

HOW OFFICE DESIGN AFFECTING EMPLOYEES' PRODUCTIVITY? A STUDY ON NATURAL GAS INDUSTRY

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ABSTRACT

In the current modern workplace and office design, organizations recognize the importance of leveraging the work environment, both in terms of aesthetics and functionality, to enhance employee productivity. The arrangement of the office space and the overall office design, which includes workflow play a crucial role in employee satisfaction and makes a positive impact on the well-being of the employees. This study examines the impact of office design on employee productivity in a processed gas industry, specifically considering factors such as furniture availability, environmental noise, ambient temperature, ambient lighting, and space arrangement. Using a quantitative method of purposive sampling, 168 respondents has completed self-administered questionnaires. The collected data was analysed using SmartPLS. The findings indicate that office furniture and ambient temperature positively affects employees' productivity. This suggests that organizations can enhance productivity by paying attention to these specific aspects of office design. This study was limited to the natural gas industry and did not capture the vast array of employees and their perceptions in other sectors. Future studies may want to empirically substantiate our quantitative investigation with a set of qualitative primary data to adequately address the limited external validity of our work also consider other elements of office design.

Keywords: Employees' productivity, Ergonomics, Natural Gas company, Office design, Work environment

1.0 INTRODUCTION

In the modern era, the link between health, well-being, performance and productivity have become a great concern among people who are not only aware on the quality of work but also on how it affects their quality of life. An appropriate physical work environment has a significant influence on the outcome produced by employees, their attitudes that indirectly affecting the organization performance as a whole (Schilleci, 2023). Therefore, it is crucial for employees to have a well-organized and healthy working environment to optimize their efficiency and

productivity. Possible elements to enhance employee productivity are related to office design. The design of the office environment and quality of life are interconnected and can have a long-term impact on employees' health and productivity. The focus towards sustainable design has mutual benefits for both parties, whereas investing on it will reap financial growth in the long-run and create a pleasant workspace. The quality of the office design and physical environment in the office is required to support employees' performance in the organization which can reflect in their health and productivity (Rasheed & Byrd, 2017; Zitars et al., 2021). Though studies associate with physical work environment and workers' productivity have been discovered in past studies (Kaushik et al., 2023; Nurick & Thatcher, 2023), however, the studies have not been extensively explored in the processed gas industry in Malaysia. This highlights a potential area for investigation into how office design affects productivity within this specific industry.

Furthermore, conducting research in the processed gas industry in terms of office design and its impact on productivity is very limited. Most of the studies have focused on other industries such as banking (Hansika & Amarathunga, 2016), construction and design company (Labib et al., 2023) and green certified buildings (Nurick & Thatcher, 2023). Hence, this study is expected to filling the gap in the literature, researchers and industry practitioners to provide a better understanding of how to create work environments that enhance employee performance in this particular sector. In 2021, Malaysia was the second-largest producer of oil and natural gas in Southeast Asia and the fifth-largest exporter of liquefied natural gas (LNG) in the world as it is located on a strategic route for marine energy trade (EIA, 2021). Nearly all of Malaysia's oil comes from offshore fields. Hence, Malaysia's natural gas industry plays an important role in driving the sustainable future for the country.

The major question posed to be answered in this study is: Does workplace environment such as furniture availability, noise from the environment, ambient temperature, ambient lighting, and space arrangement affect employee productivity? The main aim of this research is to examine whether the above selected elements which constitute a good office design may impact employee productivity. Every employee will have different views and needs in terms of their comfort in their room or office space. Some may feel uncomfortable if they have too much empty space around them while some may feel comfortable if they have more light around their workspace. This empirical study can contribute towards getting an answer for the above question which is very critical at the current era where workplace is undergoing a dynamic shift. Furthermore, this study also enriches the existing literatures by focussing on key sectors in Malaysia that contribute to national income that help provide feedback to companies to grow and challenge their performance in the market. In addition, it may also be useful in assisting the processed gas company in Malaysia with suggestions in designing the office workspace to ensure for their employee productivity and performance.

2.0 LITERATURE REVIEW

2.1 Office Design and Productivity

Office design can be considered as one of the most important aspects that directly impacts workers' productivity. It is evidence by past research stated that productivity can increased up to 20 per cent when a pleasant office environment is provided (Clements-Croome, 2015). Therefore, it is crucial to examine the impact of office design towards workers' productivity in the context of natural gas industry. Office design includes all components and elements of a workspace which includes features such as colour choices, layout, lighting elements and connectivity between employees. While organizations have their own way of planning to make the office a productive environment, office design is important for employee

satisfaction and affects their level of productivity (Hansika & Amarathunga, 2016). Furthermore, past study showed that a large number of respondents prefer a personal and tidy workspace which is an effective method to increase motivation, improve their mood and increase comfort levels in the workplace (Sinnappan, 2017). The ergonomic factors as furniture design, ventilation, noise, light, supervisor support, workspace, communication, fire safety measures affect employee productivity (Eberendu et al., 2018; Mutegi et al., 2023).

The ergonomics of furniture that is often used in the office is one of the factors to be considered very suitable and an appropriate design will produce fewer chances of incidents to endanger employees so that they remain comfortable (Altamimi et al., 2023). Additionally, Rasheed et al. (2021) suggest that the relation between Indoor Environmental Quality (IEQ) factors and the time spent in the office are positively correlated. The lesser the time they spend, the lesser they influence IEQ factors. Based on previous justification, the following hypothesis is developed:

H1: Furniture arrangement positively affects employee productivity.

Unpleasant indoor environmental quality (IEQ) will directly affect the productivity of the workers (Franke & Nadler, 2020). Noise is one of the most critical indoor environmental qualities which also known as sensor-measurable IEQ. The present of noise in the office will give a high pressure on the employees to perform their job well. Past studies showed that 91.6 per cent of employees get affected when there is a noise while conducting their works (Oseland & Hodsman, 2018). Noise can be from inside or outside the workplace includes conversations, voice generated from office machines, traffic (Fassoulis & Alexopoulos, 2015). Noise is an important factor in employee productivity as evidenced by Banbury and Berry (1997) who found that a quiet time of 5 minutes was sufficient to reverse some of the effects of background speech disturbance and office noise. Moreover, past studies have found that the noise in the workplace reduces the concentration and productivity of workers (Bergefurt, et al., 2022; Awada et al., 2023). Since workers spent most of their time in indoor office, thus maintaining a good quality of indoor environment such as quite environment is very crucial for the employers. Considering this situation, it is important to examine the relationship between noise and workers' productivity from different office environment such as in natural gas industry. Hence the second hypothesis is developed:

H2: Noise positively affects employee productivity.

Office temperature is another crucial element in indoor environmental quality (IEQ). For example, bad air quality can give many negative effects on employee's health such as breathing problems, headaches, and fatigue that can lead to decreased their work productivity (Qabbal et al., 2022). The temperature, air quality and humidity level are ambient elements that should be taken into consideration to ensure a comfortable working environment. The indoor atmosphere of the office must clean with sufficient air humidity level to ensure the safety of the working environment. Employees are more comfortable and productive if they have control on their room temperature, while hot room temperature will affect the body to sweat and certainly reduce their concentration in managing their jobs (Arminas et al., 2021). Malaysia is one of the Southeast Asia countries that always suffering from the heat wave (Li et al., 2022). Therefore, maintaining a good temperature can avoid from uncomfortable situation that may affects workers' productivity. Considering this matter, the following hypothesis is developed:

H3: Ambient temperature positively affects employee productivity.

Lighting also contributes to providing comfort to employees in the workplace where the type of lighting either natural or artificial; affects employee performance (Akhtar et al., 2014). According to Mewomo et al. (2023), natural lighting is considered the ideal light source for interior spaces due to its ability to offer the best brightness for human vision while maintaining a comfortable environment without causing any strain on the eyes, while Liu et al., (2023) claims that lighting quality is especially important when there is a lack of external light to provide a better experience to employees. According to Amble (2005), the appropriate lighting and enough daylight in the offices can reduced staffs' absenteeism by 15 per cent and increased productivity between 2.8 and 20 per cent. Furthermore, past study also confirmed that lighting levels also can directly affect employees' health as well as indoor workplace environment (Kaushik et al., 2023). Considering the importance of lighting in measuring employees' productivity, this study attempts to measure the influence of ambient lighting towards employees' productivity in the natural gas industry. Hence, the fourth hypothesis is developed:

H4: Ambient lighting positively employee productivity.

Office layout refers to the spatial arrangement and organization of physical items within a workplace. It consists of the strategic placement of furniture, equipment, and other components to foster a functional working environment. Aduwo et al. (2021) suggested that workplaces with biophilic designs are good because they incorporate natural elements into the design of the space and are considered as sustainability extensions that have a significant influence on employee productivity. Moreover, research also shows that internal nature factors such as indoor plants, inanimate objects, and window views can contribute to employees' health and motivation, while external nature factors contribute to economic, environmental and social sustainability through its impact on employees' restoration and stress (Sadick & Kamardeen, 2020). Furthermore, Moslehian et al. (2023) also found that an increase in the physical design of the workplace can result in an increase in employee performance from five to ten percent. In particular, a large body of past literature indicates that how office space affects not only the comfort of employees but their health and productivity (Rasheed & Byrd, 2017; Voordt & Jensen, 2023). Furthermore, it is supported by Tsai (2023) indicate that the benefits of appropriate office space for employee and organizational success. Based on the previous justification, the following hypothesis is developed:

H5: Spatial arrangement positively affects employee productivity.

While workplaces have their own way of planning to make the office a productive environment, office design is important for employee satisfaction which in turn affects their level of productivity (Hansika & Amarathunga, 2016). According to Wong et al. (2017) and Wu et al. (2023), workplace factors are important because employees productive in a conducive environment supports physical, mental, and emotional stability. Hence this study aims to examine how employee productivity may be impacted by office design in terms of the five elements discussed in past studies. Figure 1 presents the conceptual framework for this study. Five factors that consist of furniture arrangement, noise, temperature, lighting and spatial will be measured towards workers' productivity in the natural gas industry.

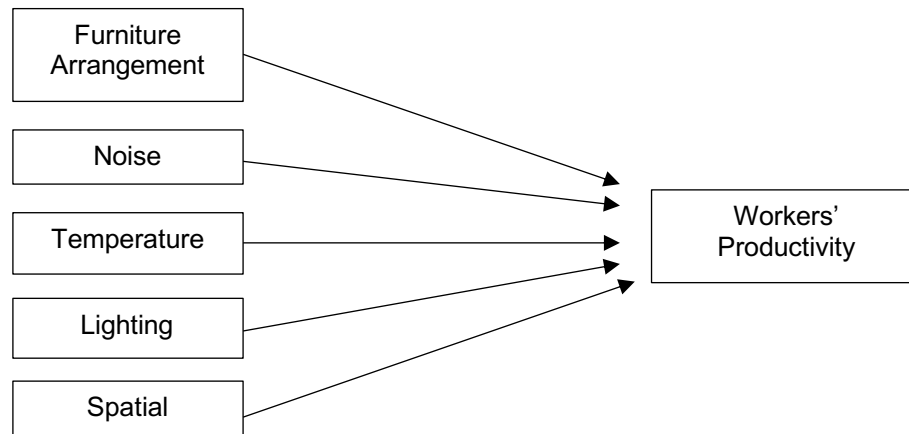


Fig. 1 Conceptual Framework

3.0 METHODOLOGY

Quantitative research method was conducted on a natural gas company which aims to examine the employee productivity due to office design. This established processed gas company with more than fifty years of experience manufactures and distributes industrial, specialty and medical gases. Besides that, this company also provides a big range of related services which include installation of gas equipment, pipelines and associated engineering services located at Selangor, Malaysia. Since the company is one of the well-established organizations in the gas sector, it can used to benchmark staff productivity and office design.

The independent variables (IV) in this study are furniture availability, noise from the environment, ambient temperature, ambient lighting and space arrangement, while the dependent variable (DV) is employees' productivity. All the questions were adapted from Olabode, Adesanya & Bakare (2017). There were three sections in the questionnaire, where Section A had demographic questions, Section B had questions on dependent variable and Section C had questions on the five independent variables. Section B and C had questions using five-point Likert scale, ranging from 1- strongly disagree to 5- strongly agree. The questionnaire consisted of 24 items, with six sections, with fours items for each variable namely furniture (4 items), noise (4 items), ambient temperature (4 items), ambient lighting (4 items), spatial arrangement (4 items) and for productivity (4 items).

The participants consisted of administrative staff who received a self-administered questionnaire. Using a purposive sampling method, a total of 168 questionnaires were distributed, but only 150 of them were considered usable for analysis. To determine the sample size, the study relied on the GPower software (Faul et al., 2007). The software was utilized to calculate the required sample size based on five predictor variables (furniture availability, environmental noise, ambient temperature, ambient lighting, and space arrangement) in relation to the dependent variable (productivity). The objective was to achieve a statistical power of 80 percent with a 5 percent probability of error. According to the GPower software, 92 responses were needed to meet these criteria. Thus, 150 respondents are appropriate for data analysis procedure.

4.0 DATA ANALYSIS AND FINDINGS

4.1 Respondents' Profile

Data was analysed using the Partial Least Square-Structural Equation Modelling (PLS-SEM) technique using SmartPLS 3.0 software to validate measurements and test the hypotheses. The reporting of the output followed the recommendations of Hair et al. (2014) and Ramayah et al. (2016). Respondents' demographics were summarised using descriptive statistics. Other statistical testing includes item loadings, convergent validity, reliability of measure and discriminate validity.

Table 1 presents the demographic profile including gender, age, marital status, education, income, and working experience of the respondents. Majority (55%) of the respondents were women, with 49% were 30 years old and below. More than half of the participants (55%) held a bachelor's degree, while 32 percent possessed STPM/ Diploma certificates. In terms of monthly income, the 39% earned between RM2501-RM5000. With regards to work experience, most employees (30%) had a tenure of 3 to 5 years. Overall, the majority (71%) of the employees had less than 5 years of experience.

Table 1. Respondents' Demographic Profile

Characteristics	Percentage (%)
Gender	
Male	45
Female	55
Age	
21-25	26
26-30	23
31-35	23
26-40	17
41 and above	11
Qualification	
STPM/Diploma	32
Bachelor's degree	55
Master's degree	12
Ph.D.	1
Marital Status	
Single	38
Married	55
Others	7
Monthly Income	
RM1,000-RM2,500	30
RM2,501-RM5,000	39
RM5,000 and above	31
Working Experience	
Less than 6 months	13
6 months - 2 years	28
3 - 5 years	30
6 years - 8 years	13
9 years and above	16

4.2 Measurement Model

To assess convergent validity, the loadings of the indicators were first examined (Hair et al., 2014) and this needs to be 0.70 or higher. Furthermore, for the average variance extracted (AVE), each construct must meet the minimum requirement of AVE to exceed 0.50 (Fornell & Larcker, 1981). Then we can conclude that convergent validity was achieved and explained. Next, the composite reliability (CR) and Cronbach's Alpha were used to assess the reliability of the measures. The values of CR must be between 0.70 and 0.90 (Nunnally, 1978; Hair et al., 2017). As presented in Table 2, all factor loadings are above the recommended threshold of 0.50, ranging from 0.55 to 0.89. Additionally, the CR scores for the factors exceeded 0.7, demonstrating good construct reliability.

Table 2. Measurement Model

Construct	Indicator	Loading	CR	AVE
Furniture	Fur 1	0.55	0.834	0.564
	Fur 2	0.695		
	Fur 3	0.868		
	Fur 4	0.848		
Noise	Nois 1	0.697	0.766	0.526
	Nois 2	0.612		
	Nois 4	0.846		
Temperature	Temp 1	0.831	0.803	0.671
	Temp 3	0.806		
Lighting	Ligt 1	0.89	0.777	0.546
	Ligt 3	0.734		
	Ligt 4	0.553		
Spatial	Spa 1	0.726	0.85	0.588
	Spa 2	0.835		
	Spa 3	0.823		
	Spa 4	0.672		
Productivity	Prod 1	0.817	0.88	0.651
	Prod 2	0.64		
	Prod 3	0.879		
	Prod 4	0.869		

Note: Noise 3, Temp 2, Tempt 4, Light 2 were deleted due to low loadings.

Discriminant validity was assessed using Fornell and Larcker (1981) criterion where the square root of AVE for each construct must be larger than the correlation between the construct and other constructs in the model. Table 3 indicates that all constructs exhibit satisfactory discriminant validity, where the square root of the AVE is greater than the correlations among the latent variables.

Table 3: Discriminant Validity using Fornell and Larcker Criterion

	1	2	3	4	5	6
1. Furniture	0.751					
2. Lighting	0.286	0.739				
3. Noise	0.309	0.359	0.725			
4. Productivity	0.601	0.41	0.353	0.807		
5. Spatial	0.36	0.629	0.391	0.424	0.767	
6. Temperature	0.416	0.487	0.36	0.577	0.401	0.819

The cross-loading matrix explains that all items are loaded higher on the construct they were measuring than on any other construct in the model. Therefore, based on the results in Table 2 and 3, the reflective measurement model can be said to have met internal consistency, convergent and discriminant validity.

To evaluate the structural model, bootstrapping was used with resampling of 500, suitable for exploratory purposes (Sapuan & Zeni, 2021). The structural model measurement was assessed by examining the standard path coefficient assessment which indicates whether the direction of the relationship is either positive or negative, where t-value assesses whether the relationship is significant based on t-statistics ($t > 1.645$). Table 4 indicates the path estimation and the hypothesis testing, which are calculated for the hypothesized relationship for the main model.

Table 4: Hypothesis Testing

Hypo.	Relationship	Std. Beta	Std. Error	t-value	Decision
H ₁	Furniture ->Prod	0.398	0.061	6.492	Supported
H ₂	Noise ->Prod	0.055	0.058	0.96	Not Supported
H ₃	Temperature ->Prod	0.325	0.072	4.499	Supported
H ₄	Lighting ->Prod	0.061	0.085	0.719	Not Supported
H ₅	Spatial ->Prod	0.09	0.076	1.18	Not Supported

Note: * $p < 0.05$

The findings reveal a significant positive relationship between furniture and employees' productivity; H₁ ($\beta = 0.398$, $p < .05$), and temperature and employees' productivity; H₃ ($\beta = 0.325$, $p < .05$). Therefore, Hypotheses H₁, and H₃ are supported. However, this study failed to support H₂, H₄ and H₅, indicating no significant relationship between noise and productivity ($\beta = 0.055$), lighting and productivity ($\beta = 0.061$), and spatial arrangement and productivity ($\beta = 0.09$). In conclusion, two of the hypotheses (H₁ and H₃) are statistically significant and the model explains 51.0 percent of the variance of employees' productivity.

To summarize, the model explains 51.0 percent of the variance in employees' productivity. The path diagram and the coefficient of determination (R^2) displayed in Figure 1 illustrate the overall relationship between office design and employee productivity. In conclusion, the study establishes significant connections between furniture, temperature, and employee productivity. However, no substantial relationships were found between noise, lighting, spatial arrangement, and productivity. The model explains 51 percent of the variance in employee productivity concerning office design.

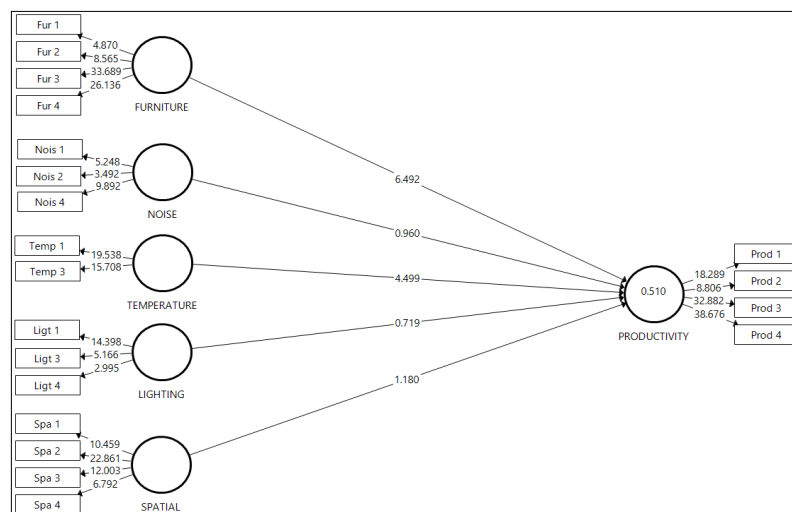


Fig 2: Path Diagram

Through hypothesis testing, reliability analysis, inferential, and regression analysis, it was determined that among the five independent variables, only two variables had a significant impact on employee productivity. Specifically, the availability of furniture and ambient temperature were found to have a positive and significant effect on employees' productivity.

5.0 DISCUSSION

This study aims to examine the influence of office design on employee productivity in a processed gas industry with regards to workplace environment such as furniture availability, noise from the environment, ambient temperature, ambient lighting and space arrangement. Better physical office environment guarantees optimum conditions for the development of the employees' productivity. The study by Voordt and Jensen (2023) show a proper office environment helps in reducing the number of absenteeism which in turn affects their actions, abilities and performance. On the contrary, a poorly designed office can result in increased production costs for the company. As the company expands and grows larger, there may be diseconomies of scale due to reduced efficiency and productivity. This, in turn, can lead to higher turnover rates, escalated recruitment and training expenses, and a decline in institutional knowledge, all of which contribute to higher production costs.

Based on the studied variables, the results reveal interesting conclusions. Findings show that from the five independent variables, two variables had a positive and significant effect on employees' productivity. Furniture availability which has been discussed widely appears to be an important factor which facilitates employee productivity. Furniture availability shows a significant relationship on employee productivity. Past Research conducted by Altamimi et al. (2023) demonstrates that providing employees with comfortable and appropriate furniture can enhance their performance and overall work efficiency. This, in turn, leads to increased employee morale, greater job satisfaction, and higher levels of engagement. This conforms to a study in the case of Sri Lanka by Hansika and Amrathunga (2016) on banking sector, which found that most of the time top management do not recognize the importance of good office design and environment and on the contrary, they believe that the only motivator to retain employees is money. But if the furniture that is available in the office is comfortable and suits the taste of majority of the employees; the staff will perform better. But sometimes, some of the employees' might find that they need better furniture to suit their everyday work activity. This can be improved by assessing through the furniture condition and function for the employees to increase their productivity (Mutegi et al., 2023).

Ambient temperature or the temperature at the office is also one the most influential factors to affect productivity among staff. The result shows a positive and significant relationship between temperature and employee productivity. This is supported by a study done by Qabbal et al. (2022) who found that air quality is important for those who spend most of their time in the office. Offices with low temperatures will irritate staff who will dry out their skin and feel cold or shiver, decreasing the performance ability. While high temperatures will make them uncomfortable to work longer in the office, especially those who work with computers that carry high heat. In addition, the weather in Malaysia is erratic sometimes hot, temperature should be an important factor to be emphasized by all companies for the benefit of the employees for their performance improvement. The findings is aligned with the past study that confirmed the temperature and noise levels have a significant impact on productivity (Arminas et al., 2021).

The other three factors had no significant relationship with employee productivity. Ambient noise, ambient lighting, and space arrangement show insignificant relationship with employee. Poor noise conditions adversely affect employee comfort, creating an uncomfortable and unpleasant work environment. The presence of excessive noise can hinder employees' ability to concentrate on their tasks and disrupt effective communication among colleagues, resulting

in misunderstandings and miscommunication. To maintain a conducive work environment and promote productivity, it is essential to plan and design workspaces that minimize the impact of sound waves and avoid noisy disturbances. Excessive noise levels can be distracting and hinder concentration, leading to decreased productivity. Implementing sound-absorbing materials, providing quiet zones, or utilizing white noise machines can help mitigate the negative effects of noise and create a more conducive work environment. By addressing noise issues, businesses can help employees maintain focus, enhance productivity, and foster a more comfortable and productive workplace.

In contrast, ambient noise showed a positive relationship with employee productivity but it was not significant. Noise from the environment does not necessarily affect performance and increase productivity. As shown by Appel-Meulenbroek, et al. (2022), an employee would like to work in a quiet workspace to be able to concentrate on the task. Yet, without it, employees still may concentrate on their jobs because environmental noise is not a major factor in productivity and some employees can work in a cheerful and happy state without being too quiet. However, one company in Indonesia showed noise effects staff productivity compared to room temperature factor (Arminas et al., 2021). The insignificant findings in this study may be because of the nature of the industry chosen which is natural gas industry where the workplace is always surrounded with the noise and thus, not affecting the employees' productivity.

Similarly, ambient lighting was not supported in this study. The lighting in the office should also be emphasized along with the seating arrangement for any inconvenience in the work environment as productivity greatly affects the growth of the company. Results of the study are consistent with theory of the person-environment fit and the diseconomies of scale. This finding support by Mewomo et al. (2023), which suggests that ambient lighting does significantly influence productivity. Instead, there are instances where outdoor and natural light can offer more comfort to employees compared to indoor lighting, and it may even replace the need for artificial ambient lighting. The inconsistent findings may be due to most of the lightings in the office have standardized level that are suitable for all people in the organization. Thus, this factor is not a crucial element that should be taken into consideration by the employees.

In the current competitive and challenging business environment, the significance of physical office space remains crucial. Despite advancements in technology and the rise of remote work options, physical office spaces offer numerous advantages that contribute to the success and growth of businesses as physical office spaces foster face-to-face interactions, promote team building, enabling seamless collaboration and help reinforce the company's culture. While current study has examined the relationship of this space arrangement with employee productivity. The study's findings revealed that the arrangement of space did not have a significant impact on employee productivity. Their performance appeared to be minimally influenced by this factor. However, the company's administrative staff expressed a preference for a more open environment, where they could interact and engage with each other instead of working alone in closed rooms. The closed-room setting was associated with feelings of boredom and a decline in morale, which in turn directly affected staff performance.

However, according to Aduwo et al. (2021), the inclusion of natural elements in the workspace has a significant impact on employees' health and motivation. This integration creates a more comfortable environment for employees, ultimately leading to increased productivity. The presence of natural elements fosters a sense of well-being and engagement, thereby enhancing the overall work experience and positively influencing employees' performance.

6.0 CONCLUSION AND LIMITATIONS OF THE STUDY

This study yields two primary findings. Firstly, it highlights the crucial impact of office design on employee productivity. Secondly, it emphasizes the significance of suitable furniture and workspace temperature, as essential components of office design, specifically in a processed gas company, in facilitating better performance and increased productivity. Organizations nowadays are all aware of the importance of employee comfort in the workplace and its working conditions such as health risks and hazards. Most of them are constantly looking into new ways to improve their office design not only to be competitive but also to retain talents, especially the skilled and efficient employees'. With the increased competition, office design has become one of the tools to attract and retain employees' in the organizations. This shows that the management of the company should focus on the effective arrangement of the furniture and room temperature in their office arrangements in order to improve and enhance their employees' productivity. These are crucial element for employees to work efficiently and achieve their key performance indicators (KPI) as stipulated in their appraisal. Employees who are satisfied with their work environment will always perform better and hence contribute more to the organizational growth. The conventional office design and workspace has to be changed to keep with the changing workspace.

However, it is important to recognize that the impact of office design on employee productivity extends beyond just furniture availability and ambient temperature. The overall work environment plays a crucial role in shaping employee satisfaction, engagement, and performance. One key aspect of office design is the layout and arrangement of the workspace. A well-designed floor plan can facilitate collaboration, communication, and efficient workflow. Open office layouts, for example, promote interaction and teamwork, while also providing flexibility and adaptability. On the other hand, some employees may benefit from designated quiet areas or private spaces for focused work. By considering the specific needs and preferences of employees, organizations can create an office design that caters to different work styles and enhances productivity.

In addition to the physical layout, the aesthetic elements of the office environment also contribute to employee well-being and productivity. Natural lighting, for instance, has been shown to have positive effects on mood, energy levels, and overall job satisfaction. Incorporating elements of biophilic design, such as plants and natural materials, can create a more visually appealing and calming atmosphere, reducing stress and increasing productivity. Providing employees with the necessary tools and resources, such as ergonomic furniture, up-to-date technology, and efficient communication systems, can streamline work processes and enhance productivity. It is important to note that office design is not a one-size-fits-all solution. Different industries and organizations may have unique requirements and considerations. Conducting studies, like the study in processed gas industry, helps shed light on the specific factors that influence productivity within a particular context. In addition to that, office design has a substantial impact on employee productivity. By considering factors such as furniture availability, ambient temperature, noise levels, lighting, and space arrangement, organizations can create work environments that promote employee satisfaction, well-being, and ultimately, higher levels of productivity. At the same time, more studies should be done on other organizations to capture to what extent office design will enhance employees' creativity and productivity and other external factor i.e., would also be tested to find the best result. Certainly, there's no denying that extended and comprehensive training programs, along with incentives and acknowledgments, can enhance performance and inspire individuals to put in greater effort (Zainon et al., 2020).

On the other hand, the study did not find a significant relationship between employee productivity and ambient noise, ambient lighting, and space arrangement. While these factors show a positive relationship with productivity, they are not considered major factors in this particular processed gas industry. However, it is worth noting that noise conditions should be

managed to ensure employee comfort, and lighting should be adequate to avoid eyestrain and headaches. The findings of your study are consistent with the theory of person-environment fit and the concept of diseconomies of scale. It is also important to consider the specific context of the processed gas industry when interpreting these results.

The results of this study are very useful because the impact of office design and the development of the work environment can improve the level of employee performance. Hence organizations need to prioritize office planning to create a conducive office design and environment for employees' job satisfaction and employee performance which both contribute to an organization's productivity and also nation building. The results reveal interesting conclusions regarding the influence of office design on employee productivity in the processed gas industry. It is also important for policymakers to know the critical factors that will motivate administrative employees to be more productive. Overall, our study can guide organizations to prioritize office planning in creating a conducive office design and environment that contribute to an organization's productivity and also nation building.

Some potential limitations of the study examining the influence of office design on employee productivity in the processed gas industry are: (1) the study focuses specifically on the processed gas industry, which may limit the generalizability of the findings to other industries. Different industries may have unique characteristics and work environments that could impact the relationship between office design and employee productivity; (2) the study focuses on internal factors related to office design, but external factors such as organizational culture, leadership, or industry-specific challenges may also impact employee productivity. These factors were not accounted for in the study could also influence employee productivity. Therefore, it is important to consider these limitations when interpreting the findings of the study and to encourage further research to address these limitations and provide a more robust understanding of the topic.

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