





SANG PENCERAH

Jurnal Ilmiah Universitas Muhammadiyah Buton



E-ISSN: 2655-2906, P-ISSN: 2460-5697

Volume 9, No 4, Year 2023

Work Stress Has An Impact On Employee Performance With Work Environment Variables As Moderation

Kardinah Indrianna Meutia¹, Bintang Narpati^{1*}

¹Universitas Bhayangkara Jakarta Raya

Correspondent: bintang.narpati@dsn.ubharajaya.ac.id

Article Info

Received 22 July 2023

Approved 17 October 2023

Published 13 November 2023

Keywords:
Work Stress, Work
Environment,
Employee
Performance

© 2023 The
Author(s): This is
an open-access
article distributed
under the terms of
the Creative
Commons
Attribution
ShareAlike (CC BYSA 4.0)



Abstract

This comprehensive study delves into the critical nexus between workplace stress and its reverberations on employee performance, all within the context of a dynamic work environment. The research methodology employs the well-regarded Slobin formula coupled with a straightforward random sampling approach. A meticulously crafted questionnaire facilitated the collection of data from a substantial cohort of 85 respondents, providing a robust foundation for analysis. The findings gleaned from this study affirm, in part, the palpable influence of work-related stress on employee performance. Notably, the presence of moderating variables within the work environment plays a pivotal role in ameliorating this impact, ultimately enhancing employee output and efficiency. Through rigorous statistical scrutiny, it was determined that the work stress variable accounted for 15.70% of the variation in employee performance before any mitigating measures were taken. This percentage saw a notable surge, escalating to 54.30%, after factoring in the influence of the work environment variable. Consequently, it can be discerned that a considerable 38.60% enhancement in employee performance is attributable to the amelioration of the work environment. These results substantiate the crucial importance of not only recognizing and addressing workplace stress but also tailoring the work environment to foster a more conducive and productive professional milieu.

1. Introduction

Industrial Revolution 4.0 The company needs many changes to grow its business in winning the competition. One of the components that support the growth and development of the organization is assets in the form of human resources. Human resources are an important component in a company to successfully achieve goals. The importance of this component of human resources, because it serves as

the main driver for the smooth running of activities at an enterprise. The organization needs employees who have good achievements and performance because they can contribute the best to the company. The company will continue to run well, if its human resources run effectively. According to (Istijanto, 2013), humans as Human Resources are assets for companies that live or breathe in addition to other assets that do not breathe such as buildings, capital, office equipment, machinery, inventory and so on.

According to (Nabawi, 2019), that if the work environment feels comfortable, employees have deep responsibilities compared to an uncomfortable work environment. Because with a comfortable work environment, it can make employees work more enthusiastically and focused on completing their work. Not only the layout or design of the room is comfortable but interaction with colleagues can also improve employee performance.

Organizations must make change steps to adjust to the circumstances. The work environment needs to be considered properly, if the work environment is not good, it causes employees to be exposed to stress, concentration is difficult and it is easy to disagree so that work productivity decreases to provide the best ability of the employee for the company. Stress problems are commonly encountered in the workplace in several companies. This stress is a condition of tension that a person experiences. The stress felt by employees can be due to not understanding work standards, which triggers the employee's performance to decrease and work too much. High stress affects psychology, individual behavior and emotional changes that have an impact on the quality of his work (Siagian, 2014).

Based on research conducted from (Sihaloho & Siregar, 2019), (Nabawi, 2019; Narpati et al., 2021), stated that the work environment affects employee productivity and performance. Research from (Candana et al., 2020) is different from the previous one, which shows that employee performance is not significantly affected by work stress. That is, if the employee's stress is too high, the employee's performance decreases. On the other hand, if the stress experienced by employees decreases or is lower, the employee's performance level is getting better and higher. The condition of work stress experienced by employees is excessive tasks that make employees' blood pressure increase and overload makes employees cause boredom.

The common research which mentioned focuses on the significance and purpose of studying work stress experienced by employees, particularly the effects of excessive tasks on employees' blood pressure and the potential link between overload and boredom. Let's break down the significance and purpose of this research:

Significance: 1) Employee well-being: Understanding the impact of work stress is crucial for promoting employee well-being and creating healthier work environments, 2) Health implications: High levels of work stress, such as excessive tasks, can contribute to physical health issues like elevated blood pressure, which may lead to cardiovascular problems if left unaddressed, 3) Productivity and performance: Excessive workloads and overload can have negative consequences on employee productivity, engagement, and overall job performance, 4) Employee retention and satisfaction: By investigating and addressing the causes of work

stress, organizations can enhance employee satisfaction, reduce turnover, and improve retention rates.

Purpose: 1) Identify stressors: Researching the impact of excessive tasks on employee blood pressure helps identify specific stressors within the work environment that contribute to negative health outcomes, 2) Inform interventions: Understanding the relationship between overload and boredom can guide the development of interventions aimed at reducing work stress and increasing employee motivation, 3) Policy and management adjustments: Findings from this research can inform policymakers, managers, and organizations about the importance of workload management, resource allocation, and creating a balanced and engaging work environment, 4) Health promotion: By recognizing the potential health risks associated with work stress, employers can prioritize employee health and well-being initiatives, such as stress management programs, wellness activities, and supportive policies.

This research seeks to shed light on the significance of work stress, identify its impact on employees' physical and psychological health, and provide insights that can inform interventions and organizational practices to mitigate the negative effects of excessive tasks and overload on employees. According to (Pertiwi & Nurhikmah, 2018) performance is the result of work which is a task given by management and done with a sense of responsibility. According to (Sari & ", 2017) performance is an organization that manages and creates good relationships with employees through effective communication to jointly make the organization progress and develop. The above construct can be concluded that performance is the result of the work of employees who are carried out directly with instructions from management through effective communication in order to make the organization progress and develop.

Employee performance has indicators (Robbins, 2006), namely: Quality Seen from the perfection of duties and skills of employees. The number of units and the number of activities that have been completed by employees. Accurate time The output produced by employees by utilizing maximum time. Effective in utilizing the use of existing resources in carrying out tasks. Independent Work commitment from employees to the organization with full responsibility.

The work environment where employees carry out their activities or activities in accordance with the direction of the organization's management, Non-physical work environment such as working atmosphere, air condition, lighting and others. In carrying out their activities, employees are often faced with a work environment that according to them is uncomfortable which causes their work or output to not meet management's expectations.

Work environment indicators (Nitisemito, 2013), are: 1) Working atmosphere: All employees always want a comfortable, pleasant environment, including good lighting, quiet and low noise, and workplace safety, 2) Relations with Colleagues: Increase harmony among employees and eliminate conflicts between employees. Harmonious relationships are the key for employees to survive in the workplace, 3) Availability of work facilities: The devices used are intended to support the smooth running of the entire workforce. Have a complete working process that supports smooth workflow, 4) Safe: Work environment security supports work safety. Therefore, the factor of safety must be realized.

The Health Safety Executive (HSE) states that stress is people's negative reaction to excessive pressure and other types of demands. The National Institute for Occupational Safety and Health states that job stress is a dangerous physical and emotional response that occurs when job demands do not match the skills, resources, and needs of workers. increase. Work stress can also occur in workers who are not fit to work (Hasibuan, 2013). According to (Sinaga et al., 2017), stress is a state of tension that affects thought processes, emotions, and circumstances. Stressed people become nervous and overly anxious. They often become irritable, unable to relax, or exhibit unfriendly behavior.

According to (Mangkunegara, 2015), stress is the stress felt by employees when facing work. Sources of stress can be at the individual, group, organizational and non-organizational levels. Excessive stress can threaten your ability to cope with your environment and ultimately prevent you from doing your job. On the other hand, stress is the result of behavioral and environmental situations that can cause excessive mental and physical stress. Stress can be seen both positively and negatively, depending on how each person views it. can be used as.

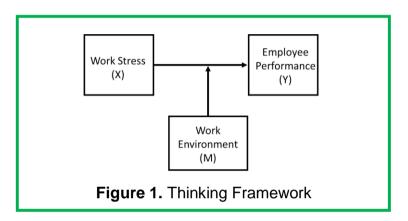
From the explanation above, job stress is a state of psychological imbalance experienced by employees in carrying out their work, which is characterized by unusual emotions and behaviors. According to (Bhastary, 2017) the factors that cause stress for employees are: 1) Difficult and excessive workload: The amount of work can be a source of stress for employees if it is not commensurate with the physical abilities, skills and time available to employees, 2) Undue pressure and leadership: Conflicts arise when leaders and subordinates experience things that are not good. B. When a manager assigns a job to an employee who is not working in their area and must complete this task in a very limited amount of time, 3) Lack of time and equipment: Employees generally have the normal ability to perform equipment related to company/office tasks, expertise, time and experience assigned to them, 4) Personal Conflict and Leadership: It has two common types of role conflict. Employees face conflicting organizational expectations from employees and endogenous role conflict. This role conflict usually arises with employees or managers occupying positions in both structures, 5) Compensation is too low: If employees who receive compensation are in accordance with what they have done for the company, they can work calmly and seriously, and they can always try to do a good job. This can cause work stress for employees if they feel that the compensation received is far from adequate.

Good and bad employee performance can be influenced by several factors, namely the work environment and work stress. The company as a place to work must be able to provide a comfortable environment that can attract employees to work well and productively. Many employees do not last long to work because the work environment is not good as a result the employees decide to stop working. Paying attention to the work environment is one of the efforts to improve employee performance. The work environment shows everything that surrounds employees and affects them in completing their work. By facilitating a conducive and comfortable work environment, it can give employees enthusiasm for the work they do.

With these conditions, the company must be able to adjust to these changes. The work environment needs to be considered properly, if there is one condition of the work environment that is not good, it can cause employees to be easily stressed,

difficult to concentrate and easily disagree so that work productivity decreases to give the employee's best ability for the company. The problem of stress is found in many workplaces in several companies. Stress is a condition where a person experiences tension due to conditions that affect him, these conditions can be from within a person or the environment outside a person. The stress felt by employees can be due to a lack of understanding of work standards which triggers the employee's performance to decline and too much work. Excessive stress can result in psychology, emotional changes, and individual behaviour that can interfere with the quality of work (Siagian et al, 2020).

The framework of thought in this study was proposed based on the results of theoretical studies as discussed above. So the framework of thought can be described as follows:



2. Methods

The research object is PT. Antam Tbk. With 85 employees as respondents. Using saturated sample technique with quantitative descriptive analysis. The methods of research refer to the systematic approach and techniques used to gather data and derive meaningful conclusions. Methods of research that could be employed include: 1) Surveys or questionnaires, 2) Interviews, 3) Observations, 4) Physiological measurements.

The procedure of collecting data involves the specific steps or process followed to gather information relevant to the research objectives: 1) Recruitment: Selecting a representative sample of employees from different departments or organizations, 2) Informed consent: Ensuring participants understand the purpose of the research, potential risks, and their rights before obtaining their consent to participate, 3) Data collection instruments: Designing surveys, questionnaires, or interview protocols that capture relevant information related to work stress, workload, blood pressure, and boredom, 4) Data collection sessions: Conducting surveys, interviews, or observations with the selected participants to gather data.

This may involve face-to-face interactions, online surveys, or a combination of methods: 1) Physiological measurements: If applicable, taking blood pressure measurements or collecting other physiological data using appropriate instruments and protocols, 2) Data recording: Documenting responses, observations, or measurements accurately and systematically to ensure reliable data, 3) Participant confidentiality: Ensuring the privacy and anonymity of participants' data and maintaining confidentiality throughout the research process.

The term "saturated sample" does not have a widely recognized or established theory within the field of research. It is possible that you might be referring to a different concept or a specific term used in a localized context. If you can provide more details or clarify the term, I can assist you further in understanding its meaning or relevance. Data analysis involves examining and interpreting the collected data to draw meaningful conclusions and address research questions or hypotheses. In the research on work stress, workload, blood pressure, and boredom, data analysis could include the following steps: 1) Conduct surveys, interviews, or any other data collection methods to gather information related to work stress indicators, 2) Analyze the collected data using appropriate statistical or qualitative analysis techniques, 3) Review and analyze the various previous studies mentioned in the text. This could involve a more detailed examination of the referenced studies to understand their findings and methodologies, 4) Based on the results of theoretical studies, further develop and refine the theoretical framework that guides this research.

3. Findings and Discussions

In this discussion, it has been carried out through statistical data quality tests and classical assumption tests. In each test a statistical value is produced which is compared with the table value to find out whether it meets the requirements or not.

3.1 Findings

Based on the tests that have been carried out, the results of the validity of the work environment variables, work stress and employee performance are :

Table 1. Validity Test Results

Table 1: Valianty Feet Results						
No	Work Stress (X1)	Work Environment (X2)	Employee Performance (Y)	r-table	Results	
1	0,623	0,247	0,632	0,1796	Valid	
2	0,798	0,646	0,728	0,1796	Valid	
3	0,827	0,671	0,761	0,1796	Valid	
4	0,745	0,723	0,675	0,1796	Valid	
5	0,747	0,609	0,844	0,1796	Valid	
6	0,717	0,356	0,741	0,1796	Valid	
7	0,802	0,280	0,804	0,1796	Valid	
8	0,779	0,624	0,800	0,1796	Valid	
9	0,447	0,720	0,750	0,1796	Valid	
10	-	0,796	0,784	0,1796	Valid	
11	-	0,385	0,713	0,1796	Valid	
12	-	0,561	0,722	0,1796	Valid	
13	-	0,766	0,534	0,1796	Valid	
14	-	0,687	0,680	0,1796	Valid	
15	-	0,426	0,709	0,1796	Valid	

Reliable items and test results as follows:

Table 2. Reliability Test Results

Variabel	Cronbach's Alpha	N of Items	Hasil
Stres Kerja - X1	0,857	9	Reliable
Lingkungan Kerja -X2	0,888	15	Reliable
Kinerja Karyawan - Y	0,933	15	Reliable

Table 2 shows the work environment variable of 0.888, work stress of 0.857, and employee performance of 0.933 producing reliability test results using a given alpha factor value of 0.60 so that all are reliable. The normality test results give the Asymp value. Sig (two-tailed) is 0.055, so the data is normally distributed.

Table 3. Normality Test Results

One-Sample Kolmogorov-Smirnov Test

		Stres Kerja
N		85
Normal Parameters ^{a,b}	Mean	53.7882
	Std. Deviation	8.26797
Test Statistic		.102
Asymp. Sig. (2-tailed)		.055°

The results of multiple linear analysis can be seen in the multiple linear regression equation $Y = 46.691 + 0.317 X_1$

Table 4. Partial Test Results

Coefficients^a

		Unstandardized Coefficients		Standardized Coefficients		
		Coemic	Jenio	Coemcients		
Mode	el	В	Std. Error	Beta	t	Sig.
1	(Constant)	46.691	4.399		10.615	.000
	Work Stress	.317	.081	.396	3.927	.000

a. Dependent Variable: Employee Performance

The results of the t-test variable workload affect employee performance. The t value for work stress is 3.927, which is sig.0.000. sig. 0.000 <0.05 from t-count 3.927 > 1.663 (t-table). Therefore, work stress partially affects employee performance. Basically, we test the coefficient of determination to see how well the model can explain the variation in the dependent variable. Next we need to know the value of the coefficient of determination. Can check it in the table below.

Table 5. Determination Coefficient Test Results

Before Moderation					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	0.396	0.157	0.147	6.12588	

The R Square value in Table 5 is 0.157 so that it can be said that the work environment variable influences the Employee Performance variable by 15.70%. After the moderating variable (work environment variable) in Table 6, the R Square value becomes 0.543 or 54.30% (increase).

Table 6. Test Results for the Coefficient of Determination **After Moderation**

7 ito i modoration					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	0.737	0.543	0.526	4.5633	

So it can be concluded that the working environment moderation variable is accepted by the hypothesis. Therefore the existence of the Work Environment variable (as a moderating variable) can strengthen or increase the influence of the Job Stress variable on Employee Performance variables.

3.2 Discussions

Effect of work stress on employee performance

Based on the test results and data analysis, the results of the partial test calculations obtained t count 3.927 > t table 1.663 and a significance value of 0.000 < . 0.05. This shows that fluctuating work stress has a partial and significant effect on employee performance. When a company wants to achieve good and optimal performance in order to achieve company goals. Companies must pay attention to the workload of their employees. Reduced work stress can affect an employee's performance in completing the work assigned to them by the company. The results of this study are consistent with the results of (Sengkey et al., 2018). Research entitled "The Influence of the Work Environment and Work Stress on the Performance of PT Employees." PLN (Persero) for the Suluttenggo Region Manado Area" said that work stress has a significant impact on employee performance. Therefore, there is an influence of work stress (X₂) on employee performance (Y).

The purpose of this research is to determine the effect of work stress during the Covid19 pandemic on employee performance (Karim, 2022). This research uses a qualitative descriptive method. This research was conducted on PT Pan Baruna Pekanbaru Pekanbaru Riau Indonesia. The sample in this study were employees of PT. Pan Baruna was limited by the administration division and the sales division, which amounted to 87 people. Sample selection using purposive sampling method. In collecting data, the author uses primary data sources with questionnaires as a tool.Based on table 5.47, it can be seen that the simple linear regression equation formed is Y = 93.147 + (-0.822X). From these equations it can be explained that if the work stress variable increases by 1%, then the work performance of employees at PT. Pan Baruna Pekanbaru Branch decreased by 0.822. This shows that the work stress variable contributes negatively to employee performance, so that the work stress level of PT. Pan Baruna Pekanbaru Branch.

This study aims to analyze the effect of work stress on employee performance with emotional intelligence as a moderating variable (Setyanto Putro & Nur Wening, 2022). This type of research is descriptive quantitative. The object of research is PT. X and the subject in this study is using the Slovin formula. The sample selection was 87 samples. All data have met the classical assumption test and the regression model has met the model feasibility test. Based on the discussion that has been done, it can be concluded that work stress and emotional intelligence have a positive and significant effect on employee performance, emotional intelligence increases the effect of work stress on employee performance. Job stress is a major problem both for employees and for organizations.

This study aims to analyze the effect of work stress on employee performance with emotional intelligence as a moderating variable (Saptarini, 2022). This type of research is descriptive quantitative. The object of research is PT. X and the subject in this study is using the Slovin formula. The sample selection was 87 samples. All data have met the classical assumption test and the regression model has met the model feasibility test. Based on the discussion that has been done, it can be concluded that work stress and emotional intelligence have a positive and significant effect on employee performance, emotional intelligence increases the effect of work stress on employee performance. Job stress is a major problem both for employees and for organizations.

4. Conclusion

The results of research that has been carried out on work stress for employee performance is a positive and significant influence. Job stress is a physical or non-physical condition experienced by individuals when experiencing work that is considered a burden beyond their ability. Work stress can be experienced by anyone for employees who have less abilities in this case skills, reasoning, physics, logic and so on. A workload that is considered too heavy can cause a person to think too deeply, whereas even doing deep thinking does not find a good solution to overcome the workload or problems faced by employees. As a result of work stress experienced by employees can have an impact on physical and non-physical disturbances of a person. For this reason, when doing work or dealing with problems, it is necessary to have joint discussions with other parties and not try to find solutions individually.

Work environment is a variable that supports employees in working to achieve goals. The workload given to employees can be reduced by the stress level by having a comfortable, clean, fragrant work environment, good lighting, fresh air circulation, air conditioning and beautiful room layout or decoration can generate enthusiasm for work. Through the results of this study, companies can organize rooms that can create a comfortable, quiet working atmosphere for employees so that they can increase performance

References

- Bhastary, M. D. (2017). Pengaruh Gaya Kepemimpinan Dan Stres Kerja Terhadap Kepuasan Kerja Karyawan. *MANEGGGIO: Jurnal Ilmiah Magister Manajemen*, 3(September).
- Candana, D. M., Putra, R. B., & Wijaya, R. A. (2020). PENGARUH MOTIVASI DAN LINGKUNGAN KERJA TERHADAP KINERJA KARYAWAN DENGAN DISIPLIN KERJA SEBAGAI VARIABEL INTERVENING PADA PT BATANG HARI BARISAN. *JEMSI Jurnal Ekonomi Manajemen Sistem Informasi*, 2(1).
- Hasibuan, M. S. . (2013). *Manajemen Sumber Daya Manusia* (Edisi Revi). PT.Bumi Aksara Jakarta.
- Istijanto, M. M. (2013). *Riset sumber daya manusia*. Gramedia Pustaka Utama. https://scholar.google.com/citations?user=cWk ABMAAAAJ&hl=id&oi=sra
- Karim, K. (2022). The Effect of Work Stress on Employee Performance. *Asean International Journal of Business*, 1(1). https://doi.org/10.54099/aijb.v1i1.68

- Mangkunegara, A. A. A. P. (2015). *Manajemen Sumber Daya Manusia Perusahaan*. Remaja Rosdakarya.
- Nabawi, R. (2019). Pengaruh Lingkungan Kerja, Kepuasan Kerja dan Beban Kerja Terhadap Kinerja Pegawai. *Maneggio*, 2(2), 170–183. http://jurnal.umsu.ac.id/index.php/maneggio/article/view/3667
- Narpati, B., Lubis, I., Meutia, K. I., & Ningrum, E. P. (2021). Produktivitas Kerja Pegawai yang Dipengaruhi oleh Work From Home (WFH) dan Lingkungan Kerja Selama Masa Pandemi. *JIMF (Jurnal Ilmiah Manajemen Forkamma)*, *4*(2), 121–133. https://doi.org/10.32493/frkm.v4i2.9808
- Nitisemito, A. S. (2013). *Manajemen Personalia (Manajemen Sumber Daya Manusia)* (Cetakan VI). Ghalia Indonesia.
- Pertiwi, W., & Nurhikmah, F. (2018). Pengaruh Perubahan Sistem Digitalisasi Terhadap Kinerja Karyawan. *Seminar Nasional Multidisiplin 2018*, *ISSN: 265*. https://core.ac.uk/download/pdf/298086095.pdf
- Robbins, P. S. (2006). *Perilaku Organisasi.* (D. B. Molan (ed.); 10th ed.). Erlangga. https://elibrary.unikom.ac.id/id/eprint/1835/8/12_UNIKOM_CUCU CAHYATI BAB 2.pdf
- Sari, N. N. P., & "K. (2017). Pengaruh Budaya Organisasi Dan Disiplin Kerja Terhadap Kinerja Karyawan Bagian Kantor Pada PT. PLN(Persero) Area Pekanbaru Rayon Kota Timur. *Jurnal Online Mahasiswa (JOM) Bidang Ilmu Sosial Dan Ilmu Politik*, 4(2). https://media.neliti.com/media/publications/200670-pengaruh-budaya-organisasi-dan-disiplin.pdf
- Sengkey, W. S., Roring, F., Dotulong, L. O. H., Manajemen, J., Sam, U., Manado, R., & Kunci, K. (2018). Pengaruh Lingkungan Kerja Dan Stres Kerja Terhadap Kinerja Karyawan PT. PLN (Persero) WILAYAH SULUTTENGGO AREA MANADO. *Jurnal EMBA: Jurnal Riset Ekonomi, Manajemen, Bisnis Dan Akuntansi*, *5*(3).
- Setyanto Putro, & Nur Wening. (2022). THE EFFECT OF WORK STRESS ON EMPLOYEE PERFORMANCE WITH EMOTIONAL INTELLIGENCE AS A MODERATING VARIABLE. *International Journal of Innovative Technologies in Social Science*, *3*(35). https://doi.org/10.31435/rsglobal_ijitss/30092022/7851
- Siagian. (2020). Model Hubungan Kepemimpinan , Stres Kerja , Komitmen Kepuasan Kerja Sebagai Variabel Intervening PERUSAHAAN JASA PENGIRIMAN KARGO DI KOTA BATAM (4(2)). Khazanah Ilmu Berazam.
- Siagian, S. P. (2014). Manajemen Sumber Daya Manusia. Bumi Aksara.
- Sihaloho, R. D., & Siregar, H. (2019). Pengaruh lingkungan kerja terhadap kinerja karyawan Pada PT. Super setia sagita medan. *Jurnal Ilmiah Socio Secretum*, *9*(2). http://jurnal.darmaagung.ac.id/index.php/socio/article/view/413
- Sinaga, S., Ibrahim, M., Saleh, A. R., Al-Shammari, D. S. A., Dewi, A. C., Trisnawati, B., Sudadio, S., Fauzi, A., Afrianti, V., Bartin, T., Ariyanti, E. H., Suratmi, S., Muldiani, R. F., Purwaningsih, S. S., Sartika, E., Hidayatulloh, H. N., Fithri, D. L., Setiawan, D. A., Merdeka, H., ... Usman, A. (2017). Manajemen Sumber Daya Manusia. *Academy of Management Journal*, 13 No. 1(2), No.15/2011.

https://doi.org/10.1007/0-387-24243-0_8

T., & Saptarini, V. (2022). The Effect of the Environment and Work Stress on Employee Performance. *International Journal of Research and Review*, *9*(7). https://doi.org/10.52403/ijrr.20220750