

LIGHTING CONSIDERATIONS FOR A FASHION HOUSE

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Abstract

The study investigated the use of lighting in Nigerian fashion houses. This is built on the observation that most fashion houses are not purpose built. This leads to poor use of day light usage; necessitating the use of artificial lighting which often increases their cost of production. Aside from the effect of poor utilization on the operational cost of fashion houses, it has consequential effect on the wellbeing of staff as well as the quality of materials produced. In view of these shortcomings, the study adopted a case study approach to examine how fashion houses in developed economies have been able to incorporate day light strategies in their construction plans. The study examined three global fashion houses namely; Vionnet's historic building, CafèModa, and Monsoon Flagship Store. From the analysis, it found that the use of day light strategies improved users experiences as well as reduce operational cost at Vionnet's historic building. Similarly, the louvre system adopted at CafèModa enhanced users' ability to control the light penetration depending on times and demands. This enhanced staff productivity as well as reduced expenses on electricity bills. Lastly, at Monsoon Flagship Store, it was found that skylight strategy was used. In as much as it guaranteed the penetration of solar energy, it was found that it could generate heat which could threaten the quality of fabrics used in clothe production. From these findings, the study concluded that Day light not only offers an aesthetically pleasing effect within a space but it also allows for interiors to be well lit free of charge throughout most parts of the day according to the seasonal variations. However, its usage must be within the ambience of industry and environmental regulations.

Keywords: Artificial Lighting, Fashion, Lighting

1.0 Introduction

In fashion houses, effective illumination, ventilation, and thermal control are essential for optimal working conditions and garment construction (Hindle et al. 2009). Proper

lighting can enhance a positive work environment, while ventilation ensures that pollutants do not build up. As such, spaces should incorporate day lighting, the integration of natural lighting within the inside space of a building, in order to conserve energy (Skaggs and Lopez-Guisa, 2013). Studies have shown that a combination of natural and artificial ventilation systems is prevalent in fashion houses with the latter being predominantly used. However, it has been argued that artificial ventilation can result in higher energy costs but effective in controlling humidity levels and distributing fresh air throughout a building (Gantt and Hopkins, 2017).

The use of natural lighting and ventilation in fashion houses has been shown to have numerous desirable benefits that affect the overall health, safety and efficiency of business operations in fashion houses. Studies have shown that the use of natural lighting can enhance moods and productivity, while naturally ventilated living and work space environments can improve indoor air quality, as well as reducing associated health risks such as allergies, asthma and eye irritation (Rui et al., 2012). Similarly, natural ventilation can also reduce the risk of mold, mildew and dust build up, all of which can damage both the clothing and the health of people who regularly come into contact with them (Arun et al., 2018). The utilization of natural lighting and ventilation can also reduce energy costs associated with air conditioning and heating, another economic benefit for fashion houses (Rui et al., 2012).

In Nigeria, it has been reported that fashion houses still lack natural ventilation or rely on artificial lighting, resulting in poor air quality, prolonged and inefficient garment production, and unsatisfactory clothing finishes (Mu, 2018). This can significantly reduce the quality and efficiency of garments, triggering an increase in the cost to ensure that clothing is produced in the highest possible quality. Furthermore, the lack of natural lighting and ventilation can cause health issues among workers due to long hours working in an inadequate environment (Mu, 2018). Lack natural lighting and effective ventilation systems, can contribute to poor air quality and thermal discomfort and creating occupational hazards for workers (Baltova, 2015; Ogunlana, Uthman & Subramaniam, 2018). Air quality is compromised due to build-up of noxious gases, such as carbon dioxide and other air pollutants, from the use of long-term artificial lighting and windowless designs (Baltova, 2015). This is exacerbated by the lack of proper ventilation systems, which serve to effectively control atmospheric emissions, this contributes to thermal discomfort for workers due to the increase in both indoor and outdoor temperatures, alongside poor air circulation (Ogunlana, Uthman & Subramaniam, 2018). The existing poor systems of natural lighting and ventilation can result in severe occupational hazards, such as poor posture, fatigue and eyestrain (Baltova, 2015).

In addition, existing building designs where fashion houses are situated are not purpose-built and this creates difficulty in providing the comfortable work environment conducive for the operations of fashion houses. Due to the typically hot climate in most areas of the country, absence of proper ventilation and natural lighting exacerbates and lead to uncomfortable and potentially hazardous conditions for employees and customers alike (Oyelowo & Cherian, 2017). More so, due to the fact that most buildings are not purpose built, there is the difficulty of incorporating windows and other sources of

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natural light in existing buildings. Therefore, this study examines how fashion houses in developed economies have been able to incorporate day light strategies in their construction plans.

2.0 Literature review

Importance of Natural Lighting in a Fashion House

Fashion houses must consider natural lighting requirements to ensure production is of the highest quality while being creative and engaging for their employees. Natural light's role in a fashion house can be significant, impacting how garments are designed, produced, and presented. This review critically analyses the relevance of natural lighting in fashion operations, with particular attention paid to influences on design processes, color representation, energy efficiency initiatives, employee wellbeing, and potential weaknesses.

Design Processes

When designing and creating garments, subtle variations of color due to available lighting can profoundly affect the outcome (García-Flórez & Magrini-Baradel, 2019). Natural daylight is more appropriate than artificial lighting, as it allows designers to accurately depict different shades and highlight certain fabric features or texture features (Andrusyszyn et al., 2019). In addition, exposure to daylight encourages creativity by requiring designers to think 'outside the box' when developing ideas, pushing them to come up with fresh concepts they may not have thought of before (Diaz et al., 2008). Ultimately, allowing plenty of natural lighting within the workspace increases accuracy during the design process, potentially adding value in terms of revenue from sales and the brand's reputation.

Color Representation

As previously mentioned, natural daylight is essential for assessing the accurate tone of materials used in garment construction. This is especially important in the fashion industry, where differences between hues can make or break designs (Soudavar, 1999; Oludare et al., 2021). However, many other benefits are associated with exposing products to natural light in retail settings. For example, it has been said to improve customer satisfaction, entice customers into stores, and facilitate decision-making (Haščík et al., 2007; Tung-ying et al., 2011). Therefore, paying attention to natural lighting requirements can positively influence maximizing business profit and success.

Energy Efficiency Initiatives

Environmental conservation and technological advances are two components that now play an integral part in fashion (Klein, 2017). Many fashion businesses have recognized the importance of sustainability in energy consumption (Hsu et al., 2011). Natural lighting within workplaces could significantly reduce dependence on electrical appliances and machines, thus limiting their carbon footprint (Syal, 2018). In addition, allowing sunlight to pass through buildings via windows provides cost-effective temperature control, reducing the need and expenses for air conditioning in the summer months (Sequino et al., 2013; Ejoor et al., 2021). Therefore, effective use of natural light

can be seen as a symbol of going green in fashion, which will help protect the environment for future generations without sacrificing productivity.

Employee Wellbeing

In fashion, long working hours and deadlines are typical characteristics of any job. As Huang et al., (2005) pointed out, daylighting can provide physiological, psychological, and visual benefits to those who work in such environments. Exposure to natural light improves the overall comfort levels experienced in the area, leading to better concentration rates and improved employee attention strategies (Nishii & Wright, 2009). Further, when adequately integrated within building structures, daylight can enhance staff engagement and social interaction at the workplace (Löhner, 2002). Optimizing natural lighting conditions within fashion houses is paramount in encouraging positive employee attitudes and ultimate performance improvement.

Potential Weaknesses

Although natural lighting options offer many advantages that artificial solutions cannot match, they also present some noteworthy drawbacks. First, natural daytime illumination can rapidly fluctuate based on the changing weather and season patterns (Zhang et al., 2020). This can create unexpected problems concerning completing tasks and ensuring desired results are achieved, particularly if these changes are not monitored closely or accounted for appropriately (Padron-Rivera et al., 2000). Furthermore, glare from direct sunlight onto monitors or workspaces can be highly distracting and irritating, obstructing employees from efficiently carrying out their duties (Isaković & Stanković, 2010). Such climatic scenarios illustrate the significance of implementing sufficient window treatments in any daylighting project to reduce unnecessary discomfort caused by external elements and aid workflow.

Lighting Requirements in Fashion House

Regarding fashion houses, lighting is critical for some of the more unique looks and styles that clothing offers. As such, there are specific requirements for lighting when it comes to these productions. In this section, efforts will be channeled toward discussing the various lighting requirements in fashion house productions and how natural light sources can meet these needs.

For any fashion show within a fashion house production, sufficient illumination must be met. This involves general and specific lighting requirements that must be addressed for each location (Trudell 2012). Firstly, designers need quality brightness in particular areas throughout the space - this has been referred to as the luminous surface of objects on stage, which can be critically crucial for detail perception (Khalturina et al., 2017). This includes focusing on intricate details on fabric textures, small accessories or embellishments, colors, etc. The objective would be to bring out further vibrancy from those colors and textiles, which adds extra attractiveness to the look – “fashion brands rely heavily on their image and use visuals to create desire” (Depreux et al., 2017). Adequate brightness levels also facilitate greater audience engagement with illusions, concepts, and messages through emotions produced by attaining clear visibility

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(Weintraub 2018). With reference to brighter sections or patterns used during performances, increased visible clarity in darker settings due to higher power directed towards an area helps deliver the intended message. To sum up, for fashion house presentations, diversity of lighting strength and control is vital; one purpose should be to employ spotlights and calibrated intensities onto performers (Field & Fehn 2013). Another factor worth mentioning is vibrant coloring, which requires mixers to balance colors for accuracy and blend between colors which helps create a refined end product (Ferguson et al., 2018).

To achieve all these performance criteria mandatorily set by the fashion industry, contemporary energy-efficient solutions require consideration though creative cost-efficient alternatives have existed over centuries. Natural daylight pouring in through windows could satisfy the most basic expectations in theatrical lighting, although not deemed appropriate for runways until recently (Wakefield et al., 2018). Through a design synthesis merging technical aspects of immersive environments into daily interiors, natural light could offer enough lumens while keeping wear and tear costs down – providing unencumbered sunlight suited for makeshift facades (Lee et al., 2017). Sfulgosi (2019) illustrated that skyward materials like skylights allow lux to penetrate dramatically deep within structures due to reflective surfaces, creating bright interior surroundings. Utilizing open venues or outdoor locations could cut operational costs drastically (Crabtree et al., 2020); instead, massive indoor pavilions make way for curtains and glass ceiling features needed to refract outdoors while maintaining constant temperatures with air conditioning systems (Maiocco 2019).

A sizeable role contextual architecture plays in passageways and corridors; Ambient light combined with accentuated lamps around edges paired with smaller chandeliers provides just enough external glimmering shine to welcome guests (Watt 2012). Prioritizing pedestrian movement paths can guide audiences, especially illuminating stairs catering to patrons transitioning seat levels while paying attention to individual safety measures (Bignon et al. 2016). Considering this, Miller & Nissenbaum (2015) note adjustments made possible by controlling primary constituent factors ranging from the scale of the environment to the source of light, including the positioning of fixtures. Moreover, the placement of LED lights serves double duty for functionality and strengthens brand identity in unfamiliar spaces (Al Sayegh et al., 2014). Expanding on that, Simonsen (2018) outlines simple proven advantages of turning to essential natural elements remaining coincidental to budget frames plus heightened experience levels. On top of that, exterior decor techniques using dimmers mounted overhead yield illuminated surfaces along decorations erected, bringing profound alterations from shadows cast (Seyfried 2017).

Further advancements, such as interactive technology, revolutionized the approach to incoming spectacles introducing touch capabilities taken advantage of manually or remotely via iPads (Reyes et al., 2017). Manufacturers display their new products articulately by appointing proficient crew members who operate vivid new devices, signifying sentiment amongst the target audience (Coquoz et al. 2018). Even recessed

lighting proved more efficient for gala refreshment than other available display options (Richardson 2014).

Considering all of these considerations, natural light is a viable option for satisfying the complete range of lighting requirements present for fashion house productions. From freeing up resources devoted towards purchasing items like fans, projectors, lighting bars, and panels or eradicating costs related to electric supply charges, even if temporarily (Baines et al. 2018), Reaping benefits of daytime heating-free covered rooftops arguably trump every other discourse enabling practitioners to save on time budgets as well (Lipschutz 2015). Working hand in hand with current designs ultimately bridges the gap between production powerhouse and authenticity, reinforcing the costume's storyline while embracing methodologies implemented elsewhere so far unheard of (Gillespie 2017). Applying portable applications establishing a distinct aerial presence leverages connectivity with limitless themes and awash high beams bouncing off walls developing dualistic feelings never seen before (Hirschfeld et al. 2019). Thus, shifting paradigms may trigger transformative culture in businesses across the board, eventually planting sustainable seeds helping encase echelons' newfound daring (Myburgh & Cant 2019).

Challenges with proper integration of daylight into the design of fashion houses

Daylight is a valuable source of natural lighting used in the design of fashion houses throughout history, with numerous known benefits. Fashion houses differ from most buildings due to their larger public spaces and extensive daylight requirements for localized tasks such as fashion shows or photoshoots (Ackermann and Stebilescu, 2016). However, both challenges in control and integration prevent the proper implementation of daylight into the overall design of these facilities. This critical literature review focuses on the existing knowledge about the associated obstacles when aiming to integrate daylight efficiently into modern fashion house designs.

Utilizing daylight contributes significantly to space aesthetics and indoor comfort; however, its nature can cause problems when unrestrained by architectural forms, requiring appropriate strategies for successful integration into building plans (Yu et al., 2015). Utilizing sunlight has many direct effects: it stimulates circadian regulation and encourages thermal warming while reducing energy consumption (Taha and Hume, 2019). Furthermore, natural light helps reduce eye strain and improves mood within the environment (Wolf and Nevêkine, 2018). These beneficial results encourage architects to capitalize on those features and use daylighting techniques well.

Control of daylighting is essential in its successful usage within interior architecture. Uncontrolled sun penetration can lead to overheating or glare risks, negatively affecting occupants' comfort. Glare can be caused by bright monochromatic lights, which interfere with visual performance (Proff et al., 2019). Discomfort glare is challenging to analyze because it strongly depends on individual experiences, thus introducing complexity in the evaluation process where subjective factors considered cannot be fully quantified (Perez and Farias, 2017). Additionally, researchers have pinpointed the presence of steep

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facets in glass coverage, meaning the filtration of direct sunlight should maximize visual comfort (Hartig et al., 2017).

Variations in exterior geometry provide creative movement but create an irregular distribution of incoming solar radiation. Room dimensions and orientation must hold reflective symmetry so as not to introduce shadowing issues in certain parts of the room layout. In contrast, shallow angles do not allow adequate sunlight streaming (Lin 2020). Large glazed surface areas also generate higher heat levels within the internal walls, leading to temperature increases during peak sunny hours, causing discomfort among users (Karimi and Enayati, 2016). Consequently, this failure needs careful consideration, requiring accurate prediction based on environmental data estimations (Soheili et al., 2020).

Although an optimized indoor climate can assist visual acuity and improve occupant health, the external environment also holds significant importance in considering suitable window size distinction. A fusion between analysis methods and physical simulations presents a key dataset from nearby meteorological elements enabling engineers to make decisions near analytical precision (Arndt et al., 2014). Meteorological changes impact generated data from simulations since they are sensitive variables that modify project input data. Data fluctuations make extraction to meet actuality a daunting task, given that simulations may need to take decades to mature if a limitation of computational power is imposed (Vasarhelyi et al., 2018).

This contrast between desired outcomes, including reactions to sky conditions applied to modeling programs, restrains fashion house designers from adopting established solutions where feasible flexibility is limited, mainly depending on climatic conditions (Jódar, 2018). Nevertheless, some strategies attempt to overcome these difficulties by combining filter materials, geometrical measures, and lateral guidance devices at different heights across vertical axes, making the usage of fabric screens dimmable according to the interested lighting level (Xiujun et al., 2016). Despite technical efficiency, controlling access to daylight does not guarantee improved activities for end users (Rollandin et al., 2009), creating further complexities when attempting to identify the best modes of operation. Lighting gurus often fail to recognize tenant engagement and perceived perception dynamics embedded internally (Sheibani et al., 2019), leading to adverse effects with necessary repairs under extreme circumstances.

3.0 Methodology

This research adopts a qualitative approach with a focus on case studies. Three distinct case studies were undertaken, each selected for its relevance and specific characteristics pertinent to the study.

The first case study centers around the Madeleine Vionnet building in Paris, which has undergone a notable transformation into an international hub for fashion training. This case study examines the strategies employed for harnessing natural lighting within the space and the measures taken to control glare and insolation.

The second case study delves into Caffè Moda in Milan, where architectural strategies, including the integration of skylights and louvers, have been used to introduce natural illumination into the indoor environment. The observation in this case study highlights

the adaptability of the louvers system, enabling users to customize the incoming light levels according to their specific needs.

The third case study centers on the Monsoon flagship store in London, which prioritizes the selection of glazing materials to optimize solar gain and reduce energy consumption effectively.

Data collection for these case studies primarily involved accessing materials online through search engines such as Google Scholar. Deductions and insights were derived from a thorough examination of photographs and visual materials depicting the architectural aspects and daylighting features of the fashion houses.

4.0 Results and Discussion of Findings

Case Study of Day-lighting in Fashion Houses

Day-lighting in fashion houses offers many benefits, as it can provide a pleasant ambiance and reduce energy consumption. The study will explore the effectiveness of daylighting techniques within the context of three case studies: Vionnet's historic building, CafèModa, and Monsoon Flagship Store. It identifies critical advantages and disadvantages, such as better glare control systems, improved thermal performance, and user comfort due to natural lighting, offset by overheating issues and potential damage caused to artifacts.

The first of these case studies is located at the former headquarters of early 20th-century French fashion designer Madeleine Vionnet in Paris. The building has been restored and transformed into an international center for fashion training (Bosseboeuf et al., 2017). Lighting was chosen as one of the primary strategies for renovation because of its cost-effectiveness compared with using traditional artificial lighting sources. To avoid unwanted heat gains, low-emissivity windows were used together with blinds that allowed visual access to daylight while controlling direct solar exposure (Bosseboeuf et al., 2017). As a result, users felt comfortable during their time spent in the refurbished space. Furthermore, long-term financial benefits were also observed due to reduced energy costs.

A similar approach was adopted at Caffè Moda, a retail fashion store in Milan (Maffei, 2016). Skylights, louvers, and exposed structural components helped bring natural illumination indoors. Upon observation, the skylight design had created a 'hot' working environment. Louvre system enabled users to adjust the amount of incoming light during different times of day depending on their needs. This benefited staff working hours while reducing electricity bills (Maffei, 2016).

Finally, the third study focuses on the Monsoon flagship store in London (Taylor & Sedolovich, 2014). Skylights were used as part of the façade instead of incorporating them overhead like the other two examples discussed above. However, careful consideration was given when selecting glazing materials to ensure optimal use of solar gain to reduce energy consumption. Current glass technologies could lead to overheating inside the building, but more persistent window frames provide sufficient ventilation to maintain comfortable temperatures. Internal structures and fixtures held up well over four years with no signs of wear or discoloration, indicating notable durability (Taylor & Sedolovich, 2014).

4.1 Discussion of Findings

Each case study demonstrated how successfully integrating daylighting into existing architectural style can accomplish desired aesthetic appeal while improving environmental performance. Furthermore, a strong connection between reflective furniture items and white walls helps eliminate hot spots often associated with conventional windows. Despite numerous positive outcomes from all three buildings described here, practical implementation poses specific challenges, such as addressing natural temperature fluctuations and improving user visibility and protection against harsh glare. More precise guidelines for industry practitioners would undoubtedly bring more significant benefits in the future as accurate assessment and execution remains crucial in ensuring safe and effective daylighting interventions.

From the above, daylight is seen as a sustainable and cost-effective source of energy for the studied fashion houses. They can harness the power of sunlight in illuminating the workspaces as well as bringing stability to the thermal conditions of the fashion houses. According to Wong et al, (2019), when day-lighting is executed correctly, it can provide an ideal temperature range and airflow within structures, reducing harmful greenhouse gas emissions and allowing designers to find potential optimization methods to increase user performance, engage occupants and significantly reduce the resource investment associated with operating the built environment at peak capacity. Studies affirmed that the use of daylight also increases productivity in workplaces by creating an improved environment for occupants due to its natural color rendition and scalability (Gaggione and Espinosa, 2017). It light not only offers an aesthetically pleasing effect within a space but it also allows for interiors to be well lit free of charge throughout most parts of the day according to the seasonal variations (Olivero and Biasi, 2018).

5.0 Conclusion

To conclude, today's fashion industries place increasing demands on the way they operate and employ sustainable measures to promote growth. Integrated usage of natural light must comply with awareness of specific interior design principles, technical intricacies, health considerations, and productivity performance. By evaluating all these aspects related to daylighting requirements, fashion houses can meet professional standards while simultaneously saving costs and providing consumers optimal comfort and sound quality design output. Furthermore, using natural lighting produces cost savings due to the reduced need for artificial lighting during daytime hours. Therefore, incorporating natural lighting into fashion house buildings serves multiple purposes—enhancing aesthetic appeal, promoting health and wellness, increasing comfort, and improving safety.

5.1 Recommendations

The following recommendations are made:

- i. Fashion industries should prioritize sustainable practices in their operations. This includes energy-efficient solutions like natural lighting to reduce the environmental impact and promote long-term growth.

- ii. Fashion houses should make a conscious effort to integrate natural light into their design and architecture. This can be achieved through the strategic placement of windows, skylights, and architectural elements that allow natural light to penetrate the interior spaces.
- iii. When incorporating natural light, fashion houses should pay attention to interior design principles. This involves ensuring that the distribution of natural light complements the overall aesthetic of the space and enhances the visual appeal of the products on display.
- iv. Fashion industry professionals should have a clear understanding of the technical aspects of implementing natural lighting. This includes knowledge of building materials, glazing options, and shading solutions to optimize the use of natural light.
- v. Health and wellness should be a key consideration when using natural lighting. Ensure that the lighting design takes into account factors like minimizing glare, providing proper illumination levels, and creating a comfortable environment for both employees and customers.
- vi. Natural lighting can have a positive impact on productivity. Fashion houses should design their spaces to harness the benefits of natural light, such as reducing eye strain and creating a more pleasant work environment for staff.
- vii. Utilizing natural light during daylight hours can significantly reduce the need for artificial lighting, resulting in cost savings on energy bills. Fashion houses should take advantage of these savings while improving their sustainability efforts.
- viii. Highlight that natural lighting provides multiple benefits, including enhancing aesthetic appeal, promoting health and wellness, increasing comfort, and improving safety. Emphasize that it's not just about reducing energy costs but also about creating a better overall environment.

By following these recommendations, fashion houses can effectively harness the benefits of natural lighting, align with sustainable practices, and create spaces that are not only visually appealing but also conducive to the well-being of their occupants.

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