The effect of job stress to employee performance: Case study of manufacturing industry in Indonesia

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Abstract. The manufacturing industry in Indonesia is proliferating, contributing almost a quarter of Indonesia's gross domestic product (GDP). This development encourages companies engaging in the industry to increase production capacity. As a result, the employees are demanded to work harder as the manufacturing sector rises. Overwork can result in fatigue, stress and various health problems. However, work stress is a common problem faced in almost all industries and often affects employee performance. Therefore, the main purpose of this study is to analyze the effect of work stress on employee performance in the manufacturing industry in Indonesia. The sample of this research is 93 employees at the staff level who work in various manufacturing companies. This study uses partial structural data analysis techniques using SPSS version 20.0. These techniques are used to analyze the effect of work stress and work environment on employee performance. The results showed that work stress and work environment has a significant impact on employee performance with the value of $R = 0.972$. Based on the survey result, non-standard working hours and poor relationship with colleagues/superiors contribute to the creation of work stress which has an impact on low performance. Thus, this study suggests the organization to perform a proper stress management as a solution to work stress by implementing flexible working hours and holding discussion forums and meetings between employees. Therefore, employees will be more motivated to improve work productivity.

1. Introduction
Worker's comfort and mental health, including protection from injury and health problems due to physical or emotional illness, are the main demands of workers apart from financial demands, because many employees experience stress, which affects the counterproductive results of work and the quality of life of workers. There are two criteria of work stress, namely Eustress and Distress. Eustress is a stress that is beneficial to health by providing motivation to its object so that it has a positive impact on workers and the organization, while distress is a stress that is not beneficial or has a negative impact, drains energy that cannot be overcome by oneself and can even have fatal consequences for workers and the organization. Work stress is a condition that arises from the interaction between humans and work and is characterized by human changes that force them to deviate from their normal function [1]. Work-related factors, according to Materson [2], work stress is influenced by large workloads and responsibilities, changes in the work system, lack of supervision, inadequate training, unsupportive work environment, and poor relationship with coworkers. Another factor that contributes to creating work stress according to Shimazu and Kosugi [3] is the number of long working hours with short rest periods and a lot of work demands.
Likewise, in the health side Selye [4] shows how stress is a risk factor for various health problems and diseases, which he labeled maladaptation. This health contributes to lower company performance and high staff turnover, and absences due to mental health problems such as anxiety, depression and other emotional disorders, as well as minor physical illnesses such as headaches, heart disease, stomach problems and obesity [5].

Based on the above theories, work stress can have a negative impact on employee performance in various work sectors. In the industrial sector, work pressure from superiors affects workers to become frustrated, which results in high turnover in the company [6]. Then in the banking sector, stress causes the performance of workers to decline and affects rewards [7]. Likewise in the medical industry sector, several studies have been done by Al Rasasi, Al Faisal, El Sawaf, Hussain and Wasfy [8] examined work-related stress among nurses in Dubai AlMazrouei and Pech [9] also examined the determinants of stress among doctors in Dubai. Both research studies concluded that doctors and nurses experience high levels of stress-related due to workloads. Khan and Khurshid [10] also stated that increasing pressure at work would reduce employee welfare.

Currently, the manufacturing industry in Indonesia is the backbone of national economic growth. Based on data released by the United Nations Statistics Division in 2016, Indonesia is ranked fourth in the world out of 15 countries whose manufacturing industries contribute more than 10 percent to Gross Domestic Product (GDP). With the rapid development of the industry, market demand is increasing and this is an opportunity for manufacturing industry players. The success rate of industrial development is determined by the quality of its human resources, in this case the employees working in this field. Assessment of employee performance in the manufacturing industry is determined by several factors, factors that are in accordance with the manufacturing industry are factors from Mathis and Jackson [11] theory, namely: Quality of results (level of customer satisfaction), ability to work together (time of the process of changing production activities / changeover time), quantity of results (capacity utilization), timeliness of results (production and achievement schedules), attendance (absentee level).

The demand for production targets to maintain customer satisfaction creates an increased workload at a certain time, causing work stress on employees to meet the quality and quantity of production. Indicators of workload, according to Hart and Staveland [12], are factors of task/job demands, effort/labor, and performance. Work pressure that is continuous can lead to decreased employee productivity as a result of physical and mental fatigue. Low productivity levels have an impact on not achieving production targets.

These various work stress problems prompted researchers to make further study about "The Effect of Job Stress on Employee Performance: Study Case of Manufacturing Industry in Indonesia". The main purpose of this study is: to examine the correlation between work stress factors and employee performance and how work stress affects employee performance; to identify what work stress factors greatly contribute to decreasing performance among manufacturing employees; to develop a solution for the problems that occurs in the organization in relation to work stress that affects job performance. Based on the arguments from previous research, the problem formulation will be analyzed in this study, such as: What work stress factor is the most significant in affecting employee performance/productivity? How does job stress affect employee performance? How is the innovation for stress management on workers? What is the right solution to increase employee performance productivity through stress management?

2. Research Method
This research was conducted in large companies in Indonesia that are engaged in the textile and garment manufacturing industry, electronics, food and beverage, building materials, and automotive. A total of 93 respondents gave acceptable responses for further data processing. Data were analyzed using descriptive statistics (Pearson Correlation & Multiple Regression).

The dimensions of work stress analyzed in this manufacturing company are: Workload and responsibility factors consisting of this indicator: excessive workload; the workhour factors includes these indicators: long working hour, lack of time to complete task, and short break; environmental factors and work facilities consist of these indicators: unsupportive work support tools and situation; wages and rewards factors consist of these indicators: lack of rewards for job appreciation; the
relationship with colleagues and superiors includes these indicators: poor communication and coordination with co-workers.

Work stress levels has an impact on the performance appraisal. The indicators for the assessment are: Ability factors consisting of accuracy in completing work; precision and seriousness at work; timeliness of results, understanding of work instructions, cooperation and knowledge; and attendance. Based on this explanation, a hypothesis can be formulated that job stress significantly affects employee performance in the manufacturing industry. The research framework can be seen in figure 1 below.

**Figure 1.** The framework of the influence work stress on employee performance

This hypothesis to be tested are that work stress affects employee performance, work environment affects employee performance, stress and its interactions with the work environment affect employee performance. The operational definition of the variables are explained in table 1.

In this study, data collection was carried out by researchers by distributing questionnaires, which the employees were given a list of statements to fill in which would then be used as data sources in the study. The researcher gave several questions and this research also includes literature study as a theoretical basis. Data will be collected through direct distribution of online questionnaires using a Likert scale to measure respondents' perceptions. Measure scale (1) totally disagree, until score (5) strongly agree. Contains 3 variables using 20 indicators. This study discusses about work stress and an effect on employee performance, the target respondents of this study are staff level employees in the production division, QA / QC, general affairs, personnel, finance, and sales and marketing.

The data obtained were evaluated in terms of validity, reliability, correlation, and regression. The validity test is conducted to measure the instrument's ability to measure the concepts of concern. This test uses Pearson's correlation statistic which is calculated by the equation (1). Where $X_i$ is a score for variable $X$ which has an average value of $x$. The variable $S_X$ is the standard deviation of variable $X$ and $n$ is the number of samples. The level of statistical significance $r$ can be measured by the $t$ statistic obtained by the equation (2).

The data is evaluated in terms of reliability which measures the consistency of the indicators' answers to a instruments. Reliability was evaluated using Cronbach's Alpha. The data are also evaluated in terms of the suitability of the data distribution to the normal distribution. This evaluation uses the Kolmogorov-Smirnov test. The association between each independent variable and the dependent variable was evaluated using Pearson Correlation Coefficient. This coefficient value that is greater than 0.60 indicates a strong relationship, and becomes the basis for conducting multi-variable regression analysis. Finally, the relationship between job stress variables, work environment variables and employee performance variables is evaluated by linear model (3). Where $X_1$ represents Work Stress, $X_2$ represents Work Environment, and $Y$ represents Employee Performance.
Table 1. Research variable and indicators

| Variable                        | Dimension                                                                                                                                                                                                 | Scale |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Work Stress [2]                 | • Excessive workload                                                                                                                          |       |
|                                 | • Change of work system                                                                                                                      |       |
|                                 | • Salary and rewards                                                                                                                        |       |
|                                 | • Lack of supervision                                                                                                                        |       |
|                                 | • Inadequate training                                                                                                                        |       |
|                                 | • Unsupportive work environment                                                                                                               |       |
|                                 | • Poor relationship with co-workers                                                                                                           |       |
| Work Stress [3]                 | • Total of working hours                                                                                                                     | Ordinal |
|                                 | • Work demands                                                                                                                             |       |
| Work environment [13]           | • Physical work environment                                                                                                                  | Ordinal |
|                                 | • Non-physical work environment                                                                                                               |       |
| Employee performance [11]       | • Quality of results                                                                                                                        | Ordinal |
|                                 | • Quantity of results                                                                                                                        |       |
|                                 | • Teamwork and productivity                                                                                                                  |       |
|                                 | • Timeliness of results                                                                                                                      |       |
|                                 | • Attendance                                                                                                                                |       |

\[
r = \frac{\sum(x_i - \bar{x}) (y_i - \bar{y})}{(n-1)s_x s_y} \quad (1)
\]

\[
t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} \quad (2)
\]

\[
Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 \quad (3)
\]

3. Result and Discussion

The results of the questionnaire show that textile and garment industry employees are the largest respondents with a percentage of 58.06% of the total 93 respondents. Most of the respondents were male (56%) and were in the productive age between 21 and 30 years (75.27%). Based on the profiles of respondents in table 2, most of them had a service period of between 1 and 5 years in the current company (60.22%) and work in the Sales and Marketing division (40.86%).

The questionnaire instrument was tested in terms of validity using Pearson's correlation coefficient and in terms of reliability using Cronbach's alpha statistics. The indicators and associated question for the survey are shown in table 3.

| Variable                        | Classification                                                                 | Percentage (%) |
|---------------------------------|-------------------------------------------------------------------------------|----------------|
| Age (Years)                     | 21 – 30                                                                       | 75.27          |
|                                 | 31 – 40                                                                       | 17.20          |
|                                 | 41 – 50                                                                       | 4.30           |
|                                 | 51 – 60                                                                       | 3.23           |
| Gender                          | Male                                                                          | 56.00          |
|                                 | Female                                                                        | 44.00          |
| Working period                  | < 1 year                                                                       | 25.81          |
|                                 | 1 – 5 years                                                                   | 60.22          |
|                                 | 6 – 10 years                                                                  | 8.60           |
|                                 | > 10 years                                                                    | 5.38           |
| Sub-sector industry             | Building Material                                                             | 23.66          |
|                                 | Electronic                                                                    | 5.38           |
|                                 | Textile & Garment                                                             | 58.06          |
|                                 | Food & Beverage                                                               | 11.83          |
|                                 | Automotive                                                                    | 1.08           |
The results of the calculations for the variables work stress, work environment, and employee performance are shown in Table 3. The calculation results show that all the corrected item total correlation Pearson (CITC) values are greater than the R table value. Instruments can be considered valid. The calculation results also show that Cronbach's Alpha coefficient is greater than 0.6 for all constructs. It can be concluded that the instrument is reliable.
Data distribution for three variables was evaluated in terms of normality. For this Kolmogorov-Smirnov statistics are used. The results of the calculations in Table 4 show that the data is normally distributed with a p-value > 0.05.

Some scientific literature shows the effects of long and non-standard working hours on various health outcomes, including acute reactions such as stress, fatigue, poor health, and mental illness [14]. Short rest hours and irregular working hours are the biggest contributors to work stress expressed in the mean values of 2.77 and 2.65. The average value of respondents’ opinions on job stress can be seen in Table 5.

Physical and non-physical work environment plays as an important role in work performance, job satisfaction, social relations, and physical and mental health. Based on the average dimension value, physical and non-physical work environments have a dominant influence. The decline in the quality of the work environment is caused by a work situation that is not conducive as indicated by the average value of the indicator 2.43 and the poor relationship of an individual with fellow colleagues is indicated by the average value of the indicator of 2.52 as shown in table 6.

Performance appraisal is the result of the quantity and quality achieved by an individual in carrying out his duties in accordance with the given responsibility [15]. The average value of the dimensions of cooperation and productivity shows that cooperation with colleagues (the average value of the indicator is 2.52) and the efforts of employees to increase productivity are quite good (average value of indicator is 2.51) as shown in table 7.

Table 4: Results of Normality Test of The Research Instruments

| Variable               | Statistic | df | p-value |
|------------------------|-----------|----|---------|
| Work Stress            | 0.079     | 93 | 0.196   |
| Work Environment       | 0.075     | 93 | 0.200   |
| Job Performance        | 0.076     | 93 | 0.200   |

Table 5: Respondents opinion based on Work Stress variable

| Dimensions                | Indicator                                | Respondent Opinion* | Mean | Std. Deviation |
|---------------------------|------------------------------------------|----------------------|------|----------------|
| Workload and responsibility | Big job responsibilities                 | 25 30 16 15 7 4.25   | 1.256|
|                           | Work requires high concentration         | 20 39 13 17 4 4.22   | 1.145|
|                           | High risk job                            | 19 39 18 13 4 2.40   | 1.095|
|                           | The task given is not suitable with individual’s ability. | 30 28 16 12 7 2.33   | 1.263|
| Working Hours             | Short break time                         | 17 29 18 16 13 2.77  | 1.320|
|                           | Irregular working hour                   | 21 23 21 12 12 2.65  | 1.316|
|                           | Job done better if given a longer time   | 27 30 15 14 7 2.40   | 1.261|

*Likert Scale: 1 = Strongly disagree, 2 = Disagree, 3 = Less agree, 4 = Agree, 5 = Strongly agree

Table 6: Respondents opinion based on Work Environment variable

| Dimension                  | Indicator                                | Respondent Opinion* | Mean | Std. Deviation |
|----------------------------|------------------------------------------|----------------------|------|----------------|
| Physical Work environment  | Condition of work support tools are inadequate | 26 32 16 13 6 2.37  | 1.214|
|                           | High noise level                         | 26 35 12 16 4 2.32  | 1.181|
|                           | The work situation is uncomfortable      | 18 44 14 7 10 2.43  | 1.201|
| Non-physical work environment | Subjective performance evaluation   | 24 34 17 11 7 2.39  | 1.207|
|                           | Lack of appreciation from superiors      | 22 41 17 9 4 2.27   | 1.065|
|                           | Poor relationship with coworkers         | 22 31 19 12 9 2.52  | 1.256|

*Likert Scale: 1 = Strongly disagree, 2 = Disagree, 3 = Less agree, 4 = Agree, 5 = Strongly agree
Respondents argue that working in certain industry sector and work stress variable. The ANOVA analysis results are given in conditions. The opinions regarding the data and the model, can be seen in regression model of the coefficient of determination $R^2$ during the process stress variable. The results of the chi square table and work stress variable. The results of the analysis give $R^2 = 0.946$, which indicates a high agreement between the data and the model, can be seen in table 10. This indicates that most of the variations in respondents' opinions regarding performance are predictable based on stress levels and working environment conditions. Next, ANOVA was conducted to influence the two independent variables on the dependent variable. The ANOVA analysis results are given in table 11.

| Table 7. Respondents opinion based on Job Performance variable |
|------------------|------------------|
| Dimension        | Indicator                     | Respondent Opinion* | Mean  | Standard Deviation |
| Meet The Standards | • Meet the task according to standards <br><br> • Complete tasks optimally | 1 | 2 | 3 | 4 | 5 | 2.37 | 1.214 |
| Punctuality      | • Timeliness in completing tasks<br><br> • Attendance<br><br> • Timeliness at work time | 26 | 32 | 16 | 13 | 6 | 2.32 | 1.181 |
| Cooperation and Productivity | • Support for coworkers<br><br> • Increased productivity | 26 | 32 | 16 | 13 | 6 | 2.32 | 1.181 |

*Likert Scale: 1 = Strongly disagree, 2 = Disagree, 3 = Less agree, 4 = Agree, 5 = Strongly agree

We use the crosstab and chi square test to determine the relationship between industrial sub-sector and work stress variable. The results of the chi square table, as shown in table 8 and table 9, show that there is no significant relationship between the industrial sub-sector and work stress (from Value Pearson chi-square and Asy. Significance 2-sided). This means that respondents argue that working in certain industrial sub-sectors has no effect on stress levels. The case processing between industry sector and stress variable describes that all of 93 data were processed by crosstab. There is no missing data found during the process and the validity level is 100%.

| Table 8. Crosstab of Work Stress variable based on industrial sub-sector |
|------------------|------------------|
| Industry         | The task given is not suitable with my ability. |
|                  | Strongly Agree | Less Agree | Agree | Disagree | Strongly Disagree | Total |
| Building Material| 7 | 9 | 3 | 1 | 2 | 22 |
| Electronic       | 0 | 3 | 0 | 2 | 0 | 5 |
| Food & Beverage  | 5 | 3 | 0 | 0 | 3 | 11 |
| Textile & Garment| 17 | 13 | 13 | 9 | 2 | 54 |
| Automotive       | 1 | 0 | 0 | 0 | 0 | 1 |
| Total            | 30 | 28 | 16 | 12 | 7 | 93 |

| Table 9. Chi-square of Work Stress variable (the task given is not suitable with my ability) based on industrial sub-sector |
|------------------|------------------|
| Chi-Square Tests | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 24.977a | 16 | .070 |
| Likelihood Ratio | 27.949 | 16 | .032 |
| Linear-by-Linear Association | .056 | 1 | .813 |
| N of Valid Cases | 93 |

* a 19 cells (76.0%) have expected count less than 5. The minimum expected count is .08

Here we report the results of the regression analysis test. We begin with the results of the calculation of the coefficient of determination $R^2$. This coefficient states the match between the data and the regression model. The results of the analysis give $R^2 = 0.946$, which indicates a high agreement between the data and the model, can be seen in table 10. This indicates that most of the variations in respondents' opinions regarding performance are predictable based on stress levels and working environment conditions. Next, ANOVA was conducted to influence the two independent variables on the dependent variable. The ANOVA analysis results are given in table 11.

| Table 10. Results of multiple regression tests for correlations of work stress and work environment variables (X1, X2) to employee performance variables (Y) |
|------------------|------------------|
| Model | R | R square | Adjusted R square | Std. Error of the Estimate | Durbin-Watson |
| 1 | .972a | .946 | .944 | 1.189 | 2.383 |
Next, we discuss the correlation between each independent variable: Work Stress and Work Environment and the Employee Performance dependent variable. Using the Pearson correlation coefficient, a correlation coefficient of 0.722 is obtained at statistical significance $t = 2.767$ for the regression test between work stress and employee performance, as shown in Table 12 and Figure 2. For the correlation between Work Environment and Employee Performance, the correlation coefficient is 0.968 with statistical significance of $t = 2.771$, as shown in Table 13 and Figure 3.

### Table 11. Results of the multiple regression ANOVA test

| Model  | Sum of Squares | df | Mean Square | F     | Sig  | F table |
|--------|----------------|----|-------------|-------|------|---------|
| 1      | Regression     | 2  | 1104.991    | 782.232 | .000 | 3.100   |
|        | Residual       | 90 | 1.413       |        |      |         |
| Total  | 2337.118       | 92 |             |        |      |         |

### Table 12. Result of regression test between Work Stress and Employee Performance - coefficients

| Model | Unstandardized B | Coefficients Std. Error | Standardized Coefficient Beta | t     | Sig  |
|-------|------------------|------------------------|--------------------------------|-------|------|
| 1     | (Constant)       | 3.763                  | 1.360                          | 2.767 | .007 |
|       | Work stress      | .748                   | .075                           | .722  | 9.945| .000 |

Ho: There is no significant relationship between work stress and employee performance.  
Ha: There is a significant relationship between work stress and employee performance.

**Figure 2.** $t$ value curve for the correlation between work stress and employee performance

### Table 13. Result of regression test between Work Environment and Employee Performance - coefficients

| Model | Unstandardized B | Coefficients Std. Error | Standardized Coefficient Beta | t     | Sig  |
|-------|------------------|------------------------|--------------------------------|-------|------|
| 1     | (Constant)       | 1.225                  | .442                           | 2.771 | .007 |
|       | Work Environment | 1.090                  | .030                           | .968  | 36.898 | .000 |

Ho: There is no significant relationship between work environment and employee performance.  
Ha: There is a significant relationship between work environment and employee performance.

**Figure 3.** $t$ value curve for the correlation between work environment and employee performance
All statistics above show a strong association between Work Stress and Work Environment on Employee Performance. The table shows a sizeable statistical F value, far greater than the critical value. This gives an indication that one or both the independent variables have a correlation with the dependent variable. To test the relationship between each independent variable with the dependent variable, a t-test was performed for each independent variable. The results of this test are shown in Table 14.

| Model       | Unstandardized Coefficients Std. Error | Standardized Coefficient Beta | t       | Sig  |
|-------------|----------------------------------------|-------------------------------|---------|------|
| I (Constant) | .339                                   | .479                          | .708    | .481 |
| Work Stress | .128                                   | .035                          | .123    | 3.696| .000 |
| Work        | .996                                   | .038                          | .885    | 26.510| .000 |
| Environment | .996                                   | .038                          | .885    | 26.510| .000 |

The results in Table 12 show that Work Stress is positively related to Employee Performance. The same thing applies to the Work Environment and Employee Performance. The results also show that the three variables are related through equation (4).

\[
\text{The Performance} = 0.339 + 0.128 \text{ (Work Stress)} + 0.996 \text{ (Environment)}
\]  

(4)

Respondents’ opinions and supported by statistical analysis, showed that long and tight working hours had an effect on stress. This is also the finding of Shimazu and Kosugi [3]. Apart from working hours, they find stress is also influenced by work demands. Regarding working hours, Osterman [16] sees organizations with high productivity often found with flexible work policies and career breaks. This policy gives employees more room to resolve work demands with family goals. Employees have time to develop themselves and complete the work thoroughly. Employees feel satisfied, which has a positive implication on productivity.

In addition to working hours, the environmental situation is also a factor influencing employee performance. Performance is the result of employee motivation and ability, and how they adapt to situational constraints and uncomfortable environments. This cannot be ignored because it leads to behavioural disorders; specifically referred to low performance [17]. A conducive work environment is one of the factors that increases employee productivity. A workspace that has good acoustics can reduce the noise level that comes from the outside. Also, the workspace layout, according to human spatial standards, co-workers support, appreciation from superiors, affect the mental health of an individual positively.

4. Conclusion and Future Research Direction

Implications of the results of research in some of these manufacturing industries indicate that the variable Work Stress \((X_1)\), and work environment \((X_2)\), significantly influence employee performance \((Y)\). Among the two dimensions of work stress variables, non-standard workhour is a factor that contributes greatly to the creation of work stress. This indicates that the working hours determined by the company are too long or in some cases, the employees are facing tight deadlines so that they are not satisfied with the results. Suggestions can be given to companies to review the number of workhour so the employees can have sufficient time to improve productivity.

Looking at the manufacturing industry, the low performance of employees is also influenced by the work environment, so the work environment must be improved by the company. This is corrected to indicate that employees have created a well established work environment around themselves so that work goals can be achieved optimally. Creating a good work environment will help companies innovate in advancing the company’s vision and mission. Among the six indicators of variable \(X_2\), things that must be concerned by the organization can be seen in the highest average value, namely the lack of appreciation from the superiors and poor relationship with co-workers because of those high average values of 2.52 and 2.51. Companies can make changes by way of their superiors, improving relationship with their employees in the organization by creating a gathering or forum.

Thus, the results of this study only provide an overview of the relationships between variables when the study is conducted. As mentioned earlier, there are two types of stress which affects differently to
an individual. It is suggested for further research to measure the stress level that can increase work productivity. In addition, this study was conducted on employees at the staff level, where each level of work had a different impact on the level of stress experienced, which would certainly affect employee performance.

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