

The Relationship Between Physical Work Environment, Working Conditions and Workplace Layout and Employee Work Performance Among Manufacturing Operators at a Manufacturing Company

Muhammad Luqman Murshid^{1*}, Mohamed Ayyub Hassan¹, Mohd Azhar Abd Hamid¹, Nur Syafiqah Hazirah¹, Athirah Wilda¹, Siti Sofia Khadijah¹

Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor, Malaysia

*Corresponding Author

DOI: <https://doi.org/10.47772/IJRISS.2026.10200184>

Received: 09 February 2026; Accepted: 14 February 2026; Published: 28 February 2026

ABSTRACT

A favourable work environment is crucial in promoting the employee work performance, especially in the manufacturing sector. Nonetheless, there is limited empirical data available on the influence of specific dimensions in the work environment as far as affecting the employee work performance in the Malaysian manufacturing setting. Grounded in Person-Environment Fit Theory, the Job Demands-Resources (JD-R) Model, and the Individual Work Performance Model, this study examines the relationship between the physical work environment, working conditions, and workplace layout on the performance of 169 manufacturing operators. The SPSS was used to analyze the data using descriptive and inferential statistics, which also included Pearson correlation analysis. The results show that the physical work environment, working conditions, workplace layout, and employee work performance were moderate. The Pearson correlation analysis also found that the physical work environment, working conditions and workplace layout had positive and significant relationships with employee work performance. These findings can be applied to imply that the workplace conditions, space configuration, and physical infrastructure can be enhanced to achieve better employee work performance. The paper also adds the empirical evidence to the Malaysian manufacturing setting and its impact on specific practical implications that can be offered to organizations interested in enhancing productivity and the well-being of the employees.

Keywords: Work Environment, Employee Work Performance, Physical Work Environment, Working Conditions, Workplace Layout

Research Background

Background Of Study

In recent years, the work environment has emerged as a critical determinant of employee work performance. Especially within manufacturing industries where operational efficiency directly influences organizational competitiveness. Empirical evidence suggests that favourable environmental conditions enhance employee commitment, engagement, and productivity (Pimpong, 2023; Putri et al., 2023). In industrial settings, physical comfort, safety standards, and spatial design play a crucial role in sustaining workforce effectiveness.

The manufacturing sector remains a major contributor to Malaysia's economic performance, accounting for 23.39% of national GDP in 2022 (Ministry of Economy Malaysia, 2024). Given the sector's reliance on labourintensive operations, optimizing the work environment is essential to maintain productivity, reduce fatigue, and ensure employee well-being. Prior research has demonstrated that environmental factors such as lighting, ventilation, and layout efficiency significantly influence task performance and job satisfaction (Lee & Park, 2021; Tabe-Afshar et al., 2023).

Despite extensive global research on work environment and performance, empirical evidence examining the combined effects of physical work environment, working conditions, and workplace layout within Malaysian manufacturing operators remains limited. Most studies have focused on isolated environmental dimensions rather than integrating multiple theoretical perspectives within a single empirical framework. Therefore, this study addresses this gap by investigating the relationship between key work environment dimensions and employee work performance among manufacturing operators in Johor Bahru.

Problem Statement

Physical work environment, working conditions, and workplace layout are critical determinants of employee work performance and broader organizational outcomes. However, many organizations fail to optimize these dimensions, resulting in poor working conditions that negatively affect employee well-being and productivity (Lee & Park, 2021; Tabe-Afshar et al., 2023; Králiková et al., 2021). Unhealthy work environments contribute to physical discomfort, emotional strain, reduced concentration, and diminished performance (Saefullah & Basrowi, 2022).

In manufacturing settings, inadequate workload management, ineffective spatial arrangement, and insufficient supervisory support further constrain employee effectiveness (Kumala, 2023). Poor layout design and redundant processes may impair efficiency, particularly in the context of the Fourth Industrial Revolution, where clarity of work procedures and structured practices are essential for operational effectiveness (Savandha et al., 2024). Although high-performing employees demonstrate strong problem-solving ability and workload balance (Karla et al., 2022), environmental constraints may limit their performance potential.

Therefore, examining the relationship between work environment dimensions and employee work performance is necessary to provide empirical evidence for strategic organizational interventions aimed at sustaining competitiveness and long-term performance (Nazirwan & Fadhlán, 2024).

Purpose Of Study

The primary objective of this research is to investigate the relationship between work environments, including the physical working environment, working conditions, and work layout and employee work performance amongst manufacturing operators in the manufacturing company, Johor Bahru, Johor.

The objectives of the study are:

- i. To identify the level of work environment (physical work environment, working conditions, and workplace layout) among manufacturing operators at the manufacturing company.
- ii. To identify the level of employee work performance among manufacturing operators at the manufacturing company.
- iii. To examine the relationship between work environment (physical work environment, working conditions, and workplace layout) and employee work performance among manufacturing operators at the manufacturing company.

LITERATURE REVIEW

Physical Work Environment

A Physical work environment refers to material workplace factors such as lighting, noise, temperature, ventilation and ergonomics which have a direct impact on the comfort, health and performance of employees (Page and Tolmie, 2024). Since the employees are exposed to these factors every time, their quality becomes basic in defining work performance. Empirical research has shown that proper lighting promotes concentration and task accuracy (Hsieh et al., 2022), whereas efficient temperature regulation and ventilation promote the quality of indoor air and employee health thus contributing to productivity (Wolkoff et al., 2021). Moreover, physical, cognitive, and organizational factors can be incorporated ergonomically and decrease musculoskeletal pressures and provide a possibility to perform (Mishra and Narendra, 2020). The results indicate that physical comfort and security are crucial conditions of successful work conduct.

To this effect, recent research has reported close relationships between the physical work environment and the performance of employees. A study by Tabassum et al. (2021) indicated that lighting, temperature, and noise levels were the most important predictors of performance and turnover intention.

In Malaysia, Munn and Azalea (2024) also found that the productivity and job satisfaction depend heavily on the workspace design and environmental comfort. All these results emphasize the necessity to optimize the physical work environment to promote working output among employees.

Working Conditions

The working conditions imply organizational policies and practices that define how employees live their daily lives, such as workload management, safety levels, communication, as well as supervisor support and job security (Sonntag et al., 2025; Youssef, 2023). According to Appel-Meulenbroek et al. (2020), comfortable and organized working environments reduce the level of exhaustion and enhance work engagement.

Moreover, the collaborative spaces provide a desire to socialize and collaborate with peers, which reinforces interpersonal relations and knowledge sharing among people (Yacoub and Haefliger, 2022). Realizing this, Malik et al. (2023) noted the significance of training, constant improvement of the workplace facilities, and the introduction of modern systems to establish positive working conditions.

The empirical evidence also supports the fact that positive working conditions can influence to increased employee performance, especially in the manufacturing environment (Efawati, 2020). On the other hand, inadequate conditions at the workplace are linked to burnout and turnover, which culminate negatively in performance (Ravalier et al., 2022). Well-established supervisory relationships, good safety practices, and favourable organizational climates can eliminate these negative outcomes (Li, 2024; Kabugade and Erande, 2023). Therefore, working conditions act as a significant organization mechanism of maintaining employee working performance (Bashir et al., 2020).

Workplace Layout

A good workplace layout is associated with reduced unnecessary mobility, physical loads, and efficient operations, especially in the manufacturing setting (Akib et al., 2024). Existing literature has already shown that well-planned layouts of workplaces are very effective in terms of operational efficiency.

Indicatively, Laomongkhochaisri et al. (2024) established that good layout designs decrease unnecessary movement, improve safety, and improve service quality. Similarly, Petkar (2019) discovered that even minor modifications made in the workplace design can influence the production levels and the organizational performance.

In addition, effective layouts stimulate cooperation, exchange of information, and long-term focus of the employees (Sailer et al., 2021).

Moreover, Hamidi et al. (2020) noted that well-planned office models decrease downtime and physical efforts, formulating workers to undertake work more effectively.

In the manufacturing industry, the application of lean principles and workplace design has led to reduced cycle times, more ergonomic workplaces, and increased capacity use (Kovács, 2020; Chowdhury et al., 2022). The results highlight the importance of workplace layout as an element connecting physical resources with employee work performance.

Employee Work Performance

Employee work performance is at which employee behaviours and outputs can be utilized to support the organization toward meeting its goals (Triansyah et al., 2023). The theory addresses the task performance that involves both technical and cognitive skills and contextual performances that are favourable to the overall organization system (Wibowo et al., 2024).

Also, Ismail and Rosdi (2022) have noted that high performance relies on employee capabilities, confidence, and goal orientation. However, these individual traits are most likely to translate into performance outcomes in case of a decent work environment and organizational resources (Nusraningrum et al., 2024).

In its turn, performance may be viewed as the product of both individualism and environmental facilitation, which is usually measured through quality, quantity, and timeliness of the work output (Tuffaha, 2020).

In the manufacturing sector, occupational safety and health, motivation, discipline, and the quality of the working environment specifically influence employee work performance (Djanuar et al., 2024).

Lack of performance results in a loss of productivity and targets (Tarigan et al., 2022). Consequently, sustainable performance and employee wellbeing have been proposed to be supported by better workplace design, workplace-life balance programs and more safety (Lavanya and Meti, 2023; Ghimire et al., 2023).

Underpinning Theories

There are three broad theoretical models that will guide this study and act as the Person-Environment Fit (P-E Fit) Theory, Job Demands-Resources (JD-R) Model and finally the Koopman Model of Individual work performance.

The Person-Environment Fit (P-E Fit) Theory by Caplan (1987) states that the individual needs align with the environmental characteristics will improve the employee motivation and performance.

The theory points out that employees work best when their physical and psychological needs are satisfied by the working environment. Conversely, inadequate person-environment fit is associated with stress, low commitment, and reduced productivity (Williamson and Perumal, 2021). In the manufacturing industry, proper lighting, ventilation, and ergonomic setting represent the environmental condition that influence this fit.

The Job Demands Resources (JD-R) Model by Bakker and Demerouti (2007) describe how the job resource will reduce the negative consequences of job demands. The job resources such as safety, autonomy and managerial support can buffer employee well-being and performance.

Within the industrial environment which characterized by repetitive tasks and high-performance targets, the adequate job resource is crucial to sustaining employee performance.

Finally, The Koopmans Model of Individual Work Performance (2011) describes employee performance as a multidimensional concept comprising task performance, contextual performance, and counterproductive work behaviour.

The model points out that performance is not merely focusing on the front of technical work but also other behaviours that facilitate the social and psychological climate of the job set up.

Also, this framework allows comprehensive evaluation of employee efficiency beyond the task execution. By integrating these three models, this study provides a holistic framework linking environmental conditions to individual performance outcomes within the manufacturing context.

Research Framework

This theoretical framework explains the relationship between the work environment and the work performance of the employees. The independent variable is the work environment which comprises of the physical work environment, the working conditions and the workplace layout.

The dependent variable is employee work performance since it is measured using task performance, contextual performance, and counterproductive work behaviour. T

he framework portrays the concept that the enhancement of workplace conditions associated to increased employee performance. Figure 1 presents the conceptual framework of the study.

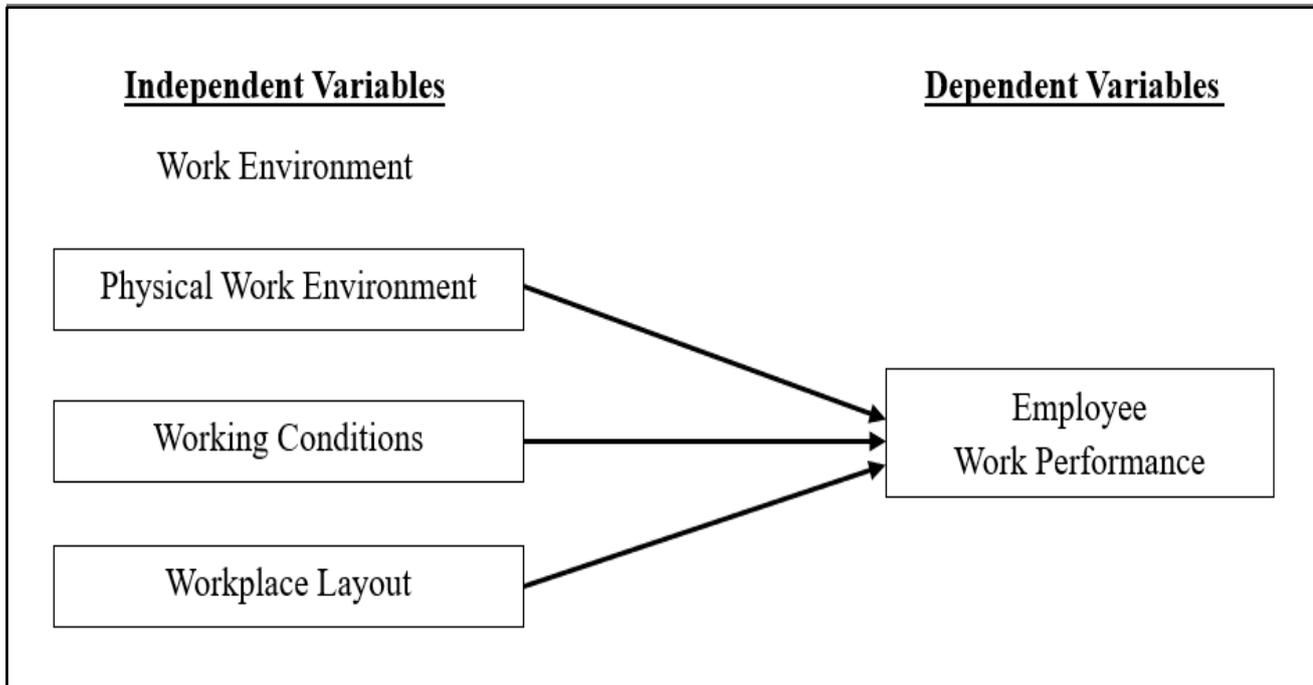


Figure 1: Conceptual Framework of Study

According to this study framework, the work environment is an independent variable, which includes the physical work environment factors, working conditions, and workplace layout. All the dimensions are considered to reflect the main dimensions that influence the context of the research.

The dependent variable has been identified to be employee work performance since it is measured against the chosen work environment dimensions.

This section gives a summary of the variables describing how the dimensions of the working environment affect the outcomes of the employees. It should also be noted that these variables and their interactions are conceptualized on the proposed research framework.

METHODOLOGY

Research Design

This study employed a quantitative correlational research design to examine the relationship between work environment dimensions, including physical work environment, working conditions, and workplace layout and employee work performance among manufacturing operators in Johor Bahru.

A quantitative approach was selected to enable objective measurement of variables and statistical testing of relationships between constructs.

Data were collected using a structured questionnaire comprising three sections: demographic information, work environment (independent variables), and employee work performance (dependent variable). All items were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Data analysis was conducted using SPSS. Descriptive statistics (mean, frequency, percentage) summarized demographic characteristics, while Pearson correlation analysis tested the relationships between variables. Additionally, multiple regression analysis was performed to determine the predictive contribution of each work environment dimension to employee work performance.

This design provides a systematic framework for assessing how variations in the work environment are associated with employee work performance. Figure 2 illustrates the research design applied in this study.

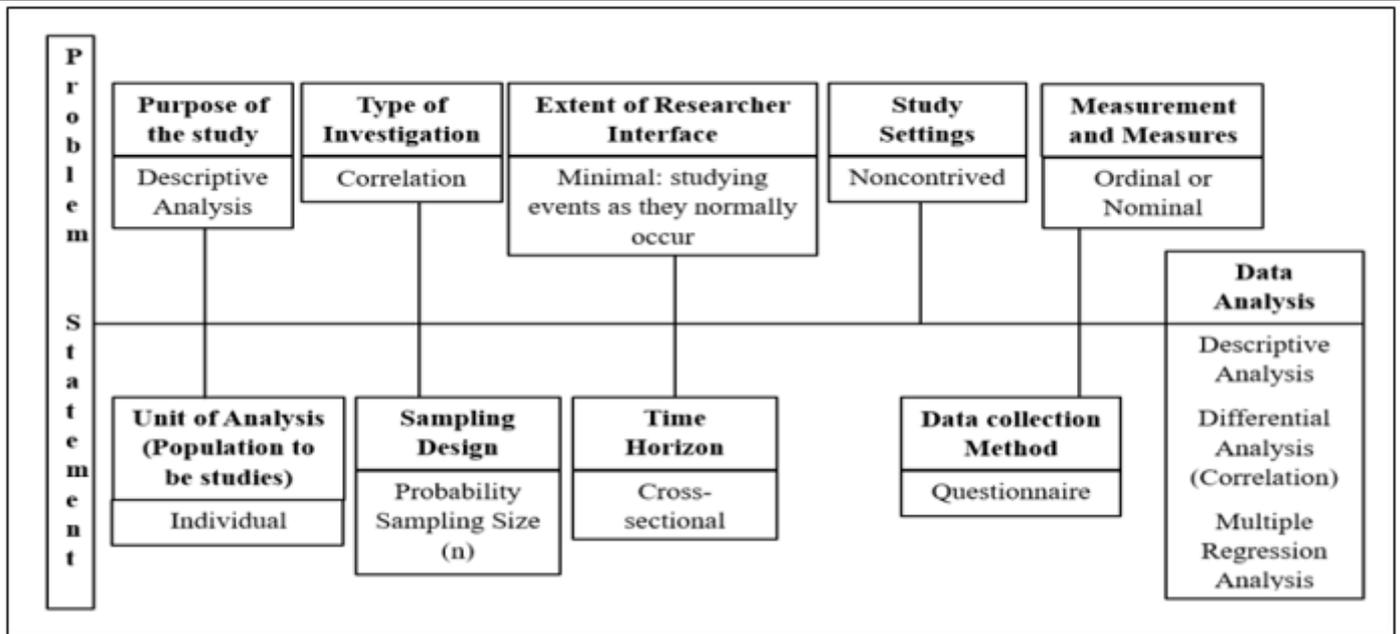


Figure 2: Research Design

Adapted from: Sekaran and Bougie (2013)

Population and Sampling

The sample of the study included all the manufacturing operators that work at the manufacturing company in Johor Bahru, Johor. There were about 298 operators whose total population was used to select a sample of 169 respondents of which a simple random sampling method was used. This was to ensure every operator stood the same opportunity of being sampled in the study, reducing the chances of bias and enhancing sample representative. In total, 165 questionnaires were completed and returned to the researcher with a high response rate of 97.6%, indicating high respondents’ engagement along with data reliability. A simple random sampling technique was employed using a computer-generated random number sequence.

The sample size selected was deemed sufficient to conduct the statistical analysis since it was more than the minimum sample size needed in conducting correlational studies to maintain a reasonable amount of precision and reliability. The operators were a unique representation of different shifts, departments and workstations that enabled the findings to have a holistic view of the work environment situation within the organization. Participation was voluntary, and respondents were assured of confidentiality and anonymity. Informed consent was obtained prior to data collection. The sampling design is conducive of future applicability of study findings to the general labour force of the organization and other manufacturing environments.

Research Instrument

This questionnaire The primary data collection tool was a structured questionnaire designed to provide quantitative information on the study variables. It utilized validated instruments from previous studies to ensure reliability and relevance. The questionnaire comprised three sections.

Section A collected demographic data, including gender, age, salary range, and length of service, to contextualize respondent profiles and interpret response trends. Section B measured the independent variable, work environment, across three dimensions: physical work environment, working conditions, and workplace layout. Items assessed workplace comfort, safety, workload, supervision, and spatial arrangement, adapted from Shafi et al. (2023).

Section C measured the dependent variable, employee work performance, using the Individual Work Performance Questionnaire (IWPQ) Italian version (Platania et al., 2023), covering task performance, contextual performance, and counterproductive work behaviour, rated on a five-point Likert scale.

Table 1 presents descriptive statistics for the Likert scale interpretation (Oppenheim, 1992), while Table 2 provides Pearson correlation guidelines for assessing the strength of relationships among variables (Care et al., 2018). And Table 3 explain the regression interpretation (Cohen, 1988).

Table 1: Guidelines for Mean Score value and interpretation

Mean Score	Mean Score Interpretation
1.00 - 2.33	Low
2.34 - 3.67	Medium
3.68 - 5.00	High

Source: Oppenheim (1992)

Table 2: Guideline for interpretation of the Pearson correlation

Value of Pearson Correlation Coefficient	Relationship Interpretation
0.000 to 0.199	Very Weak
0.200 to 0.399	Weak
0.400 to 0.599	Moderate
0.600 to 0.799	Strong
0.800 to 1.000	Very Strong

Source: Care et al. (2018)

Table 3: Interpretation of Correlation

Correlation Coefficient (r)	Interpretation
.10 to .29	Weak Correlation
.30 to .49	Moderate Correlation
.50 to 1.0	Strong Correlation

Source: (Cohen, 1988)

Pilot Test

The A pilot study was conducted with ten randomly selected respondents to assess the clarity, suitability, and reliability of the research instrument, following Hertzog (2008). The pilot allowed identification and correction of potential issues related to item wording, response time, and construct representation, ensuring alignment with the study objectives and relevance to measure workplace environment dimensions and employee work performance (Nikadimovs & Vevere, 2024).

Reliability analysis using Cronbach’s alpha indicated high internal consistency for all constructs: physical work environment ($\alpha = 0.888$), working conditions ($\alpha = 0.916$), workplace layout ($\alpha = 0.863$), and employee work performance ($\alpha = 0.933$), confirming satisfactory reliability ($\alpha = 0.863-0.933$). Table 4 presents the reliability assessment criteria (Vogel et al., 2010), while Table 5 summarizes the data analysis techniques employed.

Table 4: Cronbach's Alpha Requirements

Cronbach's Alpha	Internal Consistency
$\alpha \geq 0.9$	Best
$0.9 > \alpha \geq 0.7$	Good
$0.7 > \alpha \geq 0.6$	Acceptable
$0.6 > \alpha \geq 0.5$	Weak
$0.5 > \alpha$	Not acceptable

Source: Vogel et al. (2010)

Table 5: Summary of Data Analysis Technique

No.	Research Objectives	Data Analysis Method
1	To identify the level of work environment (physical work environment, working conditions, and workplace layout) among manufacturing operators at the manufacturing company.	Mean and Standard Deviation
2	To identify the level of employee work performance among manufacturing operators at the manufacturing company.	Mean and Standard Deviation
3	To examine the relationship between work environment (physical work environment, working conditions, and workplace layout) and employee work performance among manufacturing operators at the manufacturing company.	Pearson Correlation Coefficient

RESEARCH FINDINGS

Demographic Factor

This section gives the demographics of the respondents to give contextual understanding of the composition of employees presented of the study sample. It is necessary to understand respondent profiles because demographic factors like gender, age, salary range, and length of services could affect perceptions of work environment factors and the performance outcomes. Table 6 presents the demographic profile of 165 manufacturing operators who took part in the survey.

Table 6: Frequency and Percentage Distribution of Demographic Data

Demographic	Frequency	Percentage (%)
Gender		
Male	115	69.7
Female	50	30.3
Age		
20 years old and below	36	21.8
21 to 30 years old	123	74.5
31 to 40 years old	4	2.4

41 to 50 years old	0	0
51 years old and above	2	1.2
Salary Range		
RM 1000 to RM 1900	136	82.4
RM 2000 to RM 2900	28	17.0
RM 3000 to RM 3900	1	0.6
RM 4000 and above	0	0
Length of Service		
1 to 5 years	104	63.0
6 to 10 years	58	35.2
11 to 15 years	1	0.6
16 years and above	2	1.2

Demographic Table 5 presents the demographic profile of 165 manufacturing operators. The majority were male (69.7%) and aged 21–30 years (74.5%), with 1–5 years of work experience (63.0%) and a monthly salary between RM1,000 and RM1,900 (82.4%). This pattern reflects the typical composition of the Malaysian manufacturing workforce, which is predominantly young, male, and engaged in physically demanding production tasks, consistent with Shafi et al. (2023).

The high proportion of employees with less than five years of service suggests elevated turnover rates or continuous intake of new operators to support expanding production lines, aligning with labour patterns in the manufacturing sector as noted by Zurnizam et al. (2024). The predominance of low-income employees highlights potential implications for motivation, engagement, and performance. From a human resource perspective, these findings underscore the importance of optimizing the work environment to enhance job satisfaction, reduce burnout, and retain younger employees in operator-level roles.

The Level of Work Environment (Physical Work Environment, Working Conditions, And Workplace Layout) Among Manufacturing Operators in the manufacturing company

Table 7 indicates that all dimensions of the work environment were perceived at mid-range levels. While the overall environment appears functionally adequate, the findings suggest room for optimization, particularly in physical environmental factors such as ventilation and noise control. These results indicate that even employees have a basically satisfactory environment, some elements still need to be enhanced to improve employee effectiveness.

Table 7: Findings on the level of Work Environment (Independent Variable)

	Mean (M)	Standard Deviation (SD)
Physical Work Environment	2.8618	0.83480
Working Conditions	3.4691	0.65617
Workplace Layout	3.5879	0.51877
Overall Work Environment	3.3063	0.60324

All work environment dimensions were perceived at moderate levels (Overall M = 3.3063), indicating functional but non-optimal conditions. Workplace layout recorded the highest mean (M = 3.5879), followed by working

conditions ($M = 3.4691$), while the physical work environment was lowest ($M = 2.8618$), reflecting comparatively weaker perceptions of environmental comfort.

Concerns regarding ventilation, lighting, and noise align with evidence that inadequate physical conditions constrain concentration and well-being (Shaari et al., 2022; Wolkoff et al., 2021). From a Person–Environment Fit perspective (Caplan, 1987), this suggests partial alignment rather than optimal congruence.

Moderate perceptions of working conditions indicate the presence of basic safety and facilities, yet potential imbalance between job demands and available resources. Consistent with the JD–R Model (Bakker & Demerouti, 2007), insufficient buffering of production demands may limit performance sustainability (Efawati, 2020; Bashir et al., 2020).

Although workplace layout was rated relatively higher, spatial rigidity may still constrain workflow efficiency, as supported by prior research (Hamidi et al., 2020; Sailer et al., 2021). Overall, the environment supports operational continuity but presents structural constraints that may limit optimal performance outcomes.

The level of employee work performance among manufacturing operators in the manufacturing company

Table 8 indicates that employee work performance was perceived at a moderate level. While employees appear to meet expected responsibilities and maintain task accountability, the findings suggest limitations in initiative, creativity, and proactive engagement. These results imply that although performance is functionally sustained, certain behavioural dimensions remain underdeveloped and may require further organizational support to enhance overall effectiveness.

Table 8: Findings on the level of Employee Work Performance (Dependent Variable)

	Mean (M)	Standard Deviation (SD)
Employee Work Performance	3.5266	0.42769

The findings indicate a moderate level of employee work performance. Based on the Koopman Model of Individual Work Performance (2011), operators demonstrate adequate task performance but only average contextual performance, including teamwork, problem-solving, and initiative.

Consistent with Fallman et al. (2019), routine and monotonous manufacturing tasks may limit proactive behaviour and innovation. The results also underscore the role of organizational support such as recognition, empowerment, and participative management in enhancing contextual performance.

According to the JD–R Model, provision of resources, including feedback and task control, is associated with higher engagement, Vigor, and improved overall performance. Enhancing autonomy and recognition of proactive contributions can therefore strengthen both task and contextual performance.

The Relationship Between Work Environment (Physical Work Environment, Working Conditions, And Workplace Layout) With Employee Work Performance Among Manufacturing Operators in the manufacturing company

The inferential analysis revealed positive and significant correlations between all three dimensions of the work environment, including physical work environment, working conditions, and workplace layout and employee work performance. Table 9 shows the Pearson correlation between Work Environment (Physical Work Environment, Working Conditions, and Workplace Layout) and Employee Work Performance. Physical work environment ($r = .622, p < 0.01$), working conditions ($r = .668, p < 0.01$), and workplace layout ($r = .626, p <$

0.01) each demonstrate a significant association with overall performance. The three dimensions are also highly interrelated, indicating that improvements in one aspect, such as ergonomic conditions or layout efficiency, reinforce other environmental factors.

Table 9: Pearson Correlation

	Work Environment (Physical work environment)	Work Environment (Working Conditions)	Work Environment (Workplace Layout)	Employee Work Performance
Work Environment (Physical work environment)	1	.768**	.657**	.622**
Work Environment (Working Conditions)	.768**	1	.687**	.668**
Work Environment (Workplace Layout)	.657**	.687**	1	.626**
Employee Work Performance	.622**	.668**	.626**	1

****Correlation is significant at 0.01 (two-tailed)**

These findings in the table 8 confirm that employee performance is influenced not only by individual ability but also by the surrounding context, supporting prior research by Shafi et al. (2023) and Rendiani et al. (2024). A supportive work environment, structured layout, and optimal working conditions enhance task execution, contextual performance, and reduce counterproductive behaviours. The results align with the Person–Environment Fit (P–E Fit) Theory, Koopman’s Individual Work Performance Model, and the JD–R Model, validating that well-designed environmental resources promote engagement, efficiency, and overall employee work performance.

The Predictive Influence of Work Environment Dimensions on Employee Work Performance Among Manufacturing Operators

Model Summary

To assess the regression model’s overall fitness, the Model Summary was examined, showing how physical work environment, working conditions, and workplace layout collectively explain variance in employee performance. Table 10 showed key indicators include the multiple correlation coefficient (R), R², adjusted R², and the standard error, which reflect the model’s predictive strength and explanatory power.

Table 10: Model Summary

Model	R	R ²	Adjusted R ²	Std. Error
1	.715	.511	.502	3.0175

a. Predictors: (Constant), Physical work environment, working conditions and workplace layout

The multiple regression model indicates a strong overall relationship between the work environment dimensions and employee work performance (R = .715). The coefficient of determination shows that 51.1% of the variance in employee work performance is explained by physical work environment, working conditions, and workplace layout (R² = .511). After adjusting for sample size and number of predictors, the adjusted R² value of .502 confirms that approximately 50.2% of the variance in performance is accounted for by the model, indicating good explanatory power. The standard error of the estimate (3.0175) reflects the average deviation of observed performance scores from the predicted values, suggesting an acceptable level of prediction accuracy. These findings demonstrate that the work environment dimensions collectively provide substantial predictive influence on employee work performance among manufacturing operators.

Analysis of variance (ANOVA)

To determine whether the predictors, physical work environment, working conditions, and workplace layout, significantly explain variance in employee work performance, an Analysis of Variance (ANOVA) was conducted. ANOVA assesses whether the regression model as a whole provides a better fit to the data than a model with no predictors by comparing the variation explained by the model to the unexplained variation. The results are summarized in the Table 11.

Table 11: Analysis of variance (ANOVA)

Source of Variation	Sum of Squares	Degree of freedom (Df)	Mean Square	F
Regression	15.339	3	5.113	56.157
Residual	14.659	161	.091	
Total	29.999	164		

a. Dependent Variable: Employee Work Performance

b. Predictors: (Constant), Physical Work Environment, Working Conditions, Workplace Layout

The ANOVA table evaluates whether the regression model significantly predicts employee work performance. The regression row shows the variation explained by the predictors comprising physical work environment, working conditions, and workplace layout with a sum of squares of 15.339, 3 degrees of freedom, and a mean square of 5.113. The residual row represents unexplained variance, with a sum of squares of 14.659, 161 degrees of freedom, and a mean square of 0.091. The F-value of 56.157 indicates that the model significantly predicts employee work performance (dependent variable), demonstrating that the predictors collectively have a meaningful effect.

Coefficients

Table 12 showed the regression coefficient that presents the individual effects of each predictor on employee work performance. It shows the strength, direction, and significance of the relationships, allowing an assessment of how physical work environment, working conditions, and workplace layout contribute to predicting performance while controlling for the other variables.

Table 12: Regression coefficient

Model	B	Std. Error	β	t	Sig.	Collinearity Tolerance	VIF
(Constant)	1.682	.175		9.637	<.001		
Physical Work Environment	.092	.046	.180	2.006	.047	.378	2.646
Working Condition	.223	.061	.342	3.685	<.001	.352	2.844
Workplace Layout	.225	.065	.273	3.457	<.001	.487	2.052

Dependent Variable: Employee Work Performance

The regression coefficients table shows the individual contribution of each predictor to employee work performance. The constant (intercept) is 1.682, representing the expected performance when all predictors are zero. Physical work environment has a positive effect ($B = 0.092$, $\beta = 0.180$, $p = 0.047$), indicating a small but significant impact. Working conditions ($B = 0.223$, $\beta = 0.342$, $p < 0.001$) and workplace layout ($B = 0.225$, $\beta = 0.273$, $p < 0.001$) also positively and significantly influence employee performance, with working conditions showing the strongest effect. Collinearity statistics, including tolerance and VIF values, indicate that multicollinearity is not a concern, as all VIF values are below 5.

DISCUSSION

The Level of Work Environment (Physical Work Environment, Working Conditions, And Workplace Layout) Among Manufacturing Operators in the manufacturing company

The findings indicate that the work environment dimensions were moderately perceived among manufacturing operators, suggesting that the organization provides satisfactory but not optimal working conditions. From the perspective of the Person–Environment Fit (P–E Fit) Theory, this moderate alignment implies that environmental characteristics partially meet employee needs, enabling functional performance but limiting peak productivity.

The physical work environment received comparatively lower evaluations, particularly concerning ventilation and environmental comfort. This aligns with prior studies demonstrating that suboptimal physical conditions may hinder concentration and increase fatigue (Wolkoff et al., 2021). Similarly, moderate perceptions of working conditions suggest that although safety protocols are present, workload balance and managerial communication may require enhancement.

Furthermore, workplace layout was also perceived at a mid-range level, indicating adequate structural organization but limited flexibility. Research suggests that spatial design influences workflow efficiency and collaboration (Hamidi et al., 2020; Sailer et al., 2021). Collectively, these findings highlight the importance of optimizing environmental factors to strengthen employee engagement and operational effectiveness.

The Level of Employee Work Performance Among Manufacturing Operators at the manufacturing company

The employee work performance was found to be at a moderate level, indicating that operators adequately meet formal job requirements but do not consistently exhibit higher-order discretionary behaviours. Task performance was rated higher than contextual performance, suggesting stronger compliance with core production duties than engagement in initiative, collaboration, and proactive problem-solving.

This pattern is consistent with findings in structured manufacturing environments, where standardized processes tend to prioritize task execution over extra-role behaviours (Ismail & Rosdi, 2022; Nusraningrum et al., 2024). In line with the Individual Work Performance Model (Koopmans et al., 2011), the results indicate stable in-role performance but comparatively limited contextual contribution. From the JD–R perspective (Bakker & Demerouti, 2007), available job resources may be sufficient to sustain mandatory tasks but insufficient to stimulate broader engagement. Similarly, partial alignment under the Person–Environment Fit framework (Caplan, 1987) may explain the moderate performance level observed.

The Relationship Between Work Environment (Physical Work Environment, Working Conditions, And Workplace Layout) And Employee Work Performance Among Manufacturing Operators at the manufacturing company

The third research objectives involved examine the relationship between physical work environment, working conditions, and workplace layout and the work performance among manufacturing operators at the manufacturing company. All three work environment dimensions including physical work environment, working conditions, and workplace layout were positively and significantly correlated with employee performance. This indicates that more supportive environmental conditions are associated with higher performance levels among manufacturing operators.

The physical work environment showed a positive relationship with performance, reinforcing prior evidence that lighting, ventilation, and ergonomic design enhance operational efficiency (Shafi et al., 2023; Rendiani et al., 2024; Rahman et al., 2024). From a Person–Environment Fit perspective (Caplan, 1987), improved physical conditions strengthen alignment between job demands and individual capacity.

Working conditions were likewise positively related to performance, supporting findings that safety practices and managerial support function as critical job resources in industrial settings (Munn & Azalea, 2024; Zurnizam et al., 2024). Consistent with the JD–R Model (Bakker & Demerouti, 2007), adequate resources sustain performance under production demands.

Workplace layout also demonstrated a significant relationship with performance, aligning with research linking spatial efficiency to workflow effectiveness (Van der Voordt & Jensen, 2021; Hamidi et al., 2020). Collectively, the findings confirm that environmental factors operate as structural enablers of employee performance in manufacturing contexts.

The Predictive Influence of Work Environment Dimensions on Employee Work Performance Among Manufacturing Operators

The multiple regression analysis examined the combined and individual effects of physical work environment, working conditions, and workplace layout on employee work performance. The Model Summary indicated that the predictors collectively explain a significant portion of the variance in employee performance, demonstrating strong predictive power. The ANOVA results confirmed that the regression model is statistically significant, meaning that, overall, the predictors reliably contribute to explaining differences in performance.

Looking at the individual predictors, working conditions had the strongest positive effect, followed closely by workplace layout, while physical work environment showed a smaller but still significant effect. These findings suggest that improving working conditions and optimizing workplace layout are likely to have the greatest impact on employee performance, although attention to the physical work environment also contributes to performance outcomes. Collinearity diagnostics showed no issues, indicating that the predictors independently contribute to the model without redundancy.

Overall, the results highlight the importance of considering multiple aspects of the work environment when aiming to enhance employee performance, as each factor plays a meaningful role both individually and collectively.

Limitation and Recommendations for Future Research

Several limitations should be acknowledged. First, the study was conducted within a single manufacturing organization in Johor Bahru, which may limit the generalizability of the findings to other industrial or regional contexts. Future research may consider multi-organizational or cross-industry samples to enhance external validity.

Second, the cross-sectional design restricts the ability to establish causal relationships between work environment factors and employee performance. Longitudinal studies would provide stronger evidence regarding the directionality and temporal stability of these relationships.

Third, the study relied exclusively on self-reported measures, which may introduce common method bias and social desirability bias. Since both independent and dependent variables were collected from the same respondents at a single point in time, the observed relationships may be inflated. Future studies may incorporate multi-source data, such as supervisor-rated performance or objective productivity indicators, to strengthen measurement validity.

Finally, cultural and industrial characteristics specific to Malaysian manufacturing operators may influence environmental perceptions and performance behaviours. Replication in diverse cultural and economic contexts is recommended.

CONCLUSION

This study examined the relationship between physical work environment, working conditions, workplace layout, and employee work performance among manufacturing operators. Grounded in the Person–Environment Fit (P–E Fit) Theory, Job Demands–Resources (JD–R) Model, and Individual Work Performance Model, the findings demonstrate that environmental factors are positively associated with employee performance outcomes.

Although environmental dimensions were perceived at moderate levels, significant positive relationships indicate that improvements in physical conditions, workload management, and spatial design are likely associated with enhanced performance. These findings underscore the strategic importance of workplace optimization within labour-intensive manufacturing environments.

The study contributes to the literature by integrating multiple theoretical perspectives within a single empirical framework and applying them to the Malaysian manufacturing context. Practically, manufacturing managers should prioritize ergonomic enhancements, effective workload distribution, and flexible layout configurations to support both productivity and employee well-being.

Future research incorporating longitudinal designs and advanced analytical techniques will further strengthen understanding of the mechanisms linking work environment and employee performance.

REFERENCE

1. Akib, H., Arianasari, A. D., & Arhas, S. H. (2024). Effectiveness of implementation of office spatial principles in the Education and Culture Office of Pangkajene Regency and Islands. *Journal of Public Policy and Local Government*, 1(1), 29–37. <https://doi.org/10.70188/z5d4j460>
2. Appel-Meulenbroek, R., Van Der Voordt, T., Aussems, R., Arentze, T., & Blanc, P.L. (2020). Impact of activity-based workplaces on burnout and engagement dimensions. *Journal of Corporate Real Estate*, 22(4), 279–296. <https://doi.org/10.1108/jcre-09-2019-0041>
3. Bakker, A. B., & Demerouti, E. (2007). The Job Demands-Resources model: state of the art. *Journal of Managerial Psychology*, 22(3), 309–328. <https://doi.org/10.1108/02683940710733115>
4. Bashir, A., Amir, A., Jawaad, M., & Hasan, T. (2020). Work conditions and job performance: An indirect conditional effect of motivation. *Cogent Business & Management*, 7(1), 1801961. <https://doi.org/10.1080/23311975.2020.1801961>
5. Caplan, R. D. (1987). Person-environment fit theory and organizations: Commensurate dimensions, time perspectives, and mechanisms. *Journal of Vocational behaviour*, 31(3), 248–267.
6. Care, F. R. a. M., Subagio, B. S., & Rahman, H. (2018). Porous concrete basic property criteria as rigid pavement base layer in Indonesia. *MATEC Web of Conferences*, 147(1), 02008. <https://doi.org/10.1051/mateconf/201814702008>
7. Cohen, J. (1988) *Statistical Power Analysis for the Behavioural Sciences*, 2nd ed. Hillsdale, NJ: Erlbaum. Cotton, K. 2003. *Principals and student achievement: What the research says*. Alexandria. VA: Association for Supervision and Curriculum Development.
8. Chowdhury, S., Asadujjaman, M., & Hossain, M. (2022). Layout Optimization and Workplace Engineering for Improving Manufacturing Performance with Reference to A RMG Industry. In 5th International Conference in Industrial and Mechanical Engineering and Operations Management (IMEOM), (pp. 308-319). <https://doi.org/10.46254/BD05.20220117>
10. Djanuar, T. M., Krisnandi, H., Digidowiseiso, K., & Ngah, A. H. (2024). Effect of occupational health safety, work discipline, motivation, and work environment on employee performance. *International Journal of Social Service and Research*, 4(1), 236–248. <https://doi.org/10.46799/ijssr.v4i01.682>
11. Efawati, Y. (2020). The influence of working conditions, workability and leadership on employee performance. *International Journal Administration Business and Organization*, 1(3), 8–15. <https://doi.org/10.61242/ijabo.20.40>
12. Fallman, S. L., Jutengren, G., & Dellve, L. (2019). The impact of restricted decision-making autonomy on health care managers' health and work performance. *Journal of nursing management*, 27(4), 706–714. <https://doi.org/10.1111/jonm.12741>

13. Ghimire, B., Kumar, R., Dahal, Rai, B., & Upadhyay, D. (2023). Employee Performance Factors in the Nepalese Commercial Banks: Insights from Emerging Markets. *Journal of Logistics Informatics and Service Science*, 10(2), 29-42. <https://doi.org/10.33168/jliss.2023.0203>
14. Great Place to Work®. (2023, August 30). Great Place to Work announces the 2023 Best Workplaces in Asia, representing 5.9 million employee experiences. PRNewswire. <https://www.prnewswire.com/apac/news-releases/great-place-to-work-announces-the-2023-bestworkplaces-in-asia-representing-5-9-million-employee-experiences-301909197.html>
15. Hamidi, N. N. E., Mansor, F. A., Hashim, M. Z., Muhammad, N., & Wan Azib, W. N.H. (2020). The relationship between physical workplace environment and employees' performance. *Journal of Contemporary Social Science Research*, 4(1), 56-67.
16. Hertzog, M.A. (2008), Considerations in determining sample size for pilot studies. *Research in Nursing & Health*, 31(1) 180-191. <https://doi.org/10.1002/nur.20247>
17. Hsieh, M., Zhang, Y., Dong, R., Lee, Y., & Ni, C. (2022). Use of EEG signals, cortisol secretion, and task performance to evaluate the effects of different lighting environments on concentration level in a sustained attention task. *International Journal of Industrial Ergonomics*, 92(1), 103371. <https://doi.org/10.1016/j.ergon.2022.103371>
18. Ismail, N., & Rosdi, I. S. (2022). Individual Work Performance Success Factors: Revisiting the Human Performance System Model. *Journal of Business Management and Accounting*, 12(2), 1–21. <https://doi.org/10.32890/jbma2022.12.2.1>
19. Kabugade, R., & Erande, A. D. –. (2023). Study The Working Conditions and Performance of The Employees in Selected Universities. *Paripex-Indian Journal of Research*, 12(4), 6–7. <https://doi.org/10.36106/paripex/0906545>
20. Karla, D., Pandey, V. K., Rastogi, P., & Kumar, S. (2022). A Comprehensive review on Significance of Problem-Solving Abilities in Workplace. *World Journal of English Language*, 12(3), 88. <https://doi.org/10.5430/wjel.v12n3p88>
21. Koopmans, L., Bernaards, C. M., Hildebrandt, V. H., Schaufeli, W. B., De Vet Henrica, C., & Van Der Beek, A. J. (2011). Conceptual frameworks of individual work performance. *Journal of Occupational and Environmental Medicine*, 53(8), 856–866. <https://doi.org/10.1097/jom.0b013e318226a763>
22. Kovács, G. (2020). Combination of Lean value-oriented conception and facility layout design for even more significant efficiency improvement and cost reduction. *International Journal of Production Research*, 58(10), 2916–2936. <https://doi.org/10.1080/00207543.2020.1712490>
23. Králiková, R., Lumnitzer, E., Džuhová, L., & Yehorova, A. (2021). Analysis of the impact of working environment factors on employee's health and wellbeing; Workplace lighting design evaluation and improvement. *Sustainability*, 13(16), 8816. <https://doi.org/10.3390/su13168816>
24. Kumala, F. (2023). The influence of job demand and work environment on employee performance. *Talent Journal of Economics and Business*, 1(1), 1–6. <https://doi.org/10.59422/jeb.v1i01.187>
25. Laomongkholchaisri, N., Arandorn, N., Wangsaward, T., & Musikanit, S. (2024). Plant layout and design of Central Supply Laundry Department: a case study of a hospital in Songkhla province. *Engineering and Technology Horizons*, 41(4), 1-9. <https://doi.org/10.55003/eth.410406>
26. Lavanya, N., & Meti, N. G. (2023). A Study on Impact Of Workplace Environment towards Employees Performance At Toyama Controls And Systems Private Limited In Hoskote. *International Journal of Scientific Research in Engineering And Management*, 7(10), 1–11. <https://doi.org/10.55041/Ijsrem26620>
27. Lee, C., & Park, S. (2021). Changing Factors of Employee Satisfaction with Working Conditions: An Analysis of the Korean Working Conditions Survey. *Safety and Health at Work*, 12(3), 324–338. <https://doi.org/10.1016/j.shaw.2021.04.003>
28. <https://doi.org/10.1016/j.shaw.2021.04.003>
29. Li, L. (2024). Working conditions and performance of dance teachers in Chinese universities. *International Journal of Research Studies in Education*, 13(10), 21-32. <https://doi.org/10.5861/ijrse.2024.24703>
30. Malik, I., Abdulahad, S., Saleh, A., & Shabila, N. (2023). Health employees' perceptions of their working conditions. *Asia Pacific Journal of Health Management*, 18(1), 1-8. <https://doi.org/10.24083/apjhm.v18i1.2141>
31. Ministry of Economy Malaysia. (2024, June). The Malaysian economy in figures 2023. https://ekonomi.gov.my/sites/default/files/2024-06/The_Malaysian_Economy_in_Figures_2023.pdf

32. Mishra, S., & Narendra, P. (2020). An Overview of Ergonomics. *Journal of Ergonomics Research*, 3(1), 1–3. [https://doi.org/10.37532/jeor.2020.3\(1\).111](https://doi.org/10.37532/jeor.2020.3(1).111)
33. Munn, S. K. S., & Azalea, A. (2024). Physical work environment satisfaction and productivity of working adults in Malaysia. *Jurnal Psikologi Malaysia*, 38(1), 1–13.
34. Nazirwan, N., & Fadhlani, F. (2024). Performance of the state civil apparatus in the General Administration and Personnel section at the Sawahlunto City Population Control and Family Planning Health Service. *Adabi Journal of Public Administration and Business*, 11(1), 47–56. <https://doi.org/10.62066/jpab.v11i1.16>
35. Nikadimovs, O., & Vēvere, V. (2024). The Use of Generative Artificial Intelligence in Higher Education: University Social Responsibility and stakeholders' Perceptions. *Environment Technology Resources Proceedings of the International Scientific and Practical Conference*, 2(1), 226–231. <https://doi.org/10.17770/etr2024vol2.8015>
36. Nusraningrum, D., Rahmawati, A., Wider, W., Jiang, L., & Udang, L. N. (2024). Enhancing employee performance through motivation: the mediating roles of green work environments and engagement in Jakarta's logistics sector. *Frontiers in Sociology*, 9(1). <https://doi.org/10.3389/fsoc.2024.1392229>
37. Oppenheim, A. N. (1992). *Questionnaire, design, interviewing and attitude measurement*. London: Pinter Pub Ltd.
38. Page, G., & Tolmie, J. (2024). Physical working environments: how they affect our wellbeing and performance. *In Practice*, 46(3), 152–156. <https://doi.org/10.1002/inpr.420>
39. Petkar, R. (2019). Design, development and evaluation of plant layout for optimized material movement. *International Journal for Research in Applied Science and Engineering Technology*, 7(10), 256–262. <https://doi.org/10.22214/ijraset.2019.10038>
40. Pimpong, M. (2023). Work Environmental Factors and its Impact on Employee Productivity: The Mediating Role of Employee Commitment. *E-Journal of Humanities Arts and Social Sciences*, 916–935. <https://doi.org/10.38159/ehass.2023482>
41. Platania, S., Morando, M., Gruttadauria, S. V., & Koopmans, L. (2023). The Individual Work Performance Questionnaire: Psychometric Properties of the Italian version. *European Journal of Investigation in Health Psychology and Education*, 14(1), 49–63. <https://doi.org/10.3390/ejihpe14010004>
43. Putri, N. N. R. S., Zulqarnain, N. C. A., & Farhan, N. M. (2023). Pengaruh kinerja karyawan terhadap kualitas SDM dan organisasi. *MUQADDIMAH Jurnal Ekonomi Manajemen Akuntansi Dan Bisnis*, 1(2), 165–171. <https://doi.org/10.59246/muqaddimah.v1i2.211>
44. Rahman, R. S., Nurdiansyah, H., Sidharta, I., Purana, R. D., & Hendiky, F. (2024). Increasing employee performance through physical work environment and work motivation. *Journal of Economics Management and Entrepreneurship*, 2(1), 74–84. <https://doi.org/10.55208/jeme.v2i1.158>
45. Ravalier, J., Jones, D., Truell, R., & McFadden, P. (2022). Global social work working conditions and wellbeing. *International Social Work*, 65(6), 1078–1094. <https://doi.org/10.1177/00208728221112731>
46. Rendiani, Karmila, M., & Sutrisna, A. (2024). The Influence of Work Discipline And Physical Work Environment On Employee Performance In the Tailor Department PT. Tjiwulan Putra Mandiri Tasik. *Jurnal Pusat Manajemen*, 1(2), 69–80.
47. Saefullah, M., & Basrowi, B. (2022). Dampak Lingkungan Kerja Fisik Terhadap Kinerja Dan Kepuasan Karyawan Bagian Produksi. *Jurnal Bina Bangsa Ekonomika*, 15(2), 481–491. <https://doi.org/10.46306/jbbe.v15i2.183>
49. Sailer, K., Koutsolampros, P., & Pachilova, R. (2021). Differential perceptions of teamwork, focused work and perceived productivity as an effect of desk characteristics within a workplace layout. *PLoS ONE*, 16(4), e0250058. <https://doi.org/10.1371/journal.pone.0250058>
50. Santoso, A. B., & Oktafien, S. (2024). The impact of a conducive work environment on improving employee performance. *Manajemen Dan Bisnis*, 23(1), 69. <https://doi.org/10.24123/mabis.v23i1.722>
51. Savandha, S. D., Azzahra, A., & Purbasari, N. K. (2024). Task ambiguity: the effects of missing standard operating procedures and Inter-Leadership harmony in organizations. *American Journal of Economic and Management Business (AJEMB)*, 3(1), 1–10. <https://doi.org/10.58631/ajemb.v3i1.80>
52. Sekaran, U. and Bougie, R. (2013) *Research Methods for Business: A Skill-Building Approach*. 6th Edition, Wiley, New York.

53. Shaari, R., Sarip, A., & Ramadhinda, S. (2022c). A study of the influence of physical work environments on employee performance. *International Journal of Academic Research in Business and Social Sciences*, 12(12). <https://doi.org/10.6007/ijarbss/v12-i12/15975>
54. Shafi, M. A., Le, N. S., Zulkipli, H., Hasim, M. A., & Yusoff, M. Z. (2023). The Effect of Work Environment on Employee Productivity: A Case Study of Manufacturing Company. *Journal of International Business, Economics and Entrepreneurship*, 8(1), 77–87. <https://doi.org/10.24191/jibe.v8i1.24025>
55. Sonnentag, S., Völker, J., & Wehrt, W. (2025). Good and bad days at work: Descriptive review of daylevel and experience-sampling studies. *Journal of Organizational Behaviour*, 46(2), 207-226.
56. Tabassum, S., Siddiqui, I. H., & Shabbir, M. H. (2021). Impact of physical workspace environment factors on employee performance and turnover intention. *International Journal of Management (IJM)*, 12(1).
57. Tabe-Afshar, S., Toofan, S., & Saghafi-Asl, A. (2023). Studying the role of workplaces layout on employee's health: Sick building syndrome. *Iranian Journal of Ergonomics*, 9(4), 199-210. <https://doi.org/10.18502/iehfs.v9i4.14299>
58. Tarigan, N. N. M. R., Syahputra, N. R. A., & Yudha, N. T. K. (2022). The analysis of quality of work life and work achievement in Department of Agriculture Simalungun Regency. *SIASAT Journal of Social, Cultural and Political Studies*, 7(1), 55–70.
59. Triansyah, F. A., Hejin, W., & Stefania, S. (2023). Factors Affecting employee Performance: A Systematic review. *Journal Markcount Finance*, 1(2), 118–127. <https://doi.org/10.55849/jmf.v1i2.102>
60. Tuffaha, M. (2020). The Determinants of Employee's Performance: A Literature review. *Journal of Economics and Management Sciences*, 3(3), p14. <https://doi.org/10.30560/jems.v3n3p14>
61. Van Der Voordt, T., & Jensen, P. A. (2021). The impact of healthy workplaces on employee satisfaction, productivity and costs. *Journal of Corporate Real Estate*, 25(1), 29–49. <https://doi.org/10.1108/jcre-032021-0012>
62. Vogel, H. G., Maas, J., & Gebauer, A. (Eds.). (2010). *Drug discovery and evaluation: methods in clinical pharmacology*. Springer Science & Business Media.
63. Wibowo, H., Rahmawati, R., & Anisah, H. U. (2024). Conceptualising Factors Affecting Performance in Organisational Ecosystem. *International Conference of Business and Social Sciences*, 4(1), 422–431. <https://doi.org/10.24034/icobuss.v4i1.519>
64. Williamson, M.K., & Perumal, K. (2021). Exploring the consequences of person–environment misfit in the workplace: A qualitative study. *SA Journal of Industrial Psychology*, 47(1), a1798. <https://doi.org/10.4102/SAJIP.V47I0.1798>
65. Wolkoff, P., Azuma, K., & Carrer, P. (2021). Health, work performance, and risk of infection in officelike environments: The role of indoor temperature, air humidity, and ventilation. *International Journal of Hygiene and Environmental Health*, 233(1), 113709. <https://doi.org/10.1016/j.ijheh.2021.113709>
66. Yacoub, G., & Haefliger, S. (2022). Coworking spaces and collaborative practices. *Sage Journals*, 31(1), 87–114. <https://doi.org/10.1177/13505084221074037>
67. Youssef, F. A. A. (2023). Dimensions of Achieving Security and Occupational Safety for Social Workers in the Health Sector at Cairo University, Egypt. *Journal of Human Security*, 19(2), 1-11.
68. Zhenjing, G., Chupradit, S., Ku, K. Y., Nassani, A. A., & Haffar, M. (2022). Impact of Employees' Workplace Environment on Employees' Performance: A Multi-Mediation Model. *Frontiers in public health*, 10(1), 890400. <https://doi.org/10.3389/fpubh.2022.890400>
69. Zurnizam, N. A., Ishak, M. F., Saidon, J., Syed Omar, S. A., & Mashahadi, F. (2024). The Effect of Work Stress and Work Environment on Job Performance in Manufacturing Industry: A PLS-SEM Approach. *Information Management and Business Review*, 16(3), 263-271. [https://doi.org/10.22610/imbr.v16i3S\(I\)a.4132](https://doi.org/10.22610/imbr.v16i3S(I)a.4132)