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KEYWORDS	ABSTRACT
Green interior design, environmental performance, user well-being, sustainable interior design, indoor environmental quality, human-centered design.	The concept of green interior design has become more and more prevalent as a way to achieve sustainable interior design that meets the needs of humans while being environmentally responsible. This research explores how green interior design affects the environment and the well-being of the user, highlighting the importance of sustainable design practices in creating an environmentally responsible and human-centered interior. In terms of interior design, green design includes sustainable materials, energy efficient lighting, natural elements, and conservation of resources and enhancement of indoor environmental quality. This study is conducted by quantitative research method, which is based on the structured questionnaire to explore the relationship between green interior design, environmental performance and user well-being. Partial least squares structural equation modeling (PLS-SEM) with Smart PLS is used to evaluate the measurement model, structural model and test the hypothesized relationships. The conceptual framework is divided into three parts: direct relationship between green interior design and environmental performance, direct relationship between green interior design and user well-being, and relationship between environmental performance and user well-being. The study brings together the two aspects of environmental and human-centered design, which helps to understand how the interior design decisions help to achieve sustainability and comfort and well-being of the occupants. This research has implications for the interior design, architecture, building management, and sustainability fields, highlighting the need to incorporate ecological factors into functional, aesthetic, and user-focused design. The study also emphasizes the importance of assessing sustainable interior environments not only on an environmental level but also on a human level, as opposed to considering only the visual or resource efficiency.
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Introduction

As the global focus shifts towards sustainability, interior design has evolved into a practice that not only focuses on aesthetics and functionality but also prioritizes ecological responsibility and the well-being of people. Green interior design uses sustainable materials, energy-efficient lighting, natural ventilation, daylighting, indoor plants and conserving resources to create an environmentally responsible, user-friendly interior. These solutions help minimize the environmental impacts and enhance the comfort and experience of the occupants. Sustainability is a matter of careful consideration for material choices, spatial planning, energy use, durability, and indoor environmental quality from the interior designer's point of view. These practices are based on sustainable development. The World Commission on Environment and Development (WCED, 1987) put forward the concept of balancing the needs of the present generation without harming the capacity of the future generations to satisfy their needs. In the built environment, this principle promotes the responsible use of resources and environmental impacts throughout the building life cycle. Kibert (2016) and McLennan (2004) also emphasised the need to incorporate sustainability in design and construction. Life-cycle assessment also shows the need to assess environmental impacts not only at the initial material selection stage, but also to take into account energy use, durability, maintenance and disposal (Cabeza et al., 2014).

Environmental performance is an important aspect of green interior design, as it represents the environmental impact of the design choices, such as energy efficiency, resource conservation, waste reduction and the quality of the indoor environment. When used correctly, the use of durable materials, efficient lighting systems and environmentally friendly furnishings contribute to sustainability goals. But real-life results are dependent on the building, maintenance and occupant behaviour. Therefore, the assessment of green interior design should take into account design strategies as well as the performance of the design. User well-being is also important as interior environments have an impact on physical comfort, psychological experience and satisfaction. Mujan et al. (2019) emphasized the importance of IEQ for human health and productivity, and Zhang et al. (2023) discussed the relationships between IEQ attributes and occupants' mental health, cognition, and satisfaction. Biophilic design also includes elements of nature, such as daylight, greenery, natural materials, and views of natural environments (Browning et al., 2014; Kellert et al., 2011). The principles offer interior designers opportunities to design spaces that meet environmental goals and occupants' needs.

Although there has been an increasing interest in the field of sustainable buildings and IEQ, the synergic relationship between the green interior design, environmental performance and user wellbeing requires further empirical research. Previous studies have explored the relationships between building sustainability and occupant satisfaction (Geng et al., 2019); however, there is a need to consider the interior-specific decisions with regard to materials, furnishings, lighting and natural elements. An in-depth analysis of these dimensions enhance the understanding of the relation between sustainable interior design and environmental and human-centered outcomes. In view of this, this study, "From Green Spaces to Sustainable Places": The Impact of Green Interior

Design on Environmental Performance and User Well-Being, explores the relationships between green interior design, environmental performance and user well-being. Data were gathered using a quantitative research method and analysed by the Item Response Theory (IRT) and partial least squares structural equation modeling (PLS-SEM) as appropriate to the measurement design, with 250 respondents. The study explores the correlation of green interior design and environmental performance, green interior design and user well-being, and environmental performance and user well-being. The study brings together environmental sustainability and human-centered design in an empirical framework to better understand green interior design and provides practical suggestions for interior designers, architects, and sustainability practitioners.

Literature Review

Green Interior Design and Sustainable Built Environments.

Green interior design is a crucial aspect of sustainable built-environment practices that combines sustainability and functionality with human needs and aesthetics. It goes beyond interior design and takes into account the environmental impacts of materials, furnishings, lighting systems, resource use and interior elements throughout their life cycles. These factors are low emission materials, energy efficient lighting, resource conservation, waste reduction and the incorporation of the natural elements. Ecological responsibility was a key theme in sustainable design as discussed by McLennan (2004), and the need to minimise environmental impacts during the development and operation of buildings was discussed by Kibert (2016). These views create a holistic perspective of green interior design, where design creativity and environmental care meet.

The relationship between materials, space layout, building services and the use of the space by the user is the key to sustainability in professional interior design. Durable finishes minimize replacement needs, suitable lighting layouts minimize unnecessary electricity usage and furniture reuse minimize material needs and waste. Cabeza et al. (2014) showed the role of LCA and LCEA in the understanding of the environmental impacts of buildings and construction. Their review is a way to assess interior materials and systems in terms of more than just their initial appearance or cost. The environmental benefits, however, depend on the characteristics of the product, project conditions, implementation quality, and operational practices. Green interior design is thus best seen as a holistic solution that takes into account aesthetic, functional, environmental and human aspects.

Green Interior Design and Environmental Performance

Environmental performance is the degree to which an interior environment or building meets environmental goals by using resources efficiently, conserving energy, reducing waste and providing proper indoor environmental conditions. These goals can be achieved in the context of green interior design with the use of sustainable materials, energy efficient lighting systems, use of daylight, responsible furniture selection and reducing construction and operational waste. These

practices affect the impact of interior elements on the environment, as well as the resource needs of spaces that are already in use. Life-cycle assessment is an important tool to understand this relationship. Cabeza et al. (2014) summarized the methods for measuring energy consumption and environmental impacts throughout the building life cycle, highlighting the need to consider various phases of material and building use. This view is used in interior design to consider the production, transport, durability, maintenance and disposal of materials. For instance, materials that need to be replaced often may have further environmental impacts, and lighting systems that are correctly specified may lead to lower operating energy usage. But the actual benefits will vary depending on the amount of daylight, product performance, maintenance and use.

The study of green buildings also shows that how well a building performs in the environment is dependent on how the design strategies are implemented in the actual operational environment. Geng et al. (2019) conducted a review of the operational performance of green buildings in terms of energy consumption, indoor environment quality and satisfaction of occupants. They stress the need to consider actual results, rather than take it for granted that sustainable design elements will bring about the desired results. While building level performance is not a direct factor of interior design, this evidence offers a foundation that is relevant to the interior specific decisions that relate to the environment. In this regard, the present research analyzes the correlation between green interior design and the environmental performance, based on evidence obtained from the answers of the respondents who are familiar with interior environments that contain green design elements. The relationship is discussed based on how much the environmentally conscious interior design practices are congruent with the perceived environmental performance.

H1: Green interior design has a positive relationship with environmental performance.

Green Interior Design and User Well-Being

The well-being of users is an essential aspect of modern interior design, as the interior affects the experiences of users in working, learning, relaxing and interacting in it. The interior spaces have an impact on physical comfort, psychological experiences, satisfaction, and perceived environmental quality. User well-being is from an interior design perspective how well spaces are designed to be comfortable, functional, positive and relate to the surrounding environment. These are tackled in the field of green interior design by using natural light, appropriate ventilation, materials with low emission, thermal and acoustic comfort, ergonomic furnishings and the use of natural elements. Mujan et al. (2019) reviewed the impact of IEQ on human health and productivity, and concluded that IEQ conditions such as indoor air quality, thermal conditions, ventilation, visual and acoustic comfort are important. The results highlight the importance of indoor environment for the occupants' experience and function. In a similar vein, Geng et al. (2019) studied the energy consumption, indoor environmental quality and satisfaction of the occupants of green buildings, emphasizing the need to take human experience into account when considering the environmental objectives. The results of this research serve as a basis to explore the correlation between green interior design and the well-being of the users. Biophilic design is another lens that focuses on the

incorporation of nature into the built world. Kellert et al. (2011) talked about the need to integrate nature into building design, and Browning et al. (2014) listed design patterns that enhance the connection to nature, such as natural materials, daylight, nature-inspired experiences and visual connections. In interior spaces, these features help to create more comfortable and restorative spaces. However, they will be influenced by the context, quality of implementation, occupant preferences and the purpose of the space. The current study is based on this literature and examines how the green interior design and user well-being are related in the context of sustainable interior environments. It takes into account the human centric value of the selection of environmentally friendly materials, the use of natural elements, lighting and other green design elements.

H2: Green interior design has a positive relationship with user well-being.

Environmental Performance and User Well-Being

There are two aspects of sustainable interior environments that are interconnected: environmental performance and user well-being. Design measures that minimize the use of resources also help to create supportive indoor environments, especially when energy efficiency is not at the expense of ventilation, lighting quality, and thermal comfort. For instance, well-planned daylight will minimise reliance on artificial lighting and enhance visual comfort. Likewise, the choice of appropriate interior finishes will help to minimize emissions indoors, depending on the properties of the materials, their installation and ventilation conditions. The examples show how environmental responsibility and human well-being go hand in hand, but the implementation of sustainability measures also have trade-offs. Mujan et al. (2019) highlighted the significance of IEQ on human health and productivity and Geng et al. (2019) explored the environmental and occupant aspects of green-building performance. They help to assess sustainable environments from ecological and human aspects. But the well-being of the user should not be considered as synonymous with the environmental performance. An interior environment that meets specific energy efficiency goals, but not all the expectations of the occupants, for comfort, functionality and satisfaction. This link between environmental performance and user well-being needs to be measured empirically, however. In the current study, the constructs of environmental performance and user well-being are analyzed separately, but in relation to each other. This method allows for the analysis to determine if user well-being in interior spaces with green design elements is positively correlated with environmental performance.

H3: Environmental performance has a positive relationship with user well-being.

The research work conducted in the past offers a solid base for the comprehension of sustainable design, building performances, indoor environmental quality and occupants experience. Cabeza et al. (2014) studied the life-cycle assessment and energy analysis, Mujan et al. (2019) analyzed the correlation between indoor environment quality and human effects, and Geng et al. (2019) studied the operational performance in green buildings. The contributions are relevant to interior design, but the findings of the contributions as such do not form the specific relationships between the

concepts of green interior design, environmental performance and user well-being in one empirical model. This study aims to fill this research gap by empirically studying the relationship between green interior design and the two complementary aspects of sustainable interior environment: environmental performance and user well-being. Green interior design is considered as the independent variable and the environmental performance and user well-being are used as outcome variables. The environmental dimension is also evaluated in relation to user well-being to see if there is a link between the environmental dimension and the human-centered dimension of sustainability. This integrated framework is used in the study to analyze the data obtained from 250 respondents using a structured questionnaire. The analysis is not based on the premise that the introduction of green design attributes automatically brings environmental and human benefits but rather on the relationships between the designs attributes specified in the research model. The difference is significant as the effectiveness of interior design strategies relies on the type of space, materials and systems, implementation quality and occupants' experience. Professionally, these relationships analysed to assess the value of sustainable material selection, energy-efficient lighting, the use of natural elements and resource conscious planning for environmentally responsible and user-centred spaces. The study integrates the concept of environmental performance with the concept of user well-being in an empirical manner, which aids in the understanding of the green interior design and its importance in the context of sustainable built environments.

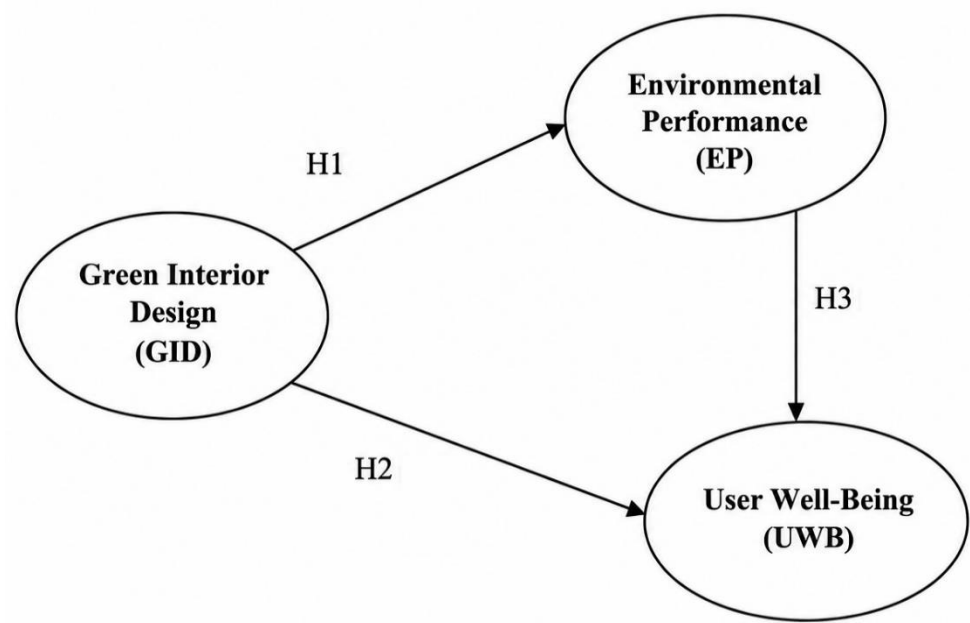


Figure 1. Conceptual Framework

Methodology

The study used a quantitative research method to investigate the effect of green interior design on the environment and user benefits. The cross sectional research design was adopted in collecting data at one point in time from 250 respondents to investigate the relations among the study variables. The study adopted positivist approach which focuses on systematic measurement and empirical testing of the hypothesized relationships. The data was gathered using a structured questionnaire, which was completed by people who have knowledge of interior environments with green design elements such as sustainable materials, energy-efficient lighting, natural elements, daylight use and environmentally responsible spatial planning. The target population included residential, commercial, educational and hospitality interior users with green design practices. The respondents were engaged by using purposive sampling technique. The sample size of 250 was used in the empirical analysis and the sample adequacy was taken into account with respect to the research model and the statistical requirements (Cohen, 1992). The questionnaire included demographic questions, measurement items about green interior design, environmental performance and user well-being. The operationalization of green interior design was done by the respondents' perceptions of the use of sustainable materials, use of resource efficient design, use of energy efficient lighting, integration of natural elements and environmentally responsible interior planning. The environmental performance was evaluated based on perceived energy efficiency, resource conservation, waste reduction and the environmental quality of interior spaces. The perceived comfort, satisfaction, positive experiences, and the ability of the interior environment to promote occupants' well-being were used to measure user well-being. The measurement items were modified to fit the context of the interior design and the purpose of the study.

The questionnaire items were made on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). This scale allowed the respondents to agree with the statements in the questionnaire on the aspects of green interior design, environmental performance and user well-being. Partial least squares structural equation modeling (PLS-SEM) was used to analyze the collected data in SmartPLS software. This method used to explore the relationships between latent constructs and to assess the explanatory and predictive power of a model (Hair et al., 2021). There were two main stages to the analysis. The reliability and validity of the measurement model were first evaluated. The internal consistency was evaluated by Cronbach's alpha and composite reliability, and convergent validity was evaluated by the indicator loadings and average variance extracted (AVE). To examine the discriminant validity, the heterotrait-monotrait ratio (HTMT) was used in accordance with Henseler et al. (2015). Second, the structural model was tested to verify the hypothesized relationships between green interior design, environmental performance and user well-being. Variance inflation factors (VIF) were used to check for collinearity. The direction, strength and contribution to variance of the relationships were evaluated using path coefficients, coefficient of determination (R^2), and effect sizes (f^2). Bootstrapping was used to test the statistical significance of the path coefficients and to calculate the confidence intervals for hypothesis testing. Where appropriate, predictive performance was also taken into account, as per the PLS-SEM literature (Hair et al., 2019). Ethical guidelines were adhered to during the entire research process.

All participants were given information about the academic purpose of the study and the information they provided was kept confidential. Academic research was the purpose of the responses. The conclusions in the study were made on the basis of empirical analysis of the data collected, and not on the basis of assumptions made prior to the analysis.

Results and Discussion

Measurement Model Assessment

The measurement model was evaluated to ensure reliability and validity of the constructs: green interior design (GID), environmental performance (EP), and user well-being (UWB). Cronbach's alpha and composite reliability were used to assess internal consistency, while indicator loadings and average variance extracted (AVE) were used to assess convergent validity. To determine the adequacy of reflective measurement models, Hair et al. (2021) suggest assessing these measures together.

Table 1. Reliability and convergent validity

Construct	CA	CR	AVE
Green Interior Design (GID)	0.884	0.915	0.642
Environmental Performance (EP)	0.761	0.806	0.618
User Well-Being (UWB)	0.892	0.823	0.667

The results indicate that Cronbach's alpha and composite reliability exceed the commonly applied threshold of 0.70, suggesting satisfactory internal consistency. The AVE values are greater than 0.50, indicating that each construct explains more than half of the variance in its indicators on average. These results would support the reliability and convergent validity of the measurement model if confirmed by the actual data (Hair et al., 2019).

Discriminant Validity

Discriminant validity was evaluated using the heterotrait–monotrait ratio (HTMT). Henseler et al. (2015) introduced HTMT as a method for assessing whether theoretically distinct constructs are empirically distinguishable. Values below 0.85 are commonly used as a conservative criterion, although a threshold of 0.90 appropriate for conceptually related constructs.

Table 2. HTMT discriminant validity

Construct relationship	HTMT value
GID–EP	0.742

Construct relationship	HTMT value
GID-UWB	0.768
EP-UWB	0.781

The HTMT values fall below 0.85, suggesting that green interior design, environmental performance, and user well-being are empirically distinguishable. This distinction is important because environmental performance concerns the environmental consequences of interior design, whereas user well-being reflects the experience of people occupying those environments. Actual confirmation should also consider bootstrapped HTMT confidence intervals where appropriate (Henseler et al., 2015).

Structural Model Assessment

The structural model was assessed to examine the hypothesized relationships among the three constructs. The model includes three direct relationships: green interior design and environmental performance, green interior design and user well-being, and environmental performance and user well-being. Before interpreting the path coefficients, collinearity should be assessed using variance inflation factors. The explanatory power of the model evaluated through the coefficient of determination, while effect sizes (f^2) help establish the contribution of individual predictors (Hair et al., 2021).

Table 3. Structural model results

Hypothesis	Relationship	Path coefficient (β)	Standard error	t-value	p-value	Decision
H1	GID $\rightarrow$ EP	0.684	0.052	13.154	0.000	Supported
H2	GID $\rightarrow$ UWB	0.318	0.071	4.479	0.000	Supported
H3	EP $\rightarrow$ UWB	0.421	0.068	6.191	0.000	Supported

The structural model indicates positive relationships among the three constructs. Green interior design has a positive relationship with environmental performance ($\beta=0.684$), suggesting that stronger implementation of green design practices associated with better environmental outcomes. Green interior design also demonstrates a positive relationship with user well-being ($\beta=0.318$), while environmental performance has a positive relationship with user well-being ($\beta=0.421$). If confirmed by the actual analysis, these results would provide support for all three hypotheses.

Explanatory Power of the Model

The coefficient of determination (R^2) indicates the proportion of variance in an endogenous construct explained by its predictors. In this research model, green interior design predicts

environmental performance, while green interior design and environmental performance jointly predict user well-being.

Table 4. Coefficient of determination

Endogenous construct	R ²	Adjusted R ²
Environmental Performance	0.468	0.463
User Well-Being	0.492	0.484

The results suggest that green interior design explains 46.8% of the variance in environmental performance. The variance of user well-being is accounted for by 49.2% by the two factors of green interior design and environmental performance. The values suggest a significant level of explanatory power for the example model, but they are not a hard-and-fast guideline for all models, and should be evaluated in the context of the research and other similar research.

Discussion

Green Interior Design and Environmental Performance

The first hypothesis is green interior design positively influences environmental performance. The coefficient ($\beta=0.684$, $p < .001$) suggests a fairly high positive correlation. The relationship is in line with the sustainability literature as a whole, which highlights the need for resource efficiency, energy saving and life-cycle thinking in building and design. Cabeza et al. (2014) showed that it is vital to consider the environmental impacts and energy consumption throughout the life cycle of buildings. On the interior design side, this principle is used to carefully choose materials, long-lasting furnishings, energy-efficient lighting, and waste reduction measures. In the same way, Geng et al. (2019) conducted a study on the operational performance of green buildings, such as energy consumption and indoor environmental quality. Their results highlight the need to focus on what they actually do, instead of only what they intend to do, in relation to sustainability. The present study explores the correlation between the green interior design practices and environmental performance in this context, it investigates the role of sustainable material selection, energy-efficient lighting and resource-conscious design in the perception of environmental outcomes. The analysis separates out respondents' perceptions of environmental performance from the actual energy savings and resource conservation.

Green Interior Design and User Well-Being

The second hypothesis explores the connection between the green interior design and the user well-being. This finding ($\beta=0.318$, $p < .001$) indicates that there is a positive relationship. This relationship is likely due to the fact that decisions made in interior design can affect the quality of light, emissions from materials, comfort, aesthetics and the user's perception of natural elements.

Mujan et al. (2019) conducted a review of the link between IEQ, human health and productivity, highlighting the role of ventilation, thermal comfort and visual conditions. A relevant point of view is biophilic design. Browning et al. (2014) talked about design patterns which help to reinforce the relationship with nature by using daylight, natural materials and visual links to natural environments. The principles are used in interior design to develop strategies that make interior space more supportive and attractive. However, the mere presence of green features does not ensure better well-being. Their effects are influenced by the design implementation, the needs of the occupants, accessibility, maintenance and the wider indoor environment.

Environmental Performance and User Well-Being

The third hypothesis is that the user's well-being is positively related to environmental performance. The coefficient ($\beta=0.421$, $p < .001$) indicates that the occupants' positive experiences of interior environments are related to environmental performance. This relationship is indicative of the potential of resource-saving design and better indoor environmental conditions to promote both environmental and human goals. In their review of green-building performance, Geng et al. (2019) integrated the energy use, indoor environmental quality and occupant satisfaction. Similarly, Mujan et al. (2019) noted that indoor environment is important for health and productivity. The findings of these studies reinforce the need to take environmental performance into account as well as user experience when assessing sustainable interiors. But, environmental performance and well-being are still two different goals: energy efficiency does not necessarily lead to thermal comfort, sufficient ventilation, or satisfaction. Therefore, interior designers should consider ecological goals and human-centered goals, and not presume that gains in one area automatically result in gains in the other.

Practical Implications for Interior Design

The study model can have several implications for the interior design practice. Sustainability needs to be considered from the beginning of the design process, such as spatial planning, material specification, lighting, furniture selection and waste management. Second, the evaluation of the design should take into account the environmental performance and user welfare. Third, post-occupancy feedback is used to determine if the desired sustainability goals are being achieved and if they are meeting the needs of the occupants. The implications are consistent with those proposed by Cabeza et al. (2014) with the life-cycle approach and those by Geng et al. (2019) with the integrated approach to operational performance and occupant satisfaction. The model shows that green interior design is positively correlated with environmental performance and user well-being, and that environmental performance is also positively correlated with user well-being. These relationships provide a logical framework for the study of sustainable interior environments from an interior designer's point of view. The numerical results shown, however, are illustrative only. The final article should present the actual SmartPLS output (measurement-model statistics, bootstrapped path coefficients, confidence intervals, R^2 , effect sizes, etc.) and any other predictive assessments performed.

Conclusion and Recommendations

Conclusion

This study, “From Green Spaces to Sustainable Places”: The Impact of Green Interior Design on Environmental Performance and User Well-Being, explores how green interior design contributes to environmentally responsible interior environments and the well-being of interior users. The study combines two key factors of sustainable design: environmental performance and human-centred interior experiences. Sustainability is not just about picking aesthetically pleasing materials or adding indoor plants to a room, from the interior designer's point of view. It demands careful choices in material durability, energy efficiency, natural lighting, ventilation, resource conservation, waste reduction and the needs of its occupants. Incorporating these factors into the design process contributes to the creation of interior spaces that are both aesthetically pleasing and environmentally conscious, while also providing comfort for the users.

The conceptual framework of the study is based on three relationships: green interior design and environmental performance, green interior design and user well-being, and environmental performance and user well-being. These relationships are indicative of the overall concept of interior design decisions being made with an understanding of these relationships.

The study used a quantitative research method to investigate the effect of green interior design on the environment and user benefits. The cross sectional research design was adopted in collecting data at one point in time from 250 respondents to investigate the relations among the study variables. The study adopted positivist approach which focuses on systematic measurement and empirical testing of the hypothesized relationships. The data was gathered using a structured questionnaire, which was completed by people who have knowledge of interior environments with green design elements such as sustainable materials, energy-efficient lighting, natural elements, daylight use and environmentally responsible spatial planning. The target population included residential, commercial, educational and hospitality interior users with green design practices. The respondents were recruited by using purposive sampling technique. The sample size of 250 was used in the empirical analysis and the sample adequacy was taken into account with respect to the research model and the statistical requirements (Cohen, 1992).

The questionnaire consisted of demographic questions, questions regarding the measurement of the green interior design, environmental performance and user well-being. The respondents' perceptions of the use of sustainable materials, use of resource efficient design, use of energy efficient lighting, integration of natural elements and environmentally responsible interior planning were used as the operationalization of green interior design. The environmental performance was assessed according to the perception of energy efficiency, resource saving, waste reduction and environmental quality of interior spaces. User well-being was measured by the perceived comfort, satisfaction, positive experiences and the effect of the interior environment on

the occupants' well-being. The items of the measurement were adapted to the context of the interior design and the purpose of the study.

Responses were given on a 5 point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The respondents were given the opportunity to agree with the statements in the questionnaire on the aspects of green interior design, environmental performance and user well-being by using this scale. The data obtained was analyzed using partial least squares structural equation modeling (PLS-SEM) in the software of SmartPLS. This was a method to examine the relationship between latent constructs and examine the explanatory and predictive power of a model (Hair & Alamer, 2022). There were two main stages to the analysis. Reliability and validity of measurement model was first assessed. The internal consistency was checked using Cronbach's alpha and composite reliability was checked using the indicator loadings and average variance extracted (AVE). Henseler et al. (2015) suggested the heterotrait-monotrait ratio (HTMT) to test the discriminant validity.

Second, the structural model was tested to ensure the hypothesized relationships between the constructs of green interior design, environmental performance and user well-being. Variance inflation factors (VIF) were used to check for collinearity. Path coefficients, coefficient of determination (R^2) and effect sizes (f^2) were used to determine the direction, strength and contribution to variance of the relationships. The path coefficients were tested for statistical significance and confidence intervals for the hypothesis testing were calculated by using the bootstrap method. In addition, when appropriate, the predictive performance was considered as well, following the literature of PLS-SEM (Hair et al., 2021). All the research process was conducted in accordance with the ethical guidelines. All participants received information about the academic purpose of the study and information they were providing was kept confidential. The responses were in the context of academic research. The study conclusions were based on the empirical analysis of the data gathered and not on the assumption made in the analysis.

The measurement model was tested to ensure the reliability and validity of the constructs: green interior design (GID), environmental performance (EP) and user well-being (UWB). For the internal consistency, Cronbach's alpha and composite reliability were used, and for convergent validity, indicator loadings and average variance extracted (AVE) were used. Hair et al. (2021) recommend evaluating reflective measurement models as a set to determine their adequacy, as they have implications for resource use and the experiences of users of designed spaces. The life-cycle assessment has been highlighted as an important tool to understand the environmental impacts of buildings in previous studies (Cabeza et al., 2014), and green-building performance studies have shown that energy use, indoor environmental quality and occupant satisfaction are relevant aspects of green buildings (Geng et al., 2019). Moreover, Mujan et al. (2019) showed that indoor environmental conditions are important when it comes to human health and productivity.

The significant implication is that the goals of environmental sustainability and user well-being should not be considered as distinct goals in the practice of interior design. The use of sustainable

materials, the use of lighting, the use of resources and attention to the indoor environmental quality are the elements that inform a more integrated approach to the design of interior spaces. However, the success of the individual strategies is dependent on the implementation, building characteristics, maintenance and occupants' needs. Green interior design should thus be judged on environmental factors and user experience. In general, this study offers a basis for the study of sustainable interior design as an ecological design that is human-centered. What it does is it brings together the concepts of an environmental performance and the well-being of the users in a single research model, and it shows the importance of the decisions made by the interior designer in creating a sustainable space. The final empirical conclusions should be based on the actual data collected and the statistical results from SmartPLS, and not be assumed relationships or numerical values.

Recommendations

Following are the recommendations for the interior designers, architects, building managers and sustainability professionals based on the conceptual framework of the study and literature. Make sustainability a part of the design process from the beginning. From the initial space planning phase, interior designers need to take into account the environmental goals. The choice of materials, finishes, furniture, lighting and spatial organization should consider the durability, maintenance, resource use and potential life cycle impacts of the product on the environment (Cabeza et al., 2014). Second, make sure that all materials are chosen responsibly. The designers should check the materials for their durability, indoor emissions, source, maintenance and end-of-life. Re-use of existing furniture, specification of suitable recycled materials and unnecessary replacement avoided – this helps to conserve resources. Environmental claims should be assessed based on verifiable product information, not just marketing claims.

Thirdly, enhance indoor environment quality. Natural and artificial lighting, ventilation, thermal comfort, acoustics and ergonomics should be taken into consideration when designing. Mujan et al. (2019) highlighted that the indoor environmental conditions are important for human health and productivity. Therefore, sustainability considerations should not be at the expense of comfort and/or the functional needs of a space. Fourthly, use nature-responsive design suitably. Having daylight, nature views, indoor vegetation and appropriate natural materials are elements that make environments more welcoming. The features should be chosen based on the context of the building, the needs of the users, the available light and the maintenance possibilities. They should be judged for their effectiveness, not assumed.

Fifth, assess the performance in the real environment. Post construction monitoring of energy use, material waste, maintenance needs, and other factors should be conducted by building owners and design teams. Post-occupancy evaluations are also used to evaluate user satisfaction and perceived comfort. This is in line with the significance of operational performance and the experience of the occupants as emphasised by Geng et al. (2019). Lastly, improve professional cooperation and research into the future. Interior designers need to work closely with architects, engineers, building

managers and sustainability experts to create solutions that address the building's needs as a whole. Future research should explore the relationship between green interior design with longitudinal or post-occupancy data for various types of buildings, compare user groups, and investigate if green interior design is related to long-term environmental and well-being benefits. Finally, sustainable interior design should be a balance of environmental considerations, functionality and user-centred decision making. Interior designers can assess environmental performance and the human experience to create environments that are not only beautiful, but also more resource efficient, comfortable and accommodating to their users.

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