An Investigation of the Implementation of the Dual Vocational Education and Training: Field Studies in Six Vocational Colleges

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Research Article

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Abstract

In recent years, Vietnamese Vocational Education and Training (VET)system has been employed with numerous reforms, especially the adoption of the German Dual VET. In the current context of globalization, Vietnam now requires high-quality manpower more than ever. By far, most VET-related studies have provided overall scenarios on Vietnam's VET but there has been no real investigation at vocational institutions. This research aimed to answer two questions: (1) To what extent does the number of affiliate enterprises affect the effectiveness of Vietnamese Dual VET?, (2) How effective is on-the-job (OJT) training curriculum of the Dual VET system toward enhancing the qualification of Vietnamese workers? Targeting the key industrial zones in all three regions of Vietnam where industries are concentrated and attract many workers, this study conducted an investigation at six vocational colleges in five provinces that have been implementing the dual model. Under the mixed method approach, the data were triangulated in the convergence framework of analysis. By conducting online questionnaires with570 vocational students and 17 semi-structured interviews with vocational educators and enterprises' managers, this research explored the real status of the job-oriented training in sampled vocational colleges.The most frequent form of questions used for the questionnaire of this study was the Likert scale, which resulted in ordinal data. As for the large number of scaled questions, the researcher decided to analyze the internal consistency (reliability) of the scales by calculating Cronbach's alpha coeficient. The α coefficients of the three scales used in the research, including "Facilities & Equipment of the college", "Business Association Activities", and "OJT evaluation" are 0.853, 0.940, and 0.925, respectively, which are all excellent levels of internal consistency. The following findings were discovered: (i) most of the sampled vocational students did not have positive feedback toward OJT; (ii) a higher number of partner enterprises indicates the better quality of OJT; and (iii) a high-quality OJT is a key factor in facilitating the sustainable development of the Vietnamese Dual VET system. From those the author raised some policy recommendations to move forward with the improvement of the dual VET quality and enhancement of the workforce.

Introduction

1.1. Vietnamese education system after Doi Moi policies

Along with other educational reforms, the dual VET model has been adopted and developed stronger since 2011. Doi Moi, the renovation policies launched in Vietnam in 1986, has brought about numerous profound changes to the country, particularly in the higher education and VET system (Hong, 2009). From a country on the brink of economic collapse, Vietnam has revived itself and is now on a path toward economic prosperity, industrialization, and globalization. After the renovation, the academic education has been preferred to vocational training, as shown in terms of both quantity and quality (Trines, 2017). The Vietnamese national education system after the Doi Moi Reform has consisted of two types: academic and vocational training. The highest levels of training are conducted at universities and vocational colleges. In reality, the numbers of vocational schools and its students have always been in decline, and the community has been more attentive toward and interested in academic education

institutes, such as universities and colleges, rather than in vocational training because of a common belief that vocational graduates would have fewer job opportunities than academic graduates. Moreover, when the foreign investment came to Vietnam, the higher education was unable to supply a force of high-quality employees to the labor market. Numerous international and Vietnamese researchers and journalists have highlighted that most of university graduates were better at theory than practice, and most of vocational learners learned knowledge and skills that were out of date and inappropriate with industrial requirements (Trinh, 2003; Huynh, 2016; Trines, 2017; Vo, 2019a; London, 2011; Ngoc Quang, 2016).

1.2. Vietnam's VET development and current shortage of skilled labour

According to the 2006 Law of Vocational Training, VET supplier facilities have three groups: vocational colleges, vocational secondary schools, and vocational training centers. These VET institutions can be owned and funded by other state and local authorities, public enterprises, mass organizations, trade unions, and private owners. The network of Vietnamese VET institutes has increasingly expanded, and in principle, aligned with economic sectors, regions, and localities. According to a report by Vietnam's Ministry of Labour – War Invalids – Social Affairs (MoLISA), until the end of 2018, there were 1.948 vocational institutes nationwide, of which: 397, 519, and 1.032 were colleges, secondary schools, and vocational training centers, respectively (Hai Nguyen, 2019). These institutions oversee training at three levels: vocational elementary, vocational secondary, and vocational college. Vocational colleges can deliver training at the three levels mentioned previously, whereas vocational secondary schools can deliver two levels of training (secondary level and elementary levels), and vocational training centers are only allowed to provide an elementary level of vocational training.

After numerous renovations, the Vietnamese government has considered VET as one of the top targets in training and supplying skilled workers and developing a more globalized industrial economy. The Directorate of VET (DVET) and vocational institutions across the country have conducted numerous advanced innovations related to training programs, job orientation, and student enrollment, which the researcher discusses in the later parts of this study. The adoption of the German Dual VET model has been one of most significant efforts by Vietnam's VET in developing training systems and upgrading workers' skills. In addition, the sector of industrial manufacturing in Vietnam has been growing stronger. This reform has brought up many challenges regarding the lack of technical skills for Vietnam's VET (TVET News, 2017).

1.3. The shortage os skilled labor

According to a report by the Vietnamese Ministry of Planning and Investment, in 2018, compared with other Asian countries, Vietnam's labor productivity was low. In 2018, calculating in accordance with Purchasing Power Parity, Vietnam's labor productivity reached US$11,142, only 7.3%, 19%, 44.8%, and 55.9% that of Singapore, Thailand, Indonesia, and the Philippines, respectively (VNS, 2019). Vietnam's labor productivity was lower than Cambodia's in the manufacturing, construction and transportation-storage-communications sectors (Dat, 2018). The country's productivity ranked the second lowest among

the reviewed countries, only higher than Cambodia in terms of agriculture, electricity-water-gas, and wholesale-retail-repair sectors.

Figure 1.3 shows that in the 2019 Total Workforce Index, which is an assessment tool of relative ease of sourcing, hiring and retaining workforce skills in world labor market, Vietnam ranked 57th out of 76 countries and territories globally and 13th in the Asia-Pacific region in terms of sourcing candidates, hiring and retaining skilled labor (Nguyen, 2019). Vietnamese workers earned an average monthly income of $242 in 2019, whereas the average monthly income in the Asia-Pacific region was $1,801. In terms of skills, the percentage of highly skilled workers in Vietnam in 2019 accounted for 11.6% of the country's total workforce of 57.5 million. Skilled workers are workers having special skills, knowledge, and abilities in their work. In Vietnam, a skilled worker is considered to have attended a vocational college, technical school, or university related to industrial engineering.

According to the 2020 Global Talent Competitiveness Index, which assesses countries potential to attract, develop, and retain talent, Vietnam ranks 96th out of 132 countries; in terms of vocational and technical skills, the country stands at 117th place (VNS, 2020). Most foreign direct investment (FDI) enterprises were attracted to Vietnam because of the large amount of good and low-wage production-line workers. Although Vietnam's labor productivity has improved significantly in the past decade, it is still lower than that of other Asian countries. If Vietnam does not promote the comprehensive reform of labor skills, the FDI assemblers may move to other countries when the wages increase in Vietnam, and the ranking position may be further than 96th. The 2017 Provincial Competitiveness Index report by the Vietnam Chamber of Commerce and Industry showed that 69% of FDI firms in Vietnam are facing difficulties in recruiting skilled technicians and workers (Nhan, 2018). The report also determined that the quality of Vietnam's human resources has not made substantial progress. In fact, training costs for new workers in FDI businesses have increased over the years from 3.6% in 2013 to 5.9% in 2014, and in 2017, it reached 5.7% of general business cost. Therefore, measures to reduce new training costs but increase labor quality are really essential. Moreover, numerous Vietnamese workers have been less appreciated than those from Malaysia, Thailand, and Singapore because of their lack of required skills, such as language, technical, and hands-on skills (Shira et.al., 2015).

1.4. German Dual VET, on-the-job training (OJT) and its roles in Vietnam's labor market

VET is the direct key to enhancing the labor-skill development, especially in the machinery industry. According to the United Nations Educational, Scientific, and Cultural Organization (UNESCO), VET is defined as all educational and training activities at vocational institutions to equip learners with the practical skills, knowledge, and attitudes required in the world of work (GC, 2015). VET's feature is focusing on specific occupations, so it has allowed individuals to develop relevant skills. Thus, it can be said that VET is the pedal to boost up high-skilled workforce development. Based on the Assessment of the ADB on Vietnam's VET (2014), the VET system of Vietnam has achieved many significant reforms

or renovations for this decade, including increases in the number of vocational training centers, vocational secondary schools and vocational colleges, increases in student enrollment, and upgrading of teacher and management levels. According to the Vietnam VET Report 2017, Vietnam has adopted the German Dual training model since 2015, which has successfully been implemented in Germany and many other countries such as Austria, Switzerland, Denmark, and parts of the Netherlands with positive results for VET (Nguyen, 2017). The Germany's Dual vocational training program, which is known as VET, is a mode comprised of two educational components including classroom study at vocational schools and on-the-job work training and supervision as well (Hockenos, 2018). Participating in this model, students learn theoretical knowledge of their occupation of choice in several days a week or even several weeks at a time, and at the same time they are hosted by a company to gain practical skills and hands-on experience.

Up to now in Vietnam, there have been some typical Dual VET models implemented in some vocational colleges (TVET Vietnam News, 2017). Two of them were executed several years ago and were reported with some achievements in terms of the quality of training content, time distribution for theory and practice, and the knowledge and skills of new graduates based on the German-standardized examinations. However, the significant number of vocational institutes nationally, the number of pilot models has been small, and the quantity of students enrolled in these models has been still low, with around 20-30 students per each site.

In November 2018, the first 3-year cooperative pilot training program of Sewage Engineering Technicians was successfully completed with graduates trained and qualified according to the German standard at the Ho Chi Minh Vocational College of Technology (HVCT) (iMOVE, 2019). Oriented toward German occupational standards and tailored to fit local conditions, this was the first cooperative training program in Vietnam, in which all relevant stakeholders, including the MoLISA/DVET, the Ministry of Construction, HVCT, and wastewater companies, made joint decisions in the development, implementation, and assessment of the program. One of the most important factors contributing to the program's effectiveness was the quality of VET personnel because all the college teachers, in-company trainers, and examiners were trained and examined in accordance with German standards. From this program, 21 graduates were qualified as sewage engineering technicians according to German standards.

The second pilot model was conducted at Lilama 2 College in Dong Nai Province. Lilama 2 was chosen by the Vietnamese and German governments to be a Centre of Excellence to supply high-quality workers for the labor market of Vietnam (Lilama2, 2018). After this, Lilama 2 was selected by Bosch Rexroth Corporation, GIZ, and the DVET to construct the pilot Dual training model. This program provided a 3-year training program for students of mechanical engineering and mechatronics. In this model, students got an allowance from Bosch of 2.7 million VND per month for the first 2 years and 3.7 million VND monthly for the third year. Students practiced at the factories 3 weeks each month, and the remaining week was for in-school study. Periodic examinations were implemented under control of both of Lilama2's teachers and in-company trainers. After graduation, students were employed directly by Bosch and other its partner companies.

The third is the partnership between BBraun and Messer Company and Hung Yen University of Technology and Education (HYUTE) (DVET, 2018). This is a part of an overall collaboration between Germany and Vietnam to bring breakthroughs to Vietnam's VET system. Based on the Dual VET, mechatronics students at HYUTE will be trained for 3 years in a structured and systematic apprenticeship program which is constructed by both parties. They will practice at factories starting from the second year to learn about the industry functions and thus to prepare for their future jobs. In this program, BBraun and Messer will provide students with practical knowledge, such as standards of technical drawing, manufacturing, assembly, testing of components of mechatronics systems, microcontrollers, pneumatic, and hydraulic systems. From the second year, students will receive allowance of 2.5 million VND per month. After graduation, students will receive a college diploma and certificate from the company. Then, they will have the opportunity to be employed by German companies located inside or outdise of Vietnam.

The fourth is the association between Holcim Company and the Technical and Economic College of Kien Giang province (TEC) (Holcim, 2019). This is a practical 3-year or 9-semester training program in cement manufacturing. Graduates will get a college degree issued by the MoET. In the first semester, students will study at TEC, while the rest of their time will be spent at Holcim's plant in Kien Giang province. Students will receive allowance during the training. This pilot model is part of an overall strategy of Holcim to advance its human resources, including engineers, technicians and managers.

Many foreign and local researchers define the importance of OJT in the Dual VET system (Mori et.al., 2009; Vo, 2019b; Pham et. al., 2017; Vu, 2017; Vu, 2018; Cao, 2011). For employees, OJT is beneficial because it allows them to learn a new skill or qualification within their field of work in a timely matter. During OJT, they are engaged in the real production process instead of a simulated learning process (John et. al., 1997). For the employers, OJT is beneficial because it narrows down and prepares the skilled employees who are right for the company. It is also cost-effective because after OJT, people can cover more tasks rather than those specified in their job description. When being trained in job areas during OJT, the employees can have more of a chance to ask about and understand job-related things in terms of the company's regulations, work safety rules, the machine operation manual, advanced skills, and more, rather than just doing tasks.

1.5. Real situation of Dual VET implementation in Vietnam

Back to the context of Vietnam, Vo (2019a) discusses how Vietnamese vocational institutions have difficulty accessing the needs of industries and consequently, many Vietnamese enterprises struggle to re-train their newcomers after recruitment. This is the reason in-house training or Dual apprenticeship programs have been implemented in many vocational institutions and most of companies in Vietnam. However, the companies have difficulty in defining the skills and knowledge thath could be used as a reference for developing a roadmap of training and controlling the quality of the combined courses. In his study, Vo (2019a) suggests that both of Vietnamese vocational institutions and enterprises should be involved in designing and conducting the Dual training curriculum. However, by far the development of

training curricula has been entirely conducted and controlled by the MoLISA/DVET. A curriculum framework with a uniform examination method has been given to nationwide vocational institutes for application in teaching and training. Therefore, revising these fixed curricula will require much time and power to get approved by the government and agencies in charge.

Tran (2006), Nguyen (2009), and Nguyen (2013) discuss and suggest the solutions of managing the training liaison between vocational institutions and enterprises in Vietnam by (i) raising the perception of the community on the importance of job-oriented training; (ii) upgrading targets and program content of the training cooperation; (iii) managing man-talent-physical resources in which man-talent resources refer to the labor force in general and the strategic employees who are intended to improve business value, in particular, and physical resources that include raw materials, building facilities, machinery, energy, and supplies; and (iv) managing the in-school and in-company training. Phan (2017) focuses on the management of joint vocational training activities between vocational institutions and enterprises in order to meet with worker demand for the firms. However, none of these studies discuss about whether the in-company training programs under the Dual VET system in Vietnam have been effective or not.

A volume of studies and journal articles discuss about the importance of OJT in the Dual VET system (UKEssays, 2018; Duong, 2019; Bui, 2015; Nguyen, 2015; Vo, 2019b; Tibken, 2015). Notwithstanding the determination of OJT in the Dual VET system, the content and outcomes of an OJT are equally important though.

There have been also many studies about the Vietnamese skilled-labor shortage and the adoption of the German Dual vocational training model into the VET system. Most discuss the renovation of state management and the standardization of vocational education according to integration requirements and recommendations regarding partnerships between vocational institutes and enterprises from general perspectives. None provide investigations at any vocational institutions in terms of Dual VET application. From the perspective of the Vietnamese Dual VET, this study will focus on Dual VET implementation at Vietnamese vocational colleges to determine the importance of the quantity of companies in association with vocational colleges and to learn about the in-company training content.

1.6. Justification and significance of the research

Dual VET is not a new or attractive theme for the researchers. However, it is necessary to explore, especially for the individuals and organizations relevant to occupational learning and training. In the current context of globalization and industrialization, Vietnam and other Global South countries need a high-quality human resources more than ever. Being considered as a bridge that trains and supplies workers to the labor market, VET has been of great potential in the field of research. A Dual VET system is a combination of school-based learning and in-company training, in which OJT plays a key role because it is the stage to help equip learners with practical skills at actual production sites. Not offering general policy solutions, as previous studies have done, this research focuses directly on OJT by investigating in depth the individuals related to VET in Vietnam to measure its effectiveness.

To understand the real implementation of Dual VET in national vocational colleges and the role of business cooperation and OJT in the Dual VET system, this study aims to answer the following two questions:

(1) To what extent does the number of affiliate enterprises affect the effectiveness of Dual VET in Vietnamese vocational colleges?

(2) How effective is on-the-job training (OJT) of the Dual VET system toward enhancing the qualification of Vietnamese workers?

The findings of this study can provide more data and arguments in the fields of skilled-labor and Dual training research in Vietnam and can be beneficial for authorities and stakeholders (relevant ministries, the DVET, nationwide vocational schools and colleges) to review and evaluate Vietnam's VET system and then upgrade the technical and hands-on skills of the labor force.

Materials And Methods

2.1. Study samples and sites

All VET-related individuals and organizations were selected as samples of this research. They include vocational educators and students, enterprises' managers or employers, those directly involved in the supply, training, and use of human resources. To attain the data size as estimated, the perspectives from both of service users (vocational students) and service suppliers (vocational educators and firms' employers) were collected.

The researcher selected certain key industrial areas of Vietnam, including Hanoi City, Vinh Phuc province, Bac Giang province, Thanh Hoa province, and Can Tho City, as target areas for this study (Hanoi and Can Tho City are indicated by arrows, and Vinh Phuc and Thanh Hoa provinces are marked with numbers 11 and 24, respectively, in the Figure 2.1 below). Among these areas, Hanoi City, Bac Giang province, and Vinh Phuc province which located in the north of Vietnam have been gathering many key industries (mechanical engineering, electronics) and vocational colleges in progress of executing Dual VET. Thanh Hoa, which is a province in central Vietnam, has many large-scale constructional material factories and is highlighted with Thanh Hoa Vocational College, where it has been organizing more and more OJT programs for students every year. While the last, Can Tho City, which is in the south, was cited by local reports as having many difficulties developing the Dual system among its vocational institutes. One more reason for choosing these areas is because they have been focusing on developing advanced industrial manufacturing sectors, especially information technology, electronics, mechanical engineering, automobile, and automotive technology, which are now spearhead training industries of the majority of nationwide vocational institutions.

The research sites which were selected from the said areas are six vocational colleges where have been implementing the Dual VET, in which sites 1 and 2 are those with many successful achievement records,

while the other sites were reported as having many difficulties and challenges in implementing Dual VET programs. Six sampled sites in this study include site 1 (Vietnam – Korea Vocational College of Technology in Bac Giang province), site 2 (Hanoi Vocational College of High Technology), site 3 (Vietnam – Korea Vocational College of Hanoi City), site 4 (Vinh Phuc Vocational College), site 5 (Thanh Hoa Vocational College of Industry), and site 6 (Can Tho Vocational College).

2.2. A mixed method approach

This research combines both of quantitative and qualitative approaches to be employed. The researcher chose a concurrent triangulation design for this study for directly comparing the statistical results obtained from the students with the qualitative findings obtained from the educators and employers. Within the scope of this research, based on two sets of data, the research generally involved the concurrent but separate, collection and analysis of qualitative and quantitative data.

The concurrent triangulation design was chosen by following reasons: Firstly, with the large size of the research samples mentioned above, including hundreds of vocational students, vocational educators, and enterprises' managers/employers, under this design, it would save time and cost for the data collection works because both types of data could be collected during one phase of the research at roughly the same time. While waiting for the questionnaire responses, the researcher could also conduct the interviews. Secondly, each type of data could be collected and analyzed in independent ways, so the researcher could freely arrange methods of contacting to respondents and proceeding with the data collection prior to finalizing different results based on the nature of each data type.

2.3. Challenges facing the researcher using concurrent triangulation design with convergence model

First, the concurrent design recommends the equal sizes of samples for each type of data, but in this study, the sample size of the quantitative data was much larger than that of the qualitative data, with 580 questionnaire respondents compared to only 17 interview participants, including 6 vocational educators and 11 enterprises' employers. To overcome this limitation, the researcher measured the weight of the samples rather than counting their size. Each educator can give bird's-eye views of his/her training program consisting of up to 100 students. Furthermore, the amount of time for each in-depth interview was longer than that for each questionnaire completion. While quantitative data were collected from the questionnaires, the qualitative data were obtained from the interviews with vocational educators and enterprises' managers/employers.

Second, the researcher may face the question of what to do if the quantitative and qualitative results do not agree (Creswell & Plano, 2006). This research is not designed to test any kind of theory; hence, the researcher compared and contrasted the similarities and differences between the two data sets and then concluded on the findings in a very flexible way.

2.4. Data collection instruments

The first research instrument was questionnaires, which were completed in the period of October and December 2020 by 580 students in six sampled sites. The questionnaire was designed to measure the learners' response to and expectation of the quality of the Dual VET program to be experienced. A 26-question survey could be completed in around 10-15 minutes by a respondent with his/her own smartphone or personal computer through a Google document link supplied by the researcher.

The second was semi-structured interviews which were carried out with (i) six educators of the six sampled sites who are in charge of training curricula and OJT programs and (ii) 11 technical managers and employers from 11 companies having in partnerships with the colleges above. The interview period was in December and January 2020.

Results And Discussion

3.1. Consistency analysis of Likert scales used in the study's questionnaire

The most frequent form of questions used for the questionnaire of this study was the Likert scale, which resulted in ordinal data. As for the large number of scaled questions, the researcher decided to analyze the internal consistency (reliability) of the scales. Cronbach's alpha is the most common measure of internal consistency and is often used when there are multiple Likert questions in a survey/questionnaire that form a scale in order to determine whether the scale is reliable (Abbott, 2017).

In this study, the Likert scales used in the questionnaire include three groups of items as "FE (Facilities & Equipment of the college)", "BAA (Business Association Activities)", and "OE (OJT evaluation)". Upon analyzing the reliability of the scale "FE", Figure 3.1a indicates the α coefficient = 0.853, which shows a high level of internal consistency. Figure 3.1b indicates the α coefficient = 0.940, which is an excellent level of internal consistency. Figure 3.1c indicates the α coefficient = 0.925, which is also an excellent level of internal consistency.

From this measurement, it can be concluded that the questionnaire and these scales are extremely reliable to be used for the purpose of this study.

3.2. Time allocation for school-based learning and in-company training

Based on the frequency analysis of in-school study time from the six sampled vocational colleges, more questionnaire respondents studied theory at their colleges for 4 - 6 months a year on average (49%), and the remaining 43% had in-school learning from 7 - 9 months in an academic year. From the data obtained from the interviews with vocational educators, the average time for school-based learning of each student was 7.4 months a year as shown in table below by calculating the mean of in-school study time.

Table 1. In-school study time *(Source: creation from interviews)*

Respondent	In-school study time (months)
VC1	7
VC2	8
VC3	7.5
VC4	8
VC5	7
VC6	7
Mean	**7.4**

In the Vietnam VET system, an academic year at nationwide vocational colleges is normally carried out in 10 months for both of theory and practice (Nguyen et.al., 2017). It can clearly be seen that in the six sampled sites, the total school-based time is allocated much more than in-company training time.

According to BIBB (n.d.), in the framework curricula of the German Dual VET program, 60-70% of the time in an academic year is allocated for in-company training, and only 30-40% is for school-based learning. This standard should not be directly transferred to other countries without considering their specific conditions and institutional development processes. Every country that adopted the German Dual VET model should modify its framework curricula based on their own conditions. Notwithstanding, most of Vietnamese institutions have been allocating training time in stark contrast to German standards, with 70% for school-based learning and 30% for in-company training in an academic year. Furthermore, so far, in the research field of VET in Vietnam, no researcher has conducted any investigation at any vocational institute in terms of time distribution between theory and practice. Mori et. al. (2009) discuss the promotion of technology transfer by partnership between institutions and FDI enterprises. Phan (2017) mentions the college-enterprise associations in meeting with human resource demands at the industrial parks at local levels. Not only arguing that OJT is the most important factor in developing the VET system in Vietnam, this research also went in depth by investigating time distribution between OJT and in-school learning.

3.3. Frequency and duration of OJT

Based on the questionnaire responses, 65% of the respondents answered that they have undergone OJT one to three times in an academic year. Only 35% said that they underwent OJT three to six times a year. No one responded that they had participated more than six times in OJT in a year.

97% of questionnaire respondents answered that all OJT were organized within 1 – 3 months. Only 2% responded with 4 – 6 month OJT (Figure 3.3a).

Organizing OJT programs or sending out students to undergo practical training at enterprises is a necessary activity implemented at all six sampled sites, according to all six interview respondents. Based on the collected data, the average length of time to be spent for OJT at each of the six sampled research sites was 2.6 months.

According to Figure 3.3b, of all the 11 interview respondents from the enterprises, 55% said that their companies often have 2 months for each OJT session, and 18% said 2.5 months; 27% responded they had 3-month OJT, and no one answered more than 3 months-length for OJT. This means that the average duration for each OJT to be organized by the 11 companies in this study was 2.4 months.

97% of the sampled vocational students reported that they had often participated in one to three OJT sessions in a year, and each OJT session lasted from 1 – 3 months. Additionally, according to educators and enterprises' staff, the time to be distributed for in-school learning was 7 – 8 months, and the 2 – 3 remaining months were for OJT, and OJT was organized for each faculty once a year. After comparing the three perspectives above, the researcher concluded that OJT has been held once a year in a period of 2 – 3 months for at least each faculty of the six sampled colleges.

The literature mentions recommendations which were discussed and given by Tran (2006), Vu (2017), Vu (2018), and Vo (2019a) to improve the Vietnamese VET system, which mainly include the management policies. No practical application solution has previously been suggested. Regarding to in-company training, in the framework curricula of the German and Japanese Dual models, the learners have school-based learning and in-company training interwoven on a weekly basis, with a ratio of 2:3, respectively (Bliem, 2014; MoHLW, 2016). This means that every week, learners have 2 days of learning in their colleges and 3 days for in-company training. Notwithstanding, in the Vietnamese VET system, OJT has often been organized on a monthly basis, once a year in 2 – 3 months, as concluded from the data analysis above.

3.4. Pre- and post-tests of OJT

Up to 79% of the questionnaire respondents said that they did not take any test before entering the OJT, and 81% responded "No" with participating in OJT post-tests. This means that most OJT held by the six research sites did not include any pre- or post- test at all to measure students' progress on occupational knowledge and practical skills.

When asked, "Has your company ever organized any pre- and post- tests of OJT to measure students' qualification?", 38% of enterprises interviewees said that their companies have regularly held the tests for students both before and after each OJT session that include the questions related to occupational knowledge, attitudes, and skills designed to be compatible with the manufacturing field and the actual status of the machinery and equipment of the companies. These tests aim to measure students' progress after each OJT session.

Of all the interview respondents from the enterprises, up to 62% responded they had not held any tests before or after each OJT session. Respondent AE4 said that her company often offered 2-month OJT for students from vocational colleges and that there is so much work to be done, so they do not have enough time for any tests (Interview, 7/1/21). During each OJT period, only one or two staff members would be assigned to train and supervise the interns, and there are several tasks for the interns to do, and thus, her company believes that the qualification tests are impossible and not needed.

Additionally, according to managers'/employers' interview responses, 16% of respondents said that their companies have often organized only OJT pre-tests, and 21% responded that only a post-test is held.

From the analysis above, a very large percentage of vocational students reported that they have never undergone any pre- or post-test of OJT. This means they participated in their internships without knowing anything about their level of progress in knowledge or skills, because no one at the companies had judged it.

In addition, based on data analyzed from the interviews, most of the enterprises had never organized any tests for interns before or after an OJT session. Some enterprises claimed that they did not have enough time for any assessment tests during their OJT program, and others stated that in-progress evaluation tests are not necessary and are wasteful of physical and human resources to conduct at the companies.

Jack and Patricia (2012) state that the pre/post-test is a common form of evaluating programs in terms of improving the knowledge of the participants. To determine the gains in knowledge and skills of the trainees, an identical test should be completed two times, the first is at the beginning and the last is conducted during the final OJT session. TVET Vietnam News (2017) indicated that the common evaluation methods used for the learning process are surveys and performance records, and these have mostly been used for theoretical learning programs, rather than occupational/vocational training. Trines (2017) states that in most of nationwide educational institutions in general, only post-tests are executed to evaluate learners' progress. If so, the content of the pre- and post-test is not identical. No article mentions pre/post-test in VET, regardless of their significance in measuring learners' progress and attitudes, and the curriculum's effectiveness.

3.5. Students' perspectives on business association activities

Table 2, which was calculated from data obtained from the questionnaires, points out that OJT has been deployed at all six research sites on a regular basis (52% of responses said "often" or "very often" (BAA6 of Table 2) but not well in terms of comprehensiveness. Of all respondents, 70% answered that their colleges have never publicized any information list of affiliate enterprises on to homepages or other colleges' media (BAA1 of Table 2). Even the recruitment notices were rarely shared with students and parents according to 73% of the responses (BAA2 of Table 2). One other important aspect of a good Dual VET system is regular organization of conferences or workshops to exchange knowledge between the colleges and enterprises, in which vocational students can communicate directly with enterprises to ask about relevant technologies, practical skills, and even recruitment requirements. However, 71% of

respondents said that their colleges had never held any such conferences, while the number of responses stating that such conferences had been held often or very often was very low (BAA3 of Table 2). According to standards of the German Dual system, as mentioned in previous chapters, students would regularly be trained at the companies for 3 – 4 days a week, and during this period, the company staff would take charge of teaching practical skills using school's equipment base at the schools for 1 – 2 days. Nevertheless, at the six research sites of this study, 73% of the respondents said they had never taken part in teaching and practice guidance at any college (BAA4 of Table 2). The colleges and enterprises might be consistent in terms of the majors of training and production; however, the equipment use might be different. Thus, actual visits to companies are held in most of German vocational institutes on a regular basis. Based on the responses, 73% of the vocational students answered that there was no actual visit to companies organized by their colleges at all, and 10% said that they were rarely held (BAA5 of Table 2). This is kind of site visit to companies is for either the same or different manufacturing fields for one or couples of days, which are often organized for vocational students to observe industrial production lines or to see how the machinery and equipment operate, etc. The last criteria to evaluate a good business association program is organizing OJT, and based on data collected through the questionnaires for the six research sites of this study, up to 47% respondents said that their colleges seldom organize OJT (BAA6 of Table 2).

Table 2. Frequency of business association activities *(Source: creation from questionnaire responses)*

ID	Business association activities	Never (%)	Rarely (%)	Often (%)	Very often (%)	TOTAL (%)
BAA1	Publicizing a list of partner businesses with the college	70%	8%	18%	4%	100%
BAA2	Providing information about recruitment needs of enterprises	5%	73%	18%	4%	100%
BAA3	Organizing exchange conferences between college and enterprises	71%	12%	14%	3%	100%
BAA4	Enterprise staff participate in teaching and practice guidance at the college	73%	13%	12%	2%	100%
BAA5	Organizing actual visits to companies	73%	10%	15%	2%	100%
BAA6	Students take part in on-the-job training at enterprises	0%	47%	45%	7%	100%

A customer survey form was used in the questionnaire with Likert-scale questions for the respondents to rate the frequency of business association activities at their institutions (Peter, 2012). Analysis herein indicated that most vocational students had negative view toward the frequency of business association activities held by their colleges, as shown in the large percentage of the "Never" and "Rarely"

options. Thus, according to the perspectives of the vocational learners, all sampled sites in this study had superficial cooperations with their partner enterprises.

3.6. Educators' perspectives on business association activities

When asked about the main activities executed to maintain and develop cooperating relationships with the enterprises, the sampled educators responded with different ideas during the interviews. Of all six educator interviewees, only respondent VC1 said that her college is always positive in finding chances to participate in job affairs and business connection events inside and outside of the province (Interview, 16/12/20). Based on invitations or information from the MoLISA, the DVET, other relevant state agencies, and newspaper and magazines, this college always attends the events held by some representatives because, according to respondent VC1, these occasions are good chances to connect with enterprises and to draw their attention to her college.

Only respondent VC1 answered that her college is always active in connecting with and inviting the enterprises inside and outside of the province to cooperate in training students (Interview, 16/12/20). The college has sent brochures and leaflets out to enterprises in the fields of manufacturing compatible with training sectors that introduced key information related to training majors, qualifications, motivation of students, etc. The college has also been always active in drawing the attention of enterprises through various occasions, such as job fairs, VET conferences, or business workshops, for instance.

Notwithstanding, respondent VC1 said that her college has often formulated an SWOT analysis to identify the company's potential for a cooperation. After the company visit, the college filled out all the information regarding the cooperation in the SWOT form, as shown in Table 3.

Table 3. SWOT analysis of potential partner company *(Source: creation from CV1's response)*

	Positive	**Negative**
Internal	**Strengths** Fields and expertise from within the company that are helpful for the college: • well-trained and experienced staff • state-of-the-art equipment for production	**Weaknesses** Potential negative impact from within the company: • negative attitude of managers in cooperating • missing safety regulations or cleanliness
External	**Opportunities** Public interest of the company that could be strengthened through the cooperation activities: • good social responsibility awareness • engagement in chambers and associations	**Threats** Interest that could negatively affect cooperation: • never hire VET graduates • no visible Human Resource Development activities

Regarding the organization of OJT, except for the first research site, proactive business connections have remained weak. The literature shows the case of HVCT with its effort to connect enterprises through workshops and events related to sewage treatment technology (iMOVE, 2019). This institute has always been proactive in finding and connecting with wastewater companies to invite cooperation in its Sewage Engineering Technicians program. The VET system of Vietnam is increasingly developed according to an industry-led direction, taking industrial demands as the training focus and target (Nguyen, 2017). Accordingly, lack of initiative in connecting with enterprises can also be seen as a failure of Dual model adoption. As reported by the ADB (2020), the call for VET investment in Vietnam has not met the development requirements, and this can be construed as a case of a lack of cohesion between vocational institutes and enterprises regarding investing in human resources through training cooperation.

4.8. Number of partner companies

Respondent VC1 said that her college has been developing relationships with 25 companies so far from the fields of industrial engineering, including electronics and telecommunication, electricity, information technology, mechanical processing, metal cutting, refrigeration, automation, and automobile technology (Interview, 16/12/20). Additionally, according to respondent VC1, her college has students from five faculties that are training key majors of industrial engineering. Each faculty has been closely cooperating with five to six companies in the manufacturing field compatible with the training majors of that faculty. According to her opinion, OJT has been held once every year for each major, based on an agreement contract among the faculty head, the Center for Human Resource Development of her college, and the enterprises. Due to the rather high number of partner companies, her college could have a large range of selection after considering the training content and benefits offered by the companies, and then it would choose the best one that is most compatible and beneficial with students' majors and motivations.

According to respondent VC2, her college is now in cooperation with seven partner companies, but on an irregular basis.

We have a total of five faculties training the occupations, such as electricity, electronics, refrigeration, mechanical engineering, and automobile technology. With the exception of the electronic faculty, which has a relationship with three enterprises in the same field, each remaining faculty has only one partner company. Thus, based on the actual condition of the enterprises, some of faculties could not organize any OJT in a year. Moreover, we have no other choice when selecting affiliate enterprise for training students through OJT. Instead, of that, we provide comprehensive and further practical training courses at our college. (Interview, 21/12/20)

When asked about the reason her college has a small list of partner enterprises, the researcher received the answer that the college has been facing with difficulty in inviting enterprises to cooperate in training. Most enterprises that have refused association state that they do not appreciate the capacity, qualifications, or hands-on skills of the students.

Respondent VC3 said that his college does not have very good relationship with 13 companies that cooperated in training practical skills for students through OJT (Interview, 25/12/20). His college organizes one OJT session a year, for each faculty. Upon selecting enterprises to cooperate for each session from the list, the college sent invitations to companies and went through signing contracts. Respondents VC4, VC5, and VC6 stated the numbers of their partner enterprises are five, six, and four, respectively (Interview with respondent VC4, 28/12/20; Interview with respondent VC5, 28/12/20, Interview with respondent VC6, 21/12/20).

From the analysis above, the researcher concluded that the number of enterprises in cooperation with vocational colleges under this study is still small. Except for the first research site, with 25 partner enterprise relationships, and the third one with 13 enterprises relationships, all of the remaining were associated with less than 10 enterprises, including even just four, five, six, or seven enterprises linking with the sixth, fourth, fifth, and second research sites, respectively. Meanwhile, in the Vietnamese vocational education system, there are often at least five specialized faculties or departments in each college, and each faculty oversees training for one occupation sector or industrial field, such as electronics, telecommunication, electricity, information technology, mechanical engineering, and automobile technology. Basically, every faculty of a college must have at least one partner enterprise for conducting OJT programs. Therefore, the fact that there are too few affiliated companies might significantly affect the effectiveness of the Dual training program.

Looking back to the current shortage of skilled workers/technicians in domestic industries and the bridging relationship between VET institutions (supply side of human resources) and enterprises (demand side of human resources), the literature shows the fundamental standards of the German and Japanese Dual systems in which vocational learners have the chance to undergo actual working environments to acquire hands-on skills close to industrial development situations (MoHLW, 2016; Nguyen, 2017; Hockenos, 2018). Accordingly, in the German and Japanese Dual systems, most of vocational institutions have close associations with many local industries, and this is the reason their VET programs have often been called as industry-led ones.

According to Bliem et. al. (2014), the mutually beneficial cohesion between vocational colleges and enterprises is one of the success factors of Dual VET in Germany, Japan, Australia, and other developed countries. The more the college-enterprise relationship develops, the more effective Dual VET will be. International and Vietnamese researchers (Mori et. al, 2009; Vo, 2019a; Pham et. al., 2017; John et. al., 2017; Vu, 2017; Vu, 2018; Cao, 2011) discuss the depth of this kind of relationship, which indicates how close the cooperation is, but none of them mention the width, as suggested in this study, that colleges should create partnerships with many enterprises rather than focusing on a few enterperises, in order to enhance effectiveness when choosing OJT programs proposed by the partners.

4.9. Training contents of OJTs

4.9.1. Educators' perspectives

When asked about which of college or enterprise would oversee setting up the training content of OJT, only one (VC1) of the six respondents answered that the content of OJT has been composed based on mutual agreement between the college and the enterprises (Interview, 16/12/20). Relying on actual progress, direction, content, the kind of sector to be trained, the content to be constructed for OJT might be the best fit for students' occupations, majors, and motivations. All the other remaining respondents said that the OJT content was fully the responsibility of the enterprises.

Responding to the question on the main content of OJT, respondent VC4 stated that upon entering an OJT, students were provided a few lessons on the company's regulations and safety rules, and other time was spent introducing production processes, technologies, machinery and equipment, and factories, etc. (Interview, 28/12/20). Then, the enterprise assigned payable jobs to be completed for each student. During the 2 months of OJT, the college also asked educators or staff in charge of business associations to be onsite at the companies for instruction and supervision.

Different from the others, respondent VC1 said that the cooperation between her college and the enterprises is very close and effective (Interview, 16/12/20). This cooperation partly expresses in setting up OJT and training content. This means that the enterprises refer to the major and training process of the student to offer suitable OJT programs. It also expresses the mutual communication between the college and enterprises, during, and after OJT. In the pre-OJT period, enterprises send their staff to the college to organize seminars to introduce students to the company and OJT programs, and at the same time, the college also takes students on actual visits to the enterprises. During the ongoing OJT process, the two sides have always maintained regular communication.

Two typical former Dual VET models conducted at the HVCT and Lilama2 institutions succeeded in reaching an agreement on all three sides, including the government, the institute, and the enterprise, in establishing and developing framework curricula (TVET Vietnam News, 2017). This is one important factor that contributed to the success of the German, Japanese, and other developed countries in Dual VET development. A job-oriented approach is the key for vocational institutions to be sustainable. Notwithstanding, as reported by the ADB (2020), the cooperation between vocational institutions and enterprises in the Vietnamese VET system lacks of cohesion. Through the analysis above, it is apparent that the college-enterprise cooperation in Vietnam is still a bit shallow. The role of the enterprise should be getting involved as much as possible right from the start of a Dual program to set up training curricula, etc.

4.9.2. Enterprises' perspectives

When asked about what content the interns should be trained during each OJT session, only 36% of respondents answered that their companies relied on colleges' curriculum and the training majors of students to set up the OJT content. Most companies provided the interns with OJT programs based on their own actual status of manufacturing and trading, regardless the relevance of the training majors of students.

Respondent AE6 said that the purpose of his company when offering OJT programs is to have a large number of short-term workers to ensure nonstop manufacturing progress (Interview, 10/1/21). These interns might or might not come from relevant training majors, but they were still provided training to be competent to work as required. The important thing here is that the level of tasks for these interns to do is simple, including hands-on work following the instructions of the trainers.

Of the respondents, 100% answered that the content of OJT was created by enterprises solely based on the actual situation of manufacturing processes. No enterprise paid enough appropriate attention to and traced the real processes of in-school learning to the extent of specialized knowledge and skills the students have been being trained in.

When asked, “Apart from the given schedule, are there any chances for students to raise their voice related to work or upgrading advanced knowledge and skills?”, nearly a half of the respondents (46%) said that they have often organized pre- and post-meetings during the OJT process. In addition to this, if there was any problem or request, students could talk to direct supervisor/trainer or during the meetings. According to respondent AE7, in an OJT period, the number of tasks assigned to the interns was fixed as a plan, and if he or she wanted to have comprehensive practice to upgrade their skills or try practicing with advanced machines or tools, it must be approved by the directors of the company (Interview, 4/1/21). The procedure of getting approved often took from several days to 1 week. According to respondent AE7, OJT schedule should be carried out as planned to ensure the compatibility with the prescribed framework curriculum.

Regarding the process of carrying out an OJT program, according to respondent AE1 (Interview, 6/1/21), when preparing to enter the peak stage, the production line might be short of manpower in some segments, so the company would contact the partner colleges to get the interns to work. Then, the college arranged a schedule for the OJT based on the curriculum and actual in-place training progress before sending out its students to the factory. At the company, the interns were assigned tasks to be done and were paid monthly under the supervision and guidance of the trainers who are senior technicians or technical managers of the company. The working positions of the interns were determined depending on the actual situation of the production line. All interns worked at the same level, with no distinction between the good and the poor.

4.10. Students’ evaluations on the real implementation of OJT programs

Peter (2012) states that the Student Outcomes Survey is a method to measure a learner’s satisfaction with the training quality, in which the participants are asked to rate their satisfaction with different aspects of their training, grouped under three themes: teaching, assessment, and generic skills and learning experiences. Trinh (2003), Tran (2006), Mori et. al (2009), and Vu (2018), in their research, studied on the Vietnam’s VET system and the college-enterprise cooperation and particularly point out the shortcomings and suggest solutions to move forward, but no student satisfaction survey has been conducted.

This study uses 5-level ascending Likert scale questions for respondents to rate their satisfaction toward the implementation and quality of the undergoing Dual VET in terms of business association activities.

Of the questionnaire respondents, 60.5% did not agree that OJT brought them the chances to upgrade their practical skills or understand the production technologies of enterprises (Table 4 – OE7). Based on the survey, 52.6% said that the specialized knowledge acquired from their colleges was not utilized or applied during the OJT process (Table 4 - OE8). Only 2.7% of respondents agreed that the knowledge and practical skills learned at their colleges are similar to or consistent with OJT (Table 4 – OE10). Similarly, only 3% indicated that there is compatibility of machines and equipment between their colleges and enterprises (Table 4 – OE11). Moreover, only 5.6% stated that they were respected by the enterprises' staff, while the number who disagreed is 51.5% (Table 4 – OE13). Most of respondents (69.3%) indicated that they could not freely express their personal ideas and desires related to OJT training content (Table 4 – OE14). Surprisingly, up to 68.9% of respondents stated that the knowledge acquired from OJT was not useful for them (Table 4 – OE15). Based on the survey, 69.3% did not feel more confident in their expertise and majors after completion of OJT (Table 4 – OE16). Up to 71.1% of all respondents from the six research sites were unsatisfied with the knowledge and skills to be trained in from OJT and 70.9% concluded that the OJT programs were not as effective as they expected (Table 4 – OE18 & OE19).

4.11. Summary

As mentioned before, there have been many Vietnamese researchers who have discussed and suggested solutions to optimize the current VET system. Vo (2019b) suggests a mutual responsibility of colleges and enterprises in setting up training curriculum. Tran (2006), Nguyen (2009), Nguyen (2013), and Phan (2017) suggest the solutions of managing college-enterprise cooperation, including raising the perception of community on the importance of job-oriented training, upgrading the targets and program content of the training cooperation, developing human capital and facilities, and managing in-school and in-company training. Mori et. al. (2009) state the importance of business association in vocational training and suggest solutions to improve this cooperation.

However, different from other studies, this research targeted the most significant factor in the structure of a Dual VET system that is OJT. OJT illustrates how well the college-enterprise cooperation maintained and developed. A good OJT program also means an effective Dual VET model.

Conclusion

5.1. Major findings

The increase in the number of vocational institutions in Vietnam is not proportional to improvement in the quality of vocational trainees. Vocational institutions have increasingly focused on building and developing relationships with businesses, but this is not sufficient. The purposes of this study are to investigate the satisfaction level of vocational learners with the existing Dual VET programs in Vietnam, to identify the most important component in developing the Dual VET system and to determine the

factors affecting the effectiveness of Dual VET in Vietnam. The findings have answered the two research questions by measuring assessments of individuals and organizations relevant to VET on the importance of high-quality OJT programs.

a. Most sampled vocational students did not have positive feedback toward the OJT programs they have undergone

The majority of vocational students in this study said that OJT was not as effective as expected. During OJT, they were not given chances to upgrade their practical skills and understanding about the production technologies of enterprises. Specialized knowledge equipped in the colleges was not used in the OJT and there was a difference between the colleges' equipment and the enterprises'.

b. The more partner enterprises, the better the quality of OJT

As shown in the data analysis of section 4.8, the researcher concluded that the number of enterprises affiliated with the sampled vocational colleges under this study is still small. The fact that there are too few partner enterprises will make the colleges face certain difficulties and challenges. The vocational educators also expressed concern that the lack of associated enterprises may not lead to sustainable development for the vocational college in coming years.

c. A high-quality OJT program is a key factor in facilitating the sustainable development of the Dual VET system in Vietnam

Most vocational students reported that they have often participated in one or two OJT sessionsin a year, and each OJT session lasted 1 – 3 months. Additionally, according to educators and enterprises' staff, the time distributed for learning at the colleges is from 7 – 8 months, and the 2 – 3 remaining months are for OJT at the companies, and OJT is organized for each faculty in a year. After comparing three perspectives, the researcher concluded that OJT is held once a year in a period of 2 – 3 months for at least each faculty of the six sampled colleges of the study. Not to mention, some faculties of some colleges have no OJT implemented in a year. All the while, the total study time for 1 year at all nationwide vocational colleges is 10 months (TVET VietnamNews, 2017). It can be concluded that there is significant difference between the theory and practice time distributed in a year in most of the research sites under this study. The duration for OJT is too limited.

According to all the research respondents, there is a lot of work to be done in OJT, including learning the company's rules and regulations, working safety laws, working styles, and doing assigned tasks. Three months seems to be insufficient to achieve truly effective OJT in which every student has the chance to formulate their own ideas related to the training content as well as to get comprehensive training. The data showed that 3-month OJT was not as effective as expected. Interns need more time to learn details about the optimal operation of machinery and production processes. In addition, they need time to upgrade their skills and other advanced knowledge required for their specialization. Furthermore, during

unexpected incidents occurring in the OJT process, the interns can learn to deal with the situation on their own before asking for help.

One of the arguments of this study is that each OJT should last more than 3 months in duration. A longer condensed period should be enough to achieve the highest efficiency, that is the most beneficial for both the colleges and enterprises.

In the Dual VET system in Germany, the participants learn the theoretical knowledge of their occupation of choice at schools and practical skills at companies on an alternate basis for 1 week or 1 month (Hockenos, 2018). Under the German Dual system, an apprentice often spends 60% of their time in the workplace and just 40% in the classroom, but the time distributed for theory and practice is interwoven in 1 week or 1 month.

Regarding evaluation methods, a small number of interviewees from enterprises believe that pre- and post-tests are important for organizing each OJT program. Under such a program, the tests are composed of questions related to occupational knowledge, attitudes, and skills of the interns relying on the real machinery and equipment of the enterprises. Additionally, in accordance with in-progress curricular programs at colleges, interns are assessed for their progress in particular areas of professional skills.

The cooperation between vocational colleges and enterprises is a win-win situation, so colleges need to ensure they provide the company with qualified interns good enough to fulfill the OJT requirements, and vice versa, and companies need to return to the colleges better outcomes through serious training and accurate evaluation systems. From this interpretation, as mentioned in the initial arguments by the researcher, it could be concluded that pre- and post- tests of OJT are very important and significant for measuring an intern's progress after OJT.

On the other hand, for effective implementation of the progress tests before and after OJT, it is important to set up a system of evaluation criteria and methods with agreement from enterprises and colleges. According to the enterprise respondents, most companies have no evaluation criteria or method, and have one-sided or non-comprehensive evaluations in terms of knowledge and hands-on skills that solely. In order to conduct a comprehensive evaluation, the interns should be assessed in all three respects of OJT, including knowledge, hands-on skills, and attitudes/disciplines, like three sides of an isosceles triangle. Most enterprise respondents said that their companies have never used any methods to evaluate their interns' progress. A minority mentioned evaluation toolkits and regular meetings and reports of supervisors or mentors. In this study, the researcher suggests some effective evaluation methods for partner enterprises to use as follows:

1. Select appropriate evaluation techniques right from the beginning of OJT programs.
2. Choose the right evaluation tools, including observations, tests, surveys, interviews, and reports/performance records.

For the compatibility of the training contents of OJT, Most questionnaire respondents gave negative feedback on the quality of the OJT they have experienced and suggested that students should participate in the right OJT programs. This means that the content to be trained in needs to fit with their specialized major at the colleges. As mentioned by one interview respondent, a streamlined design of training content/agendas for OJT should be based on mutual discussions and agreements between both colleges and partner enterprises in relation to students' majors, competence and motivations, and actual progress of training curriculum at the colleges.

To foster engineers with practical and creative abilities, most vocational colleges in Vietnam have given their students opportunities to experience and become accustomed to the actual sites where engineers and technicians solve complicated problems in the real world, rather than through theoretical learning alone. As part of these efforts, many vocational colleges have provided OJT programs as a compulsory subject for all students at least once a year or once in a whole 3-year course. The most significant feature of OJT is to provide students the opportunity to obtain practical business experience and acquire a clear sense of purpose in their education. In this regard, the researcher proposes a feasible design for an OJT program to be applied at nationwide vocational colleges as below:

1. Students of any industrial major must be included in OJT at a company whose production purpose corresponds to that industrial sector.
2. Students in OJT should be like employees under training, and should be given the opportunity to extensively understand the production line, techniques, operation of machines and equipment, etc., through skill-specific tasks and mentoring. Vital as it is, OJT should be dynamic and skill centered for students to effectively grasp the practical learning in the workplace.
3. OJT should provide students the opportunity to utilize the theories, principles and ideas learned in the colleges under supervision at the actual sites in the most efficient way possible, and gaps in trainees' knowledge should be filled through live-work machines and practice.
4. Specific tasks assigned to the interns should have the potential to develop the professional skills of the interns.
5. The interns have the opportunity to raise their voices related to the compatibility of the training content and assigned tasks as well as the chance to acquire extensive knowledge and skills in relation to their majors.

5.2. Policy recommendations

Policy recommendations drawn from 5.1 are as follows: (i) the more partner enterprises there are, the better the quality of OJT; (ii) an OJT program should be longer than 3 months; (iii) it is essential to have specific criteria and methods for evaluating the trainees before and after OJT; (iv) the training content of OJT must be compatible with the majors of students.

In addition, it was found that in order to set up and develop a successful Dual VET model especially effective OJT programs, it is essential to strengthen close coordination and support among three

stakeholders: vocational institutions, enterprises, and the government at all levels. The government plays an important role in creating labor and labor use demand, and making policies for vocational institutions to develop. This cooperation should be student-centered that regularly take account of students' minds, aspirations and needs relating to training activities. Accordingly, it is necessary for the DVET and the MoLISA to facilitate the college-enterprise cooperation through legal corridor and listen more carefully to the vocational students' needs to have more appropriate adjustments in training curricula, especially in the time distribution between in-school learning and in-company training and in the training content of OJT programs. If possible, the DVET should organize a number of large-scale Dual pilot models, with the participation of a large number of students and focusing on OJT.

Abbreviations

DVET: Directorate of Vocational Education and Training

HVCT: Ho Chi Minh Vocational College of Technology

MoLISA: Ministry of Labour – War Invalids – Social Affairs

OJT – On-the-job Training

VET – Vocational Education and Training

Declarations

Ethical approval was obtained from the Directorates of six sampled sites and the consents to participate were obtained from all research participants.

Availability of data and materials

The datasets used during this study are available in https://docs.google.com/document/d/1ChPhwwvHa1FJZuC7Ad3Zy1BzkaP37okI/edit?usp=share_link&ouid=107164444973679068280&rtpof=true&sd=true

Competing interests

The author declares that there is no competing interests.

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Figures

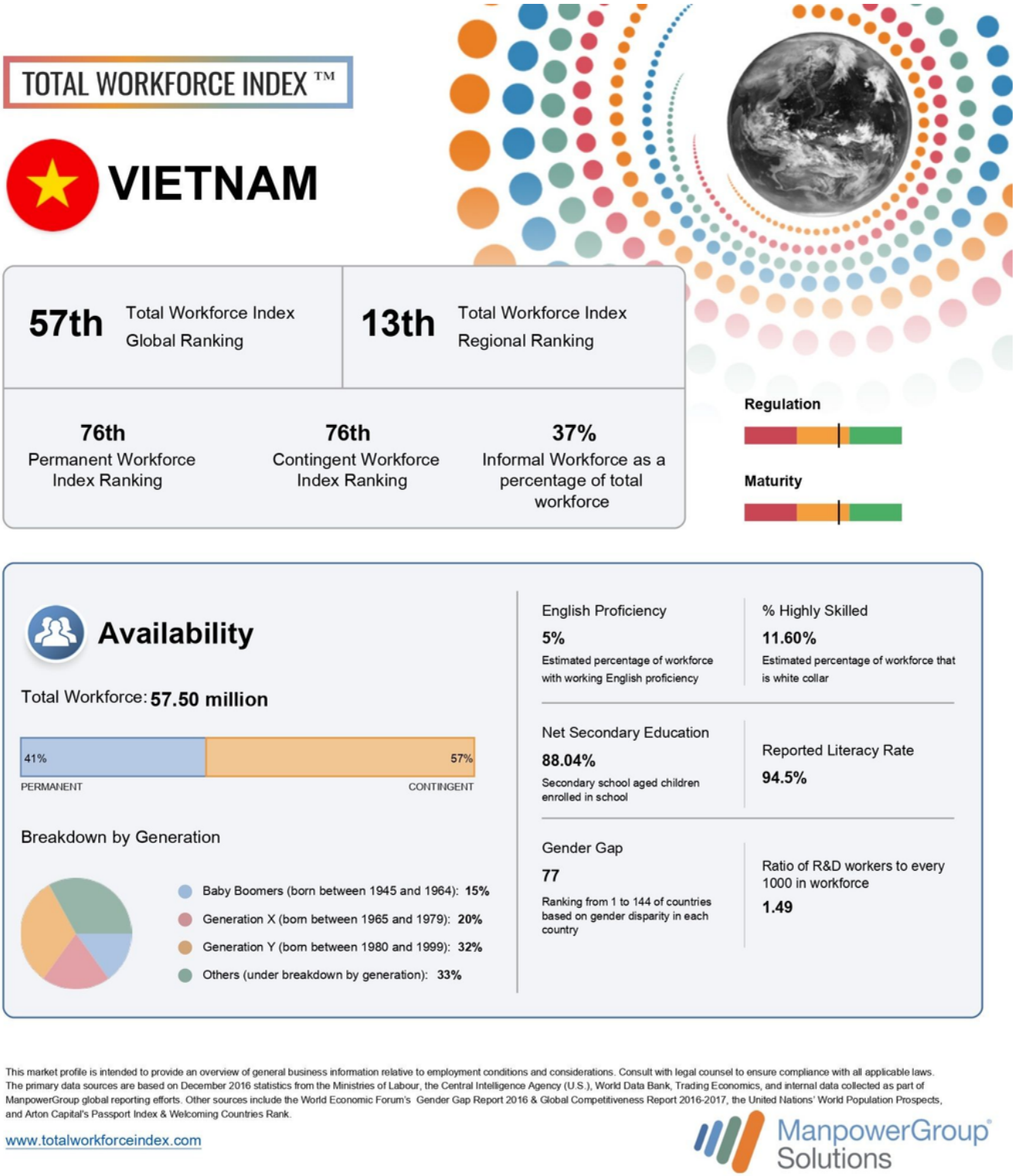


Figure 1

Figure 1.3. Vietnam's ranking regarding skilled labor

(Source: Nguyen, 2019)

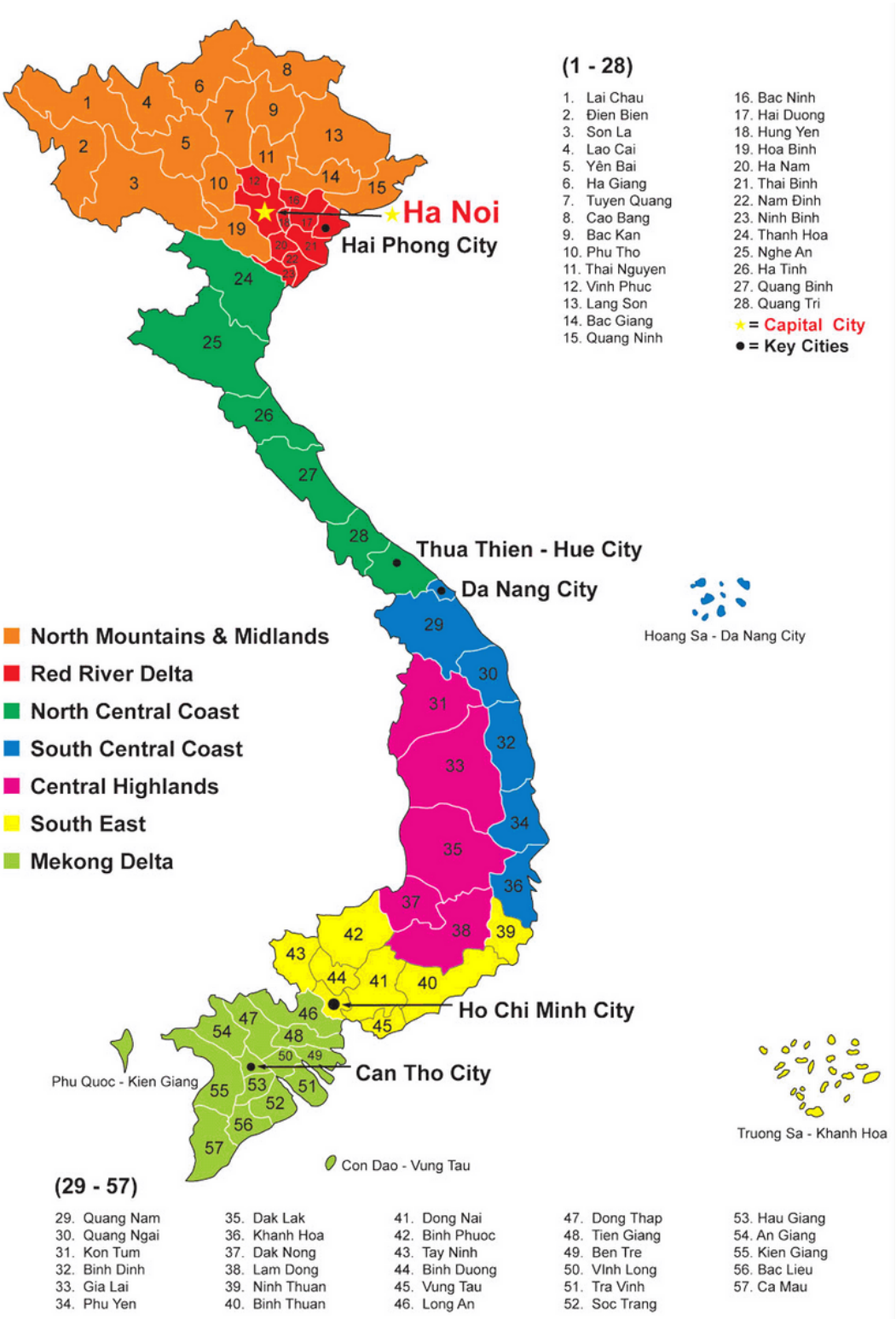


Figure 2

Figure 2.1. Map of Vietnam *(Source: quyhoachvietnam.com)*

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.853	.854	7

(a)

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.940	.940	6

(b)

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.925	.927	19

(c)

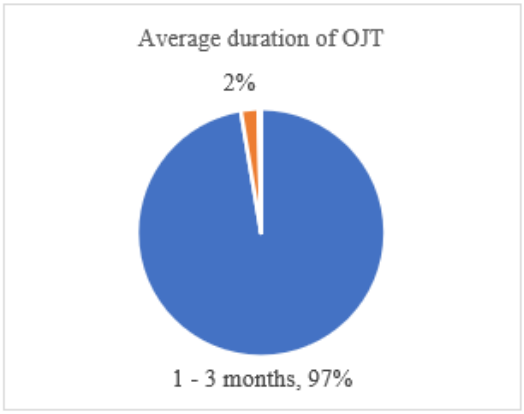
Figure 3

Figure 3.1a*:* Reliability analysis of scale "FE"

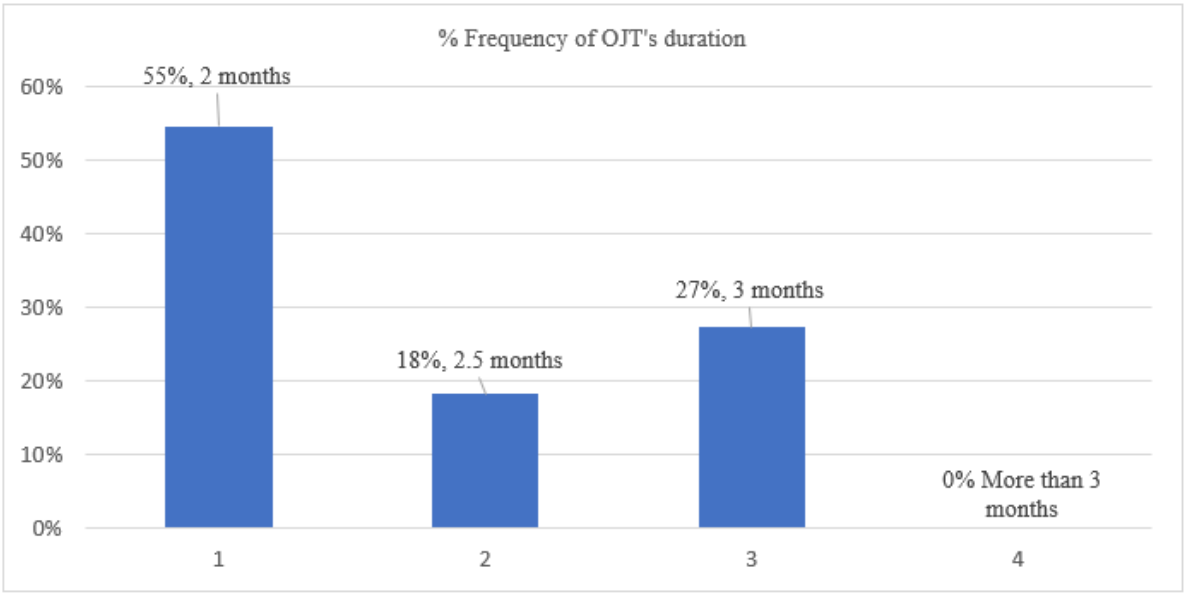
Figure 3.1b: Reliability analysis of scale "BAA"

Figure 3.1c: Reliability analysis of scale "OE"

(Source: Cronbach's alpha analysis by the researcher)



(a)



(b)

Figure 4

Figure 3.3a. Average duration of OJT

(Source: Creation from Questionnaire Responses)

Figure 3.3b: OJT average duration

(Source: Creation from Interviewees' Responses)

Supplementary Files

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- Appendices.docx