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التصميم البايوفيلي في المجمعات التجارية: تقييم نماذج في دولة الكويت

Biophilic Design in Shopping Malls: An Assessment of Cases in Kuwait

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الملخص

إن هذا البحث يقيّم صفات التصميم الداخلي لأربعة مجمعات تجارية في الكويت. ويختبر إدماج العناصر الطبيعة ضمن الفراغات الداخلية وفقاً لمعايير التصميم البايوفيلي. إن هذه الدراسة تركز على المجمعات التجارية لكونها أصبحت مواقع عامة ومحورية وتشكل نسبة كبيرة من العقارات التجارية، وتخدم الثقافة الاستهلاكية الرائجة. كما أن تطبيق مبادئ التصميم البايوفيلي تعد أكثر أهمية في البيئات الصحراوية القاسية كالكويت. أن تطبيق التصميم البايوفيلي يمكنه أن يقود لتصاميم أفضل للمراكز التقليدية وأن تحسّن من تجربة الزوار وتشجعهم على تكرار الزيارة واستطالة أمد المكوث. ويوظّف البحث منهجيات البحث النوعي والوصفي ويعتمد على أداة المشاهدة لجمع المعلومات وبناء الاستنتاجات. ويدعو هذا البحث لتطبيق مبادئ التصميم البايوفيلي في المجمعات التجارية وأن تتضمن عناصر طبيعية كالهواء والماء والنباتات والحيوانات والطقس والمناظر الطبيعية وغيرها. وعلى التصاميم الداخلية للأسواق أن تحاكي الأشكال الطبيعية وأن توفر تجارب مكانية متنوعة تماثل الطبيعة وأن ترمز للايكولوجيا والثقافة المحلية. وتوصي الدراسة بإجراء المزيد من الدراسات القائمة على الأدلة حول فوائد البايوفيليا.

الكلمات المفتاحية: المحلات، التصميم الداخلي، الثقافة الاستهلاكية، الطبيعة، المشاهدة.

Abstract

This research assesses the interior of four shopping malls in Kuwait and examines the integration of nature within buildings according to the attributes of biophilic design. The research focuses on shopping malls due to the fact that they have become significant public spaces that account for a large share of commercial properties, and cater to a rising culture of consumerism. The practice of biophilia, in retail, is even more important in places like Kuwait, where the environment is harsh. The researcher employed a qualitative and descriptive research method, relying on observation to gather data and build conclusions. Shopping Malls should include natural elements such as: air, water, plants, animals, weather, landscapes, and fire, and aim to mimic natural shapes and forms. Furthermore, they should provide varied experiences that evoke a feeling of being in nature. There should be references made to ecology and local natural settings present in the interiors of malls. The study recommends conducting additional evidence-based research to make valid conclusions about the topic.

Introduction

Contemporary shopping malls can be found in the majority of countries, worldwide. Unfortunately, their aesthetic is similar, and impersonal. They share similar attributes in terms of planning and design, such as large-scale isolation from the urban fabric, and a neutral, modern design language. The state of Kuwait has several high-quality shopping centers that fail to create a pleasant and beneficial interior environment. Despite this, they have become important sites of public gathering for the sake of consumption. It is crucial, therefore, to create indoor spaces in shopping malls that connect people to nature, especially in places like Kuwait that experience harsh weather and lack urban public spaces. (Ali, 2017. P26).

Biophilic design aims to forge meaningful links between natural and artificial environments, creating restorative and healthy atmospheres that can improve a person's well-being. This research elucidates the benefits of implementing biophilic design principles in retail spaces. Using the attributes of biophilic design outlined by Kellert (2015, p. 10), this research assesses the interior design of four modern shopping malls, in Kuwait, and examines the level of nature integrated into the design of their interiors.

The researcher employed a qualitative and descriptive method to collect data through observation. The case studies were conducted in natural settings and relied on observation to gather data and build conclusions. The researcher selected four prominent shopping malls in Kuwait for this study: Al Hamra Mall, 360 Mall, 360 Extension Mall, and Asima Mall. The researcher assessed the design of each shopping mall using the attributes of the biophilic design developed by Kellert and Calabrese (Kellert, 2015,

p. 10). These attributes provide a framework for a comprehensive assessment of how biophilic design was applied at varying levels at the four case study locations (see Table 1).The research findings highlight issues related to contemporary shopping mall design, in Kuwait. In addition, this paper also highlights the global design problem in need of more references to local culture, and ecological contexts. It also stresses the benefit of employing biophilic design principles as a guide for improving the interior environments of shopping malls. This paper believes that the improved satisfaction of shopping mall visitors will benefit mall owners, and retailers, alike.

Research Problem

Commercial buildings, particularly shopping malls in Kuwait, are high-quality constructions designed by international consultants who aim to create exemplary buildings. However, this research reveals that the interior designs of some prominent shopping malls fail to create a pleasant interior environment and instead lean toward a cold architectural language of concrete, steel, and glass. Indoor spaces, such as these, need to address the human inclination toward beauty.

Research Objectives

This research will assess the indoor spaces of four shopping malls in Kuwait in light of biophilic design principles. It aims to highlight the importance of connecting with nature in every design project, addressing the deep human need to connect with nature. Biophilic design principles improve overall well-being and increase productivity. When these principles are applied in shopping malls, they encourage visitors to spend more time in them, and consequently, increase spending. The research focuses on commercial shopping malls because they have become central public spaces catering

to the rising consumerist culture. They act as alternative public spaces in a city known for its harsh weather, and lack of urban public areas.

Research Questions

- What is the particular importance of biophilic design in Kuwait?
- How are biophilic design principles applied in the interior spaces of four shopping malls in Kuwait?
- What is the potential role of biophilic design in shopping malls?

Research Hypothesis

The application of biophilic design principles in designing shopping malls will result in creating better designs and, subsequently, lead to an enhanced visitor experience. This will encourage more frequent visits, longer periods of stay, and a general rate of higher consumer satisfaction.

Research Importance

Kuwait is located in the Arabian Peninsula, overlooking the Arabian Gulf. It is geographically located in the desert and has a continental climate, with long, dry, hot summers, and short, warm winters, with sporadic rainfalls. During the summer, dust cyclones are frequent, and relative humidity rises. The temperature occasionally reaches 50 °C. Kuwait's winters are mild. The temperature rarely drops below 18 °C, let alone 0 °C. Winter rainfall is erratic and varies in intensity from year to year. Both spring and fall are also, very brief.

The harsh desert weather in Kuwait, and the lack of plants and water make people yearn to connect with greenery, natural light, and water features. The harsh weather encourages people to spend time indoors where the climate is controlled. It is evident

that shopping malls, in general, have become an alternative semi-public space where people go for entertainment, and social gatherings. While many major architectural projects in Kuwait are carefully designed and utilize expensive construction materials, they exhibit a modern, minimalistic, unwelcoming design which fails to create a natural looking space as an alternative to the harsh outside environment. As a result: they neglect the needs of their visitors.

Theoretical Framework

This research elucidates the benefits of implementing biophilic design principles in retail spaces in Kuwait, assesses the interior design of four modern shopping malls within the country, and examines how nature was integrated into their interior environments. Accordingly, the researcher established a framework divided into two sections: the first covers retail in Kuwait, and the second examines the concept of biophilic design. The researcher begins with presenting background information on the State of Kuwait, and the nature of retail industry. Next, the significance of consumer spaces and the role of shopping malls in today's society are covered. Finally, the researcher presents an introduction to the concept of biophilic design, its benefits, and its role in the designing of shopping malls.

Retail and Consumption in Kuwait

Kuwait is a small, oil-rich country located in the Arabian Gulf. In 2021, the population was approximately 4.3 million. About 70% of the population is comprised of expatriates, and less than one million are native Kuwaitis. As a result of efforts to diversify the country a strong private sector was formed. The results are particularly seen in the areas of finance, real estate, and retail. Kuwait's GDP is $140.6 billion, ranking it as the

58th highest in the world. In addition, the economy ranks even higher: at 11th place, in terms of GDP per capita ($67,000, PPP-adjusted) (Georank, 2020). This high income is driven by the country's large oil reserves and a robust, thriving private sector, with retail being one of its strongest pillars. Retail plays a significant role in Kuwait's economy. In addition, the high per-capita income forms a solid base for the country's retail sector, as consumers have more disposable income to spend on goods, and services. This has led to an increase in demand for high-end products, and luxury items, particularly among the affluent segments of the population.

Kuwait's population growth rate is modest, with an estimated 1.17% growth rate in 2022 (CIA, 2023). Kuwait's median age is 29 years. Although the population-age pyramid appears unbalanced, it is the right mix to spur on the country's retail sector. Studies have established a positive correlation between an increase in the population of young people and the exponential growth of the retail sector. For example, Chrisman (1985) investigated the relationship between changes in population and the number of retail businesses, and employees. He established that the number of retail enterprises increases when demographics shift toward younger populations. In fact, a 2010 analysis of Kuwait's retail sector revealed a strong correlation between the robust demands of youth and significant growth in the retail sector (Rotabi, 2010).

Kuwait's retail sector was valued at $4.4 billion in 2020. Retail constitutes a considerable part of the economy, contributing to approximately 13% of the country's GDP in the same year. This sector has experienced significant growth over the past decade, driven by population growth, especially, the demographic shift toward a younger population. Other contributing factors are an increasing per capita income, and government

policies that promote private sector growth. Due to policy efforts, and the varied tastes of consumers, the retail sector is highly diversified consisting of both local and international retailers operating within the country in various forms, including: shopping malls, hypermarkets, supermarkets, convenience stores, specialty stores, and online retailers (OG Analysis, 2021).

Biophilic Design

The term "biophilia" originates from Greek, and can be translated as "love of life." Historically, humans have been immersed in a natural environment. In his book "Biophilia," the American biologist Edward O. Wilson used the term and defined it as: "the connections that human beings subconsciously seek with the rest of life." He, among others, was interested in bringing humans into contact with nature. Biophilic design aims to strengthen the integration of nature into built environments, and as a result, improve the health and well-being of humans. Biophilic architecture refers to successfully integrating buildings into the natural context. (Wilson, 1993). People interact with nature in various degrees, but we all possess a subconscious desire to interact with nature. It is a mistake to think that biophilic design exclusively concerns plants, or greenery. It is also about patterns, materials, space, sounds, and scents. Even artwork that depicts nature can significantly impact an individual's well-being.

Even though Edward O. Wilson is known for inventing the term "biophilia," Stephen Kellert, a professor of social ecology, is responsible for introducing several ideas concerning the nature of biophilic design and how to integrate it into the building environment. In his literature, he provides a set of criteria for a biophilic design that includes, what is referred to as: "six elements." The six elements mentioned are:

- Environmental features
- Natural shapes and forms
- Natural patterns and processes
- Light and space
- Place-based relationships
- Evolved human-nature relationships (Kellert, 2008).

Kellert authored two books: "Building for Life: Understanding the Human-Nature Connection" (2005), and "Biophilic Design: The Theory, Science and Practice of Bringing Buildings to Life" (2008), which provide detailed information on how people can integrate natural systems in design to support their well-being, performance, and health (Martin, 2018). Furthermore, Kellert's work has become part of the "Living Building Challenge," a certification system and design that depicts the ideal for the built environment (Martin, 2018). The author inspires designers to create buildings that function as flowers: firmly entrenched in a location, obtaining all of their energy from the sun, water, and sky, without toxins or waste, and in harmony with their environment.

(Browning et al. 2014), refers to the 14 patterns of biophilic design and produces another valuable categorization referring to the 14 patterns of biophilic design. This categorization considers human well-being within the built environment and architectural design. The 14 patterns of Biophilic design were developed through extensive interdisciplinary scientific evidence-based research. Biophilic design can lessen stress, enhance creative and perceptive functions, improve overall health, and accelerate recovery. The 14 patterns of biophilic design, as developed by Browning, provide an outline to understand and integrate several design approaches into the built

environment. They have been organized into three categories: nature in space, natural analogues, and nature of space (see Table. 1).

Table 1.

The 14 Patterns of Biophilic Design. (Browning et al 2014).

Nature in Space Patterns	Natural Analogues Patterns	Nature of Space Patterns
1. visual connection with nature 2. non-visual connection with nature 3. non-rhythmic sensory stimuli 4. thermal & airflow variability 5. presence of water 6. dynamic & diffuse light 7. connection with natural systems	8. biomorphic forms & patterns 9. material connection with nature 10. complexity & order	11. prospect 12. refuge 13. mystery 14. risk/peril

Benefits of Biophilic Design

Building designers can benefit from the use of biophilia in their design projects. Some physical health benefits include, reduced anxiety, stress, and cortisol levels, and an increase in cognitive function, concentration, and memory. Research shows that mortality rate decreases due to consumer reaction to biophilic retail architecture used in shops, despite references to various heart and lung diseases that occur when neighborhoods experience tree loss. Thus, a well-established correlation is found between vegetation and resident health. (USDAFS, 2014). Additionally, hospitals and other care facilities that incorporate nature within their built environments show positive enhancement in vitality, mood states, and a sense of purpose. (Cooper, 2016). These benefits are demonstrated in several evidence-based research studies (Bratman, 2015; Kaltenegger, 2016; Yin, 2019). Buildings incorporating biophilic design principles help

patients recover from illness, and major surgical procedures. There have been over 50 studies published on the use of biophilic design as a core factor in the healing rates for patients, a decreased reliance on medication, the lowering of stress on staff and family, and an improvement in emotional health due to viewing nature, daily. Scientists found a correlation between direct contact with nature and healthy childhood development. One study showed that children with attention deficit hyperactivity disorder displayed an improved concentration level when they took 20-minute walks in a natural setting, compared to walking in a city environment (Martin, 2018, p. 5).

The benefits of indoor and outdoor integration are proven, and many studies are finding a strong correlation between user well-being, and building design. According to Morris et al. (2006), environmental drivers impact both psychological and physiological states, resulting in positive or negative states of mind (Clements-Croome, 2013, p. 53). Similarly, recent brain studies measuring reactions to specific environments such as forests and therapeutic landscapes showed that exposure to healing settings can trigger neurogenesis, and improve brain function. (Fisher, n.d., p. 149). Likewise, good building design consisting of proper lighting, ventilation, and the use of vegetation impacts human beings by promoting their well-being, increasing their productivity, and restoring their health. Indoor air quality also helps to raise productivity levels and positively impacts human health. Good air quality is determined by high airflow and minimal CO_2, and pollutants. According to Carnegie Mellon's analysis, with an average ROI of at least 120%, natural ventilation, or mixed-mode conditioning, health expenditures could reduce by 0.8 to 1.3%, productivity could increase by 3 to 18%, and HVAC energy use could reduce by 47 to 79% (World, 2014, p. 20). In the past ten years,

several studies have projected productivity improvements associated with being close to windows (World, 2014, p. 8). Experts now believe that outside views, mainly those that connect to nature, are likely the most crucial component to satisfaction and productivity. Therefore, the evidence is conclusive. Biophilic design in retail, offices, and urban settings improves human mental health and well-being.

People have a deep and innate desire to spend time in natural settings. Being in natural environments or near elements of nature stimulates positive psychological feelings and physical reactions, such as: lowering blood pressure, relieving bodily tension, reducing stress, enhancing focus, and improving thinking and creativity. (Browning, 2016) (Wilson, 1993, p. 32). Nonetheless, research connecting nature (particularly forests) to well-being may help partially explain intuitive logic (Li, 2010). Research shows that exposure to vegetation and nature strengthens the immune system. Trees and plants radiate antibacterial and antifungal qualities fighting off harmful insects and diseases which humans inhale. Similarly, studies show that individuals who take walks in natural environments, such as: grasslands, forests, or playgrounds exhibit fewer negative emotions than those who take walks inside shopping malls (Ichoku, 2015).

In addition, biophilic design has a positive impact on social interaction. Furthermore, by incorporating nature and reducing pollution, we create a cleaner atmosphere which has a measurable positive impact on well-being, creative thinking, and productivity. In workspaces, it can improve creativity and productivity levels. Interestingly, just one plant can improve air quality by 25%, adding several plants can result in maximum human well-being (Hes, 2018). Some biophilic principles minimize energy consumption and conserve natural resources. Following biophilic design principles can also help real

estate owners obtain green building certifications.

Biophilic Design and Shopping Centers

Biophilic retail design is a relatively recent notion, and its application in research, marketing, and retail is yet to be discovered. The concept of biophilic store design was developed by Joye et al. (2010). It illustrates several advantages of incorporating natural elements such as: plants, vegetation, water features, and sound in retail spaces. However, little evidence-based research has examined the presence of nature in shopping malls, stores, displays, and shop fronts, worldwide (Yan & Eckman, 2009) (Brengman et al., 2012, p. 808), (Mower et al., 2012), (Rosenbaum et al., 2016).

The Biophilia Theory indicates that humans who live in urban areas far from nature maintain a deep psychological need to be close to nature which can be ascribed to their biological origin and historical beginnings. (Kellert, 2008; Wilson & Kellert, 2013). According to Wilson, Biophilia confirms the deep human connection with natural systems (Wilson, 1993, p. 31). One of the principal findings of research conducted in the Netherlands and Slovenia, concerning the amount of greenery in urban areas, was that the people living there voted for considerably more vegetation (Kozamernik, 2020). Such a desire signifies their need to be closer to nature.

Shopping centers that integrate natural elements within the retail experience enable browsing and exploration and create a "play-space" in the mind of shoppers (Maclaran & Brown, 2005, p. 315), one that signifies the spontaneous and playful nature of consumption spaces. Such retail play spaces consequently enhance energy and focus. The biophilic design suggests that integrating natural elements such as plants, birds, and fountains in shopping mall design can relieve fatigue among shoppers and thus

encourage more extended shopping, and more frequent visitations. In addition, retail researchers investigated the healing potential of green areas within the indoor retail environment (Rosenbaum et al., 2016). Consequently, biophilic design in shopping centers is shown to help people reduce their level of fatigue.

Methodology

Once the research problem had been identified, and the theoretical framework on the subject had been reviewed, the researcher determined both the research type, and design. The researcher employed a qualitative and descriptive research method. The research focused on four cases, used observation, and tested the qualities of the four cases against the attributes of the Biophilic design principles. The results of this research are well suited for this study because the research was conducted in a natural environment; aiming to describe the phenomenon by relying on observation to gather data and build conclusions. The researcher collected data through observation. Marshall and Rossman (1989) define observation as the methodical explanation of events, behaviors, and objects in the natural setting of the study (p. 79). Gorman and Clayton describe observational studies as systematically recording the observed phenomenon or behavior within a natural setting. (2005, p. 40). Observation in the field is suited for the design discipline as it involves "active looking, improving memory, informal interviewing, writing detailed field notes, and perhaps most importantly, patience" (DeWalt & DeWalt, 2002, p. vii). Observation is a valuable research method as it allows the researcher to:

- Capture the context
- Experience and discover inductive findings, firsthand

- Explore aspects that may not come up in other research methods: such as interviews, or questionnaires

The researcher established a structured observation where a specific criterion was established for the selected case studies. The researcher spent long periods during the study and personally experienced the phenomenon (Chatman, 1984, p. 426). The researcher frequented the studied sites until a comfortable rapport was achieved (Jorgensen, 1989, p. 21). In addition, the researcher visited the sites in question and gathered information on biophilic design elements.

The researcher possesses prior knowledge of the design field from education and practice, and thus was able to reflect on the evaluations. The author believes that such methods will yield benefits for the study, as "the use of one's senses, as well as other data collection techniques, make observation a more holistic type of research that allows the researcher to gain a better understanding of insiders from their perspective" (Baker, 2006, p. 187).

Yin (2003) defines a case study as an empirical investigation that examines a current phenomenon within its natural context, mainly when there is a lack of clarity between the phenomenon, and the context. Accordingly, the researcher selected four prominent shopping malls in Kuwait for this study: Al Hamra Mall, 360 Mall, 360 Extension Mall, and Asima Mall. Then, the researcher assessed the design qualities of each of the four selected case studies in light of the attributes of biophilic design developed by Kellert and Calabrese (Kellert. 2015. p. 10). These attributes of biophilic design provide a framework that allows the researcher to comprehensively assess how biophilic design is applied at different levels (see Table 2).

Table 2

Experiences and Attributes of Biophilic Design

Direct Experience of Nature	Indirect Experience of Nature	Experience of Space and Place
	Images of nature	
Light	Natural Materials	
Air	Natural Colors	Prospect and refuge
Water	Simulating natural light and air	Organized complexity
Plants	Naturalistic shapes and forms	Integration of parts into wholes
Animal	Evoking nature	Transitional spaces
Weather	Information richness	Mobility and way finding
Natural Landscape & Ecosys-	Age, change, and the patina of	Cultural and ecological attach-
tems	time	ment to the place
Fire	Natural geometries	
	Biomimicry	

Note: (Kellert, 2015, p. 10)

Case Studies

The researcher selected four prominent shopping malls in Kuwait for this study: Al Hamra Mall, 360 Mall, 360 Extension Mall, and Asima Mall.

Al Hamra Mall

Al Hamra Tower and Mall is located in Sharq district, in Kuwait City. Designed by the American firm SOM, it is a contemporary lifestyle destination that houses premium brands, and offers exclusive shopping and entertainment options. It is a gateway to a mix of food and beverages that can be found in its food court, as well as the shopping center (see Figures 1 & 2).

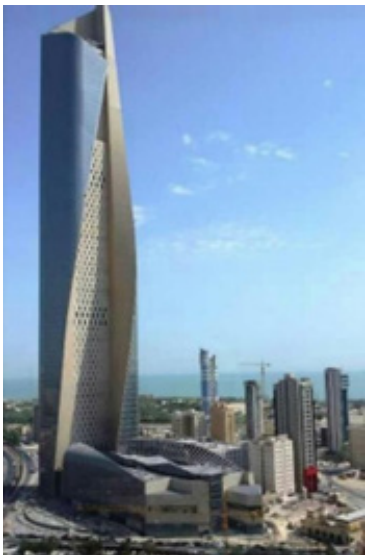

Figure 1 Al Hamra Mall Exterior (Turner Construction Co. 2012)

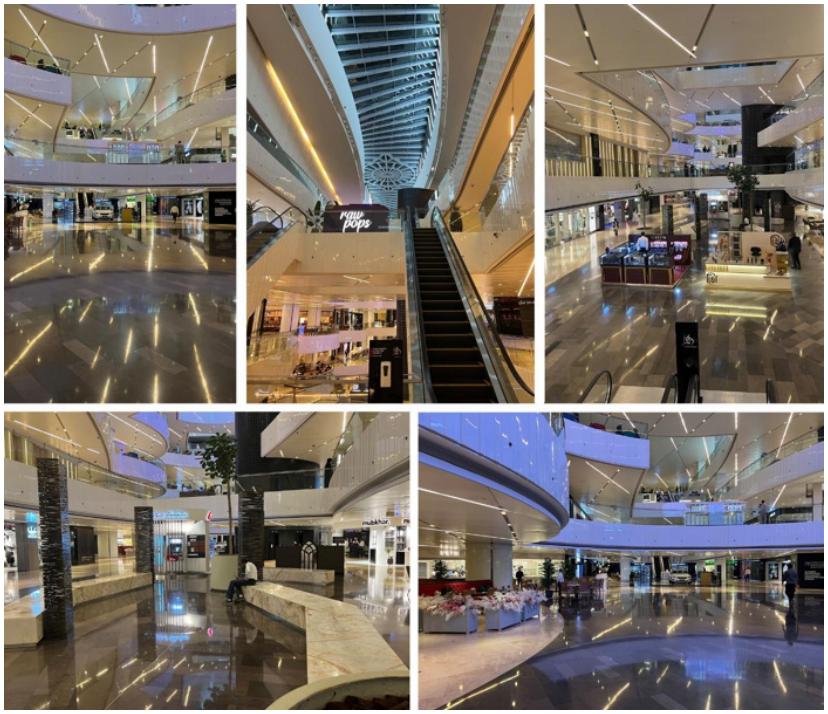

Figure 2Al Hamra Mall Interior (Author)

360 Mall

360 Mall is located in South Surrah, Kuwait. It was opened in 2009. The mall consists of three floors, and has a circular design covering an area of 82,000 square meters. It contains a mix of retailers, restaurants, and cafes, and includes both a cinema complex and an indoor family entertainment center (see Figures 3 and 4).

Figure 3 360 Mall Exterior (CallisonRTKL.2023)

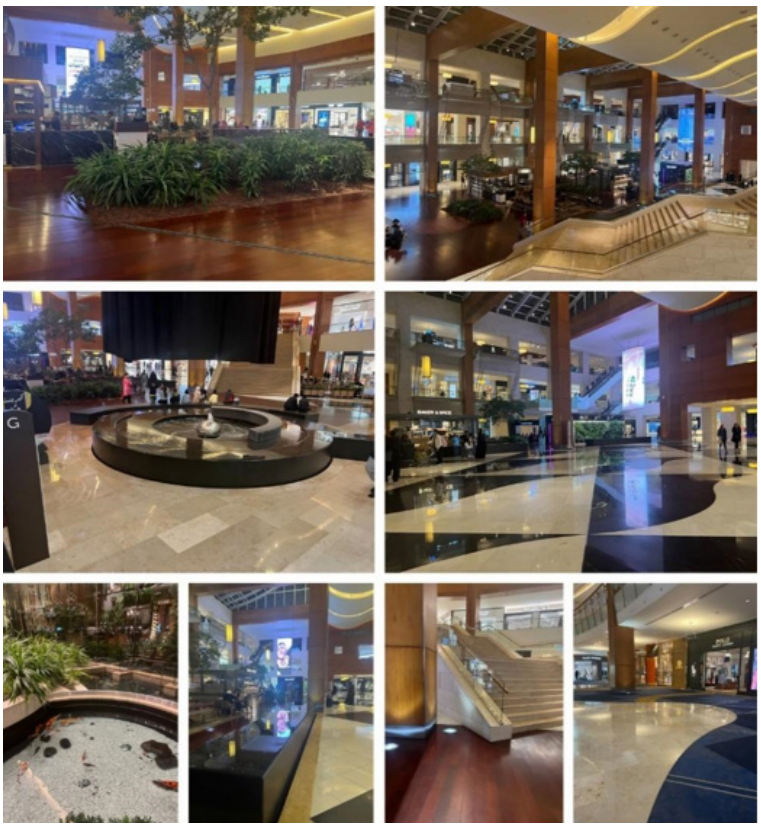

Figure 4 360 Mall Interior

New 360 Mall

The 360 Mall Extension is a new addition to the 360 Mall, located in South Surrah, Kuwait. The project was designed by the global design firm Callison RTKL. The Mall consists of 260 retailers, and a large cinema. It covers an area of more than 20,250 sq meters.

Figure 5 New 360 Mall Exterior (Tamdeen Group.2015)

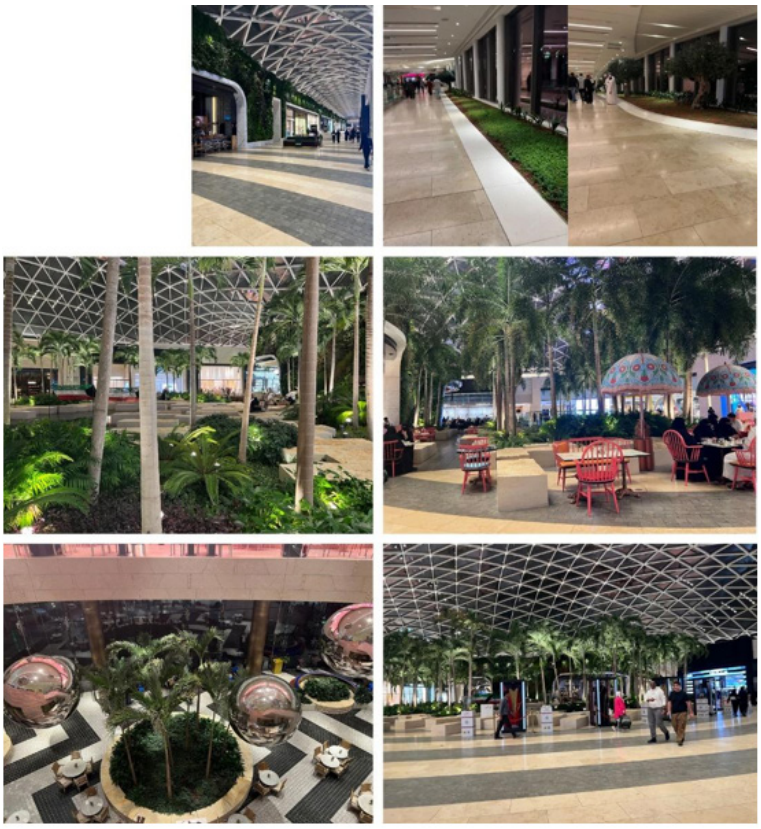

Figure 6 The New 360 Mall Interior (Author)

Assima Mall

The Assima Mall, located in the heart of Kuwait City, is a high-end shopping center that covers an area of 20,000 sq meters and consists of retail, food and beverage outlets, and many leisure facilities. The project was designed by the British firm, PLP Architecture.

Figure 7 Al Assima Mall Exterior (Al-Zayyat & Ben Garcia. 2021)

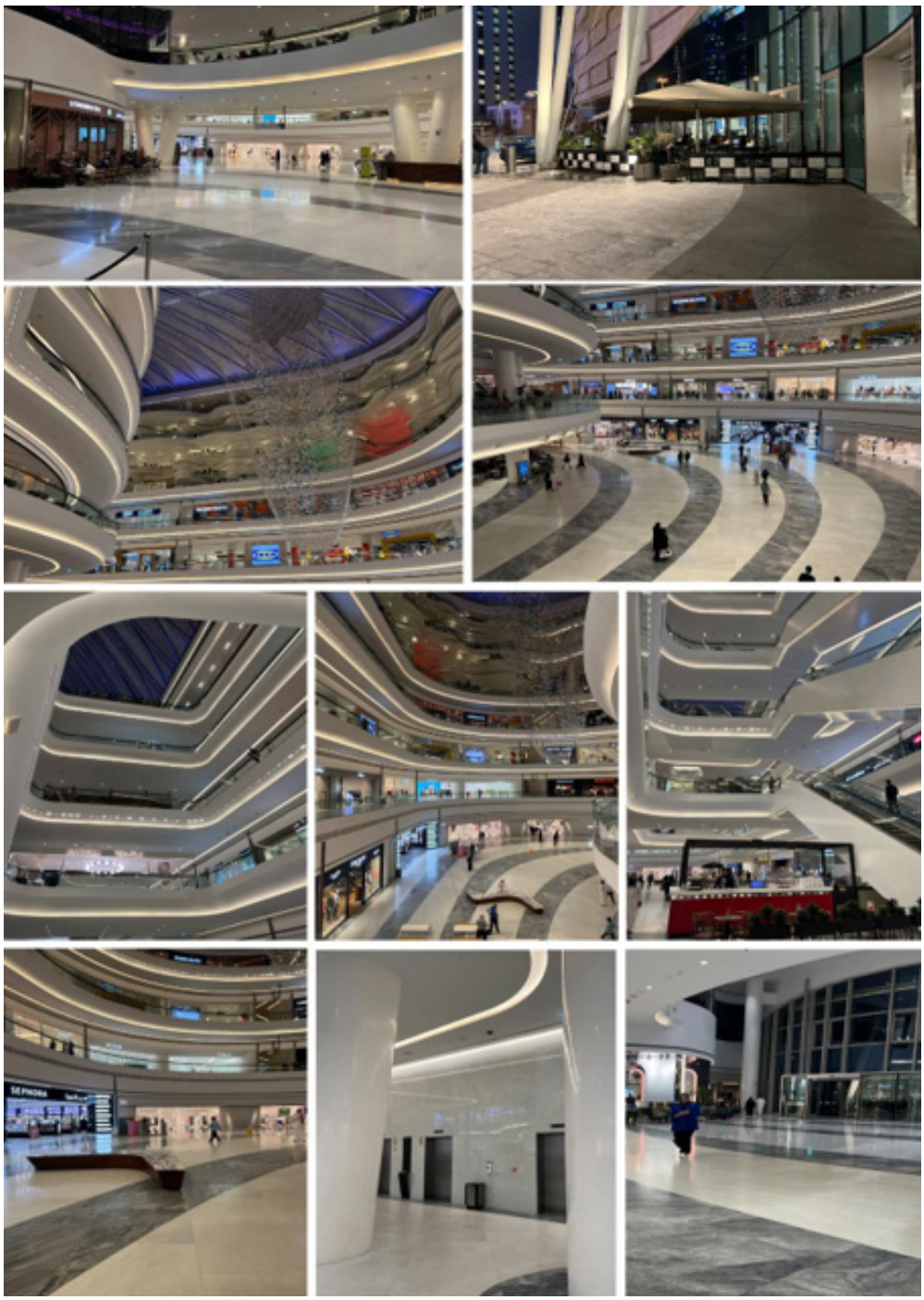

Figure 8 Al Assima Mall Interior (Author)

Findings

After completing the case study observations, the researcher gathered the findings and divided them into three sections: "Direct Experience of Nature, Indirect Experience of Nature, and Experience of Space and Place" Kellert (2015), following the framework developed by Kellert (2015). The findings are recorded in the observation table (See Table 2).

Direct Experience with Nature

In the assessment of direct experiences of nature in the four shopping malls, it was noted that Al Hamra Mall has a generous skylight that allows natural light to penetrate the interior. However, it lacks natural air ventilation aside from conventional air conditioning systems. The mall did not incorporate water features, plants, or natural landscaping.

As for Al Asima Mall, one can see a similar pattern to Al Hamra Mall. The provision of a large skylight allows for natural light to come into the space. However, Al Asima Mall provides outdoor spaces, mainly for cafes and restaurants, allowing visitors to experience natural air and weather. The mall generally lacks water features, plants, and references to natural elements.

Next, 360 Mall has large skylights and windows, allowing natural light to penetrate the space. The mall is rich with various indoor plants, and a vertical garden. The mall also has various types of water features. Additionally, 360 Mall includes ponds with fish. However, it does not provide outdoor areas with natural air.

Finally, the New 360 Mall was examined for direct experiences of nature. It provides a large central skylight, and various glass roofs allowing natural sunlight to light the

space. The mall is bursting with indoor plants and vertical wall gardens. However, it does not possess outdoor spaces that provide direct contact with nature.

Indirect Experience with Nature

Moving on to indirect experiences with nature, the Al Hamra Mall does not display any images of nature. The interior finishes are predominantly modern, and impersonal. The Al Hamra Mall does not incorporate natural light, air, shapes, or forms. Therefore, the design and interior aesthetic does not appear to seek to evoke nature, nor does it pursue biomimicry.

The Al Asima Mall also does not display any images of nature. Instead, it employs modern, cold materials. It utilizes natural colors: whites and grays. However, the use of color and material does not convey, nor evoke, nature. The use of curvilinear shapes may simulate natural forms, however, the particular mall design used was not intended to create an indirect experience of nature.

The 360 Mall design aims to evoke nature through natural colors and materials such as: wood and wool fabrics. The varying forms, materials, shapes, and treatments reflect information richness. The mall shape mimics natural shapes and forms.

The New 360 Mall also aims to imitate nature through vertical gardens and widespread greenery. The mall utilizes natural colors and materials. Also, the central plaza provides a rich indoor garden that employs various types of seats, benches, and steps, creating a unique space that evokes natural terrain and provides for varying mobility.

Experience of Space and Place

Finally, the experience of space and place was assessed. The Al Hamra Mall design is complex and displays an integration of parts into a whole. However, it does not provide

transitional spaces, nor does it provide any cultural or ecological specificity.

The Al Assima Mall does not provide views of the outside, it needs more complexity as it is composed of stacked floor plates around a large open void and is a fluid shape. In addition, the mall needs to provide solid transitional spaces. With regard to the experience of the main gate and drop-off area, the modern design of the mall does not create any attachment to its cultural context. It does not seek to establish any ecological connection to the surrounding area.

The 360 Mall needs to establish cultural and ecological references to its specific location. Also, it needs to create a strong visual from the outside. Its complex design provides various components and organizational spaces (circular, linear, and irregular). The design of the 360 Mall achieves strong integration of parts into a whole through the creation of circulation spaces that act as intersection points to join different spaces. The mall provides several transitional spaces, such as the main drop-off area, and the various entrance gates. Various mobility options, such as: grand staircases, escalators, elevators, and travelators enrich the space and evoke a sense of being in a variety of natural settings.

The New 360 Mall is isolated from the urban context. It provides few transitional spaces and needs to reflect cultural and ecological connections to the local cultural and urban fabric. The internal organization of the mall is simple as it comprises a loop. The mall provides one area of visual connection to the exterior. The mall design succeeds in integrating parts into a whole through the precise series of boundaries and the sequential linkage of spaces.

Table 3 Observation Table (Author)

	Al Hamra Mall	Al Asima Mall	360 Mall	New 360 Mall
Direct Experience of Nature				
Light	•	•	•	•
Air	•	X	X	X
Water	X	X	X	X
Plants	X	X	•	•
Animal	X	X	X	X
Weather	X	X	X	X
Natural Landscape	X	X	X	X
Fire	X	X	X	X
Indirect Experience with Nature				
Images of Nature	X	X	•	•
Natural Materials	•	•	•	•
Natural Colors	•	•	•	•
Simulation of natural light and air	X	X	X	X
NATURALISTIC SHAPES AND FORMS	•	•	•	•
EVOKING NATURE			•	•
INFORMATION RICHNESS	X	X	X	X
AGE, CHANGE, AND THE PATINA OF TIME	X	X	X	X
NATURAL GEOMETRIES	•	•	•	•
BIOMIMICRY	X	X	X	X
Experience of Space and Place				
PROSPECT AND REFUGE	X	X	•	•
ORGANIZED COMPLEXITY	•	•	•	X
INTEGRATION OF PARTS TO WHOLES	•	•	•	X
TRANSITIONAL SPACES	X	X	X	•
MOBILITY AND WAYFINDING	X	X	•	•
CULTURAL AND ECOLOGICAL ATTACHMENT TO PLACE	X	X	X	X

Recommendations

This research aimed to highlight the importance of biophilic design principles and the integration of the natural environment within the interior spaces of buildings. Applying biophilic design principles is essential to improving the design of buildings, especially, shopping malls which have become contemporary sites of public gatherings. The findings suggest that applying biophilic design principles is even more important in places like Kuwait, where the harsh environment outdoors is not pleasant.

Today, shopping malls are generally isolated structures that are disintegrated from the urban fabric. From an urban point of view, shopping centers must seek to establish

good physical integration with the surroundings and create visual connections. Thus, cities should limit their construction, and designers should aim to integrate them within the existing context, and at the very least, allow for a visual connection to the outdoors.

In regard to architectural and interior design, and whereas most shopping malls employ large skylights in their interior spaces, they neglect to include other elements that enhance the direct experience of nature, such as: air, water, plants, animals, weather, natural landscapes, and fire.

Designers should aim to mimic natural shapes and forms because incorporating them into the place would enhance the human experience of the space. The findings reveal that the indirect experience of nature is also an essential attribute of good shopping mall design. It can consist of using natural images, materials, and colors, or simulating natural light and air.

Designers of shopping malls should attempt to create a refuge similar to what is found in nature and seek to create spaces that thrill, and that offer both safety and tranquility. This research confirms that such varied experiences that evoke nature contribute to creating rich indoor environments.

Many shopping malls are designed with function in mind. They seek to achieve high utilization of space to increase the amount of leasable space. In doing so, they favor simple organization, while this research shows that complexity is an essential attribute of nature that would enhance user experience.

Most modern shopping malls neglect to establish cultural references, which weakens their design and creates a sameness effect making malls aesthetically similar, worldwide. Thus, this research recommends that designers introduce more

cultural references into shopping malls to root the buildings in their locality. Also, more references should be made to ecology, and the local natural settings, as culture and ecology contribute to the quality of interior spaces and visitor well-being.

This research highlights the potential that biophilic design principles provide to designers and end-users. It provides a clear framework for designers to develop and examine their proposals. Biophilic design principles allow people to embrace nature, protect the environment, enhance the indoor experience, and integrate nature within the built environment, especially, in hot, arid environments.

Overall, the results emphasize the need for more evidence-based research to make valid conclusions. Other studies may examine other cases against the 14 patterns of biophilic design and the developed categorization (Browning et al., 2014). More research can be done to establish correlations between monetary spending in retail settings that employ biophilic design.

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