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Unveiling the Role of Office Design on Employees' Performance: A Meta-Analysis Study

Buberwa M. Tibesigwa
ORCiD: https://orcid.org/0000-0003-4035-6717
Department of Architecture and Art Design, Mbeya University of Science and Technology, Tanzania
Email: buberwa.tibesigwa@must.ac.tz

Abstract: The contemporary workplace is changing and physical environment has now emerged as one of the most important drivers for employees' performance and well-being. In response, this study explored the relationship between office design and employees' performance through a comprehensive review of 80 research articles. The study used the systematic qualitative analysis, employing the nomothetic-based content analysis approach to assess the spatial design elements. The study noted eight essential spatial design elements that have a profound impact on workplace productivity: lighting, acoustics, ergonomics, thermal comfort, color schemes, technology integration, indoor air quality and office layout. Optimal lighting is shown to enhance analytical thinking and creativity while moderate background noise and ergonomic arrangements promote innovative thinking. High workplace concentration and reduced fatigue are linked to maintaining temperatures between 20°C and 22°C. The use of cooler colors has been shown to enhance analytical thinking and creativity; on the other hand, effective technology integration fosters communication efficiencies. These interrelated factors are crucial for developing healthier and productive workplace settings, which can greatly enhance the employees' well-being and drive organizational success. The study highlights the importance of policymakers providing standardized, context-specific workplace design guidelines that ensure healthier and more productive working spaces.

Keywords: Office design; design elements; employee performance.

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Introduction

Office design at workplaces involves size, layout and organization of material elements surrounding the employees (Marmaras & Nathanael, 2021). The design serves symbolic, instrumental and aesthetic functions, influencing collaboration, individual distinctiveness, place attachment and decision making (Elsbach & Bechky, 2007). The role of office design in influencing employees' performance has gained increasing attention in recent years, as organizations recognize the strategic importance of creating conducive work environments (Soe et al., 2024; Hansika & Amarathunga, 2016). In recent research, the influence of office design is brought to the forefront on the organizational performance of the worker in various context. In certain parts of sub-Saharan Africa, research has revealed that ergonomic aspects, such as lighting, table levels, workflow and sitting affect the organizational performance (Afolayan et al., 2020). Awareness and application of ergonomic principles have, however, been registered to be low in most organizations, mainly as a result of issues, such as limited resources and scarcity of research (Olabode et al., 2017).

Research explores the impact of office design on employees' performance, emphasizing on modern layouts that incorporate ergonomic

furniture (furniture designed to fit and support the human body), state-of-the-art technology, natural lighting and collaborative spaces (Kapri et al., 2023). Empirical evidence from advanced economies shows that properly designed office environments positively impact employees' productivity, organizational effectiveness and job satisfaction (Mwinuka et al., 2025; Kisokola et al., 2024; Kapri et al., 2023; Davis et al., 2011). Studies by Van der Voordt (2020) and Kim et al. (2018) provide compelling evidence that design for the worker improves performance at work through the reduction of physical discomfort, decreased creative distraction and fostering of motivation. Open plan offices with flexible workplaces, for instance, have been linked with increased productivity; natural light exposure has shown to reduce fatigue and enhance intellectual capacity. Smart office technology innovations also improve employees' performance by customizing working environments (Samani et al., 2015; Meijer et al., 2009). Furthermore, ergonomics intervention, such as height-adjustable chairs and sit-stand tables have been shown to avert musculoskeletal disorders and reduce absenteeism and increase productivity (Van Niekerk et al. (2012). These observations depict the critical function of office design on staff well-being and organizational performance.

Although the advantages of good office design have been well documented in Western and Asia settings, far more research is needed to respond to specific issues of developing economies, especially Sub-Saharan Africa (Genovese & Zoure, 2023). Current studies tend to presume idealized conditions, such as stable electricity, universal internet connectivity, and financial resources that are frequently unrealizable in this geographical context (Friederici et al., 2017; Verma & Ryan 2016). Socio-economic constraints, including budget constraints, limited infrastructure and workplace cultural conventions render the uptake of internationally prescribed office layouts unfeasible (Verma & Ryan 2016). For example, while open-plan offices are praised for facilitating collaboration in the developed world, they can create noise pollution and privacy challenges in this context, where workspace density tends to be high. Physical conditions like poor ventilation, erratic electricity supply and poor natural lighting, like in most offices in Sub-Saharan Africa, have been proven to directly affect employees' performance (Bbaale, 2018). A study by Ngonyani et al. (2022) quotes shortages of workspace conditions like ventilation and lighting that affect employees' productivity negatively. In spite of these, most of the ergonomic and workplace design principles have been founded upon research from high-income economies, and as such, they tend to be less relevant in Sub-Saharan African settings.

Although some work has been done that identified essential shortcomings in workspace environments, there has been limited work in developing cost-effective adaptations of ergonomic principles for low-resource environments, cultural determinants of workspace need, consequences of hybrid work patterns in areas with limited infrastructure and policy structures to promote ergonomic enhancement in the region's workplaces (Ngonyani et al., 2022). This study sought to explore how office design can be optimized to enhance employees' performance for the socio-economic and cultural context of Sub-Saharan Africa.

Theoretical Framework

This study is based on Herzberg's Two-Factor Theory of Motivation, which contends that workplace satisfaction and performance are controlled by two sets of factors which are motivators and hygiene factors. Hygiene factors, including office design, acoustics, lighting, indoor air quality and ergonomics improve satisfaction when properly addressed but cause dissatisfaction when ignored (Vischer, 2007; Banbury & Berry, 2005; Wargocki et al., 2002). Motivators, however, influence employee's performance and motivation. Whereas there is an abundance of studies in Western settings confirming the status of office layout as a hygiene factor (Dul & Neumann, 2009; Seppänen et al., 2006; Becker, 2004), empirical investigations in Sub-Saharan Africa are limited. In light of the region's peculiar infrastructural and environmental issues, including temperature, diverse cultural tastes, and unreliable power supply, the relevance of Herzberg's theory to Sub-Saharan African offices is untested. In the absence of context specific studies, organizations risk selecting office schemes that ignore essential local

hygiene considerations, which possibly reduce worker's performance despite the theory's general provisions. This model therefore necessitates localized studies on the impact of office layout on productivity in Sub-Saharan African workplaces.

Conceptual Framework

The conceptual framework illustrated in Figure 1 is grounded in the Herzberg's Two-Factor Theory of Motivation, which distinguishes between hygiene factors and motivators in shaping the employee satisfaction and performance. In the context of this study, office design elements, such as lighting, spatial layout, acoustics, ergonomics and indoor air quality are positioned as key hygiene factors. These environmental attributes, when adequately addressed, reduce dissatisfaction and create a conducive setting for optimal employees' performance. The framework aligns with the study's central problem by offering a theoretical lens to examine how office designs influence the employees' motivation and productivity, particularly within diverse and evolving organizational contexts.

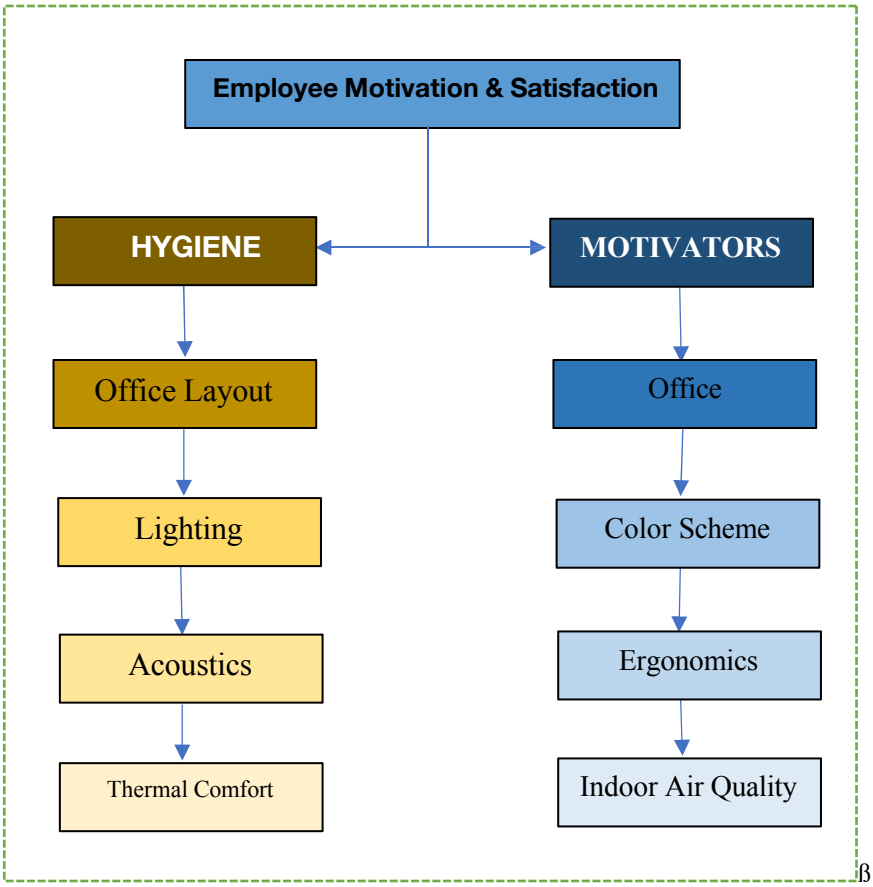

Figure 1: Conceptual Framework: Herzberg's Two-Factor Theory with Office Design Variables

Methodology

Design

This study employed a systematic review methodology to explore the relationship between office design and employees' performance. An extensive search was conducted across multiple academic databases, namely Web of Science, Scopus and Google Scholar to retrieve peer-reviewed articles focusing on key office design factors. These included spatial layout, lighting, ergonomics, acoustics, thermal comfort, technology integration, color schemes and indoor air quality. The study employed the systematic qualitative synthesis design, applying the nomothetic content analysis for categorizing and interpreting systematically occurring patterns and themes within the literature. To ensure methodological rigor, the selection of sources and development of the coding scheme were explicitly aligned with the research objectives. This approach enabled a robust synthesis of findings while maintaining

relevance and generalizability across diverse workplace contexts.

Population and Sampling

The study initial population consisted of 357 peer -reviewed papers and reports published within ten years from various publishers, including Web of Science, Scopus, Elsevier and PubMed, based on specific keywords, such as "office design," "layout," "lighting," "acoustics," "ergonomics," "thermal control," "color schemes," "technology integration" and "indoor air quality." Through systematic screening, relevant studies were selected for analysis. A final sample of 71 high impact studies was retained. Backward and forward snowballing techniques yielded an additional nine studies, some of which were published more than ten years ago. These were included based on the relevance and empirical depth of their focus, which significantly enriched the scope and analytical depth of the review.

Treatment of Data

The research employed the nomothetic content analysis, a methodological approach that synthesizes existing literature from various scholars to derive generalized conclusions. This involved systematically coding the qualitative data and categorizing it into salient themes and patterns applicable across diverse contexts. The analysis was conducted with rigor, ensuring that the interpretations remained consistent with the study's central objectives.

Ethical Considerations

The review rigorously complied with ethical research standards by systematically gathering credible, peer-reviewed literature while maintaining academic integrity in all aspects of citation and referencing. Each data source underwent a comprehensive ethical evaluation to mitigate bias, thereby ensuring the highest level of objectivity in the findings.

Criteria for Inclusion and Exclusion

This study has several limitations. First, it excluded studies focusing on residential, industrial and non-office workplace environments because these do not align with the study's objectives. The review did not examine the specific spatial, ergonomic and technological requirements of particular professions but instead analyzed general feedback gathered from various disciplines. Furthermore, while the study included research conducted across Africa, it primarily focused on studies that addressed the cultural and environmental dynamics of Sub-Saharan Africa, which may limit the generalizability of the findings to other regions.

Results and Discussion

This study extensively explored how office design factors, such as spatial layout, lighting, acoustics and air quality affect worker's performance. The findings show that workplaces designed for productivity enhance productivity and efficiency of employees.

Office Layout

Studies continue to show the profound impact that carefully designed office spaces have on workers' productivity and well-being. Nasrullah et al. (2022) established that purposeful spatial layout, sufficient lighting and ergonomic configuration directly improved workers' performance through promotion of work behavior and efficiency. This aligns with research by Oluwunmi and Gbarayeghe (2022) at Covenant University, Nigeria, where formal office designs, especially those with lighting quality and ergonomic seating as key features, minimized stress and distraction, thus enhancing productivity and job satisfaction of academic staff. Mutually beneficial effects of office design were also highlighted by Ahmad et al. (2020), whose study established that open-plan designs support collaboration and communication. To corroborate these findings, Osoro and Kanyajua (2019) emphasized the twofold function of office design in fulfilling employees' physical and psychological requirements, stating that accessibility of equipment and comfort are the bases for continued productivity. Cumulatively, these studies point to the complex relationship between workspace design and organizational performance.

The office design plays a crucial role in employee performance, revealing that architectural layouts can significantly influence both cognitive and emotional responses, which in turn affects productivity (Vischer, 2018). The study emphasized the importance of creating balanced environments that integrate personal space with both open and enclosed work areas to improve focus and task execution. The study was collaborated by an investigation conducted by Hassan et al. (2021) that found that spatial configuration, furniture arrangement, and

lighting within the manufacturing sector affect the performance. The study emphasized that personalized and ergonomic workspaces are associated with reduced stress and enhanced well- being, ultimately leading to improved employees' performance.

Flexible office layouts and natural elements, such as vegetation and outdoor sceneries enhance creativity and cognitive performance in high-tech organizations (Li & Zhang, 2019). Jaiswal and Yadav (2020) equally noted that well-designed office environments improve collaboration, reduce stress and boost productivity. Finally, Pradhan and Jena (2022) found that in retail environments, workplace designs that support efficient workflows provide ample lighting and enhance occupant comfort, significantly improving motivation and performance.

Lighting Condition

Lighting plays a crucial role in office design, impacting employee's productivity mood and well- being. Research by Lan et al. (2018) reported that natural daylight enhances cognitive performance, mood and it reduces fatigue, compared to artificial lighting. The study emphasized the need to incorporate natural light in office designs to improve employees' performance and well- being, noting that more access to daylight leads to better concentration and sustained productivity. Hong and Lee (2019) found that LED lighting, which provides a softer and more uniform light, led to higher employee satisfaction and improved focus on tasks. In contrast, fluorescent lighting, with its harsh flickering, caused more eye strain and discomfort. Consequently, LED lighting was deemed more conducive to the employees' performance.

It has been revealed that temperature affects intellectual function, of which cooler temperatures (5000K to 6500K) boost alertness and concentration while warmer temperatures (2700K to 3000K) are better for creative tasks, promoting a calm and collaborative environment (Kim & de Dear, 2020). On the other hand, Chen et al. (2021) argued that a combination of ambient and task lighting enhances workplace performance better than either type alone, emphasizing the need for effective lighting strategies to augment productivity and minimize eye fatigue.

Furthermore, poor lighting increased stress and mental fatigue while optimal lighting boosted motivation and engagement, underscoring the importance of well-illuminated environments (Zhang & Wang, 2022; Katabaro & Yan, 2019). Vardi et al. (2023) supported these findings, indicating that bright, cool lighting improves cognitive tasks while harsh lighting induces irritability, negatively impacting emotional well-being and teamwork. The study advocates for dynamic lighting systems tailored to specific tasks to enhance intellectual and emotional health. It has been explored that lighting dynamics influence performance (Patel & Kumar, 2024). Furthermore, adjustable lighting, such as dimmable desk lamps, reduces eye strain and visual discomfort, leading to improved performance in various tasks. They emphasized the importance of allowing employees to control their lighting settings for greater comfort and efficacy. Controlling lighting settings includes adjustments to lighting temperature. Miller and Wong (2023) explored the psychological implications of lighting on employees' creativity. The study demonstrated that exposure to dynamic lighting, which adjusts color temperature throughout the day, positively impacted creative output. Workers in settings with lighting systems that mimicked the natural progression of daylight exhibited greater innovation and were more adept at creative problem-solving.

Lighting quality relates to retention and productivity. There is a connection between effective lighting design and enhanced employee retention and overall performance, suggesting that strategic investments in office lighting yield significant advantages for both the workforce and organizations (Zhang et al., 2024).

Acoustic Control

Recent research emphasizes the critical role of acoustic control in workplace environments and its significant effects on employees' performance and well-being. Haghshenas et al. (2019) found that high noise levels in open-plan offices adversely impact cognitive tasks that require focus, leading to increased stress and decreased productivity. They recommend implementing noise control measures like soundproofing and quiet zones. This was substantiated by Zhang et al. (2024), who stressed that the quality of acoustic design is crucial for employees' performance, noting that

issues like high reverberation and echo disrupt communication and hinder collaboration. These acoustic deficiencies can lead to increased frustration and reduced engagement during meetings and teamwork.

People with high noise sensitivity suffer significant performance declines due to acoustic disturbances, particularly in tasks requiring concentration; those with lower sensitivity are less affected (Kwon & Lee, 2021). Mehta et al. (2022) reported that high noise levels in the workplace lead to increased stress and lower job satisfaction, with employees in noisy environments reporting more mental fatigue and reduced morale. Additionally, background noise levels of 50-70 dB can boost creative thinking but anything above this range may cause cognitive overload and hinder focus (Li & Wu, 2023). It has been revealed that while open layouts promote teamwork, high noise levels negatively affect group discussions and team performance. Therefore, there is a need to create designated quiet zones and private workspaces to balance social interaction with focused work (Jensen & Smith, 2020).

Studies have revealed that individuals subjected into modified auditory surroundings, such as using noise-canceling headphones or accessing quiet spaces, have higher job satisfaction and productivity (Miller & Wong, 2021). This aligns with the principle of environmental control in office design, which results in better performance and well-being. In the same vein, Sato et al. (2022) examined the use of background white noise and sound masking in open offices to reduce distractions. The study underscored that sound masking improves focus in noisy settings but over-reliance on masking may cause negative effects, as prolonged exposure might lead to habituation and decreased effectiveness.

Research has revealed that hybrid office configurations that integrate acoustic privacy with collaborative areas enhance performance by facilitating cognitive clarity, enhancing communication and boosting the overall productivity (Liu & Chen, 2021). Furthermore, improving soundproofing and customized workspace layouts produce considerable long-term financial advantages, including decreased absenteeism and heightened job satisfaction, which ultimately offset the initial capital expenditures (Patel & Sharma, 2024).

Workspace Ergonomics

Research indicates that the use of ergonomic chairs, optimal lighting configurations and height-adjustable tables in offices enhances productivity by alleviating physical discomfort, minimizing musculoskeletal disorders, decreased absenteeism, enhanced cognitive clarity and increased job satisfaction (Adetola et al., 2021; Tshukudu & Kgosidintsi, 2021; Mugisha & Ntumba, 2019; Kinyua et al., 2018). Similarly, individuals working in ergonomically designed settings reduce levels of fatigue headaches. These physiological and cognitive benefits improve work quality and overall job performance (Chirwa et al., 2020). These empirical evidences underscore the critical role of ergonomic interventions in fostering both physical health and cognitive performance, particularly in environments demanding prolonged attention, focus, cognitive workload and intellectual engagement.

Further studies revealed that the implementation of ergonomics specifically, the optimization of workstation layouts and the provision of sufficient rest periods significantly decrease the incidence of repetitive strain injuries and fatigue. This consequently facilitates operational efficiency, thus elevating the overall performance. It indicates the critical importance of ergonomics in safeguarding physical health (Oduro et al., 2024; Mubiru & Tuga, 2023; Banda et al., 2022; Zawadi & Kalimba, 2022). Nkosi and Mathe (2023) corroborate these evidences, revealing that the integration of ergonomic chairs, adjustable workstations and footrests significantly mitigate musculoskeletal discomfort. Such ergonomic designs not only support physical well-being but also enhance cognitive function, thereby contributing to elevated productivity in high-demand work settings.

Thermal Comfort

Effective thermal control in office environments is crucial for ensuring comfort, productivity and overall well-being. Research pinpoints the significant influence of thermal conditions on cognitive function, whereby maintaining temperatures between 20°C and 22°C can notably enhance cognitive performance while also recognizing that individual preference plays a substantial role in productivity (Lan et al., 2018). The inconsistence of thermal conditions can lead to discomfort, ultimately

impairing performance and job satisfaction, particularly in tasks that require sustained attention (Zhang et al., 2024; Kim & de Dear, 2019). Similarly, employees working in well-regulated environments are more inclined to engage in spontaneous interactions and collaborative tasks, enhancing performance. In contrast, temperatures outside the ideal range hinders peer interactions, negatively affecting team productivity (Shiau & Lin, 2021).

A study by Singh and Dempsey (2022) shows that both high and low temperature extremes are associated with increased absenteeism and reduced productivity. Employees working in excessively high temperatures reported symptoms, such as dehydration and fatigue, which significantly hindered their performance. Similarly, temperatures exceeding 26°C led to a notable decline in performance on tasks requiring memory recall and analytical thinking (Zhang & Song, 2023). These evidences highlight the critical importance of maintaining optimal temperature conditions to support cognitive function and enhance overall workplace productivity.

It was revealed that employees operating in settings where temperature control is tailored to individual preferences experience high levels of job satisfaction and reduced stress. This emphasizes a correlation between the implementation of individual thermostatic controls or localized heating and cooling systems and enhanced mental well-being, alongside measurable improvements in performance (Haverinen et al., 2021). Furthermore, thermally comfortable environments ranging 22-23°C boost motivation, creativity, task efficiency, attention to detail and advances problem solving skills while temperatures above 25°C contribute to decline in creative output (Trigui & Smaoui, 2024; Ormandy & Scoville, 2023). This indicates that both extreme low and high temperatures can negatively impact workplace creativity, motivation, and efficiency.

Conclusively on this aspect, employees situated in optimal thermal environments demonstrate higher levels of job satisfaction, which in turn foster greater loyalty and reduce turnover rates (Martin & Evans, 2022). The situation underscores the importance of maintaining comfortable office temperatures, which not only enhances immediate productivity but also yields significant long-term advantages for organizations.

Color Scheme

The influence of office color schemes is a significant determinant in organizational psychology and environmental design, impacting employees' well-being, mood and productivity. Cool colors like blue and green enhance creativity and problem-solving while warm colors like red, orange, yellow, blue and orange boost focus, energy levels and mental clarity, correlating with increased analytical thinking, engagement and productivity (Adeyemo et al., 2020; Moyo & Ramasodi, 2020; Smith et al., 2018). Similarly, studies have revealed that employees in neutral-toned environments (beige and light gray) experience higher productivity and a sense of calmness (Chisanga & Kunda, 2019), emphasizing the need for a balance between vibrant and neutral colors to optimize workplace effectiveness. Nonetheless, the study cautions against excessive exposure to bright hues, which may lead to overstimulation and stress (Moyo & Ramasodi, 2020). This underscores the critical need for a measured approach in the application of vibrant colors within office design to foster conducive working environments.

Research demonstrates that color schemes can effectively reduce stress levels and enhance motivation. The use of pastel shades, particularly soft blues and greens, alleviates stress, fosters a calmer work environment and enhances collaboration, thereby facilitating open communication among employees (Tshuma et al., 2022; Mthembu & Zungu, 2021). In relation to impact of color schemes on employee motivation, a study by Ncube and Masuku (2021) revealed that vibrant colors, such as red and yellow were linked to heightened motivation and engagement among employees. However, the study cautions that prolonged exposure to bright colors may result in cognitive fatigue and sensory overstimulation, potentially diminishing the positive effects.

Further studies indicate that neutral colors, particularly shades of white and off-white correlate with increase of job satisfaction and enhance performance, especially in settings that necessitate prolonged concentration (Kowit & Lungu, 2022). The use of white color is associated with perceptions of cleanliness and order, which positively influences employees'

focus and efficiency. However, overabundance of white color could create an environment that feels sterile, consequently reducing warmth and engagement within the workplace. Vibrant colors, specifically yellow, purple and green, significantly enhance creativity and innovative thinking among employees. Such vibrant colors activate thinking processes, thereby promoting divergent thinking essential for innovation in creative sectors (Sibanda & Mhlanga, 2023). This underscores the potential of strategic color application in encouraging creativity within industries reliant on design and advertising.

Conclusively, color schemes dominated by blue and green improve concentration and problem-solving capabilities. Conversely, warm colors, such as red and orange energize employees, thereby enhancing engagement in more physically demanding tasks (Mbamba et al., 2024). This emphasizes the importance of a strategic balance in color application to increase both mental and physical productivity.

Smart Office Design

An essential aspect of Smart Office Design is the use of software that enhances productivity. Technologies, such as video conferencing, instant messaging and collaborative software, facilitate continuous connectivity, enable rapid information exchange, bolster team collaboration and foster knowledge sharing, ultimately leading to improved performance (Kim & Park, 2021; Alghamdi & Ahmad, 2020; Lee et al., 2020). In a similar vein, project management tools like Trello and Asana help employees streamline tasks and improve time management by providing clear objectives and deadlines (Martinez et al., 2019). Additionally, Chen et al. (2020) highlighted that AI-powered task management systems automate routine tasks, allowing employees to focus on problem-solving activities and creativity. This not only enhances job satisfaction but also correlates positively with overall performance.

Platforms such as e-learning platforms and digital training tools that enhance technical competencies offer flexible, on- demand learning opportunities, enabling employees to access educational resources at their convenience, which contributes to improved knowledge acquisition and skill development. Employees who consistently use these platforms exhibited notable improvement in job performance and career advancement (Wang & Zhang 2021). In a related study, Tan and Lim (2022) investigated the impact of virtual reality (VR) training simulations in complex industries, concluding that VR environments significantly improve learning outcomes and overall performance by providing engaging, realistic and hands-on experiences. Apart from platforms, management systems and performance metrics integrate functionalities, such as real-time feedback loops, goal-setting mechanisms and advanced performance. The frequent, data-driven feedback significantly fosters employees' engagement and aligns individual objectives with organizational targets (Johnson et al., 2021).

Patel and Gupta (2020) emphasized the significant influence of smart lighting, weather control systems and ergonomic office configurations on employees' comfort and performance. These technologies, which adapt the workplace environment according to individual preferences, have been demonstrated to markedly enhance employees' well-being, thereby improving focus and performance. In a similar vein, Brown et al. (2022) discovered that the incorporation of Internet of Things (IoT) devices in workplace settings, including smart desks and health-tracking instruments, contributed to a more personalized and efficient work experience, positively affecting the overall productivity. The overall impact of integrating Smart Office Design on employees' performance is contingent upon the effective implementation of these technologies in alignment with organizational objectives. Successful technology integration necessitates strong leadership, effective communication and active employees' involvement in the decision-making process. When technologies are deployed without regard for employees' needs or preferences, they may encounter resistance and face challenges in adoption, thereby diminishing their potential benefits (Singh & Kaur, 2021).

However, excessive dependence on technology may result in information overload, thereby diminishing productivity if not appropriately managed. It is noted that the relentless learning curve associated with rapidly evolving technologies can lead to frustration and hinder performance, particularly for those with limited digital literacy. Additionally, inadequate training and support for new technological systems

often result in underutilization, compromising the intended benefits of technology integration within organizations. In broadening this area, there is a link between extensive use of technology for work outside regular office hours and increased levels of stress and burnout among employees (Smith & Taylor, 2023). The "always-on" nature of digital technologies tends to blur the boundaries between professional responsibilities and personal life, contributing to fatigue that negatively affects overall productivity and performance outcomes.

Indoor Air Quality

Indoor air quality (IAQ) is a vital factor that significantly influences employees' health, well-being and performance in office environments. Poor IAQ characterized by elevated levels of pollutants, such as carbon dioxide (CO_2), particulate matter (PM), volatile organic compounds (VOCs) and inadequate ventilation can lead to a range of health issues. These include respiratory problems, fatigue, discomfort, headaches, diminished concentration and cognitive impairments, all of which negatively affect job performance (Chidi et al., 2018; Ndiaye et al., 2020).

High concentrations of VOCs and particulate matter have been specifically linked to increased occurrences of headaches, dizziness and difficulties in maintaining focus, which in turn hinder effective decision-making (Oluwaseun et al., 2019). Similarly, Mokgadi et al. (2020) and Gichunge et al. (2021) observed that poor air quality reduces job satisfaction, as employees working in poorly ventilated spaces often report higher stress levels and increased fatigue. To address these challenges, the installation of air purification systems is required to improve IAQ

Furthermore, exposure to air pollutants such as CO_2 and PM adversely affects employees' respiratory health, leading to more frequent absenteeism and reduced productivity (Chikova et al., 2021). Therefore, regular maintenance of ventilation systems and the implementation of effective air circulation strategies are essential to improving IAQ, protecting employees' health and enhancing workplace performance. In addition, poor IAQ contributes to physical ailments, such as fatigue and respiratory disorders, ultimately diminishing employees' productivity (Adebayo et al. 2022; Osei et al., 2022). Likewise, Nyakudya et al. (2023) and Muzenda et al. (2024) revealed elevated levels of dust and CO_2 impaired teachers' ability to concentrate and led to fatigue, which in turn negatively affected customer service delivery.

Conclusion and Recommendations

This study identified the key roles played by office design in improving employees' performance and well-being. The study concludes that lighting quality, acoustics, ergonomics, thermal comfort, color psychology, smart office technology, indoor air quality and biophilic design collectively impact productivity, cognitive performance, and emotional well-being. Appropriate lighting and acoustics lower the level of distractions while ergonomic furniture decreases physical discomfort. Maintaining the optimal temperatures (20°C – 22°C) and improving air quality enhance health and comfort. Strategic application of color and nature-integrated design positively influence mood and creativity. However, without coordinated policies, these benefits are intermittent. Therefore, policymakers must establish region-specific workplace standards to ensure that these design principles are effectively implanted, resulting in healthier and more productive workplaces.

In order to gain the most from office design, organizations must embrace data-driven approaches, such as dynamic lighting, acoustic dampening controls, ergonomic workstations and intelligent climate control. Task-specific color schemes and biophilic content must be introduced to suit various work functions. Additionally, indoor environmental quality can also be enhanced with investments in air filtration systems and sustainable materials. Therefore, policymakers have an important role to harmonize such practices; companies should solicit employee feedback at intervals to plan workplaces as per their needs. With the inclusion of such inputs, companies can build flexible, efficient and people-friendly workplaces to ensure long-term success in the evolving business scenario.

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