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Assessment Of Workspace Design Strategies, Space Adequacy, And Staff Productivity in Selected Paint Factories in Southwest Nigeria

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Abstract- ***Workspace design and space adequacy are essential determinants of operational efficiency and employee productivity in manufacturing industries. However, limited empirical evidence exists on how these factors influence staff productivity in Nigeria's paint manufacturing sector. This study assessed workspace design strategies, space adequacy, and their impact on staff productivity in selected paint factories in Southwest Nigeria. A quantitative research design was adopted, and primary data were collected through structured questionnaires administered to 114 respondents drawn from eight (8) purpose-built paint factories using a multistage sampling technique. Data were analyzed using descriptive statistics, including frequencies, percentages, weighted mean scores, and adequacy indices. The findings revealed that 59.6% of the respondents were male, while 39.5% were technicians and 67.5% were married. The evaluation of current workspace design strategies produced an overall Workspace Design Strategy Index (ECDSSPFI) of 3.82, indicating that existing design strategies generally supported workflow efficiency and staff productivity. The assessment of space adequacy recorded an overall Space Adequacy Index (ASAIISPSPFI) of 3.69, with collaboration space (mean = 4.10) and workspace layout minimizing unnecessary movement (mean = 3.91) receiving the highest ratings. Conversely, ergonomics (mean = 3.61), temperature control (mean = 3.51), storage provision (mean = 3.47), and workspace size contribution to productivity (mean = 3.46) were identified as areas requiring improvement. The study concludes that effective workspace design strategies and adequate space allocation positively influence staff productivity in paint factories. It recommends periodic workspace evaluations, ergonomic improvements, enhanced environmental conditions, and optimized spatial planning to improve productivity and employee well-being.***

Keywords: Workspace Design, Space Adequacy, Staff Productivity, Paint Factories, Manufacturing Industry, Southwest Nigeria.

I. INTRODUCTION

The design of industrial workspaces has become an increasingly important factor in improving organizational performance and employee productivity. Beyond serving as a physical environment for production activities, workplace design influences workers' efficiency, safety, health, and overall job satisfaction. Studies have shown that the quality of the physical work environment significantly affects employee performance, particularly in manufacturing industries where production processes require precision, coordination, and continuous interaction between workers, machinery, and materials (Ahmad et al., 2020; Hamed et al., 2023). Consequently, organizations are increasingly adopting workplace design strategies that optimize operational processes while promoting staff well-being and productivity.

Workspace design strategy refers to the systematic organization of production spaces, workstations, machinery, storage facilities, circulation routes, and support areas to facilitate efficient workflow and effective utilization of available resources (Bendul & Blunck, 2019). In modern manufacturing environments, efficient space utilization has become a strategic requirement for improving production efficiency, minimizing operational costs, and maintaining competitiveness (Waghmare et al., 2017). Advances in factory layout planning have shifted manufacturing systems from conventional arrangements to more flexible and optimized layouts that reduce material handling, eliminate unnecessary movement, and enhance operational performance (Kovács, 2020). Similarly, Ivanov-Kostetskyi (2021) emphasized that an effective factory layout promotes

direct workflow, minimizes production delays, and improves overall staff productivity through efficient arrangement of production facilities.

Productivity in manufacturing depends not only on technological advancement and production processes but also on the adequacy and organization of workspace. Improved factory design enhances workflow by reducing production cycle time, minimizing bottlenecks, lowering material handling requirements, and improving the utilization of labour and equipment (Al-Bayati & Al-Zubaidy, 2021; Ivanov-Kostetskyi, 2021). Space adequacy, therefore, represents an essential component of workplace performance because it provides sufficient room for movement, equipment operation, material storage, and safe interaction among workers. Previous studies have identified adequate workspace, quality control practices, total quality management, and standardized production procedures as critical contributors to organizational productivity (Pearly, Gritty Maria, & Ramanathan, 2019).

The relationship between workspace design and employee productivity extends beyond physical efficiency to include workers' psychological and physiological well-being. Research indicates that employees working in supportive and well-organized environments exhibit higher motivation, lower absenteeism, and improved work performance (Tarro et al., 2020). Conversely, poorly planned workspaces characterized by congestion, inefficient layouts, and inadequate circulation can increase physical effort, reduce morale, and contribute to occupational health challenges (Shubham & Prasad, 2016). Since productivity is generally expressed as the ratio of output to production inputs, improving workplace design has become an important strategy for maximizing labour efficiency while optimizing the use of capital, materials, and equipment (Akshay & Achal, 2017). Furthermore, Maganha et al. (2019) highlighted that designing efficient industrial layouts remains one of the fundamental responsibilities of architects because spatial organization directly influences manufacturing effectiveness.

In Nigeria, the manufacturing sector remains an important contributor to employment generation and economic development, with the paint manufacturing industry representing a significant component of industrial production. Despite its economic importance, many paint factories continue to experience operational challenges associated with inadequate workspace planning and inefficient spatial organization. Poorly coordinated production layouts often increase travel distances between processing units, prolong production time, increase workers' physical effort, and elevate workplace safety risks. These deficiencies ultimately reduce operational efficiency and staff productivity. Although considerable research has examined factory layout optimization and workspace design in different industrial settings, empirical evidence relating workspace design strategies, space adequacy, and staff productivity within the Nigerian paint manufacturing sector remains limited.

Given the importance of efficient workspace planning in improving manufacturing performance, there is a need to assess existing design strategies and determine how space adequacy influences staff productivity in paint factories. This study therefore assesses workspace design strategies, space adequacy, and staff productivity in selected paint factories in Southwest Nigeria, with the aim of providing empirical evidence that can support improvements in industrial workspace planning and enhance productivity within the sector.

II. LITERATURE REVIEW

Workspace Design Strategies in Manufacturing

Workspace design strategy is a fundamental aspect of manufacturing systems because it determines how production facilities, workstations, machinery, storage spaces, and circulation routes are organized to facilitate efficient operations. An effective design strategy promotes smooth workflow, optimizes the utilization of available resources, improves worker safety, and enhances overall production performance (Al-Bayati & Al-Zubaidy, 2021). Rather than focusing solely on equipment placement, modern workspace design integrates ergonomics, process flow, environmental quality, flexibility, and safety into a coordinated production system that supports

both operational efficiency and employee well-being (Bendul & Blunck, 2019).

The increasing complexity of manufacturing operations has shifted factory planning from conventional layouts toward integrated and flexible workspace designs that minimize unnecessary movement, reduce production delays, and improve coordination between production stages (Kovács, 2020). Efficient workspace planning also ensures that production facilities can adapt to technological changes, product diversification, and fluctuating production demands without major disruptions to operations. According to Maganha et al. (2019), effective industrial design contributes not only to productivity but also to sustainability by creating work environments that promote safety, comfort, and efficient resource utilization.

Several studies have identified ergonomics, spatial organization, environmental conditions, and workflow optimization as the principal elements influencing the effectiveness of workspace design strategies (Ajayi et al., 2015; Muralidar et al., 2019). Ergonomically designed workstations reduce physical strain and musculoskeletal disorders by ensuring that tools, equipment, and work surfaces correspond to workers' physical capabilities. Likewise, appropriate environmental conditions—including adequate lighting, ventilation, temperature regulation, and noise control—improve concentration, reduce fatigue, and support sustained productivity (Pimpong, 2023). Spatial organization further enhances operational efficiency by minimizing congestion, improving material flow, and ensuring that production activities follow logical sequences throughout the manufacturing process (Al-Bayati & Al-Zubaidy, 2021).

An effective workspace design also strengthens organizational competitiveness. Proper arrangement of production facilities reduces material handling costs, shortens production cycles, minimizes bottlenecks, improves labour utilization, and enhances product quality (Ahmad et al., 2020). Consequently, workspace design has evolved from a purely physical planning exercise into a strategic management tool for improving manufacturing performance and supporting long-term organizational growth.

Space Adequacy in Manufacturing Facilities

Space adequacy refers to the availability of sufficient and appropriately organized physical space required to accommodate production activities efficiently while ensuring safe movement of personnel, equipment, and materials (Nnezi et al., 2018). Within manufacturing environments, adequate space extends beyond the quantity of floor area to include the quality of spatial organization that enables efficient workflow, ergonomic operations, and operational flexibility (Subodh & Kuber, 2014).

Effective space planning facilitates logical placement of machinery, organized storage systems, and unobstructed circulation routes that reduce unnecessary movement and production delays (Abhishek, Rajbir Bhatti, & Harwinder, 2014). Similarly, Vivekanand et al. (2014) observed that well-planned factory layouts improve workflow efficiency by reducing transportation distances between production units and ensuring that production resources remain readily accessible throughout manufacturing processes.

Space adequacy also contributes significantly to workplace safety and operational adaptability. Manufacturing facilities frequently experience changes in production volume, equipment configuration, and technological innovation. Adequate workspace enables organizations to accommodate these changes with minimal interruption to production activities while maintaining compliance with occupational safety standards (Castro et al., 2013). Conversely, inadequate space often results in congestion, inefficient movement patterns, increased material handling, higher accident risks, and reduced employee comfort, all of which negatively influence operational performance (Saaid et al., 2018).

Beyond operational efficiency, adequate workspace contributes to employee satisfaction by creating comfortable working conditions that reduce fatigue and facilitate effective communication among workers. Organizations that prioritize space adequacy

are therefore better positioned to improve productivity, minimize operational costs, and respond efficiently to changing production requirements (Akinlolu, 2024).

Workspace Design, Space Adequacy and Staff Productivity

Staff productivity remains one of the most important indicators of organizational performance because it reflects the efficiency with which labour and other production resources are utilized to generate output (Akshay & Achal, 2017). Although productivity is influenced by multiple organizational factors, growing evidence suggests that the physical work environment plays a significant role in determining employee performance, motivation, and operational efficiency (Hamed et al., 2023).

Workspace design influences productivity by creating conditions that either facilitate or hinder employees' ability to perform their tasks effectively. Ergonomically designed workstations reduce physical discomfort and fatigue, thereby enabling workers to sustain higher performance levels over extended working periods (Ajayi et al., 2015). Likewise, effective workflow design minimizes unnecessary movement, reduces production interruptions, and ensures that equipment and materials remain easily accessible, contributing to improved operational efficiency (Riyad et al., 2014).

Environmental conditions within manufacturing facilities also affect staff productivity. Adequate lighting improves visibility and task accuracy, while effective ventilation enhances indoor air quality, regulates thermal comfort, and minimizes workers' exposure to harmful pollutants commonly associated with industrial production (Preto & Caramelo, 2019; Dhayal & Bandana, 2023). These environmental improvements reduce fatigue, support worker health, and improve overall production performance.

Space adequacy further strengthens staff productivity by providing sufficient room for movement, equipment operation, collaboration, and material handling. Well-organized workspaces reduce congestion, improve communication among employees, facilitate teamwork, and create safer working conditions (Al-Bayati & Al-Zubaidy, 2021). In contrast, overcrowded production environments increase physical strain, contribute to stress, restrict workflow, and reduce employee morale, ultimately lowering productivity (Saari & Judge, 2004).

Previous studies consistently demonstrate that manufacturing organizations adopting integrated workspace design strategies experience improvements in labour utilization, production efficiency, workplace safety, and employee satisfaction (Pearly et al., 2019; Ahmad et al., 2020). However, despite extensive international literature on factory layout optimization and industrial workspace planning, empirical studies specifically examining the combined effects of workspace design strategies and space adequacy on staff productivity within Nigeria's paint manufacturing industry remain limited. Most existing studies have concentrated on production efficiency, ergonomic interventions, or general manufacturing performance without investigating how workspace design and spatial adequacy jointly influence staff productivity within paint production environments. This contextual gap provides the justification for assessing workspace design strategies, space adequacy, and staff productivity in selected paint factories in Southwest Nigeria.

III. METHODOLOGY

Research Design

This study adopted a quantitative research design to assess workspace design strategies, space adequacy, and staff productivity in selected paint factories in Southwest Nigeria. The quantitative approach was considered appropriate because it allows for the systematic collection and statistical analysis of data relating to employees' perceptions of workplace design and its influence on productivity. Data were collected using structured questionnaires containing closed-ended questions designed to capture information on respondents' socio-economic characteristics, existing workspace design strategies, space adequacy, and staff productivity.

Study Area and Population

The study was conducted in selected purpose-built paint factories located across Southwest Nigeria. The

target population comprised production and administrative staff employed in registered paint manufacturing companies operating within the region. Southwest Nigeria was selected because it accommodates a substantial concentration of paint manufacturing industries, providing a suitable context for evaluating industrial workspace design and staff productivity.

Sampling Procedure and Sample Size

A multistage sampling technique was employed. Purposive sampling was first used to identify purpose-built paint factories that met the study criteria. Subsequently, simple random sampling was adopted to select staff members from the participating factories.

Twenty-six registered paint factories were identified across the six states of Southwest Nigeria. Based on the availability of purpose-built facilities and accessibility for data collection, eight paint factories were selected for the study. These factories were distributed across Lagos, Ogun, Osun, Oyo, and Ondo States, while no factory from Ekiti State was included because no purpose-built paint factory satisfying the study criteria was identified.

The selected factories had a total workforce of 221 employees, from which 114 respondents, representing approximately 50% of the workforce, were sampled through questionnaire administration. This sample size was considered adequate to provide reliable information while ensuring effective field administration.

Data Collection

Both primary and secondary data sources were utilized.

Primary data were obtained through structured questionnaire administration and field observations. The questionnaire was organized into sections covering respondents' socio-economic characteristics, existing workspace design strategies, space adequacy, and staff productivity. Field observations complemented the questionnaire by documenting the physical characteristics of the factory work environments.

Secondary data were obtained from published journal articles, textbooks, conference proceedings, technical reports, and other relevant literature relating to industrial workspace design, space adequacy, ergonomics, and manufacturing productivity.

Variables and Measurement

The study focused on three principal variables:

i. Socio-economic characteristics, including age, gender, educational qualification, work experience, and employment category.
ii. Workspace design strategies, assessed using indicators such as spatial layout, workstation organization, equipment arrangement, circulation, ergonomics, lighting, ventilation, and workplace safety.
iii. Space adequacy and staff productivity, measured using respondents' perceptions of workspace sufficiency, ease of movement, accessibility, workflow efficiency, comfort, and perceived productivity.

Responses relating to workspace design strategies, space adequacy, and staff productivity were measured using a five-point Likert scale.

Data Analysis

The collected data were analyzed using descriptive statistical techniques. Frequencies, percentages, mean scores, and adequacy indices were used to summarize respondents' socio-economic characteristics and evaluate workspace design strategies, space adequacy, and staff productivity. The results were presented using tables, charts, and descriptive statistics to facilitate interpretation and comparison of the study variables.

IV. FINDINGS

Socio-economic Characteristics of the Staffs in the Selected Paint Factories in South West Nigeria

The data from Table 1 presents the socio-economic characteristics of respondents from selected paint factories in South West Nigeria. Berger Paints Plc has 70.6% male and 29.4% female respondents. Age distribution shows that 23.5% are aged 18-25 years, 35.3% are 26-35 years, 41.2% are 36-45 years. Regarding their positions, 5.9% are managers, 23.5%

supervisors, 35.3% are technicians, 17.6% are operators and Administrative staff. For marital status, 17.6% are single, 70.6% married, and 11.8% divorced.

Demlux Standard Emulsion Paints shows 78.6% male and 21.4% female respondents. Age-wise, 14.3% are 18-25 years, 50% are 26-35 years, 21.4% are 46-55 years, and 14.3% are 36-45 years. Positions include 7.1% managers, 14.3% supervisors and administrative staff, 21.4% operators, and 42.9% technician. Marital status reveals 14.3% single, 78.6% married, and 7.1% divorced. President Paints and Products Nigeria Limited has 53.8% male and 46.2% female respondents. Age categories show that there was no respondent between 18-25 years, 38.5% are 26-35, and 30.8% of the respondent falls between 36-45 and 46-55 years. Positions held are 7.7% managers, 15.4% supervisors, 53.8% technicians, 7.7% operators, and 15.4% administrative staff. Marital status indicates 27.3% single, and the rest constituting 72.7% are married. Portland Paints and Products Nigeria Plc shows 72.7% male and 27.3% female respondents. The age groups consist of 9.1% aged 18-25 years, 40.9% aged 26-35 years, 22.7% aged 36-45 years, and 27.3% aged 46-55 years. Position distribution includes 9.1% managers, 13.6% supervisors, 45.5% technicians, 22.7% administrative staff, and 9.1% operators. Marital status shows 22.7% single, 59.1% married, 13.6% divorced, and 4.5% widowed.

Armstrong Paints reports 63.6% male and 36.4% female respondents. Age distribution includes 0% respondent between the age of 18-25 years, 54.5% aged 26-35 years, 27.3% aged 36-45 years, and 18.2% aged 46-55 years. The roles are 18.2% supervisors, 36.4% technician, 18.2% administrative staff, and 27.3% operator. Marital status reveals 18.2% single, 72.7% married, and 9.1% widowed. African Paints (Nigeria) Plc shows 35.7% male and 64.3% female respondents. The age breakdown is 7.1% aged 18-25 years, 35.7% aged 26-35 years, 42.9% aged 36-45 years, and 14.3 % aged 46-55 years. Positions include 7.1% managers, 28.6% supervisors and technician, 21.4% operators, and 14.3% administrative staff. Marital status shows 28.6% single, 64.3% married, and 7.1% widowed. Premier Paints Plc has 33.3% male and 66.7% female respondents. Age groups are 16.7% aged 18-25 years, 41.7% aged 26-35 years, 33.3% aged 36-45 years, and 8.3% aged 46-55 years. Positions are 16.7% supervisors, 33.3% technician, 25.0% operator and administrative staff. Marital status shows 16.7% single, 66.7% married, and 16.7% widowed.

Yrs Company Limited shows 54.5% male and 45.5% female respondents. Age distribution includes 18.2% aged 26-35 years, 54.5% aged 36-45 years, and 27.3% aged 46-55 years. The roles are 9.1% managers and administrative staff, 18.2% supervisors, 36.4% technician, and 27.3% operator. Marital status shows 27.3% single and 72.7% married.

Overall, 59.6% of respondents are male and 40.4% are female. The age distribution is 9.6% aged 18-25 years, 39.5% aged 26-35 years, 32.5% aged 36-45 years, 18.4% aged 46-55 years, and no respondent identify to be above 56 years. The positions include 6.1% managers, 18.4% supervisors, 39.5% technician, 18.4% operator and 17.5% administrative staff. Marital status shows 21.1% single, 67.5% married, 5.3% divorced, and 4.4% widowed.

Implication

The data show a workforce predominantly composed of males across the selected paint factories in the study area, with the majority in the 26-35 years age group. The positions are mainly filled by operators, and most respondents are married. This demographic structure shows a relatively young, predominantly male workforce with stable marital status.

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Table 1 Socio-economic characteristics of the staffs in the selected paint factories in south west Nigeria

Socio-economic characteristic		Selected Paint Factories in South West Nigeria																Total	
		Berger Paints Plc		Demlux Standard Emulsion Paints		President Paints Nigeria Limited		Portland Paints & Products Nigeria Plc		Armstrong paints		African Paints (Nigeria) Plc		Premier Paints Plc		Yrs Company Limited			
		No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Gender of the Respondent	Male	12	70.6	11	78.6	7	53.8	16	72.7	7	63.6	5	35.7	4	33.3	6	54.5	68	59.6
	Female	5	29.4	3	21.4	6	46.2	6	27.3	4	36.4	9	64.3	8	66.7	5	45.5	46	40.4
Grand Total		17	14.9	14	12.3	13	11.4	22	19.3	11	9.6	14	12.3	12	10.5	11	9.6	114	100
Age of the Respondent	18-25 years	4	23.5	2	14.3	0	0	2	9.1	0	0	1	7.1	2	16.7	0	0	11	9.6
	26-35 years	6	35.3	7	50.0	5	38.5	9	40.9	6	54.5	5	35.7	5	41.7	2	18.2	45	39.5
	36-45 years	7	41.2	2	14.3	4	30.8	5	22.7	3	27.3	6	42.9	4	33.3	6	54.5	37	32.5
	46-55 years	0	0	3	21.4	4	30.8	6	27.3	2	18.2	2	14.3	1	8.3	3	27.3	21	18.4
	56 and above	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total		17	14.9	14	12.3	13	11.4	22	19.3	11	9.6	14	12.3	12	10.5	11	9.6	114	100
Position in the Factory	Manager	1	5.9	1	7.1	1	7.7	2	9.1	0	0	1	7.1	0	0	1	9.1	7	6.1
	Supervisor	4	23.5	2	14.3	2	15.4	3	13.6	2	18.2	4	28.6	2	16.7	2	18.2	21	18.4
	Technician	6	35.3	6	42.9	7	53.8	10	45.5	4	36.4	4	28.6	4	33.3	4	36.4	45	39.5
	Operator	3	17.6	3	21.4	1	7.7	2	9.1	3	27.3	3	21.4	3	25.0	3	27.3	21	18.4
	Administrative Staff	3	17.6	2	14.3	2	15.4	5	22.7	2	18.2	2	14.3	3	25.0	1	9.1	20	17.5
	Others	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total		17	14.9	14	12.3	13	11.4	22	19.3	11	9.6	14	12.3	12	10.5	11	9.6	114	100
Marital Status	Single	3	17.6	2	14.3	3	27.3	5	22.7	2	18.2	4	28.6	2	16.7	3	27.3	24	21.1
	Married	12	70.6	11	78.6	8	72.7	13	59.1	8	72.7	9	64.3	8	66.7	8	72.7	77	67.5
	Divorced	2	11.8	1	7.1	0	0	3	13.6	0	0	0	0	0	0	0	0	6	5.3
	Widowed	0	0	0	0	0	0	1	4.5	1	9.1	1	7.1	2	16.7	0	0	5	4.4
Grand Total		17	14.9	14	12.3	13	11.4	22	19.3	11	9.6	14	12.3	12	10.5	11	9.6	114	100

Source: Author's Field Survey, 2026

Evaluation of Current Design Strategies in Selected Paint Factories

Data from Table 2 presents the Evaluation of Current Design Strategies in Selected Paint Factories. The table assesses various aspects of workspace design strategies using a Likert scale ranging from Strongly Agree to Strongly Disagree. The Total Weighted Value (TWV) and the average mean score (TWV/f) for each question were analyzed to determine respondents' perceptions of the effectiveness of the design strategies.

The first aspect assessed whether the layout of the workspace allows for an efficient workflow. With a TWV of 461 and an average mean score (TWV/f) of 4.04, the responses indicate a moderate level of agreement that the layout supports workflow efficiency. The design of the workspace facilitating sufficient interaction between different departments received a TWV of 433 and an average mean score (TWV/f) of 3.80, showing stronger agreement on this aspect. The ergonomics of the workspace, aimed at reducing strain and fatigue, achieved a TWV of 412 and an average mean score (TWV/f) of 3.61, showing that respondents generally agree on the effectiveness of ergonomic design. Safety measures incorporated into the workspace design recorded a TWV of 428 and an average mean score (TWV/f) of 3.75, indicating a positive perception of safety features.

The support of current workspace design for staff productivity was evaluated with a TWV of 469 and an average mean score (TWV/f) of 4.11, reflecting a higher level of agreement compared to other aspects. Lighting adequacy for all tasks received a TWV of 457 and a TWV/f of 4.01, showing that respondents believe lighting is satisfactory but could be improved to fully support task performance.

Ventilation sufficiency for maintaining air quality scored highly with a TWV of 446 and an average mean score (TWV/f) of 3.91, indicating strong agreement on its effectiveness. The minimization of noise levels in the workspace recorded a TWV of 419

and an average mean score (TWV/f) of 3.68, suggesting that respondents perceive noise control as fairly effective. Temperature control in the workspace received a TWV of 400 and an average mean score (TWV/f) of 3.51, reflecting strong agreement on its adequacy. Lastly, the accessibility of the workspace for easy movement of people and materials recorded a TWV of 431 and an average mean score (TWV/f) of 3.78, indicating that respondents generally agree on the workspace's accessibility and ease of movement.

Implications

The data reveal that most design strategies in the selected paint factories are viewed positively, particularly in terms of workspace layout, departmental interaction, safety measures, and support for staff productivity. Respondents generally agree that the current design facilitates workflow efficiency, provides adequate lighting, and ensures sufficient ventilation, contributing to a functional and comfortable work environment. However, aspects such as temperature control, noise minimization, and ergonomics received relatively lower ratings, indicating potential areas for improvement. By focusing on enhancing these specific elements, management can further optimize the workspace design to better support employee comfort, well-being, and overall productivity.

Table 2 Evaluation of Current Design Strategies in Selected Paint Factories Index ECDSSPFI

Question	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	Total Frequency (f)	TWV	TWV/f
The layout of the workspace allows for efficient workflow	33	56	22	3	0	114	461	4.04
The design of your workspace allows for sufficient interaction between different departments.	12	75	19	8	0	114	433	3.80
The ergonomics of your workspace are well-designed to reduce strain and fatigue.	10	56	42	6	0	114	412	3.61
The safety measures incorporated into the workspace design are effective.	11	66	35	2	0	114	428	3.75
The current workspace design supports the productivity of staff.	26	75	13	0	0	114	469	4.11
The lighting in the workspace is adequate for all tasks.	15	85	14	0	0	114	457	4.01
The ventilation in the workspace is sufficient for maintaining air quality.	34	45	28	6	0	114	446	3.91

The workspace design minimizes noise levels, enhancing focus and productivity.	12	65	25	12	0	114	419	3.68
The temperature control in the workspace is adequate.	9	45	55	5	0	114	400	3.51
The accessibility of the workspace allows for easy movement of people and materials.	19	56	35	3	1	114	431	3.78
Total								38.21/10
								3.82

Source: Author's Field Survey, 2026

Assessment of Space Adequacy and Its Impact on Staff Productivity in the Selected Paint Factories

Table 3 presents the Assessment of Space Adequacy and Its Impact on Staff Productivity in the selected paint factories. The table evaluates various aspects of workspace adequacy using a Likert scale ranging from Strongly Agree to Strongly Disagree. Each question's Total Weighted Value (TWV) and average mean score (TWV/f) provide insight into respondents' overall perceptions of each factor.

The first aspect analyzed is whether the workspace provides sufficient room for all necessary equipment and materials. This item recorded a TWV of 399 and an average mean score (TWV/f) of 3.50, indicating general agreement that the workspace is adequately spacious for equipment and materials. Similarly, the amount of space allowing for easy movement and reducing congestion scored a TWV of 433 and a TWV/f of 3.80, showing moderate agreement regarding the efficient use of space to minimize congestion. The assessment of whether the workspace is adequately sized to accommodate all staff without overcrowding resulted in a TWV of 418 and a TWV/f of 3.67, showing a general consensus among respondents that the workspace is well-sized. The design of the workspace for an organized and efficient workflow received a TWV of 430 and a TWV/f of 3.77, showing that respondents believe the workspace design promotes operational efficiency.

A key aspect examined was the available space's role in enhancing the ability to perform tasks effectively, which recorded a TWV of 402 and a TWV/f of 3.53, showing strong agreement. Furthermore, the size of the workspace contributing to overall staff productivity recorded a TWV of 395 and a TWV/f of 3.46, emphasizing the positive influence of workspace size on productivity.

Adequate storage space for tools and materials within the workspace received a TWV of 396 and an average mean score (TWV/f) of 3.47, showing a moderate level of agreement that storage needs are sufficiently met. The workspace layout minimizing unnecessary movement recorded a TWV of 446 and a TWV/f of 3.91, indicating a strong perception of efficiency in spatial organization. Lastly, the provision of sufficient space for collaboration among team members recorded a TWV of 467 and a TWV/f of 4.10, showing stronger agreement on the adequacy of collaborative space within the workspace.

Implication

The data reveal that respondents generally perceive workspace adequacy as positively influencing staff productivity in the selected paint factories. Most respondents agree that the workspace provides sufficient room for equipment and materials, allows for easy movement, and accommodates all staff without overcrowding. Additionally, the design of the workspace is seen to promote an organized and efficient workflow, supporting staff in performing tasks effectively. Collaborative activities are also well-facilitated, with respondents indicating that the available space encourages teamwork and interaction. However, certain areas, such as storage provisions and the overall contribution of workspace size to

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productivity, require attention. These findings reveal that enhancing these specific aspects of workspace adequacy could further improve productivity and workflow efficiency in the factories.

Table 3 Assessment of Space Adequacy and Its Impact on Staff Productivity in the Selected Paint Factories Index ASAIISPSPFI

Question	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	Total Frequency (f)	TWV	TWV/f
The workspace provides sufficient room for all necessary equipment and materials	12	35	65	2	0	114	399	3.50
The amount of space in the workspace allows for easy movement and reduces congestion.	16	65	27	6	0	114	433	3.80
The workspace is adequately sized to accommodate all staff without overcrowding.	12	56	42	4	0	114	418	3.67
The workspace design allows for an organized and efficient workflow.	9	75	25	5	0	114	430	3.77
The available space in your workplace enhances your ability to perform tasks effectively.	6	52	52	4	0	114	402	3.53
The size of the workspace contributes positively to overall staff productivity.	10	36	65	3	0	114	395	3.46
There is adequate storage space within the workspace for tools and materials.	14	42	44	12	2	114	396	3.47
The workspace layout minimizes unnecessary movement and improves task efficiency.	22	60	32	0	0	114	446	3.91
The workspace provides sufficient space for collaboration among team members.	15	95	4	0	0	114	467	4.10
Total								33.21/9
								3.69

Impact of space Adequacy on Staff Productivity

Table 4 presented data on the relationship between workspace design and staff productivity, examining aspects such as safety measures, ergonomics, lighting, and job satisfaction. The responses are analyzed based on the Average Mean and Variance to evaluate the level of agreement and consistency among respondents. The question regarding whether the current workspace design enhances safety measures recorded an Average Mean of 840 and a variance of 9.17. This show moderate agreement among respondents, showing that while safety measures are implemented to some extent, there remains room for improvement in ensuring a safer

working environment. Meanwhile, the workspace's ability to allow distraction-free work had a relatively high Average Mean of 920 and a variance of 9.59. This shows dissatisfaction, with many respondents perceiving the workspace as not conducive to maintaining focus.

The adequacy of space in improving productivity was rated with an Average Mean of 840 and a variance of 9.17. This show mixed opinions, where some staff acknowledged the positive impact of space adequacy, while others felt its influence on productivity was limited. On the other hand, the workspace design's consideration of ergonomics received the highest Average Mean of 960 and a variance of 9.80. This show the widespread concerns about the lack of ergonomic features, which contribute to discomfort and reduced efficiency. The role of workspace design in enhancing the quality and accuracy of work garnered a high Average Mean of 987 with a variance of 9.93. This reveal a strong consensus that effective design can significantly impact the precision and quality of tasks. Similarly, the impact of workspace design on improving lighting and ventilation scored an Average Mean of 940 and a variance of 9.70, showing that most respondents agree on the importance of proper lighting and air circulation in boosting productivity.

The layout's impact on health issues or discomfort was assessed with an Average Mean of 947 and a variance of 9.73. While some respondents acknowledged health-related concerns arising from the layout, others were less affected, showing a mixed perception. The workspace's conduciveness to maintaining concentration received an Average Mean of 927 and a variance of 9.63. This show a moderate level of agreement that the workspace supports focus, though there is room for better optimization. Regarding job satisfaction, the workspace design was rated with a lower Average Mean of 787 and a variance of 8.87. This show that the design does not strongly contribute to job satisfaction, revealing a need for redesigning workspaces to better align with employee preferences. Lastly, the question on whether the workspace promotes social connection scored an Average Mean of 927 and a variance of 9.63. While the responses reveal that the workspace moderately supports social interaction, it could benefit from enhancements to foster better collaboration and teamwork.

Table 4 Impact of space Adequacy on Staff Productivity Index ISASPI

Question	Yes	No	Not Sure	Average Mean (μ)	Variance (s^2) $= \sqrt{\frac{\mu}{n}}$
Does the current workspace design enhance safety measures?	47	22	45	840	9.17
Do you feel that the workspace allows you to work without distractions?	16	65	33	920	9.59
Has the space adequacy in the factory led to an increase in your productivity?	57	12	45	840	9.17
Does the design of the workspace put in ergonomics consideration?	32	55	27	960	9.80

Does the design enhance quality and accuracy of work?	59	32	23	987	9.93
Do you believe the workspace improve lighting and ventilation?	45	39	30	940	9.70
Has the current workspace layout led to any health issues or discomfort?	23	62	29	947	9.73
Is the workspace conducive to maintaining a high level of concentration throughout the workday?	36	46	32	927	9.63
Does the workspace design improve job satisfaction?	46	15	53	787	8.87
Do you think the current workspace promote social connection?	62	20	32	927	9.63

V. CONCLUSION

This study assessed workspace design strategies, space adequacy, and staff productivity in selected

paint factories in Southwest Nigeria. The findings demonstrate that workspace design is a critical determinant of productivity within manufacturing environments. Although the selected factories generally adopted conventional industrial design strategies, variations were observed in the adequacy of workspace planning, spatial organization, circulation patterns, ergonomic provisions, and environmental conditions. These differences influenced workers' ability to perform their tasks efficiently and safely.

The study further established that adequate workspace contributes significantly to staff productivity by facilitating effective movement, reducing operational constraints, improving communication, and minimizing physical fatigue. Well-planned workspace layouts enhanced workflow efficiency, equipment accessibility, and employee comfort, thereby supporting higher levels of work performance. Conversely, inadequate space allocation and inefficient layout arrangements contributed to congestion, unnecessary movement, increased physical effort, and reduced operational efficiency.

Overall, the study concludes that workspace design strategies and space adequacy are important components of industrial productivity. Manufacturing organizations seeking to improve employee performance should prioritize efficient spatial planning, ergonomic workplace design, and adequate allocation of production spaces as integral elements of factory management and organizational development.

VI. RECOMMENDATIONS

Based on the findings of this study, it is recommended that paint manufacturing companies periodically evaluate their workspace layouts to ensure efficient workflow, minimize unnecessary movement, and optimize the utilization of available production space. Regular assessments of factory layouts will help identify operational inefficiencies and provide opportunities for continuous improvement in production processes.

Factory management should also incorporate ergonomic principles into workstation design by providing adequate circulation spaces, appropriate equipment arrangement, and comfortable working conditions that enhance employee safety, well-being, and productivity. Ergonomically designed work environments can reduce physical strain on workers while promoting greater efficiency and job satisfaction.

Furthermore, existing production facilities should be redesigned where necessary to improve space adequacy, eliminate workplace congestion, and facilitate effective interaction between workers, equipment, and materials. Such improvements will contribute to smoother production flow, reduce unnecessary material handling, and improve overall operational performance.

In addition, organizations should prioritize investments in workplace environmental quality

through the provision of adequate lighting, effective natural and mechanical ventilation, proper noise control measures, and good housekeeping practices. These environmental improvements will create healthier, safer, and more comfortable workplaces that support higher levels of staff performance and productivity.

Finally, industrial architects, factory planners, and manufacturing organizations should integrate workspace design considerations into future factory development, renovation, and expansion projects. Emphasizing efficient spatial planning, ergonomic workplace design, and adequate space allocation during the planning stage will ensure that manufacturing facilities remain adaptable, operationally efficient, and capable of sustaining long-term organizational productivity.

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