

Ergonomics and Employee Performance: A Study on Oil Palm Plantations in Rompin District, Pahang

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Abstract

Purpose: The proceeding by the Future of Ergonomics Committee of 18th Triennial World Congress on Ergonomics, in Brazil stated that “ergonomics or human factors have great potential to ensure that any designed artefacts, ranging from a consumer product to an organizational environment, is shaped around the capacities and aspirations of humans. Ergonomics is disregarded by many, ignored due to time, cost and considered as a complex and a battlefield for management with the recent economic conditions (Punadi, 2015). This study was conducted to determine the physical ergonomics; such as noise, lighting and furniture and the relationship towards employee performance.

Design/methodology/approach: This study was quantitative in nature, using the survey method to examine the relationship between independent variables (ergonomics) and dependent variable (employee performance). Oil Palm Estates in Rompin District in Pahang were chosen as they had a substantial number of plantation employees working in various oil palm companies. 200 questionnaires had been distributed to the respondents. The response rate from the respondents was 76%.

Findings: The research concluded that physical ergonomics such as furniture, noise, and lighting were considered important factors in contributing to employee's performance.

Research limitations/implications: There are limited studies conducted in Malaysia on the topic of ergonomics and employee performances. Loo et al. (2012) researched on ergonomic issues in Malaysia, but not on the relationship with performance. Punadi (2015) did a research to measure the relationship between ergonomic and employee performances in private higher education institution. There is currently no research conducted in the plantation industry. In addition, it was also difficult to determine the accurate number of population as there were no statistic on the number of plantation employees in the district of Rompin.

Practical implications: The study of ergonomics is valuable to organizations as most working individuals spent almost of their time in the workplace. Therefore, the design and working space should meet the right level of security to maintain the level of health; and also to increase the level of satisfaction and achieving individual comfort. This is where ergonomic principles play a role in providing welfare in the work environment. According to Leblibichi (2012), an enriched workplace environment motivates employee performance and leads to job satisfaction.

Originality/value: By applying ergonomics, the plantation industry would increase their employee performances in the office. Furniture, lighting and noise are found to influencing the employee performances. Providing suitable furniture for the employees, with enough lighting in the workspace had proven it could improve the performance of employees. In fact, this research also found that noise also has a significant relationship with employee's performance. This study on ergonomics would give benefit to the organization in helping to increase the employee performances; thus increasing the productivity of the plantation industry

Keywords: Ergonomics, Furniture, Noise, Lighting, Employee Performance.

Introduction

Background of the Study

Agriculture was the pioneer sector that was in operation and was important in the build-up of the national economy after the independence of Malaysia. About 11.5% of Malaysian's population were employed in this sector (Syazwani et al., 2016). In 2015, the Department of Statistics Malaysia stated that the main plantation in Malaysia was oil palm and it was a major contributor to the GDP of agriculture sector at 46.9%. The industry player in the plantation industry dealt with the ergonomics or human factors in the company's operation. The Malaysian palm oil industry, especially the oil palm plantation sector offers various job opportunities and they highly depend on manual labour. The main operations and activities in the plantation are physically demanding, arduous, and require extreme energy in performing the task, thus leading plantation employees to be highly exposed to ergonomics hazards (Shamsul et al., 2015). The employee performance is reflected through high productivity, quality of production, obedience of occupational safety and health regulations and job satisfaction. Therefore, based on that reflection, the development of ergonomic factors in plantation industry is significant as the industry is one of the major contributors of Malaysian economy. Furthermore, Wilson (2000) stated that, "the application of ergonomic in reality requires knowledge through practice, experience and empirical study with hypothesis and testing."

Problem Statement

In Malaysia, studies were carried out in the past pertaining to ergonomics (Ibrahim, 2011). A research on anthropometric data was conducted to design an ergonomic ablution area at mosques for public use, which focused on designing wudu' workstation for elderly and disabled people in mosque (Dawal et al., 2016). Another study by Deros et al. (2016) was on the prevalence of back pain among workers in the Malaysian oil palm industry. Their findings showed many manual handling activities and tasks performed were not designed ergonomically, resulting to a high prevalence of musculoskeletal disorders found among oil palm fresh fruit bunches (FFBs) manual workers. In addition, there was another research on ergonomics especially on evaluating the effectiveness of exercise, ergonomic modification, and a combination of training exercise and ergonomic modification on the scores of pain in office workers with neck, shoulders, and lower back pain (Shariat et al., 2018). Studies on ergonomics are still being conducted but limited studies were carried out in the palm oil industry, especially in developing countries. This resulted to a gap in understanding these issues especially in comparing between developing countries and industrially advanced countries (Loo and Stanley, 2012).

Providing employees with furniture, tools and accessories such as monitor arms, desks, foot rests and keyboards that are adjustable to personal ergonomics needs can improve employees' productivity and allow them to configure their workspace for their best personal comfort (Timm, 2007). According to Healy et al. (2012), the majority of evidence pertaining to the health impact of prolonged workplace sitting comes from the ergonomic literature. The evidence focused on musculoskeletal disorders, where a part of the musculoskeletal system is injured over time through repetitive overuse. This confirmed the need of ergonomic furniture. They also stated that they found increased recognition that these chronic conditions are related to lower labour-force participation.

Noise in the workplace might affect one's performance and productivity will reduce the level of focus as well as distracted the communication and interaction between two or more parties (McKeown, 2008). A study on workplace environmental factors towards employees' performance by Naharuddin and Sadegi (2013) showed disturbances such as noise will cause discomfort on the employees and affect their performance. Chandrasekar (2011) stated that the quality of workplace environment, which includes noise impact the employee's level of job performance and motivation. Based on these reasons, this research was conducted to determine the relationship between physical ergonomics; such as noise, lighting and furniture and employee performance.

Objective of Study

1. To study the relationship between lighting and employee's performance.
2. To study the relationship between furniture and employee's performance.
3. To study the relationship between noise and employee's performance.

Research Questions

1. Is there a significant relationship between lighting and employee's performance?
2. Is there a significant relationship between furniture and employee's performance?
3. Is there a significant relationship between noise and employee's performance?

Research Hypotheses

- H1: There is significant relationship between lighting and employee's performance.
H2: There is significant relationship between furniture and employee's performance.
H3: There is significant relationship between noise and employee's performance.

Significant of Study

Benefits provided by ergonomics all linked to the reduction in occupational injury risks and to the improvement of physical and psychosocial conditions of the workforce with a drastic reduction in costs linked to absenteeism, medical insurance, and rehabilitation (Carey and Gallwey, 2002). The reduction of the adverse factors as mentioned by Carey and Gallwey (2002) is essential about utilizing the workforce to perform their work. Ergonomics is very important towards individual and organization as the comfortable setting of workplace and work conditions will aid in retaining high performers and talented individuals to meet the present and future demands of an organization towards sustainability (Nilsson and Ellstrom, 2011). Moreover, Sarit and Parna (2015) suggested that a "specific 'place' variable and employee's work environment preference for goal orientation plays a predominant role in performance and commitment outcomes".

Literature Review

Ergonomics

Ergonomics as defined by Chapanis (1995) is "discovering and applying information about human behaviour, abilities, limitations, and other characteristics to the design of tools, machines, system, tasks, jobs, and environments for productive, safe, comfortable, and effective human use" (Sanders and McCornick, 1993). In 2000, The International Ergonomic Association (IEA) defined ergonomics as "Ergonomics (or human factors) is the scientific discipline concerned with the understanding of the interactions among humans and other elements of a system, and the profession that applies theoretical principles, data and methods to design in order to optimize well-being and overall performance" (Jan et al., 2012). The optimization of socio-technical systems including the organizational structures, policies and processes is another definition linked to organizational ergonomics (Karwowski, 2005). The organizational ergonomics is also known as 'macroergonomics' that emphasized ergonomics as not just about how individuals interact with object but even organizations need to be design ergonomically (Catherine, 2008).

Physical Ergonomics

The International Ergonomic Association describes the physical ergonomics as the domain in relation to with human anatomical, anthropometric, physiological and biomechanical characteristics as they relate to physical motion. Physical ergonomics issues, primarily in the workplace, typically dominate the public view and understanding of ergonomics (Catherine, 2008). Salvendy (2012) added that physical ergonomics is concerned with human anatomical, anthropometric, physiological, and biomechanical characterise as they relate to physical activity.

Employee Performance

Performance management is "a continuous process of identifying, measuring, and developing the performance of individuals and teams and aligning performance with the strategic goals of the organization" (Amstrong, 2009). He also mentioned that the main objectives of performance

management are to maintain, develop, and motivate the people at work and for the employees to present better results. One of the concerns of performance is creating a work environment or setting in which employees are unable to perform to the best of their abilities. Amstrong (2009) also mentioned that the high employee's performance direct to enhancement of productivity of individual and collectively impact the organizational productivity. He also added that some factors that affect the level of individual performance which are motivation, ability and opportunity to participate.

The Relationship between Ergonomics and Employee Performance

The human factors termed as 'ergonomics' stressed out the understanding of interactions among human term as 'employee' and other elements of a system involved due to their engagement in the employment. Loo and Stanley (2012) concluded that ergonomics helped to improve performance besides enhancing workplace occupational safety and health (OSH) and it is essential to promote ergonomics concepts and practice to various industries in Malaysia. The relationship between ergonomics and employees performance also can be grounded to the Herzberg's Two-Factor Theory on "hygiene factors or job context" that focused on the importance of 'work environment' and 'company policy' (Herzberg, 1987). The satisfaction with work environment and company policy will affect the employee's motivation to perform at individual desire level of performance (Nanzushi, 2015). Hence, an enriched ergonomics redesigning and improvement among working conditions showed better workers' performance.

Research Methodology

Research Design

This study was quantitative in nature and used survey method to examine the relationship between independent variables (ergonomics) and dependent variable (employee performance). The descriptive research design was used to collect data from respondents. The findings and conclusion of the study depended on the full utilization of statistical data collected and analysed using SPSS. This study analysed the relationship between independent and dependent variables through quantitative and qualitative approaches.

Sampling and Population

The samples of the study were employees from Plantation Companies in Rompin District, Pahang, Malaysia. 200 questionnaires were distributed to the respondents but only 152 questionnaires were returned, giving a 76% respond rates.

Instrument and Measurement

Primary data gathering used structured questionnaire as an instrument. Questionnaire that has been used to collect data about the physical ergonomics is adapted from Punadi (2015).

Findings

Reliability Analysis

The reliability analysis is as shown below.

Table 1: Variables Reliability Results

Factors	N	Alpha score	Score interpretation
Furniture	5	0.798	Good
Noise	5	0.773	Good
Lighting	5	0.728	Good
Employee Performance	5	0.837	Very Good

The results showed that the questionnaires were valid and reliable as supported by Hair et al. (2009).

Correlation Analysis

The correlation analysis is as shown below.

Table 2: Correlation Analysis

		FURALL	NOIALL	LIGALL	EMPALL
FURALL	Pearson Correlation	1	.766**	.618**	.466**
	Sig. (2-tailed)		.000	.000	.000
	N	152	152	152	152
NOIALL	Pearson Correlation	.766**	1	.551**	.478**
	Sig. (2-tailed)	.000		.000	.000
	N	152	152	152	152
LIGALL	Pearson Correlation	.618**	.551**	1	.706**
	Sig. (2-tailed)	.000	.000		.000
	N	152	152	152	152
EMPALL	Pearson Correlation	.466**	.478**	.706**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	152	152	152	152

** . Correlation is significant at the 0.01 level (2-tailed).

The Table 2 below showed the summary of correlation analysis.

Table 3: Summary of Correlation Analysis

Relationship between:	Pearson Correlation	Strength of association
Furniture and performance	0.466	Moderate
Noise and performance	0.478	Moderate
Lighting and performance	0.706	High

Discussions and Conclusion

As presented in the above table, it can be concluded as below:

Hypothesis 1: There is Significant Relationship between Furniture an Employee's Performances.

From the correlation table above, Cronbach alpha is 0.466 - indicated a moderate coefficient range between furniture and employee's performance. Thus, the hypothesis is accepted.

The result showed there is a significant relationship between furniture and employee's performance. The positive correlation concluded that an increase in furniture factors will lead to an increase in employee's performance. Ghassan (2002) stated that improving organizational performance by exploiting workplace flexibility such as poorly designed workstations including the furniture adversely affect the employee performance. Nanzushi (2015) showed employees that were satisfied with the physical environment including furniture comfort would help improve their performances. The comfort of physical environment including the furniture factors may prevent or minimize the stress level of an individual while getting work done and could lead to increase in their job performance (MacCoy and Evans, 2005).

Hypothesis 2: There is Significant Relationship between Noises an Employee's Performance.

Pearson correlation is 0.478 which indicated moderate coefficient range between noise and employee's performance. Thus, the hypothesis is accepted.

The result also showed that there is a significant relationship between noise and employee's performance. The positive correlation concluded that an increased in noise factors will increase in employee's performance. Shikdar and Sawaqed (2003) investigated the ergonomics factors including noise in the environmental lead to low worker performance where the measures were productivity, quality and absenteeism. They added that the performance indicators and environment factors have significant correlation. Another study also found that employees that performed under different conditions ranging from rarely to extreme unpleasant conditions including the noise factors would influence employees' performance, and they demonstrated low job performance as compared to those that work under better conditions (Kahya, 2007).

Hypothesis 3: There is Significant Relationship between Lighting an Employee's Performance.

From the correlation table above, Cronbach Alpha is 0.706 which indicated high coefficient range between lighting and employee's performance. Thus, the hypothesis is accepted.

Hypothesis tested showed that there is a significant relationship between lighting and employee's performance. Overall, the positive correlation concluded that an increase in lighting factors correlated in an increase in employee's performance. This finding was supported by Nanzushi (2015) that showed a spacious office with enough lighting would boost the employees' performance. Inadequate lighting in offices is a serious ergonomics concerns which have a tendency towards increasing the stress level in employees and influence their health and their overall performance.

Based on the above, it can concluded that the study of ergonomics is valuable to organization as it is related to employees' performances. Most working individuals spent almost of their time in the workplace that is in a working environment that affects thoughts, emotions and actions. Therefore, the design of work space should meet the level of security, able to maintain the level of health and increase the level of satisfaction and individual comfort. Ergonomic principles play a role in providing welfare in the work environment. According to Leblibichi (2012), an enriched workplace environment motivates employee's performance and leads to job satisfaction. Andersen et al. (2011) found constant usage of computer is associated with musculoskeletal pain. This is one of the bad effects of misapplying ergonomic principles at work. The impact of such physical factors can lead to other effects on the organization such as employee dissatisfaction and subsequent a reduction in efficiency and performance. By applying ergonomic principles,

fatigue and stress can be reduced. Employees will not only accomplish tasks, but they can speed up the task and minimize stress at work.

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