

Human Resource Development of Vietnam Manufacturing Industry. Support from Japanese Organizations and Firms

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Abstract

Human resources development is an important goal for national sustainable development. Vietnam has a huge potential labor force and attracts significant foreign direct investment due to the comparative labor cost for manufacturing industry. However, Vietnam's workforce lacks skilled labor which can contribute to the human resource development of the country. This research presents the current situation of the vocational and training education of Vietnam and discusses how to upgrade the technical know-how for Vietnamese engineers through technical assistance from Japanese organizations and firms. This paper argues that the human resource development of Vietnam cannot boost the workforce's skills without considering cooperation with foreign organisations and firms (Japanese in this case). The paper also raises the issue of university-industry linkages which require comprehensive strategic cooperation between theory-based education and technical training, all of which contributes to the quality and adaptability of the labour force.

This is a qualitative study based on interviews with Japanese organizations, Japanese firms, Vietnamese vocational schools and academics in Thailand in terms of enhancing technical skills for human resources in the manufacturing industry.

Keywords: human resources development; technical transfer; manufacturing industry; Japanese firms

Abbreviations:

AEM-METI	:	The Third ASEAN Economic Ministers- Ministry for International Trade and Industry
AMEICC	:	AEM- METI Economic and Industrial Cooperation Committee
ASEAN	:	Association of Southeast Asian Nations
AOST	:	The Association for Overseas Technical Cooperation and Sustainable Partnerships
FDI	:	Foreign Direct Investment
HRD	:	Human Resources Development
JICA	:	Japan International Cooperation Agency
JETRO	:	Japan External Trade Organization
STI	:	Science, Technology and Innovation
VJCC	:	Vietnam – Japan Institute for Human Resources Development

1. Introduction

Obtaining a quality education is the foundation to creating sustainable development, as mentioned in Goal 4 of the Sustainable Development Goals of the United Nations. Human resources development is an important contribution for national growth. According to Anand, Sudhir and Amartya Sen, sustainable human development enables the people to lead long, healthy, educated and fulfilling lives (Anand, Sudhir, Amartya, 2000). For the long-term sustainable development goals, human resources are regarded as the main contribution to productivity and innovation for a country. This is especially relevant in developing countries where the economy is growing but technology is lagging. Human resource development is an important component to develop as well as maintain national growth and productivity.

Vietnam ranks as the 14th most populous country in the world and the 3rd in Southeast Asia. Vietnam's population reached over 95.5 million in 2017 (UN, 2017), among which 54.4 million are of working age as noted in the Ministry of Planning and Investment report in 2016. Nevertheless, the percentage of unskilled laborers who have not experienced any technical training in Vietnam is over 80 per cent of the total workforce (MPI, 2016). This potential source of labor is attracting many foreign direct investments to Vietnam. However, the disadvantage of Vietnamese labor is the shortage of technical skills. As reported in the Human Capital Outlook: Association of Southeast Asian Nations (ASEAN) 2016, only 10% of Vietnamese labor is skilled labor, 14% less

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than in Thailand and 25% less than in Malaysia. (World Economic Forum, 2016)

Currently, the Foreign Investment Agency, under the Ministry of Planning and Investment, has announced that the total foreign direct investment (FDI) registered in Vietnam in the first quarter of 2018 reached approximately US\$5.8 billion, equivalent to 75.2% of the same period in 2017*. Foreign manufacturing firms not only bring capital to Vietnam, but also the technical skills for the local employees. The labor force of Vietnam is thereby presented the opportunity to upgrade its know-how from foreign manufacturing firms. However, this is a challenge for Vietnamese labor, since it requires a bridging of the technical gap between the low skill level of local employees and the technological standards of foreign firms.

This research aims to illustrate the situation of the skilled workers in Vietnam's manufacturing industry. The research focuses on the relationship between skills obtained in the workplace and those obtained through higher education; more specifically, pinpointing the gaps in technical instructional quality of Vietnamese higher education in engineering, then gauging support from Japanese organizations and firms for engineering training systems in Vietnam. As such, the collaboration between vocational schools, universities, and Japanese firms will boost the technical skills and adaptability for the workforce through training and on-the-spot workshops.

2. Research methodology

This paper is the result of many in-depth interviews with Japanese organizations, such as Japan External Trade Organization (JETRO) Hanoi, JETRO Ho Chi Minh, JETRO Bangkok, AOST Osaka Office, JICA Bangkok, and Denso International Asia Bangkok. These interviews were conducted in order to get additional information not found in the previous literature.

3. Conceptual Framework

The relationship between human resource development and sustainable development

Eric Neumayer emphasizes that *"There is no real difference between human development and sustainable development"*. However, human development measured by the factors of the Human Development Index (HDI) can influence sustainable development weakly or strongly. Moreover, sustainability can be indicated by the level of human development or Human Development Index (Eric Neumayer, 2010)

According to the Sustainable Development Goals of the United Nations, Goal 17: Revitalize the global partnership for

sustainable development, *"the capacity building should enhance international support for implementing effecting and targeted capacity- building in developing countries to support national plans to implement all the sustainable development goals"*. The Sustainable Development Goals emphasize the partnerships between multiple stakeholders that mobilize, share and transfer knowledge and expertise to achieve the desired sustainable development goals. The country should encourage and build the network for all stakeholders (United Nations, 2016). Vietnam should enhance all international support, especially from foreign manufacturing firms on technical transfer, for its human resources development in the manufacturing industry.

University – industry linkages

There are many scholars that mentioned the importance of university–industry linkage, which is technology transfer from the firm to the university and vice versa (Atchibugi, D., and Filippetti, A., 2017) (Bercovit, J. and Fieldman, M, 2006) (Mowery, D. C., and Shane. S, 2002) (Thuesby, J., and Thursby, M., 2011). Universities that are of higher quality make greater academic contributions to industrial innovation (Mansfield, 1995). Perkmann discussed that the concept of "academic engagement", which consists of many activities such as collaborative research projects, is one that involves "person to person interaction" between industrial firms and universities (Perkmann, M., Tartavi, V., McKelvey, M., Autio, E., Brotrom, A., D'este, P., et al., 2013).

According to Jose Guimon 2013, Perkmann and Walsh 2007, there are three typologies of university-industry links from higher to lower intensity. (Guimon, 2013). The low intensity relationship between university-industry linkage includes informal interaction, scientific publications and commercializing of intellectual property together with activities such as conferences, meetings, social network. The medium relationship between university–industry consists of academic entrepreneurship and human resource training and transfer, which focuses on spin-off companies and training programs for students. A high relationship for university-industry linkage covers research partnerships, research services, and shared infrastructure. This is the most intensive relationship between university and firms, one which shares the technology, quality control, and collaborative R&D. In Vietnam, the university–industry linkages are typically of the low level relationship type, where the manufacturing transfers the technical information and skills for the students.

Literature review

The International Standard Classification of Occupations of skills levels

* <https://www.vir.com.vn/vietnam-may-reach-new-foreign-investment-record-in-2018-62159.html>

The International Standard Classification of Occupations defines four levels of skills (skill level 1 to skill level 4). Each skill level requires different technical skills, know-how and work experience. The employees at Skill Level 1 perform simple and routine physical or manual tasks which require the use of hand-held tools, or of electrical equipment. The requirement of skill level 1 is in basic literacy and numeracy. In order to complete the job standard of skill level 1, a short period of on-the-job training will be needed. The skill level 2 requires the technical skills from the worker who can operate machinery and electronic equipment, drive vehicles, undertake maintenance and repair of electrical and mechanical equipment. The occupations for skill level 2 require relatively advanced literacy and numeracy skills and good interpersonal and communication skills. In the case of skill level 2, the employee needs to complete secondary school as well as on-the-job training. Skill level 3 requires higher skills than skill levels 1 and 2. Skill level 3 includes the ability to understand complex written material, prepare factual reports; together with relevant work experience and prolonged on-the-job training. Skill level 4 requires skills of problem solving, decision-making, creativity and factual knowledge in a specialized field. (ILO, 2010)

The shortage of technical skills and soft skills of Vietnamese labor

According to the Labor Force Survey of the General Statistic Office of Viet Nam 2018, around 80% of the Vietnamese work force have not participated in any technical training. In the case of Japanese manufacturing firms, the companies organize workshops and on-the-spot training for all the new employees for around 3 months, and then they can undertake simple tasks in the factory with the supervision of Vietnamese team leaders. In this regard, from the skill level classification, 80- percent of the Vietnamese labor force falls into the categories of skill level 1 or 2 which are able to assemble and operate machines with the instruction.

Alan Montague discussed the shortage of vocational and capacity skills in Vietnam manufacturing and service sector. He defined that vocational skills were related to the formal higher education or vocational education and training. Meanwhile, the capacity shortages are allied to the soft skills which include teamwork, communication skills, interpersonal and behaviour skills (Monatague, 2012). In the case of Vietnam, Alan explained that the skill level is low in Vietnam and it needs more workers to be trained and educated for task which are suitable for a sophisticated modern economy. In addition, there is a skills shortage because the technical skills of the graduates do not meet the standard of recruiters, according to a survey of 234 recruiters and 3,364 graduates from 20 university, published in the research "Solutions for Enhancing Higher Education Quality" by Ho Chi Minh University of Pedagog (Huynh, accessed 10 Apr 2019).[†]

In the Vietnam Competitive Report 2010, Ketels mentioned that the labor productivity of Vietnam is a key driver for economic growth but remains behind many countries. Ketels explained that the quality of education is low and varied while there is some improvement for the training program (Ketels C, 2010)

According to the ManpowerGroup/ talent Shortage Survey 2011, Vietnam's workforce not only has a lack of quality consciousness but also soft skills which are very important for the country's competitiveness. The survey mentioned that Vietnam has potential workers for simple tasks but need more blue-collar workers with technical and computer skills to undertake sophisticated tasks.

According to the World Bank, the employers in Vietnam are struggling to find well-qualified workers. The World Bank report found that there is a shortage of workers with adequate skills in Vietnam. Even though Vietnam has a large potential human resource, the employers are seeking workers who have both practical ability and behaviour skills. The Report from World Bank analysis indicates that there are three steps for the improvement of behavioural and technical skills which are: promoting school readiness through early childhood development, building the cognitive and behavioural foundation in general education, and building job-relevant technical skills among graduate-recruiter networks. The government is seen as an important connector between the university and the recruiter or foreign investor.

4. Analysis

4.1 Human resources development in manufacturing of Vietnam

4.1.1 Overview of Vietnam

Vietnam is in Southeast Asia, and shares a border with China to the north, Laos and Cambodia to the west, and has a coastal border with the Pacific Ocean to the east. The current population of Viet Nam is 96,683,369[‡] in 2018 based on the latest United Nations estimates. The median age of Vietnam is 30.9 years. In demographic terms, Vietnam is regarded as being in its "golden age", describing a relatively young population and emerging middle class. As such, Vietnam has huge potential for human resources.

3.1.2 Human resources- current situation of Vietnam

The current policies and strategies of the Vietnamese government in promoting technical skills of human resources

[†] <https://talk.onevietnam.org/students-in-ho-chi-minh-city-are-weak-in-soft-skills/>

[‡] <http://www.worldometers.info/world-population/vietnam-population/>

The Vietnam policy framework for long-term HRD is defined and guided by key government strategies and plans, including the Socio-Economic Development Plan 2011-2020 and The Human Resources Development Strategy 2011-2020

Table 1 Human resource development strategy of Vietnam from 2011 to 2020

Targets	2015	2020
Rate of trained laborers (%)	55	70
Rate of Vocationally trained laborers (%)	40	55
State management, policy making and international law	18,000	20,000
University and college lecturers	100,000	160,000
Science-technology	60,000	100,000
Medicine, health care	70,000	80,000
Finance – banking	100,000	120,000
Information technology	350,000	550,000

Sources: Author edited from the report of the Human Resources Development Strategy 2011-2020 of Vietnam

Table 2 Actual figure of the targets of the Human resource development strategy of Vietnam from 2011 to 2020

Actual figure	2017
Rate of trained laborers (%)	53
Rate of Vocationally trained laborers (%)	19,9
State management, policy making and international law	18,000
University and college lecturers	72,792
Science-technology	43,849

Sources: Author edited from the report of the Ministry of Labor-Invalids and Social Affairs

The figures in both table 1 and table 2 indicate that Vietnamese human resources are still lacking in both trained laborers and vocationally-trained laborers. In the HRD strategy, the target percentage of trained laborers was 55% in 2015 however, the actual percentage of trained workers in 2017 was only 53%. These workforce segments need to be expanded by the vocational education system of Vietnam and through technical training by foreign firms.

The strategies on the development of human resources during 2011-2020 period do not provide detailed action plans specifically for the manufacturing industry. Technical skill promotion is an important part of HRD because it relates to the process of industrialization and modernization, forces which drive the country to a higher level of long-term development. Decision No. 579/QĐ-TTg is still a general plan without specific priorities and specific policies for implementation to develop the quantity and quality of skilled labor.

Among ASEAN countries, Vietnam is still lagging behind Thailand in terms of policy measures and direction for human resource development adopted by the government. In the case of Thailand, the government has promoted human resource development with five Action Plans: (i) The Vocational Education Act 2008, (ii) The Skills Development

Promotion Act 2002, (iii) The National Science, Technology and Innovation (STI) Policy and Plan 2012-2021, (iv) The National Education Act of 1999, and (v) The 11th National Economic and Social Development Plan (2012-2016) (UNCTAD, 2015). These Action Plans are being implemented at all levels of education and the government has allocated finance to support STI teaching and training, provide research scholarships and promoting cooperative education. (UNCTAD, 2015). Furthermore, the Thai government has cooperated with the Japanese government in many human resource development programs with assistance from JICA. For example, a project of King Mongkut’s Institute of Technology Ladkrabang has been implemented since 1971, which has resulted in a pool of high-quality engineers and scholars for the industrialization process in Thailand (Interview 2017: Miyoshi). Meanwhile, the Vietnamese government has not yet promoted any detailed action plans for effectively actualizing the general strategy of human resource development.

4.1.3 The current status of technical skills of the Vietnamese workforce in the manufacturing industry

In an interview with Vietnam National Press, the Chief Representative of JETRO in Ho Chi Minh, emphasized that “the last chance for Vietnam to participate in the automotive industry has to focus on supporting industry in order to supply for big assembly companies. However, to capture this opportunity requires Vietnam to promote supporting industries and improve the professional skills of labor”. Skilled labor plays an important role in terms of developing Vietnam’s automotive industry.[§]

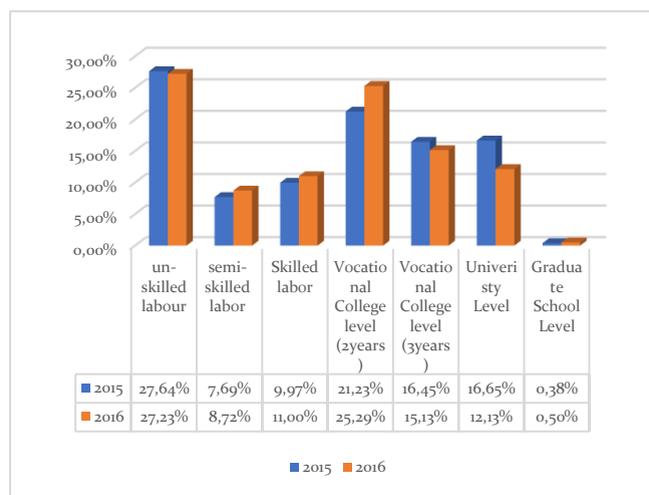


Figure 1 Academic level of labor in Ho Chi Minh City 2015 and 2016
Source: Author edited from the report of Ministry of Labor, Vietnam

[§] <http://cafef.vn/nganh-o-to-viet-nam-can-lam-gi-de-tiep-can-thi-truong-khu-vuc-20170223154749089.chn>

The number of skilled laborers who graduated from Vocational College reached 25.29% (two-year technical training program) and 15.13% (three years technical training program) in 2016. Even though the graduate students were trained in vocational school, there remains a technical gap between Vietnamese workers and the standards of skill required to work in engineering and technology.

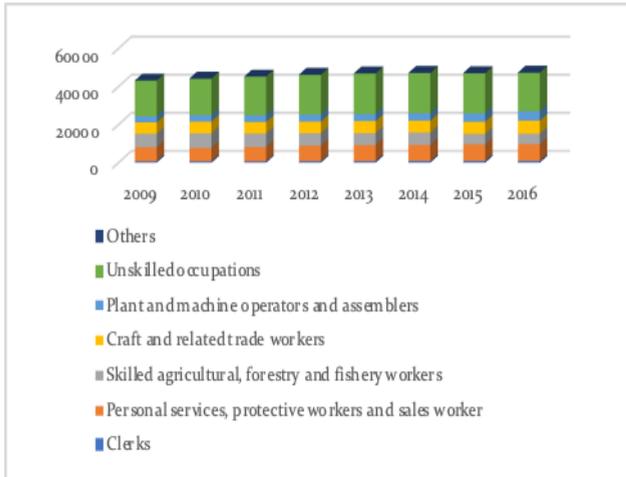


Figure 2 The number of skills and unskilled laborers in Vietnam from 2009 - 2016

Sources: Author edited from the report of General Statistics Office of Vietnam, 2017

Figure 2 illustrates a comparison between the different types of workers across all types of industries. As we can see in this figure, the number of “Plant and machine operators and assemblers” is the smallest among all the other types of workers. Thus, the number of industrial laborers should be increased because human resources play an important role in industrialization.

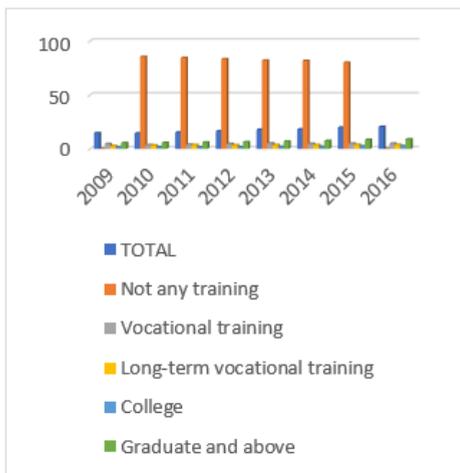


Figure 3 Percentage of trained employed workers

Sources: Author edited from the report of General Statistics of Vietnam, 2017

The percentage of the workforce who have not had any vocational training or have not studied in higher education is very high- almost 80%. This number indicates that Vietnamese labor is at a disadvantage. Vietnamese labor has little to no technological skills, largely engaging in low-skilled work such as assemblage, and also does not utilize the technology from foreign firms. Furthermore, the number of graduates from schools of higher education is small. These numbers are reflective of the lack of engineers who can work in sophisticated industry or in research and development projects. The lack of skilled workers and engineers depicts the quality of human resources in Vietnam’s manufacturing industry.

The quality of labor in Vietnam is lower than that of more advanced countries in ASEAN. The Head of Global Management Center, Japan Productivity Centre, evaluated that Vietnam’s labor productivity, compared to other ASEAN member countries, was higher than Laos’s and Cambodia’s, but lower than Thailand’s and Indonesia’s (Vietnamplus, 2018)

According to the Deputy Representative, The Third ASEAN Economic Ministers-Ministry for International Trade and Industry (AEM- METI) Economic and Industrial Cooperation Committee (AMEICC Secretariat), Japanese manufacturing firms want to build up technical skills for employees, but there is a gap between Japanese technical standards and the current local technical level, which keeps preventing the transfer of technical skills to the local workforce (Interview 2016). In order to take advantage of the golden population structure and bridge the gap in technical levels, the Vietnamese government should play a more crucial role.

4.2 Analysis on Japanese support for technical skills in Viet Nam

4.2.1 Technology transfer activities from Japanese organizations

Japanese organizations offer an illustration on how support from industry for the enhancement of skilled labor performance in manufacturing sectors could be utilized in parallel with governmental policies.

Japan International Cooperation Agency (JICA) started to cooperate with the Vietnamese government in 1993 and has implemented training of ASEAN’s human resources and transfer of Japan’s techniques and experience by dispatching long-term experts (from two to five years) and receiving Vietnamese counterparts for training in Japan under technical cooperation schemes. JICA has also contributed many education funds for Vietnamese students in industrial engineering majors such as the AUN/SEED-Net Scholarship, Management of Technology (MOT).

In terms of engineering education, the AUN/SEED-Net Scholarship under JICA provides scholarships for Master’s and Doctoral degrees in engineering majors. This network and fund aim to promote human resource development in

engineering for 26-member institutions in ASEAN with assistance from 14 Japanese supporting universities. AUN/SEED-Net provides 5 graduate scholarship for ASEAN students every year. For a master's degree program, the ASEAN student will get funds from Japan to study in host institutions in ASEAN which are well-known technical institutions such as ITB Indonesia, UGM Indonesia, Chulalongkorn Thailand, UTM Malaysia, NUS Singapore, and NTU Singapore. For the Doctoral Program, the PhD candidates can study in Japan, Singapore or sandwich programs (8-months in Japan and 2 years in ASEAN's institution).

This program will improve the ASEAN's universities to the Japan standard and contribute to the development of engineering students in Southeast Asia. The scholarship contributes significantly to human resources development in Southeast Asia. The alumni of AUN/SeedNet Scholarship work for the University, which improves the quality of engineering majors for the students of ASEAN's countries, particularly in Viet Nam. The alumni of AUN/SeedNet Scholarship are also the key factor which drives the network, with joint-research between universities in ASEAN and Japan.

However, a program only focused on faculty members and students is not enough for upgrading of technical skills for human resources development. Since the majority of awardees of the AUN/SeedNet Scholarship are working for universities or in academia, not for the private sector such as manufacturing firms. Besides, the majority of human resources in manufacturing are working in manufacturing firms. The contribution of the program is not directly affecting most of the labor force who are working at the manufacturing firms.

4.2.2 Technical training in the Japanese firms

Technical training in Japanese firms can be divide into two programs, including on-the-job training and technical training from Japanese organizations.

4.2.2.1 On-the-job training in the company

On-the-job training is necessary for young people who are equipped with the relevant skills to use new technologies (ILO I. L., 2017b)

In Japanese firms, on-the-job training includes training or workshops which are provided by senior employees or experts to junior employees. According to Denso International Asia in Thailand, the senior employees will divide the employees into pairs or groups which consist of both seniors and juniors so that they can learn the know-how and experience from each other. The on-the-job training is the technical transfer process from the foreign technology firm or investor to the local employee.

According to the JETRO Office Bangkok, the capacity of the local employees will decide how much the technical skills will be transferred. The Japanese manufacturing firms

provide technical training for the local employees from the beginning and provide workshops and on-the-spot training so that the employees can learn and practice technical knowhow and techniques.

In the case of Vietnam, the senior officer at JETRO Ho Chi Minh office, said that there is a technical gap between the Japanese technology and Vietnamese employees. Because of the lack of skills and experience of the Vietnamese workforce, they can only cover the simple tasks such assembly so that the local employees can not obtain more advanced technical skills from the Japanese companies. If the vocational and training education of Vietnam was more efficient, the Vietnamese workforce would be able to work on higher level skills and adapt more advanced technology from Japanese investors.

4.2.2.2 Technical training program from Japanese companies through Japanese training associations

Other than the on-the-spot training in firms, Japanese companies use the training programs of Japanese organizations. The Association for Overseas Technical Cooperation and Sustainable Partnerships (AOTS) is an organization for human resources development which promotes technical cooperation through training for Japanese companies. AOTS have two training centers in Japan, including Tokyo and Osaka, which have organized 190 training courses in Japan and overseas for Japanese firms all over the world. AOTS has two main activities, including training activities in Japan and overseas. The funding of the training is 20% from the AOTS budget and 80% from the companies which send the employee for training. The content of the training program depends on the skills desired by the companies. The training program is divided into two parts, including Japanese language-culture and technical training. The Japanese language-culture component takes two weeks or one month, providing an introduction to Japanese working culture for the international employees. This course emphasises the importance of the Japanese working manner which the foreign employee need to understand and adapt to, such as punctuality, safety, and teamwork. The second part of the training program is the technical training at the training center or factory. The length of the technical training will depend on the requirements of the company.

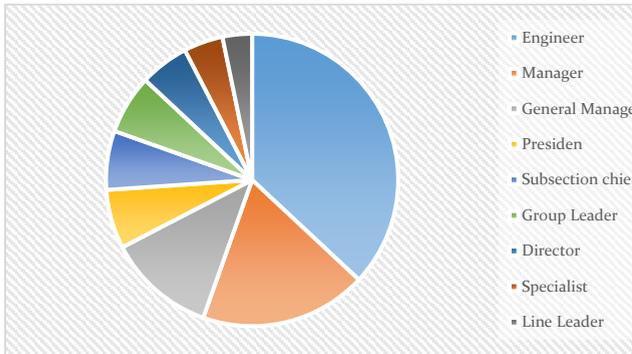


Figure 4 Major government subsidized programs by position 2008-2014
Source: AOTS Report in 2014

From the figure, the majority of the participants for the AOTS training courses are engineers, managers and general managers. Different to the technical training in the factory, these training courses provide more management skills for the engineers or manager level positions.

The technical training in AOTS Osaka Office is only for high-level local staff and these staff will transfer this knowledge further for the workers in the host countries through workshops or practical training on the spot. Because the technical level of staff who have training courses in Japan is high, the technology which can be transferred will upgrade the technical skilled labor in the host country.**

4.3 Discussion on promoting technical skills for Vietnamese workforces

➤ Promotion of the collaboration between universities and Japanese firms in Vietnam under the university-industry linkage

Regarding the promotion for human resource development in the manufacturing industry, engineering education is very important. However, according to the General Manager of Panasonic Research and Development Centre in Hanoi, the curriculum for engineering majors is ineffective in that it consists of theory which is often unnecessary for the future job prospects of the student. In order to increase the number of skilled students for the manufacturing industry, universities should invite many Japanese experts and trainers who have first-hand experience in working in manufacturing plants to give lectures and provide workshops for the students.

Regarding the case of cooperation between universities and Japanese firms, Vietnam has not had a specific technical university that is able to provide the skills needed for employees to work in Japanese manufacturing companies in Vietnam.

Currently, the establishment of the Vietnam-Japan Institute for Human Resources Development (VJCC) in 2017 aims to upgrade the activity of “developing human resources in business”, indicated by the Vietnam-Japan Human Resources Cooperation Centres in Hanoi and Ho Chi Minh City. The VJCC has conducted many activities in cooperation with the Japan International Cooperation Agency (JICA). VJCC provides courses for quality control, innovation, and communication skills for those already in the workforce, such as top-middle managers. The number of Vietnamese managers in Japanese firms is small, which does not affect the quality of the labor force significantly in Vietnam, because the workforce for Japanese firms mainly has low-level skills. Therefore, it must be considered that the quality of the employees, being graduates of engineering majors, will influence human resource development in the manufacturing industry. In this regard, the VJCC should extend the enhancement of the engineering undergraduate program and cooperate with Japanese firms to obtain vital education through lectures and training.

5. Conclusion

This paper discusses the role of Japanese organizations and firms in upgrading the technical skills for Viet Nam’s human resources. The Japanese organizations contribute to the research, academia, and quality of engineering education for the students of Vietnam. Thus, what is found is that the Japanese firms enhance and improve the technical skills of Vietnam’s workforce through on-the-spot training and workshops. This bridges the knowledge and technical skill gaps found in the Vietnamese educational system.

The relationship between universities and industry influences the human resource development of the country. The universities educate would-be employees for firms; if universities can adopt the standards of the firms in their educational programs, the labor force would be able to meet the requirement of the firms and thus upgrade the skill level easily.

This paper highlights the need for a university-industry linkage as a channel for upgrading human resource skills and bridging the gap between local employees and foreign manufacturing firms.

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** In the interview with AOTS’s staff at AOTS Osaka office: Mr. Kazuhisa Ogawa

Graduate School of International Relations Ritsumeikan University for their comments on the manuscript.

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Primary Data Sources: List of Interviewees 2016

Senior officer	:	HIDA Osaka office, Osaka, Japan
Deputy Representative	:	AMEICC Secretariat, HIDA, Bangkok, Thailand
IT engineer	:	Toshiba Corporation, Tokyo
Project Formulation Advisor	:	JICA Thailand Office, Bangkok, Thailand
General manager	:	Panasonic Research and Development Center in Hanoi
Senior Officer	:	JETRO Hanoi Office, Hanoi, Vietnam
Senior officer	:	Denso International Asia Co., Bangkok, Thailand