chapter, the new plan will be added to the graph showing the change, so may have noticed several trends appear in the same form.

The contents of survey and analysis perfomed above show the demand with the largest number in the sense that HR is a fresh graduate. In fact, many employers conduct recruit the mid-way personnel about 20-30% . This is considered the additional personnel to compensate the shortage or lack of effective skills, especially in the new period of new employment.

If we consider the recruitment of mid-way it would be a little relaxed during peak stress of students graduate period, and it is understood that some employees to be recruited are actually most at 500-600 person / year.

2.4.2 Manpower supply situation in the province of Thanh Hoa and future forecast

In the previous chapter mainly refers to the necessary staff (the key), in this Chapter also surveys the posibilities to provide the labor matching the critical needs. Hardest issue is the providing technicians, so our focus should be put on this point survey to creat a general equilibrium. The survey was conducted basing on the premise of recruitment rate at the technician level as well as to the benefit of local

recruitment. Regarding the quality of technician at engineer level, they may recruit outstanding personnel from throughout Vietnam without area limitation and do not need to be explored to provide Human Ability in this reaspect.

According to the Management Board of Nghi Son Heavy Industry and Petrochemical, the number of Graduates from the School at Nghi Son area and the surrounding area is as in the following diagram.

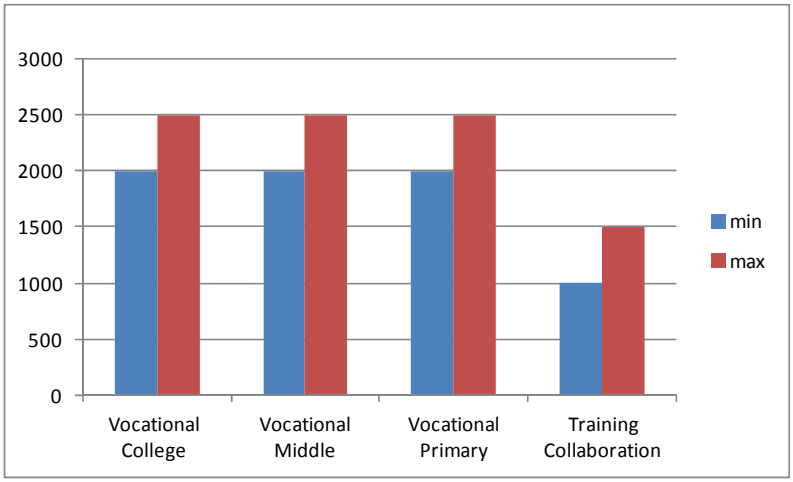


Chart 2-15The availability of human resources for the Nghi Son Economic Zone

(Source: The Management Board of Nghi Son economic zone, 2007)

Chart 2-15 showing number of graduates from vocational upper colleges (equivalent to short-term University, Upper Colleges) and the schools. Through this chart one can handle the number of executive-level personnel for the key manager. From this result can be seen the Ability to provide personnel necessary for the Nghi Son PJ Graduates is 6000-7500. Personnel in the heavy industry and petrochemical industry sector are the technical side (Chemical, Mechanical, Electrical and Management). However, one can not say that all graduates are able to meet entry requirements use, but if you see numbers in terms of demand made in the previous chapter, you can say that there is sufficient capacity to provide personnel.

2.4.3 Statistics on the supply of human resources of the Bureau of Statistics Data Thanh Hoa province

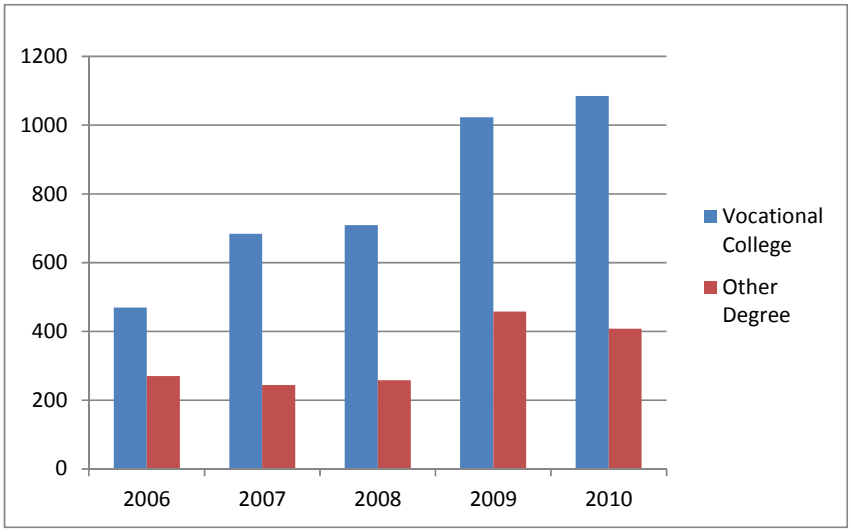
The data is described in the above section are provided by the investment promotion body (Nghi Son PJ), in addition also need verification from the Statistical data of Thanh Hoa. Thanh Hoa Statistical Office has released the "Statistical Yearbook (2010)". Here would be discussed based on the statistical materials.

In the Statistical Yearbook of Thanh Hoa Statistical Office Statistics were given Number of Graduates of the Education and TrainingEstablishments. However, these figures are the total numbers but no detailed figures for Technical Sectors and Office Sectors.

Chart 2-16 showing number of graduates of vocational training schools (short-term University),

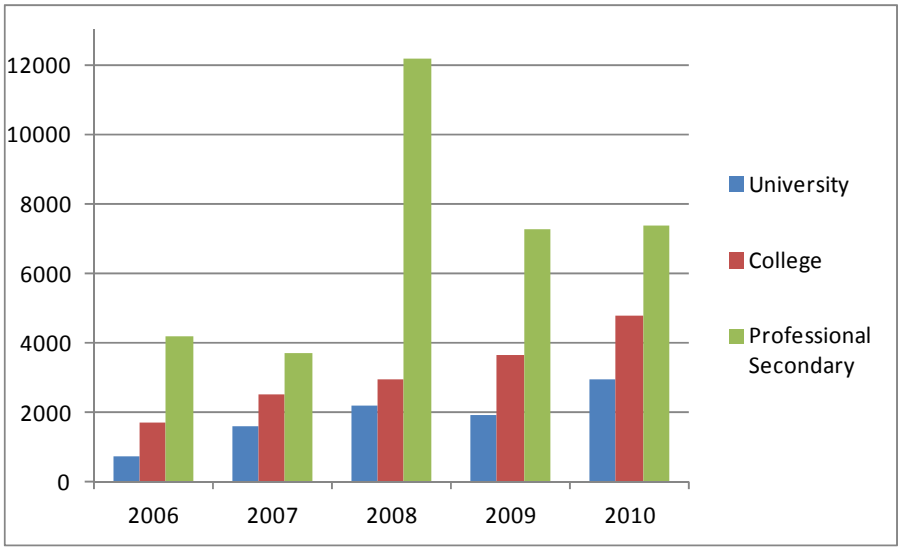
Chart 2-17 is the University, Upper colleges, Lower colleges, and professional secondary training schools,

Chart 2-16 The availability of human resources provided by Vocational training schools in the province of Thanh Hoa



(Source: Thanh Hoa Statistical Office, 2011)

Chart 2-17 The availability of the manpower Training systems in Thanh Hoa Province



(Source: Thanh Hoa Statistical Office, 2011)

Particularly, the Professional Upper Colleges System in 2008 is at an extremely high level, even excluding this section in all the column headings of Table above, the rightmost column are also higher. It was found that the training activities be done in a planned way. The following survey can be analyzed

based on the premise that major attention put to the most recent year.

If merely sum on the results from Charts 2-16 to 2-17 the number of graduates the University short term level is 8,000. In terms of ratio Technical Sector and upgraded Vocational Training establishments, one can see that the figure indicated by Nghi Son PJ is satisfactory.

However, the numbers used in this Section does not consider the quality of HR, but merely to address balance issues with the number of personnel. For operating oil refinery personnel will need to be both theoretical knowledge and experience on the equipment, just to know with certainty judgment in any situation. Regarding the quality of personnel it should be discussed later after collecting information from many sides.

2.5 Status of Education and Training in Thanh Hoa province

2.5.1 Primary Education, Secondary (Lower Secondary and Upper Secondary Education)

As described in Table 2-18, the number of primary school, secondary schools in Thanh Hoa province from 2006 to 2010 in a state of relative stability. There are around 730 primary schools, 650 lower secondary schools, around 100 in upper secondary schools (general system).

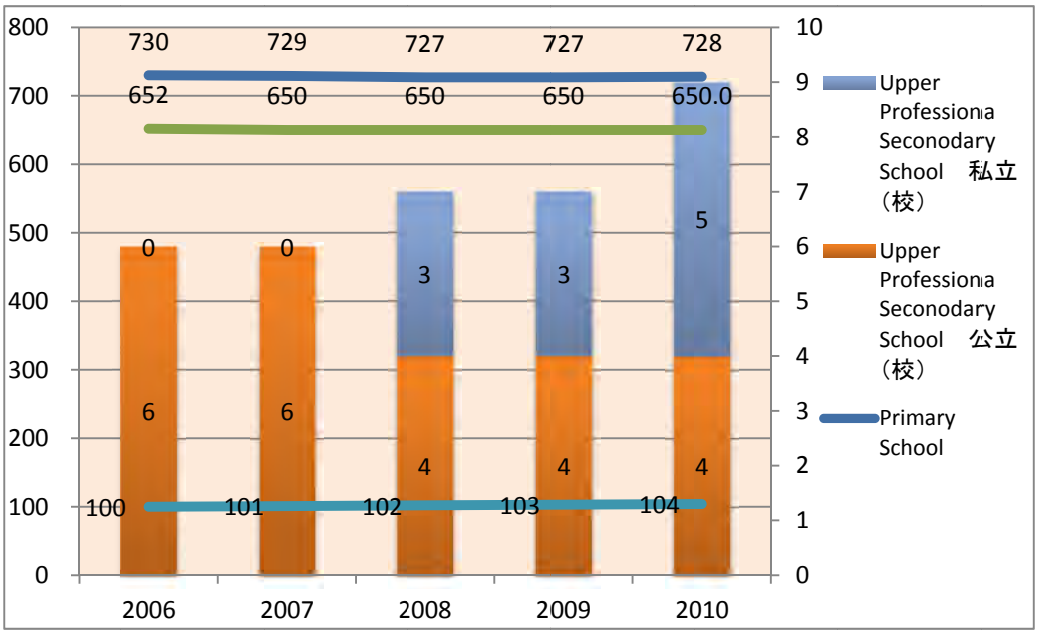


Chart 2-18 The number of Primary schools, Secondary schools (general system) in Thanh Hoa Province (2006-2010)

(Source: Thanh Hoa Statistical Office, 2011)

The attendance rate of Primary Education, Lower Secondary Education in Thanh Hoa Province is higher

than the average of the country. There are disparities regarding the Economic and Social as well as attendance rate between Mountain and remote areas with the plains areas.

According to the chart 2-19, one can find on the whole, the numbers of students have actually declined [13]in all primary school, lower secondary education, upper secondary education (general system), and professional lower colleges. Particularly upper secondary education in 2010 present other tendancy students in public schools increased dramatically from 100,000 in the previous year to 130,000 students, the general system of private schools present a sharp decrease from 43,000 to 5,000 students. The reason is because all the establishments that previously were semi-public schools (Semi-Public: are private schools, but was partly supported by the government) have turned into public schools.

At the professional lower colleges from the public school in the steady state from 11,000 to 13,000 students, while volume of students increased considerably in private school up from 700 the previous year to 3,700 students in 2010 (up 79%).

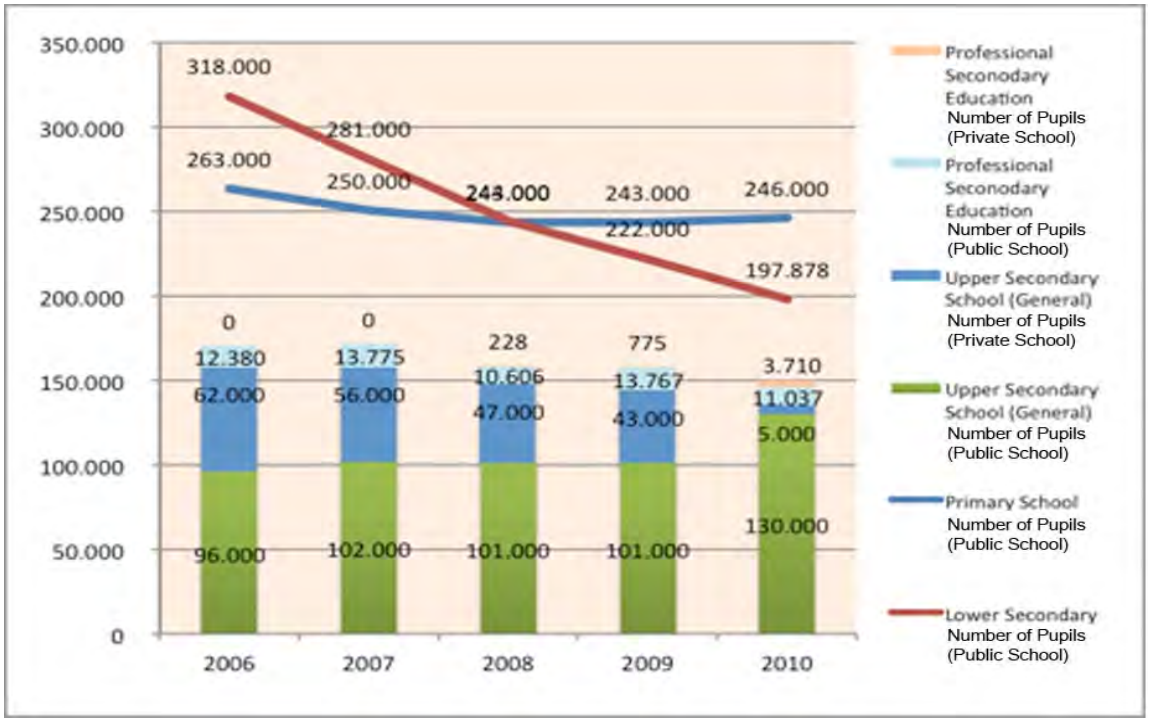


Chart 2-19 Numbers of Students in Primary and Secondary education in Thanh Hoa Province (2006-2010)

Note: In 2010 there were 6 private primary schools; this content is not shown in the diagram.

(Source: Statistical Office of Thanh Hoa, 2011)

[13] We asked DOET about the reason for the sharp decrease in the number of Lower secondary students and it has been answered that it is due to the birth control policy of the Government from around 1987. But the reason of less primary pupils is unclear

2.5.2 Higher Education (Lower college, upper college, university or above)

Table 2-21 is the list of Lower College, Upper College Schools, University directly under the MOET, DOET of Thanh Hoa. As of February 2012, there are 3 public universities, 34 public colleges. In public schools with state school centrally (MOET) and the schools established under DOET province of Thanh Hoa province. In Thanh Hoa there were no universities, private upper colleges.

The Sam Son preparation to University school is the public one preparing for students after high school they took entrance exam to the University, subject students are ethnic minorities in mountainous areas. There are 12 lower College Schools. The normal professional lower colleges is the training programs of 2 years usually, enrolled students from 18 years old, it is also possible that the training system for 3 years and enrolled students from 15 years of age. In the Upper College schools also has Lower college system (2 types). Most of the 12 schools mentioned above have the lower college level. As a rule, in the University there is no lower college level. However, the HUI-TH is the exception, equipped with this system.

In addition, there are 96 vocational training schools, including lower vocational college system[14]., vocational training centers under MoLISA, DOLISA. The higher education systems of Thanh Hoa are with 193 occupations. Because there is no limit on the number of entries in the University, so there are plenty of private universities (Preparatory to University School types).

Table 2-21 List of universities in Thanh Hoa province (as of 2011)

	NO.	University, College Name (English)	Name (Vietnamese)	Pulic/ Private
1	Univ. 1	Hong Duc University	DH Hong Duc	Public-TH
2	Univ. 2	University of Tourism, Culture & Sport	DH Van Hoa TT&DL	Public-TH
3	Univ. 3	Ho Chi Minh City University of Industry (HUI)	DH Cong nghiep	Public-Gov.
4	Prep.Univ. *1	Samson University preparation courses	Trường Dự bị DH dân tộc	Public-Gov.
5	U. College 1	Health Upper College	CD Y Te	Public-TH
6	U. College 2	Sport Upper College	CD The duc The thao	Public-TH
7	U. College 3	Natural resource & Environment Upper College	CD Tai nguyen Moi truong MT	Public-Gov.
8	L. College 1	Fishery Lower College	Trung cap Thuy san	Public-TH
9	L. College 2	Political Province college	Chinh tri tinh	Public-TH
10	L. College 3	Trade Lower College Central No. 5	Trung cap Thuong mai TW5	Public-Gov.
11	L. College 4	Thanh Hoa Construction Lower College	Trung cap Xay dung	Public-Gov.
12	L. College 5	Duc Thien Lower College	Trung cap Duc Thien	Private
13	L. College 6	Hop Luc Medecine-Pharmaceutical Lower College	Trung cap Y duoc Hop luc	Private
14	L. College 7	Van Hien Medecine-Pharmaceutical Lower College	Trung cap Y duoc Van Hien	Private
15	L. College 8	Tue Tinh Lower College	Trung cap Tue Tinh	Private
16	L. College 9	Agricultural -Forestry Lower College	Trung cap Nong lam	Private
17	L. College 10	VISTCO Lower College	Trung cap VISTCO	Private
18	L. College 11	Bach nghe Lower College	Trung cap Bach Nghe	Private
19	L. College 12	An Nhat Vinh Lower College*2	Trung cap An Nhat Vinh	Private

Note: Public-TH: Public school founded by Thanh Hoa province. Public-Gov: state school. Private: College

14 According to national statistics, the name translated into English as a Professional Secondary School, but the correct name is the Professional Lower college(include the training system from 15 years to 18 years)

Source: Data received directly from DPI, DOET *Thanh Hoa*

As Table 2-20, according to 2010 data, in the university system in Thanh Hoa province there are 8.341 students from first year (Full time) and 8.690 part time students, a total of 17.031 students.

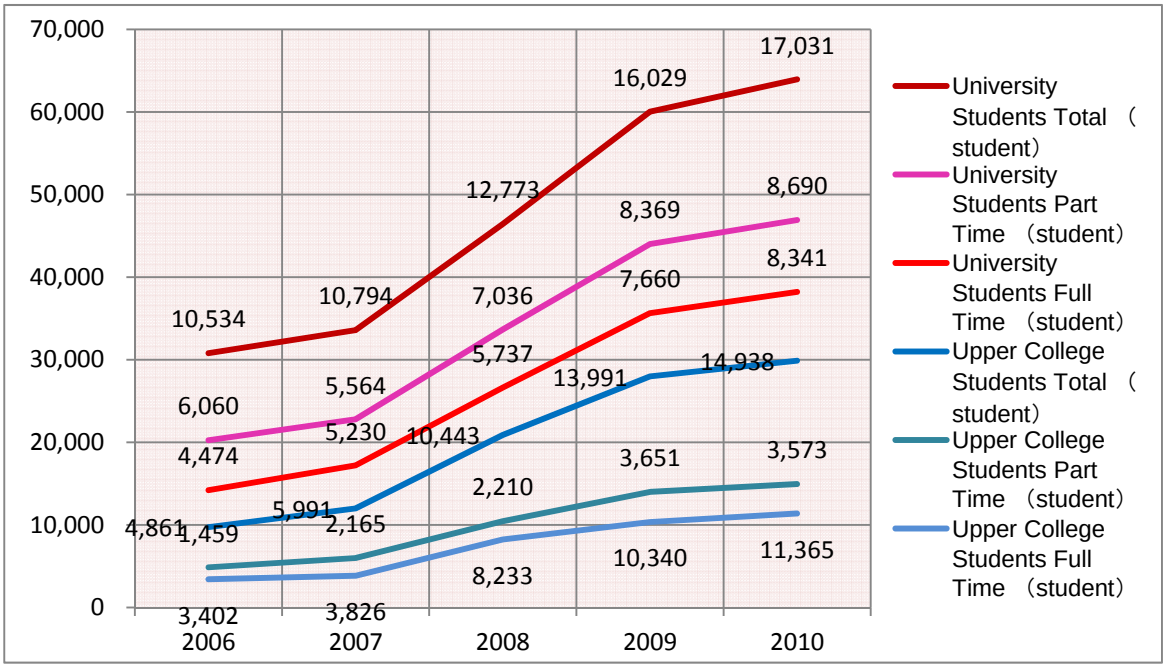


Chart 2-20: Number of students (Full time, Part time) in the Universities and Upper Colleges in Thanh Hoa Province

Note: At the University, including *the number of students belonging Upper College*, lower college and Transitional courses

(Source: *Thanh Hoa Statistical Office*, *2011*)

2.6 Planning of Human Resource Development (HRD - Human Resource Development) in Thanh Hoa province

In "Planning Human Resource Development (HRD) in Thanh Hoa province 2011-2020" (Department of Planning and Investment (DPI) in Thanh Hoa province, 2011) launched by DPI Thanh Hoa in 10/2011, mentioned the situation of the Education and Training based on the plan of Development of Industries in Thanh Hoa province and make plans to 2020[15]... This is the first HRD plan in Thanh Hoa province and considered as very high landmark.

Major contents of this Plan is based on the transformation of economic growth in various sectors in the

15 It is expected to conduct a survey every 2 years.

province so far to set out three scenarios and forecasts of an increase in labor population in each sector along with increases in population over the labor having been some Education and Training. At the same time it raises the urgency to improve the quality or expanding of the Education and Training establishments. The budget allocation is also discussed. On the other hand, in an objectivity view, it also outlines the strengths and weaknesses of Thanh Hoa.

According to the plan of Thanh Hoa province, as Table 2-22, the working population of the province in 2020 was 2,261,000 people, the demand is 2,260,000 people, hence supply and demand balance each other. In May, an estimated demand of construction and industry sector is 893,000 people, including industry demand in the Nghi Son economic zone is 160,000 and demand for oil, petrochemical complex is 8,000 people. On the supply side, the human resources training needs to be in accordance with demand. The following section presents specific content.

Table 2-22: Planning on demand and supply of personnel in Thanh Hoa province
(Unit: thousand persons)

Description			2011	2015	2020
Population			3427	3512	3601
Workforce Supply			2128	2175	2261
Demand	Province		2090	2162	2260
	Construction industry		524	692	893
	Nghi son	Industry	25	85	160
		Chemical	0	4	8

(Source: *Adapted from personnel training plan Thanh Hoa Department of Planning* and Investment)

2.6.1 The "strength" and "weakness" related to human resources (HR) in Thanh Hoa province

In this plan it pointed out the "strong points" of Thanh Hoa is the high rate of economic growth and local governments also pay attention to human resource development, particularly the need for high-quality Human resources commensurate with Nghi Son Industrial Zone and other economic zones.
"Weakness" and the cause of it are raised as follows: - The investment environment is not fully extended.

- Employment, Wages and life in general are not stable. There are many people leaving the province to live. According to Census in 2009, population relocation ranks third nationally (71.5%).

- Number of persons engaged in agriculture and forestry is 55% higher than the national average is 51%.
- The quality of the laborers did not meet the requirements of the business. Lack of technicians.
- The Education establishments, Vocational schools do not meet the demand. So that can not establish the training system for new professions.
- The level of teachers, education and training is still low
- The management of local government related to HR is still weak. Laws and regulations are unreasonable. Not enough information or data on job and labor market.
- Supply and demand of labor resources is not balanced, supply is greater than demand.
- Budget from the central is not enough, scale well as the quality of education establishments, vocational schools do not fit the need. Training programs and methodologies meet the needs but can not be converted into new ones. Therefore, there are no the links between occupations and education level. As a result there is no coherence between the employer and who are employed.

2.6.2 Sector Trends and Forecast, Plan for future

Table 2-20 shows the variation of per capita income GDP in fields over the past 10 years (The years 2001, 2005, and 2010) and ratio of specific sectors in the year. Percentage of Agriculture Forestry sector is decreasing every year (in 2001 of 38.5%, 24.1% in 2010), while the ratio of the Construction, Industry and is rising (in 2001 is 27.9%, 41.5% in 2010). In particular, the rate of processing industry has also increased to 22.8%.

On the other hand, the rates of working population in the industries are changing quickly, especially in the last 5 years (2005-2010). The data after 2011 are the forecasts of working population changes. It is estimated that in 2020 the population working in the Agriculture and Forestry will decline to 30.4%, the construction industry and is increased to 39.5%, the service sector will rise to 30,1%.

Table 2-23 Income per capita GDP by sector, the working population (2001, 2005, and 2010) in Thanh Hoa Province and detailed rates in each year

	2001		2005		2010		2011		2015		2020	
	GDP		GDP		GDP		GDP		GDP		GDP	
	amount	%	amount	%	amount	%	amount	%	amount	%	amount	%
Agriculture, Forestry, Aqua culture	4,116.0	**38.5**	6,052.0	**32.3**	12,404.9	**24.1**	-	-	-	-	-	-
Industry & Construction	2,986.0	**27.9**	6,484.0	**34.6**	21,302.6	**41.5**	-	-	-	-	-	-
Mining Industry	85.1	0.8	132.0	0.7	298.7	0.6	-	-	-	-	-	-
Self Explotion	18.6	0.2	21.7	0.1	24.6	0.0	-	-	-	-	-	-
Processing Industry	1,850.4	17.3	3,944.0	21.0	11,701.8	22.8	-	-	-	-	-	-
Electricity, Water, Gas Fabo	83.7	0.8	161.0	0.9	427.7	0.8	-	-	-	-	-	-
Construction	966.8	9.0	2,247.0	12.0	8,874.4	17.3	-	-	-	-	-	-
Services	3,597.4	**33.6**	6,209.0	**33.1**	17,685.4	**34.4**	-	-	-	-	-	-
Total	10,699.4	100.0	18,745.0	100.0	51,392.9	100.0	-	-	-	-	-	-

	2001		2005		2010		2011		2015		2020	
	Labour		Labour		Labour		Labour		Labour		Labour	
	Person	%	Person	%	Person	%	Person	%	Person	%	Person	%
Agriculture, Forestry, Aqua culture	1,267,050	**74.3**	1,378,560	**73.7**	1,138,510	**55.0**	1,086,800	**52.0**	864,800	**40.0**	687,000	**30.4**
Industry & Construction	190,920	**11.2**	215,000	**11.5**	476,101	**23.0**	522,500	**25.0**	691,800	**32.0**	892,700	**39.5**
Mining Industry	23,412	1.4	12,849	0.7	31,722	1.5	-	-	-	-	-	-
Self Explotion	7,512	0.4	7,188	0.4	5,491	0.3	-	-	-	-	-	-
Processing Industry	1,116,578	65.5	122,106	6.5	256,318	12.4	-	-	-	-	-	-
Electricity, Water, Gas Fabo	3,423	0.2	4,572	0.2	10,330	0.5	-	-	-	-	-	-
Construction	47,507	2.8	75,473	4.0	177,731	8.6	-	-	-	-	-	-
Services	246,660	**14.5**	276,060	**14.8**	455,389	**22.0**	480,700	**23.0**	605,400	**28.0**	680,300	**30.1**
Total	1,704,630	100.0	1,869,620	100.0	2,070,000	100.0	2,090,000	100.0	2,162,000	100.0	2,260,000	**100.0**

(Source: DPI Thanh Hoa, 2011)

In this Plan it was set out three scenarios from the estimated population growth rate as follows:

- Scenario 1: annual average population growth rate of 0.55% in 2011-2015, 2016-2020 is 0.40%.
- Scenario 2: annual average Population growth rate of 2011-2015 is 0.61%, 0.50% 2016-2020.
- Scenario 3: annual average population growth rate of 0.65% in 2011-2015, the period 2016-2020 is 0.65%.

Population growth rate of Scenario 2 uses the average value. By considering the labor force over 15 years should increase the labor force in each scenario by adding a working population of that age would be calculated as Table 2-24 below.

Table 2-24 Planning Human Resource Development HRD, Thanh Hoa Province)
Estimated Population and Working Population of each scenario (2011, 2015, 2020) and estimated rate of increase of average years (2011-2015, 2016-2020)

		2011-2015	2016-2020	2011	2015	2020
		Projection: averate growth rate				
Senario 1	Population	0.55	0.40	3,424,000	3,502,000	3,572,000
	Labour	0.78	0.72	2,092,000	2,171,000	2,250,000
Senario 2	Population	0.61	0.50	3,427,000	3,512,000	3,601,000
	Labour	0.67	0.69	2,128,000	2,185,000	2,261,000
Senario 3	Population	0.65	0.65	3,429,000	3,519,000	3,635,000
	Labour	0.95	0.75	2,129,000	2,189,000	2,272,000

2.6.3 Future plans of Nghi Son economic zone and Nghi Son industrial zone

2.6.3.1 Planning

The future plan is to turn Nghi son into the Nghi Son economic zone, making it a development priority subjects to become the gateway's groundbreaking development in general and in particular Economic Development of the province. Regarding Capital for the entire economic sectors, increase the state budget for development[16].

It considers Nghi Son home to the lure of economic activity, focusing highly qualified labor. "Management Board of Nghi Son Industrial Zone" had established 5-Year Plan and Annual Plan to provide human resources based on the needs of Human Resources for the industries of the Nghi Son.

After the oil refinery plant was built it will lack of trained technicians at a high level, so that Thanh Hoa said that by 2020, building up the private Nghi Son University of Technology and Economics is necessary. This might just stop at making ideas; specific plan has not been established. They are planning on calling for investment capital of private enterprise and will be reflected in the future

2.6.3.2 The changes of Students Number of Education and Training Establishments, estimates and future plans.

Table 2-25 shows the variation of Students Number of Education and Training Establishments in Thanh Hoa province (2005, 2010). Overall, the number of students attending vocational training courses under the management of MOLISA outnumbers the Professional Education course under the management of MOET (about 1.5 times).

At the Professional Education course under the management of MOET, the number of University students

16 Thanh Hoa province's population in 2011, the urban areas is 367,500 people (10.8%), in addition to other locations including mountainous areas is 3,039,300 people (89.2%). In particular, socio-economic status of backward mountainous region.

(including Transitional system) and Upper College is the largest, accounting for about 54%. Also in vocational training system under the management of MOLISA is mainly Basic training course and short-term trainings within 3 months (2010 is 72%). The rate of students attending Vocational Upper colleges is 0% at the time of 2005 increased to 9.7% in 2010.

Table 2-25 Number of Students Education and Training Establishments of Thanh Hoa province (2005, 2010)

		2005		2010	
Professional (Under MOET)	University and Upper Professional College	35,527	53.4	62,802	54.1
	Upper College	15,642	23.5	26,892	23.2
	Lower College	15,375	23.1	26,435	22.8
	Total	**66,544**	100.0	**116,129**	100.0
Vocational (Under MoLISA)	Upper Vocational College	0	0.0	5,517	9.7
	Lower Vocational College	7,000	16.6	10,100	17.8
	Basic Training & Trained Below 3 months	35,200	83.4	41,000	72.4
	Total	**42,200**	100.0	**56,617**	100.0
Grand Total		**108,744**	**38.6**	**172,746**	**61.4**

(Source: DPI Thanh Hoa, 2011)

2.6.4 Budget related to Human Resource Development

When looking at the changes of the education budget distribution for the training and education systems of Thanh Hoa, as Table 2-26, the budget distribution for professional system managed by MOET in each year more than budget distribution for the vocational training school managed by MOLISA, 3 times in 2010.

In Thanh Hoa province, thare was in 2006 a Public University, in 2009 increased to 2 schools, so one can see that the budget for the University in 2009 many times larger than the previous year. Looking at the Budget distribution rate in 2010, the Professional Sector is 75.3%, in which is 54.7% for the University.

Table 2-26 The budget for Education and Training of Thanh Hoa province (2006-2010)

(mill. VND)

	Year	2006	2007	2008	2009	2010		2010 School Number	in which private
		person	person	person	person	person	rate(%)	school	school
Professional System	University	37,342	85,255	94,992	199,015	234,041	54.7	2	
	Upper college	19,043	21,240	29,105	55,506	63,733	14.9	4	
	Lower college	28,600	24,705	26,774	20,074	24,635	5.8	12	7
	Total	84,985	131,200	150,821	274,595	322,409	75.3	18	
Vocational system	Upper college	3,054	6,345	7,337	10,329	12,891	3.0		
	Lower college	32,642	41,571	40,245	44,088	42,624	10.0		
	Basic training	15,717	15,776	13,504	13,344	50,133	11.7		
	Total	51,413	63,692	61,086	67,761	105,648	24.7	92	45
Grand Total		136,398	194,892	211,907	342,356	428,057	100.0		

(Source: DPI Thanh Hoa, 2011)

Budget related to Human Resource Development from 2011 to 2020 in Thanh Hoa province is allocated from the central, local government and from other places (private enterprise). As described in Table 2-27, in USD 576.5 billion expenditure from 2011 to 2015, apart for the strengthening of teachers at the school, the budget was used to improve quality.

Table 2-27 Budget Allocation related to Human Resource Development Thanh Hoa province (2011-2020)

(mill. VND)

		2011-2015	2016-2020	2011-2020
Budget Resource	Central	2,255,000	5,622,000	7,877,000
	Local	2,862,000	3,936,000	6,798,000
	Other	5,453,000	6,669,000	12,122,000
	Total	10,570,000	16,227,000	26,797,000
Investment Plan	for HR Development	5,765,000	7,827,000	13,592,000
	to Build the Facilities	4,805,000	8,400,000	13,205,000
	Total	10,570,000	16,227,000	26,797,000

(Source: DPI Thanh Hoa, 2011)

2.6.5 The HR target in Thanh Hoa Province

This Plan sets out the target divided by the period 2015 and 2020.

* *By 2015 period:*

- Striving to achieve 55% of employees trained, in which the number of employees that have passed vocational training is 43.4%.
- Reduce the number of employees in the Agriculture and Fisheries production from 55% in 2010 to 40%. Increase the number of employees in the construction, industry and from 45% to 60%.
- 100% of employees having the education and training needed in accordance with Economic and Social Development demand.
- So, 50% of the faculty at the University with a bachelor degree, 35% are from Master or above, of which 10% are advanced training to get a PhD.
- Of every 10,000 people in the province there are 300 people educated, trained at the university or upper colleges, of which 45% from schools in the province.

* *By 2020 period:*

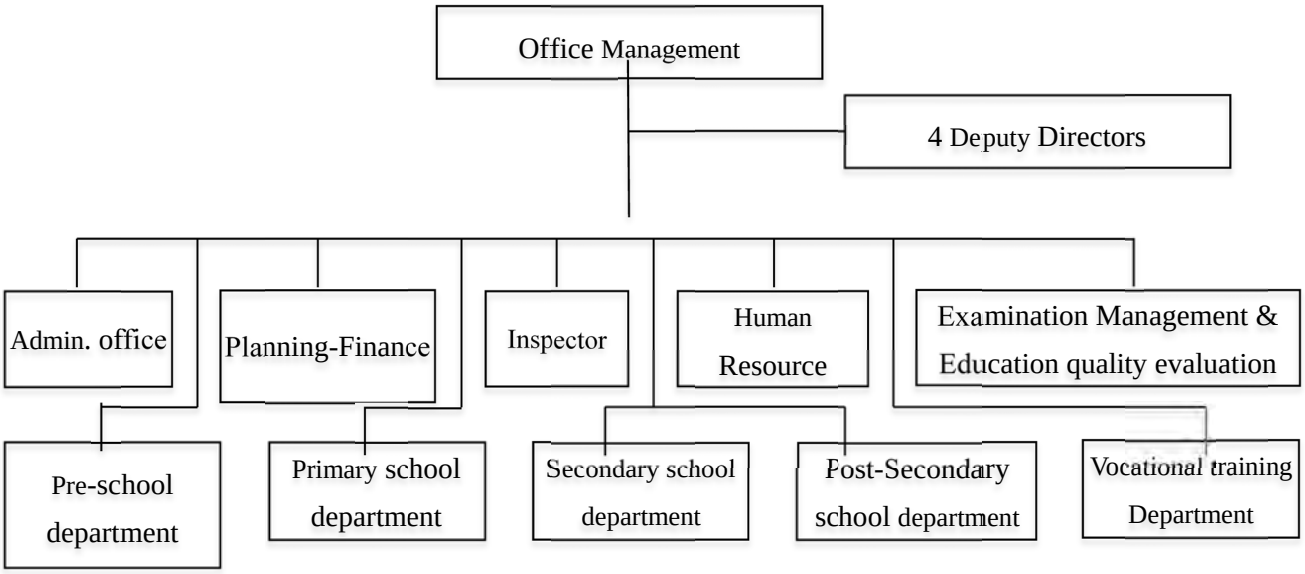
- Improve the quality of human resources commensurate with the world economy for 2,260,000-2,265,000 laborers.
- Striving to achieve 70% of employees trained, educated, of which 55% were vocational trained.

- Number of employees in the Agriculture and Forestry sector is 30.4%, in the construction, industry and is 69.6%.
- There are 10-12% of economic managers, entrepreneurs, professionals; scientists have been trained at a high level.
- 80% University faculty, 60% of upper college faculty have master degree or higher. 30% Teachers University and 20% Upper College Lecturers are PhD.
- For every 10,000 people in the province there are 400 people were trained at universities or upper colleges, from which 50% of schools in the province.

2.7 Department of Education and Training of Thanh Hoa (DOET)

As described in Table 2-21, in the Department of Education and Training of Thanh Hoa (DOET) there are 10 Departments under the Office Management Department, these departments are responsible for planning and monitoring of education activities of the province.

Figure 2-21 Organization chart of Thanh Hoa DOET



(Source: Self made after hearing the information from DOET Thanh Hoa)