

THE INFLUENCE OF WORK ENVIRONMENT AND SUPERVISION TOWARDS QUALITY OF OCCUPATIONAL SAFETY AND HEALTH ON WORK PRODUCTIVITY OF PT. PERMATA HIJAU GROUP (PHG) AND PT. VVF, INDONESIA

Chairil Almy

School of Graduate Studies
Management & Science University
Shah Alam, Selangor, MALAYSIA

Corresponding Author's E-mail: almychairil@gmail.com

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ABSTRACT

The implementation of the occupational health and safety program since two decades has become a growing issue and has received serious attention in many countries along with the complexities of business world, industry, and employment. The high number of work injuries, injuries and labor pains in major corporations around the world has led to the rise of various programs related to occupational health and safety. This research aims to examine the influence of work environment and supervision towards the issues of occupational safety and health and its impact on work productivity. This study was conducted at PT. PHG and PT. VVF companies in Indonesia with the number of respondents of 200 employees. The results of this research demonstrate that work environment, supervision, occupational safety and health, and work productivity are good. Therefore, it can be suggested that both companies either PT. PHG or PT. VVF Indonesia, that the quality of occupational safety and health could be enhanced through the improvement of facilities in work environment that meet work safety standards, and increase supervision activities in the efforts of improving the quality of occupational safety and health. Thus, by improving the occupational safety and health, the rise of work productivity can be reached. The limitation of this study reflects the same measurement model in implementation on two different companies. For future research, it is advised to employ the same model to test the same numbers of population with the larger number of samples, so that the research data will be more accurate.

Keywords: *work environment, supervision, occupational safety and health, work productivity*

1.0 INTRODUCTION

The implementation of the occupational health and safety program since two decades has become a growing issue and has received serious attention in many countries along with the complexities of business world, industry, and employment. The high number of work injuries, injuries and labor pains in major corporations around the world has led to the rise of various programs related to occupational health and safety. The policy is also strengthened by the emergence of health and safety laws to protect and provide a sense of justice for workers.

The maintenance of occupational safety and health is not only important for employees but also for an organization. The main reason is that if occupational safety and health are maintained, not only the reduced medical costs incurred by the company for medical expenses, recuperation costs, and premium on health insurance, but also to improve job satisfaction, lower absenteeism and conserve high productivity levels (Siagian, 2009).

PT. VVF Indonesia as a palm oil manufacturing company with Foreign Investment status (PMA) must have a better standard in handling and controlling health and safety risks as set out by OHSAS, especially in OHSAS 18001: 2007. At the time of its operation in Indonesia, the company has to take into account the occupational health and safety procedures as defined in the Decree of the Minister of Manpower and Transmigration No. 609 of 2012 or other provisions governing occupational health and safety procedures. Several forms of these requirements seem to have become a controlled system of the organizational culture.

While PT. Permata Hijau Group (PHG), as a palm oil manufacturing company with the status of Domestic Investment (PMDN), has met the health and safety standards and procedures set forth in the Act of the Minister of Manpower and Transmigration No. 609 of 2012. The work environment is everything that exists around the employees that can influence them in carrying out the tasks they carry. The work environment at PT. Permata Hijau Group (PHG) and PT. VVF Indonesia identified from the physical environment and non-physical environment. The physical environment consists of lighting, room cleanliness, regular work facilities and noise caused by the density and frenzied sound of processing machines while the non-physical environment consists of the behavior of members of the organization, both leadership and employees along with supervision and work procedure, even the form of the work itself. All of these factors can affect accidents and health of an employee (Anoraga, 2011).

The rapid development of production activities at PT. Permata Hijau Group (PHG) and PT. VVF Indonesia raises the consequences of increasing work intensity resulting in increased risk of accident and occupational health, but this condition always unnoticed by employees. Employees should have a responsibility to meet occupational safety and health requirements but often ignoring the conditions. This condition ultimately brings problems to safety and health. Then it has an impact on worker productivity.

2.0 LITERATURE REVIEW

2.1 Work Productivity

Employee productivity implies an understanding of the economic, philosophical and system concepts. As an economic concept, productivity is related to the business or activity of employees to produce services or goods that are profitable for the company. As a philosophical concept, productivity contains a life view and a mental attitude that always strives to improve the quality of life where today is better than yesterday, and the tomorrow must be better than today. While from the aspect of system concept, productivity is the achievement of a purpose, where there is a cooperation or integrity from the relevant elements as a system. In general according to (Griffin, 2004) productivity is a measure of economic efficiency that summarizes the value of output relative to the value and input used to create it. This is inter-connected with the socio-economic notions, hence socio-economic issues are intertwined that they are distinguishable but indivisible (Pillai and Ahamat, 2018).

Horner and Duff (2001) in Hajikazemi (2017) define that productivity is the output to size how much we produce. Productivity quantities how much we generate per unit of input from a client perspective, higher productivity leads to lower costs. The advanced productivity creates more competitiveness, more satisfied customers, higher turnover rate and increasing profits. Raviyanto (1991) in Sutrisno (2013) says productivity includes a mental attitude that always has the view that today should be better than yesterday and tomorrow should be better than today. While Klinger and Nanbaldian in Gomes (2005) states productivity is a multiplication function of the worker effort, which supported by high motivation, with the ability of employees. Thus, employees with high work effort may not necessarily have high

productivity if not supported by motivation or willingness and ability, especially intellectual ability.

2.2 Work Productivity Indicators

Productivity embraces two dimensions of quantity and quality. Larger productivity indicators include work efficiency and effectiveness, goal achievement, customer satisfaction and quality of work (Palvalin et al., 2013). The measure of work productivity, according to Sutrisno (2013) is as follows:

1. Ability. Having the ability to perform the task, an employee's ability greatly depends on their skills and professionalism at work. They provide the power to complete the tasks they bring.
2. Increasing the results. Trying to improve the results achieved. The result is one that can be felt both by those who work and enjoy it. So, it needs the effort to utilize work productivity for each involved in a job.
3. Work spirit. The determination to be better than previous. This indicator can be seen from the work ethic and results achieved in the next day compared to the previous day.
4. Self-development. Improving work skills with a self-development done by looking at challenges and expectations workers faced. The stronger the challenge, the greater self-development can be done. Also, the urge to be better will improve the worker ability.
5. Quality. Always attempt to improve the better quality. Quality is the result of work indicating the quality of an employee's work. Therefore, improving quality aims to deliver the best results, which will be very useful for the company and itself.
6. Efficiency. Comparison between the results achieved with the overall resources used. Inputs and outputs are aspects of productivity that give significant results to employees.

2.3 The Factors Affecting Work Productivity

Labor productivity is influenced by several factors either related to the labor itself and other factors such as skill level education, discipline, attitudes and work ethic, motivation, nutrition and health, income level, social security, work environment, work climate, technology, means of production, management, and achievement according to Ravianto, 1991 in Sutrisno (2013). The productivity in organizations according to Taiwo (2010) is principally influenced by various internal and external variables, which is categorized as follows:

1. Common factors: climate, geographical distribution of raw materials, fiscal and credit policy, adequacy of public utilities and infrastructure facilities, etc.
2. Organizational and technical factors: ie, integration level, percentage capacity, size, and stability of production, etc.
3. Human factors: including labor-management relations, social and psychological working conditions, incentive wages, physical fatigue, labor practices, etc.

Thus, employee productivity is determined by three factors; the employees, the company, and the environment. The factors from the employee related to ability, personal quality, education, experience, and some demographic factors. While the factors that come from the company is related to company policy and supporting facility. Management policy relates to compensation, occupational health and safety programs, insurance coverage and compensation issues. Supporting facilities include technology, production equipment, occupational safety and health, and work climate. In addition, productivity is also related to the external environment of companies such as government policy and industrial or company relationship.

2.4 Occupational Safety and Health

Occupational safety and health refer to the physical and physiological conditions of labor caused by the work environment. If companies implement safety and health actions effectively, fewer workers will suffer from injuries or diseases due to their work in the company (Schuler and Susan, 1999). Mathis and Jackson (2009) explain the definition of occupational safety and health is a closely related term. The extensive health term refers to physical, mental, and emotional stability in general. A healthy individual is free from illness, injury, and emotional problems that disturb one's activity generally. While safety refers to the protection of a person physically, the ultimate goal of effective workplace safety in a company is to prevent work-related injuries or accidents.

Then Monday (2008) defines safety and health separately as: "Occupational safety covers the protection of employees from injuries caused by accidents including stress and violence in the workplace, while occupational health is referring to freedom from physical and emotional illness ". According to Rivai (2014) occupational safety and health refer to the psychological-physical and psychological conditions of labor caused by the work environment provided by the company. If the company carries out safety and health measures effectively, fewer workers will suffer short or long-term injuries or illnesses because of their work at the company.

From the definitions can be explained that the occupational safety and health is a preventive policy to avoid the occurrence of countless incidents of occupational safety and health. However, work safety is more oriented towards workers' contacts with equipment, machinery or other means of production, so companies should be able to provide a method for workers such as training, equipment inspection systems and work environments, work procedures and use of security during work, in order to avoid various incidents. Many deaths, injuries and work-related pains happened due to the poor working environment and lack of safety and health programs. As a result, the company faces lawsuits and big fines. In addition, poor occupational safety and health conditions also have implications for a poor relationship between management and labor such as low job satisfaction, worker moral change, and decreased work productivity (Schuler and Susan, 1999).

Large amounts of expenses often arise because of losses due to deaths and accidents in the workplace and the loss of occupational diseases. In addition, there are also associated with psychological conditions. The feelings of the workers who consider themselves insignificant and their low involvement in work may be more difficult to quantify, as are the symptoms of stress and low quality work life.

2.5 The Effects of Work Environment, Occupational Safety and Health Towards Employees' Productivity

Erfanti and Puspitasari (2013) analyze the effect of work environment, occupational safety and health towards employees' productivity (case study in PT. Nyonya Meneer). The finding demonstrated that work environment physically and non-physically (social and psychology) is directly working on occupational safety and health as well as indirectly influence employee productivity. Likewise, occupational safety and health directly affect employees' productivity. Kaligis (2013) studied about the influence of occupational safety and health implementation program towards employee productivity stated that the implementation of occupational safety and health will offer a significant effect in employee productivity if the two aspects are applied simultaneously. It has been proven through the test result; partial/individual test and simultaneous test. In partial test with t-distribution results $t_{b1} = 0,152$ is between $-2,763$ and $+2,763$ and $t_{b2} = 0,232$ is between -2763 and $+2763$. They do not give significant effect (H_0 is accepted) because separated. While in simultaneous test with F-distribution results $F\text{-value} = 15,311 \geq 3,354$ (H_0 is rejected), there is a significant influence.

Busyairi et.al (2014) conducted the research about the influence of occupational safety and health towards employee productivity. Based on multiple regression analysis showed that

occupational safety variable (X1) work environment, job safety equipment, work procedure), has a positive contribution and significant towards the level of employee productivity (Y) for 65,5%. Busyairi et.al added that more complete facilities and a serious attention to occupational safety in PT.XYZ will progressively affect employees' productivity. Based on multiple regression analysis showed that occupational health variable (X2) (medical examination, break time, ergonomics) which measure from employee productivity (Y), has a positive contribution and significant towards the level of workforce productivity for 21.8%. Therefore, the more complete facilities and a serious attention to occupational health in PT. XYZ will increasingly influence employees' productivity. Occupational safety and health variable significantly influence productivity variable. It is proven by the SPSS version 19 calculation which indicated the F-value 47,085 (significance F = 0,000) greater than F table 3,09 or Sig. F < 5% (0,000 < 0,05) then H_0 is rejected which means occupational safety program (X1) and occupational health (X2) the two variables influence or have a positive contribution and significant towards employee productivity (Y).

Research of Jimoh et.al (2017) entitled influence of supervision on labor Productivity on construction sites in Abuja-Nigeria, showed that statistically significant difference between productivity with professional supervision and without professional supervision (foremen) since small and medium construction sites were considered and experienced foremen were involved. The study also concluded that the most significant factor militating against effective supervision on construction sites are communication breakdown, inexperienced and uncommitted supervisor, inadequate documentation of records, lack of motivation and unclear instruction were ranked highest. While the most not influential factor is misapplication of construction schedule / inadequate information, undefined construction package to be executed, labour disloyalty, determination of labor ability, irregular meeting.

In his study, Firmansyah (2011) explored about analysis of quality supervision and its influence to the level of workforce productivity in PT. PLN (Persero) distribution of West Java and Banten UPJ Majalaya (Case Study in Financial Supervisor, Administration and Human Resource). The study found out quantitatively showed the quality supervision in increasing the level of employee productivity, such as, training, employees' mental and physic ability, relation between supervisor and subordinates of PT. PLN (Persero) Distribution West Java and Banten UPJ Majalaya.

Sihotang et.al (2016) conducted a study about the relation between the supervision function of Section Head and nurse productivity in Regional Public Hospital dr. Pirngadi Medan. Based on the research finding, it can be concluded that the supervision function of section head in regional public hospital dr. Pirngadi Medan has been held well. The result of sub-function of section head is formative, restorative and normative showed a relatively similar value although it looks lower on the formative function. The research finding on nurse work productivity showed that nurses had a high productivity. The research finding showed that there is a high relation between supervision function of Section Head and nurse work productivity in regional public Hospital dr. Pirngadi Medan, it indicates that the better the implementation of the supervision function, the better work productivity of the nurses.

3.0 METHODOLOGY

This study conducted in Permata Hijau Group (PHG) Company and PT. VVF Indonesia which located in PT. Kawasan Industri Medan precisely in Medan Industrial Area II Mabab, Medan Province of North Sumatra, Indonesia.

3.1 PT. VVF Indonesia

PT. VVF Indonesia was established Notary Deed Number 06 dated February 18, 2008, from Indrasari Kresnadjaja Gunadharma AH., MKn., Notary in Jakarta. Deed of Establishment approved by Minister of Justice of Indonesia in his Decision Letter number AHU-42977.AH.01.01. July 18, 2008. The articles of association were amended by Notarial Deed No. 02 dated April 06, 2011 of Deni Thanur S. E., S. H., MKn., in Jakarta, regarding the decision of the shareholders of PT. VVF Indonesia. The shareholders are VVF FZE Company Limite by 85% and VVF Limited India by 15%. Products produced by the companies consist of Fatty Acid, Fatty Alcohol and Soap Noddle.

The company has been operating since 2012. The company is domiciled at Jalan Pulau Pinang VI-VII, Medan Industrial Area Phase II, Pematang Johar, Subdistrict Labuhan Deli, Regency of Deli Serdang, North Sumatra. With the raw materials that are available in Indonesia such as Crude Palm Stearin (CPS), Palm Kernel Oil (PKO), it is expected that the company can produce the products maximally. PT. VVF Indonesia is a subsidiary of VVF Limited Group. VVF Group is a world-class manufacturer in Oleochemical industry and personal care products. The company also produces cleaner products and cosmetics for world-class companies such as Johnson & Johnson, Amway, Reckitt Beckiser, Henkel, Biersdorf (Nivea), Pfizer and others.

3.2 PT. Permata Hijau Group (PHG)

PT. Permata Hijau Group (PHG) is one of the integrated palm-oil companies which was established in 1984 with its core business engaged in the field of oil palm plantations. Currently, PT. PHG is an integrated operation which covers the entire palm oil value chain, from upstream plantations to downstream industries. The downstream industry has produced value-added products and delivered them around the world with efficient logistics solutions for customers. The achievement of PT. Permata Hijau Group (PHG) comes from the use of cutting-edge technology for factories, high-scale economies and an integration of the company's operations in order to produce quality and cost-effective products to consumers, suppliers, and communities through value-added activities. PT. Permata Hijau Group (PHG) continuously serves loyal customers in the long term, as well as responds to the ever-changing needs and market demands.

Population of this research is all employees of PT. Permata Hijau Group (PHG) and PT. VVF Indonesia with details as follows:

1. PT. Permata Hijau Group (PHG) with the number of population is 903 employees. From the population, 120 employees were chosen as the samples. Convenience sampling was applied as the sampling technique which the samples were selected directly in the research location, in which the researcher selects participants because they are willing and available to fill the questionnaires. However, from 120 questionnaires provided and willingly filled by the employees (respondents), only 111 were completely filled.
2. PT. VVF Indonesia with the population of 120 employees. From the population, the researcher selected 99 employees as the samples. Because the number of employee population is represented studied so that all of employees population were sampled. Hence, the sampling technique, in this case, is known as the census. However, from 120 questionnaires provided to be distributed to all of the employees, only 99 questionnaires are completely and collected.

3.3 Correlational Analysis Technique

Correlational analysis method was applied to know the influence and the level of relation between two variables or more. Testing and analysis of primary data on the influence of work environment and supervision on occupational safety and health and its impact on employee

productivity were carried out path analysis with SPSS. The formulation of the analysis is shown in the relationship model as follows:

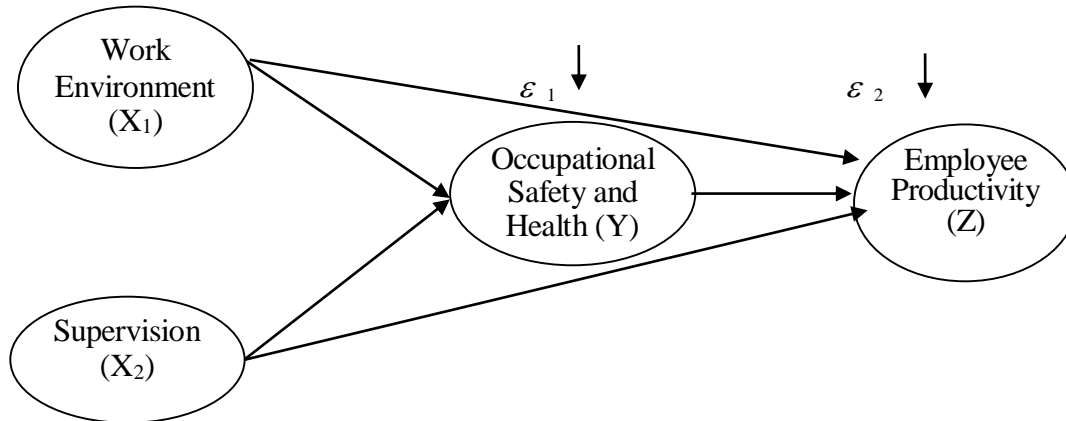


Figure 1: Conceptual framework

Figure 1 above, it can be formulated as three models of path analysis equation as follows:

$$Y = P_{yx_1}X_1 + P_{yx_2}X_2 + \varepsilon_1$$

$$Z = P_{zx_1}X_1 + P_{zx_2}X_2 + \varepsilon_2$$

$$Z = P_{zy}Y + \varepsilon_3$$

Where:

- Z = Employee Productivity
- Y = Occupational Safety and Health
- X₁ = Work Environment
- X₂ = Supervision
- P = Path coefficient
- ε = Residual

3.4 Comparative Analysis Technique (T-test)

Comparative analysis technique was used to the hypothesis about the presence or absence of significant differences between variables or models studied; between the variables and models of the influence of work environment and supervision on occupational safety and its impact on productivity at Permata Hijau Group (PHG) company as the domestic investment company and PT. VVF Indonesia as the foreign investment company. The t-test was performed by SPSS with the formulation as follows:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\frac{s}{\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}}$$

$$s = \frac{n \sum f_1 x_1^2 - (\sum f_1 x_1)^2}{n(n-1)}$$

t = calculated t value

\bar{x}_1 = average value of variables and analytical model of Foreign Investment Company.

\bar{x}_2 = average of variable value and model of analysis at Domestic Investment Company.

n_1 = Variable observation sample and model of Foreign Investment Company.

n_2 = Variable observation sample and company model of Domestic Investment.

S = Standard deviation

4.0 ANALYSIS OF RESULTS

Test reliability was carried out by using internal reliability test from alpha value. This test was only performed once on for a group of respondents in each variable. A measure of reliability is considered reliable on alpha coefficient 0.60 (Malhotra, 2005). If the degree of data reliability more than alpha coefficient ($\alpha=0.6$), then the result of measurement can be considered as a measure with the level of the good accuracy and consistency. The results of reliability test are shown in Table 1.

Table 1: The result of test reliability

No	Variable	N of Items	Cronbach's Alpha		Meaning
			Value	Standard	
1	Employee Productivity	6	0,625	0,60	Reliable
2	Occupational Safety and Health	5	0,676	0,60	Reliable
3	Work Environment	8	0,761	0,60	Reliable
4	Supervision	9	0,757	0,60	Reliable

Source: Primary Data (processed), 2017

Table 1 describes the result of reliability test on the result of primary data collection at PT. VVF Indonesia by using 28 question items of the questionnaire. It was obtained that the alpha value in of each variable is more than Cronbach's Alpha reliability value; 0.60. Therefore, all of question items used in four research variables at PT. VVF Indonesia have satisfied aspects of consistency and reliability.

To determine the influence of work environment and supervision on occupational safety and health and its impact on employee productivity at PT. VVF Indonesia used path analysis which partially correlates all the research variables. This analysis can be proved by linear regression by using SPSS program. Regression analysis using four variables i.e. work environment (X1) and supervision (X2) as independent variables, occupational safety and health (Z) as mediator variable and employee productivity (Y) as the dependent variable. Independent variables will influence the dependent variable. The influence of these two variables is reinforced by mediator variable. The effect of the variables from the SPSS output results is shown in the following table.

4.1 The Influence of Work Environment and Supervision on Occupational Safety and Health at PT. VVF Indonesia

From the SPSS output of the table above, it can be created linear equations as follows:

$$Z = \rho ZX_1 + \rho ZX_2 + \varepsilon_1$$

$$Z = 0,240X_1 + 0,143X_2$$

The formulation above explains that:

1. The beta regression coefficient for the influence of work environment = 0.240. It means that each improvement of work environment in a unit then, it can increase occupational safety and health at PT. VVF Indonesia of 0.240 units. Hence, if the work environment can be improved, the occupational safety and health at PT. VVF Indonesia will be influenced to be better. The beta regression coefficient for the influence of supervision = 0.143 explains that every increasement of supervision activity in a unit can improve occupational safety and health at PT. VVF Indonesia for 0.143 units.
2. Correlation coefficient $R = 0.338$ clarifies that there is a positive correlation between work environment (X_1) as well as supervision (X_2) and occupational safety and health (Z) at PT. VVF Indonesia with a close correlation of 33.8%. It is categorized as the weak correlation because the value is below 0.5. Coefficient of determination equal to $(R^2) = 0.114$. It indicates the role of the variable of the work environment (X_1) and supervision (X_2) simultaneously influence occupational safety and health (Z) at PT. VVF Indonesia only for 0.114 (11.4%). While the residual value of the increase of the occupational safety and health is 0.886 (88.6%). It is affected by other variables out of the model. Therefore, there are a lot of other variables which play a role in influencing occupational safety and health at PT. VVF Indonesia. If supervision activity can be increased, so, PT. VVF Indonesia will have a better occupational safety and health.

Table 2: Results of regression analysis of the effect of work environment and supervision on occupational safety and health at PT. VVF Indonesia

	Unstandardized Coefficients		Standardized Coefficients	t	Sig
	B	Std. Error	Beta		
Constants	1.451	0,700		2,073	0,041
Work Environment (X_1)	0,354	0,166	0,240	2,136	0,035
Supervision (X_2)	0,229	0,180	0,143	1,275	0,205
Correlation coefficient	0,338	a. N of data 99 respondents b. Independent variable X_1 = Work Environment X_2 = Supevision c. Variabel mediating: occupational safety and health			
R Squwere	0,114				
F value	6,188				
Sig	0,03				

4.2 The Influence of Occupational Safety and Health on Employee Productivity at PT. VVF Indonesia

Based on the SPSS output in the above table, it can create the linear equations as follows:

$$Y = \rho YZ + \varepsilon_2$$

$$Y = 0,264X$$

The formulation above explains as follows:

1. The beta regression coefficient for the influence of occupational safety and health equal to = 0.264. It clarifies that the improvement of occupational safety and health in a unit will affect the increase in employee productivity at PT. VVF Indonesia for 0.264 units. Therefore, if the occupational safety and health can be increased more so that the employee productivity at PT. VVF Indonesia will be better.
2. The coefficient of determination of (R²) = 0.070 explains that the role of the variable of occupational safety and health (Z) in influencing the employee productivity at PT. VVF Indonesia equals 0.070 (7.0%). While the residual value of the increase in employee productivity is 0.930 (93.0%) affected by other variables outside the model. Thus, there are many other variables which take a role in affecting occupational safety and health at PT. VVF Indonesia.

Table 3: The results of regression analysis of the influence of occupational safety and health on employee productivity at PT. VVF Indonesia

	Unstandardized Coefficients		Standardized Coefficients	t	Sig
	B	Std. Error	Beta		
(Constant)	3,177	0,271		11,723	0,000
Occupational Safety and Health	0,188	0,070	0,264	2,695	0,008
Correlation Coefficient	0,264	a. N of data 99 respondents b. Variable mediating: occupational safety and health c. Dependent variable: employee productivity			
R Squere	0,070				

4.3 The Effect of Work Environment and Supervision on Employee Productivity at PT. VVF Indonesia

From the output of SPSS in the table above can be made linear equations as follows:

$$Y = \rho YX_1 + \rho YX_2 + \varepsilon_3$$

$$Y = 0,122X_1 + 0,294X_2$$

The above equation describes as follows:

1. The regression coefficient beta for the influence of work environment is equal to = 0,122 explaining the increases in work environment in a unit. Hence, it will be able to improve work productivity of employees at PT. VVF Indonesia of 0.122 per unit. Thus, if the work environment is increasing then the productivity of employees at PT. VVF Indonesia will get better. The regression coefficient beta for the influence of supervision is equal to = 0,294 explaining every increase in supervision activity of a unit. Hence, it will be able to increase the productivity of employees at PT. VVF Indonesia of 0.294 per unit. Thus if the supervision activities are increasing then the level of employee productivity at the PT. VVF Indonesia will be better.

2. Correlation coefficient of $R = 0.372$ explains that there is a positive relationship between work environment (X_1) and supervision (X_2) with work productivity (Z) at PT. VVF Indonesia with a close correlation of 37.2%. The relationship is relatively weak because it is below 0.50. Determination Coefficient which is equal to $(R^2) = 0,138$, explains about the role of work environment (X_1) and supervision (X_2) both are affecting work productivity (Z) of employees at PT. VVF Indonesia which is 0.138 (13.8%). While the rest (residual value) of the increasing of employee productivity which is 0.882 (88.20%) is influenced by other variables outside these two. Thus there are many other variables that play a role in affecting employee productivity at PT. VVF Indonesia.

Table 4: The result of regression analysis of effect of work environment and supervision against work productivity

		Unstandardized Coefficients		Standardized Coefficients	t	Sig
		B	Std. Error	Beta		
1	Constants	2,010	0,491		4,093	0,000
	Work environment (X_1)	0,127	0,116	0,122	1,097	0,275
	Supervision (X_2)	0,334	0,126	0,294	2,646	0,010
	Correlation coefficient	0.372	a. Number of data 99 respondents b. independent variable X_1 = Work environment X_2 = Supervision c. Dependent variable: work productivity			
	R Square	0,138				
	F Count	7,697				
	Sig	0,001				

Based on the three models of regression equation above, hence can be formed one diagram equation model line which explains the direct or indirect relation between them. The two-lane model is as follows:

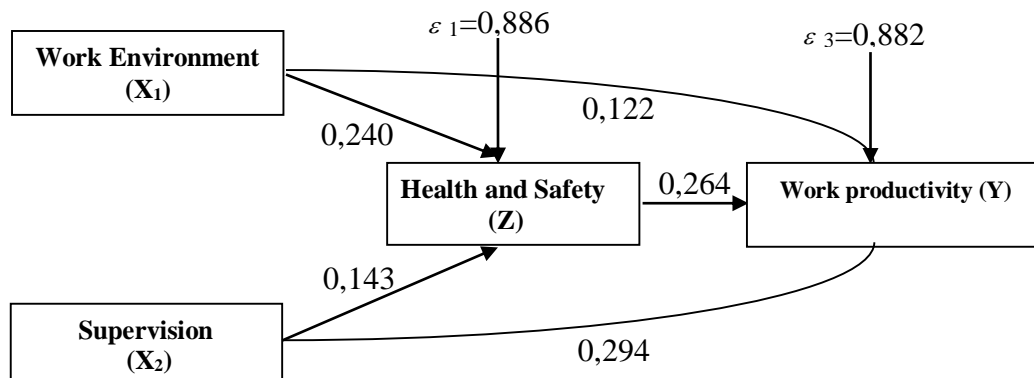


Figure 2: Equation Model Line

Table 5: Direct and indirect influence of line chart

No	Influences between variables	Model	Beta
	Direct influence		
1	Effects of work environment on occupational safety and health	X_1-Z	0,240
2	The influence of supervision on occupational safety and health	X_2-Z	0,143
3	Effects of occupational safety and health productivity	$Z-Y$	0,264
4	Effects of work environment on work productivity	X_1-Y	0,122
5	Effects of supervision on work productivity	X_2-Y	0,294
	Indirect influence		
1	Effect of work environment on work productivity through occupational safety and health.	X_1-Y-Z	$(0,240 \times 0,264) = 0,0634$
2	Effect of supervision on work productivity through occupational safety and health.	X_2-Y-Z	$(0,134 \times 0,264) = 0,0354$

The table above explains that the working environment and supervision are both directly involved in improving the occupational safety and health of employees at PT. VVF Indonesia. Then the work environment and also supervision also play a direct role in improving the productivity of PT. VVF Indonesia. But the role of work environment in improving safety and health and in improving employee productivity at PT. VVF Indonesia is relatively bigger compared to supervision. Indirectly, occupational safety and health can increase the role of work environment relationship with employee productivity at the PT. VVF Indonesia with a coefficient of mediation of 0.0634.

4.1 Hypothesis Testing

Hypothesis testing using regression analysis type to know the influence between variables is conducted by using the value of significance (P value) at the level of significance of 0.05. Hypothesis testing can be seen in Table 6.

Table 6: Hypothesis testing

No	Influence between variables	Beta	Sig
1	Effect of work environment on occupational safety and health	0.240	0.035
2	The influence of supervision on occupational safety and health	0.143	0.205
5	Effects of occupational safety and health on employee work productivity	0.264	0.008
3	Effect of work environment on work productivity	0.122	0.275
4	Effect of supervision on work productivity	0.294	0.010
6	Effect of work environment on work productivity through occupational safety and health	0.0634	
7	Effect of supervision on work productivity through occupational safety and health	0.0354	

Based on the value of regression coefficient in Table 6, it can be explained that:

1. Work environment significantly affects the occupational safety and health of employees at PT. VVF Indonesia with a significant value of 0.035 or smaller than the value limit of 0.05. Thus it can be decided to accept the H_{a1} hypothesis and reject the H_{o1} hypothesis. Supervision has no positive and insignificant effect on worker occupational safety and health at PT. VVF Indonesia with a significant value of 0.205 or greater than the value limit of 0.05. Thus, it can be taken a decision to accept the H_{o2} hypothesis and reject the H_{a2} hypothesis.
2. Employee safety and health have a positive and significant effect to work productivity of employees at PT. VVF Indonesia with a significant value of 0.008 or less than the 0.05 significance limit. Thus it can be taken a decision to accept that the H_{a3} hypothesis rejects the H_{o3} hypothesis. Work environment has a positive and insignificant effect on work productivity of PT. VVF Indonesia with a significant value of 0.275 or greater than the significant limit, 0.05. Thus it can be taken a decision to accept that the H_{o4} hypothesis and reject the H_{a4} hypothesis.
3. This research is supported by Agustin (2016) research with the title "the influence of physical work environment to work productivity of employees at PT. Federal International Finance Branch of Samarinda". Physical work environment influences on work productivity of employees at PT. Federal International Finance Branch of Samarinda. Supervision has a positive and significant effect on work productivity at PT. VVF Indonesia with a significant value of 0.010. The value is smaller than the value limit which is 0.05. Thus, it can be taken a decision to accept that the H_{a5} hypothesis reject the H_{o5} hypothesis.

4.2 Differences of the Influence of Work Environment and Supervision on Occupational Safety and Health

The value of beta regression coefficient of the influence of work environment on occupational safety and health condition at Permata Hijau Group (PHG) Company with the status as the domestic investment company is relatively higher than at PT. VVF Indonesia with the status as the foreign investment with the coefficient value of 0.415 units. While the influence of the work environment at PT. VVF Indonesia is only 0.240 units. The influence of work environment in both companies is significant with the significance value < 0.05 . Table 7 explains the value of beta regression coefficient of the influence of work environment on occupational safety and health condition at Permata Hijau Group (PHG)

Table 7: Differences of analysis model of the influence of work environment and supervision in occupational safety and health at PT. VVF Indonesia adn Permata Hijau Group Company

Model 1	PMA Company		PMDN Company	
	Standardized Coefficients	Sig	Standardized Coefficients	Sig
	Beta		Beta	
Work Environment (X_1)	0,240	0,035	0,415	0,001
Supervision (X_2)	0,143	0,205	0,134	0,248

Source: Primary Data (processed), 2017

While the value of beta regression coefficient of the influence of supervision on occupational safety and health condition at PT. VVF Indonesia with the status as the foreign investment company is slightly higher than Permata Hijau Group (PHG) Company with the coefficient value of 0.143. Whereas the influence of supervision at Permata Hijau Group (PHG)

company is only 0.1313 units. The influence of supervision in the two companies is not significant with significance value <0.05 . Differences and similarities of the model 1 can be proven of the t-analysis results as follows:

Table 8: Different test model analysis of the effect of work environment and supervision on occupational safety and health at PT. VVF Indonesia and Permata Hijau Group Company

Model 1	PMA Company	PMDN Company	Difference	Sig.
The Influence of Work Environment and Supervision on Occupational Safety and Health	0,1915	0,2735	-0,0820	0,543

Source: Primary Data (processed), 2017

Table 8 clarifies the model 1 analysis of the influence of work environment and supervision on occupational safety and health at domestic investment company is slightly higher than foreign investment company with the difference value of 0.0820. However, the difference model is not significant, with the significance value of 0.543 or less than 0.05.

4.3. Differences of the Influence of Occupational Safety and Health on Employee Productivity

The value of beta regression coefficient of the influence of occupational safety and health on employee productivity at PT. Permata Hijau Group (PHG) with the status as Domestic Investment Company (PMDN) is relatively higher than at PT. VVF Indonesia as Foreign Investment Company (PMA) with the coefficient value of 0.471. While the influence of occupational safety and health at PT. VVF Indonesia is only 0/264 units. The influence of occupational safety and health in the two companies is significant with significance value < 0.05 . Table 9 explains the value of beta regression coefficient of the influence of occupational safety and health on employee productivity at PT. Permata Hijau Group (PHG).

Table 9: Differences of model analysis of the influence of occupational safety and health on employee productivity at PT. VVF Indonesia and at PT. Permata Hijau Group (PHG)

Model 2	PMA Company		PMDN Company	
	Standardized Coefficients	Sig	Standardized Coefficients	Sig
	Beta		Beta	
Occupational Safety and Health (Z)	0,264	0,008	0,471	0,000

Source: Primary Data (processed), 2017

4.4 Differences of the Influence of Work Environment and Supervision on Employee Productivity

The value of beta regression coefficient of the influence of work environment on employee productivity at Permata Hijau Group (PHG) company as the foreign investment company is relatively higher than the influence at PT. VVF Indonesia as the domestic investment company with the coefficient value of 0.280 units. The influence corresponds with the significance value <0.05 . While the effect of work environment at PT. VVF Indonesia is only 0.122 units. The effect is not significant with the significance value >0.05 . Table 10 clarifies the value of beta regression coefficient of the influence of work environment on employee productivity at Permata Hijau Group (PHG).

Table 10: Differences of model regression analysis of the influence of work environment and supervision on employee productivity at PT. VVF Indonesia and at PT. Permata Hijau Group (PHG)

Model 3	Perusahaan PMA		Perusahaan PMDN	
	Standardized Coefficients	Sig	Standardized Coefficients	Sig
	Beta		Beta	
Work Environment (X_1)	0,122	0,275	0,280	0,029
Supervision (X_2)	0,294	0,010	0,113	0,371

Source: Primary Data (processed), 2017

However, the value of beta regression coefficient of the effect of supervision on employee productivity at PT. VVF Indonesia as foreign investment company is slightly greater than the influence at Permata Hijau Group (PHG) Company with the coefficient value of 0.294. The influence is significant with the significance value < 0.05 . While the effect of supervision at Permata Hijau Group (PHG) company is only 0.113 units. The effect is not significant with the significance value > 0.05 . Differences and similarities of the model 3 can be proven from the result of t-analysis as follows:

Table 11: Testing differential model analysis of the influence of work environment and supervision on employee productivity at PT. VVF Indonesia and PT. Permata Hijay Group (PHG)

Model 3	PMA Company	PMDN Company	Difference	Sig
The Influence of Work Environment and Supervision on Employee Productivity	0,2080	0,1980	0,0100	0,960

Source: Primary Data (processed), 2017

Table 11 explains analysis model 3 of the influence of work environment and supervision on the increasing of employee productivity at PMA Company is slightly higher than PMDN Company with the difference of 0.010. However, the different model is not significant with the significance value of 0.960 or less than 0.05. Based on several models of regression analysis above, it can be concluded that the direct or indirect correlation as in Table 11.0.

Table 12: The differences of direct and indirect influence of path analysis model at PT. VVF Indonesia and PT. Permata Hijau Group (PHG)

No	Influences between Variables	PMA Company		PMDN Company	
		Model	Beta	Model	Beta
Direct Influence					
1	The influence of work environment on occupational safety and health.	X ₁ -Z	0,240	X ₁ -Z	0,415
2	The influence of supervision on occupational safety and health.	X ₂ -Z	0,143	X ₂ -Z	0,134
3	The influence of occupational safety and health on employee productivity.	Z-Y	0,264	Z-Y	0,471
4	The influence of work environment in employee productivity.	X ₁ -Y	0,122	X ₁ -Y	0,280
5	The influence of supervision on employee productivity.	X ₂ -Y	0,294	X ₂ -Y	0,113
Indirect Influence					
1	The influence of work environment on employee productivity through occupational safety and health.	X ₁ -Y-Z	(0,240x0,264) = 0,0634	X ₁ -Y-Z	(0,415x0,471) = 0,195
2	The influence of supervision on employee productivity through occupational safety and health.	X ₂ -Y-Z	(0,134x0,264)= 0,0354	X ₂ -Y-Z	(0,134x0,471) =0,063

Source: Primary Data (processed), 2017

Table 12 clarifies either Permata Hijau Group (PHG) company as domestic investment company or PT. VVF Indonesia as foreign investment company has the work environment and supervision activities which play a direct role in improving occupational safety and health quality as well as employee productivity. However, the roles of work environment and supervision have different values on each relationship. Occupational safety and health indirectly works well either at Permata Hijau Grup (PHG) company as domestic investment or PT. VVF Indonesia as foreign investment can increase the role of correlation between work

environment and supervision with employee productivity. Differences and similarities of the total model analysis can be proven by the result of analysis t difference as follows:

Table 13: Testing differential model analysis of direct and indirect influence PT. Permata Hijau Group and PT. VVF Indonesia

Model Analysis	PMA Company	PMDN Company	Difference	Sig
Total model	0,165971	0,195857	0,029886	0,665

Source: Primary Data (processed), 2017

Table 13 explains the total of model analysis of the influence or work environment and supervision on the increasing of occupational safety and health quality and its impact on employee productivity at PMDN company is slightly higher than the difference value of 0.029886. However, the difference of the model is not significant with significance value of 0.665 or less than 0.05.

5.0 DISCUSSION

Generally, work environment significantly influences occupational safety at PT. VVF Indonesia with the significance value of 0.035 or less than the 0.05 significance limit. Therefore, it can be taken a decision to accept the hypothesis H_{a1} and to reject hypothesis H_{o1} . This condition is caused by the creation of the adequate work environment with the facilities and work infrastructure is a humane demand in the company to ensure the occupational safety and health (Anoraga, 2011). Human factors and social environment will affect the employees' attitudes and behavior in doing careless work, not careful and lead to the occurrence of errors in work (Anoraga, 2011). While, supervision has no a positive influence and not significant on occupational safety and health at PT. VVF Indonesia, with the significance value of 0.205 or higher than the limitation of significance value of 0.05. Therefore, it can conclude that hypothesis H_{o2} can reject H_{a2} . This research finding is supported by the previous research which was conducted by Hendriani and Mangapul (2013) on the influence of training and supervision on occupational safety and health (OSH) and Employee Achievement at PT. Turba Jaya Engineering in Pangkalan Kerinci.

The result of the research explained that supervision directly influences on occupational safety and health at PT. Truba Jaya Engineering. This condition is due to supervision is one of the significant aspects of the workplace that intends to maximize the potential of human research. Even though the employees do not encounter problems in finishing their job, but they must have the appropriate instructions and supervision to ensure that they carry out their tasks properly and with a minor risk of injury (Leiter, 2001). Occupational safety and health influences positively and significantly on employee productivity at PT. VVF Indonesia with the significance value of 0.008 or less than the limitation of significance value 0.05.

Hence it can be summarized that hypothesis H_{a3} is accepted and H_{o3} is rejected. This finding is supported by the research of Busyairi et.al (2014) on the influence of occupational safety and health on employee productivity. Based on multiple regression analysis, it shows that the variable of occupational safety (X1) (work environment, safety equipment, work procedures) as measured by the variable of work productivity (Y). On the other hand, this result is not supported by the research of Jumanto and Ade (2017) about The Influence of Occupational Safety and Health (OSH), Discipline and Supervision on Employee Productivity of Cutting Crimping Section at PT. Sumitomo Wiring Systems Batam Indonesia. The result of

Jumanto and Ade's research claimed that there was no positive and significant influence on occupational safety and health (OSH) (X1) on employee productivity (Y).

Work environment has a positive influence but not significant towards employee productivity at PT. VVF Indonesia with the significance value of 0.275 or higher than the limitation of significance value of 0.05. Consequently, it can be taken a decision to accept hypothesis H_{04} and to reject hypothesis H_{a4} . This result is supported by the study of Agustin (2016) entitled *The Influence of Physical Work Environment on Employee Productivity at PT. Federal International Finance Branch Samarinda*. The research finding noted that physical work environment affected employee productivity at PT. Federal International Finance Branch Samarinda.

Supervision affects positively and significantly on employee productivity at PT. VVF Indonesia with the significance value of 0.010 or more than the limitation of significance value 0.05. Therefore, it can be concluded that hypothesis H_{a5} is accepted and hypothesis H_{05} is rejected. This finding is supported by the study of Firmansyah (2011) about the analysis of supervision quality and its impact on the level of employee productivity at PT. PLN (Persero) West Java and Banten UPJ Majalaya Distribution. Firmansyah's research quantitatively proposed the level of supervision quality in improving employee productivity. This condition is caused by regular supervision of subordinates in order to increase employee productivity and overall performance. Regular supervision acts as the mechanism of continuous monitoring. In this case, the supervisor should compare employee's performance with the standards and expectations. Supervision also allows the employee to express their concerns and ask questions immediately related to their tasks (Omwasore, 2014). By having the good relationship with employees, the manager who is as the supervisor can monitor productivity more consistently. In turn, the supervisor can detect concerns and solve problems rapidly (Zivnuska & Shaw, 2007).

Work environment significantly influences occupational safety and health at PT. Permata Hijau Group (PHG) with the significance value of 0.001 or less than the limitation of significance value 0.05. Hence, it can conclude that H_{a1} is accepted and H_{01} is rejected. This condition is caused by the creation of the adequate work environment with the facilities and work infrastructure is a humane demand in the company to ensure the occupational safety and health (Anoraga, 2011).

Human factors and social environment will affect the employees' attitudes and behavior in doing careless work, not careful and lead to the occurrence of errors in work (Anoraga, 2011). Supervision has no significant influence on occupational safety and health at PT. Permata Hijau Group (PHG) with the significance value of 0.248 or higher than the limitation of significance value 0.05. Therefore, it can be summarized that accepts hypothesis H_{02} and rejects hypothesis H_{a2} . This research finding is supported by the previous research which was conducted by Hendriani and Mangapul (2013) about the influence of training and supervision on occupational safety and health (OSH) and employee achievement at PT. Turba Jaya Engineering in Pangkalan Kerinci. The result of the research explained that supervision directly influences on occupational safety and health at PT. Truba Jaya Engineering. This condition is due to supervision is one of the important aspects of the workplace that intends to maximize the potential of human research. Even though the employees do not encounter problems in finishing their job, but they must have the appropriate instructions and supervision to ensure that they carry out their tasks properly and with a minor risk of injury (Leiter, 2001).

Furthermore, occupational safety and health significantly influence employee productivity at PT. Permata Hijau Group (PHG) with the significance value of 0.00 or less than the limitation of significance value 0.05. Hence, it can conclude that hypothesis H_{a3} is accepted and H_{03} is rejected. On the other hand, the result of the study is not supported by Jumanto and Ade (2017) about the influence of occupational safety and health (OSH), discipline and supervision on employee productivity of cutting crimping Section at PT. Sumitomo Wiring Systems Batam Indonesia. The result of the study explains there was no positive and significant influence on occupational safety and health (OSH) (X1) on employee productivity (Y). This condition is caused by regular supervision of subordinates in order to increase employee productivity and overall performance.

Regular supervision acts as the mechanism of continuous monitoring. In this case, the supervisor should compare employee's performance with the standards and expectations. Supervision also allows the employee to express their concerns and ask questions immediately related to their tasks (Omwasore, 2014). This is considered an open door concept and connected to the entrepreneurial orientation. A recent study demonstrated on 105 private hospitals in Indonesia, it is evidenced that entrepreneurial orientation of hospital organizations in Indonesia proved has a significantly positive influence on organizational performance in the disruptive environment condition (Dewi and Ahamat, 2018). The hospital's business model innovation is influenced by the entrepreneurial orientation and the strength of collaboration between management with physicians, who can jointly improve organizational performance (Dewi and Ahamat, 2018). While, the collaboration role between the supervisor and hospital employees are crucial to enhance the service quality and patient satisfaction in any organizational set-up. This illustrates the critical role of human capital in organizational ecosystem. The human capital is shaped by social equity hence the well being of individual and the community (local or global) increases institutional-individual relationship (Ahamat, 2017).

6.0 CONCLUSION

Based on the obtained research findings, it can be concluded that, PT. VVF Indonesia, work environment influences positively and significantly on occupational safety and health. Supervision influence positively but not significantly on occupational safety and health. Supervision positively influences but not significant on occupational safety and health. Occupational safety and health positively and significantly influence employee productivity. Work environment influences positively but not significantly on occupational safety and health. Supervision has a positive and significant influence on occupational safety and health. Occupational safety and health play a role in improving the influence of work environment and supervision on employee productivity.

At PT. Permata Hijau Group (PHG), work environment influences positively and significantly on occupational safety and health. Supervision has a positive influence but not significant for occupational safety and health. Occupational safety and health significantly influence employee productivity. Work environment significantly and positively affects on employee productivity. Supervision positively influences but significantly on employee productivity. Occupational safety and health have a role in improving the influence of work environment on employee productivity. Occupational safety and health play a role in increasing the effects of supervision on employee productivity.

Furthermore, for future study it is suggested here that one of the ways to progress research, is to challenge the traditional approaches and to employ scientific approach in observing, measuring, analyzing, and concluding management phenomena (Ahamat, 2014). This could be achieved by embedding qualitative research strategies. Using structured interviews and personal observation driven to the discovery of key emerging themes, which may not have been uncovered as explicitly if only non-qualitative approaches had been applied (Ahamat, 2019). This could further explains the complex nature of influence of work environment and supervision towards quality of occupational safety and health in both companies.

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