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The Evaluation of the Beauty in Hotel Interiors: A Framework Using an Objective Method for Aesthetic Measurement

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Abstract

This study aims to provide interior designers with a framework for understanding the qualities of attractive interior surfaces as a hotel interior design strategy. Additionally, to establish a common foundation and a reliable reference point for evaluators in evaluating the aesthetic aspects of inner space. Hotel buildings are establishments designed to captivate public interest. Moreover, the interior design of these spaces is a significant factor that entices individuals to attend. Consequently, the interior design of a hotel may be as significant as the quality of the structure and the services it provides. Examining the aesthetic evaluation of interior surfaces is crucial for achieving a thorough comprehension of texture as a strategy in interior design. Furthermore, using Birkhoff's aesthetic measure, the study assesses the aesthetic evaluation of interior surfaces in hotels' interior areas. For this reason, three opulent hotels have been chosen to serve as case studies. The study also found that increasing order and reducing complexity are the driving forces behind the aesthetic value of texture in interior surfaces. The outcomes demonstrate the benefit of Birkhoff's measurement tools for evaluating beauty in modern and contemporary styles more than traditional styles with plenty of types of ornaments.

Keywords*:* Aesthetics, Interior Design, Birkhoff's Aesthetic Measure, Hotel Buildings.

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1. Introduction

As human society evolves, interior design also evolves gradually and improves people's lives (Grieze & Miģelsone, 2021; Hasti & Kusnia, 2019). Interior design and people's lives support one another as society advances (Chen & Wang, 2020). The primary distinction between design and art is that the former places greater emphasis on functional aspects. To enhance the interior spaces and demonstrate their visual impact on the occupants and onlookers, the interior surfaces are a crucial component of the building's aesthetic. There are several methods and strategies for designing interior spaces. According to Brooker and Stone (2010), the friendly, intricate layout of every component might be referred to as the tactics.

It is crucial to remember that several elements, such as materials, lighting, colour, textures, forms, and patterns, affect the quality of a space (Llorens-Gámez et al., 2022; Ching, 2007). Color is an

important part of the design because it affects the visual quality of the interior space. It is therefore one of the primary techniques in hotel interior design that can affect guests' perceptions and entice them to stay.

Hence, the study will focus on colorcolor. The definition of colorcolor in architecture reflects two properties of materials: Color variation due to material properties or applied color (Zimnicka et al., 2022). As a result, it is seen in architectural theory as an integral part of decoration, contributing beauty, meaning, and emphasis (Lewis 2008). In other words, buildings have a specific artistic feature. Thadani (2010) defines decorative attributes of color as an architectural element capable of eliciting a human reaction in terms of aesthetics, emotion, identity, memory, and communication.

However, there is great difficulty in evaluating the Aesthetics in the colors of the interior surfaces. One piece of evidence behind the implementation of aesthetics in objects is based on the fact that objects that follow the universal laws of nature, follow their orders and hierarchy, and understand cross-cultural aesthetic appreciation, thus gain the life of architecture (Alexander, 2003). The idea of architectural life legitimizes why individuals share a comparative inclination for a few works of design overall, like Taj Mahal, Notre-Dame Cathedral, and Hagia Sophia, regardless of their different societies' peculiarities (Lozanovska, 2010; Salingaros, 1997).

Currently, designers utilize a variety of methods to create interior environments. Nevertheless, the majority of them are unable to assess the aesthetic worth of color as a design approach; this could be due to a lack of knowledge and understanding about the aesthetic evaluation of color and how it emerges. As a result, determining the aesthetic value of surface colors was difficult and fraught with quandaries.

The paper aims to suggest a framework to empirically evaluate an interior surface aesthetic value based on the objective view. The study tries to answer the following question: How can the aesthetic value in interior surfaces be measured objectively?

The ratio of Order to Complexity is the aesthetic value, according to Birkhoff's aesthetic metric, which has been applied. This measurement will be used as an analytical technique to evaluate the aesthetic value of a hotel's interior surface texture. The purpose of this study is to use Birkhoff's "aesthetic measurement" to investigate the key factors that influence the aesthetic value of hotel interior surfaces. Additionally, to look into the influence of color on hotel interior design. to investigate quantifiable aspects of order and complexity. To deal with Three opulent hotels from around the globe—the Atlantis Hotel in Dubai, United Arab Emirates; the Town House Galleria Hotel in Milan, Italy; and the Hotel President Wilson in Geneva, Switzerland—have been chosen as case studies. These hotels' interior surface textures have been examined from an aesthetic perspective.

2. Literature Review

2.1 Color in Architecture

Color, in conjunction with lines, shapes, and subsequently volumes, constituted the fundamental element in the visual arts, encompassing painting, sculpture, and architecture, and held significant symbolic importance throughout the prehistoric era when humans adorned cave surfaces. In architecture, color is a crucial design element that goes beyond simple aesthetics (Zybaczynski, 2013). It's a tool that defines the character of a structure and its surroundings, affects mood, and molds perception. Color may draw attention to architectural details, produce visual harmony, and even elicit particular feelings (Mahnke, 1996). See Figure 1.

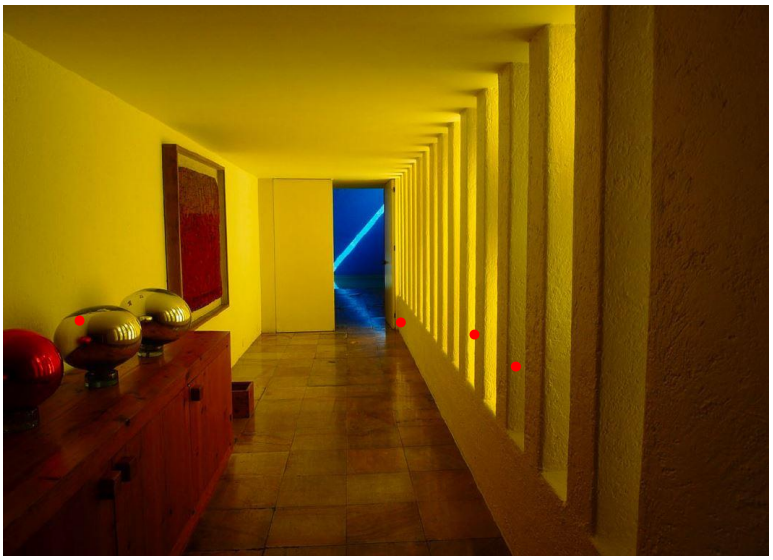


Figure 1. The color can stimulate emotions and show visual effects. (Pereira, 2009).

The architecture and color themselves were significant concerns for the Mesopotamian and Assyrian civilizations (structures were constructed of sun-dried bricks, painted on the inside, and whitewashed on the exterior). Built of brick, ziggurats featured four or seven steps, each of which represented a different color of the deified stars (Leick, 2002).

The exploration of color in architecture encompasses various dimensions: the interplay between architectural form and color (Caivano, 2006; Vosbeck, 2009), the distinction between perceived and inherent color (Fridell Anter, 2008), the psycho-physiological effects of color on humans (Golu and Dicu, 1974; Meerwein et al., 2007), the connection between architecture, color, and urban environments (Minah, 2008), the influence of geographical location on architectural color (Lenclos, 2004), and the development of methodologies for achieving color harmony at both principled and architectural levels (Itten, 1970; Kobayashi, 1998). Each study addresses specific facets of the relationship between color and architecture.

2.2 Beauty and Aesthetics

According to Kumar and Garg (2010), "aesthetic" refers to beauty, the enjoyment of beauty, artistic influence, and appearance. Plato (427–347 BC) distinguished between two types of beauty: the beauty found in geometry and in nature and living things. Plato distinguished between absolute and natural beauty; the latter is human-made, while the former is proportionate (Mahdavinejada et al., 2013). Thomas Aquinas (1225–1275) thought that while beauty is learned through the eyes, ears, and reasoning senses, it is not entirely sensual. He distinguished between two types of beauty: the ethereal, or spiritual and honest, and the tangible, or clear and proportionate (Aquinas, 2006).

Santayana (1863–1952) describes beauty as a pleasure experienced as a quality of a thing, and beauty is a component of aesthetic philosophy, which is the pursuit of pleasure (Archie and Archie, 2006). He contends that the conditions of beauty stem from emotion and measurement, or, in other words, material or shape, form, and expression. He asserts that beauty is a type of experience that arises from an underlying emotional interest in perception rather than a result of the perceptual process. As a result, he believes that beauty is an emotional component, a pleasure we experience and regard as a feature of an object (Muhy Al-Din & Pakravan, 2022). Birkhoff proposed that aesthetic value can be assessed as the ratio of Order to Complexity (Gifford et al., 2000).

2.3 Birkhoff's aesthetic measurement

Birkhoff's aesthetic theory provides a mathematical framework for evaluating the beauty of architectural designs by balancing visual harmony and intricacy (Megahed and Gabr, 2010). In architecture, this approach is applied to assess structures based on their formal qualities, such as proportion and detailing, deliberately ignoring cultural or practical considerations (Pallasmaa, 2010). The theory's core principle is expressed as;

$$Aesthetic\ Value\ = Order/Complexity \quad \text{----------(1)}$$

This formula quantifies aesthetic appeal by measuring the relationship between structured design and cognitive equipment (Katsenelinboigen, 1997). In practice, architects use this formula to analyse both interior and exterior design. Order reflects the coherence and clarity of a structure's composition, evident in elements like proportional alignments, rhythmic patterns, colors, or unified material choices (Weingarden, 1985). For instance, a building with consistent geometric proportions, such as the minimalist design of Tadao Ando, exemplifies high order. See Figure 2.

Figure 2. The Church of the Light, Osaka-Japan by Tadao Ando. (Baek, 2017).

Conversely, Complexity captures the richness of the design elements that demand attention, such as intricate patterns, varied textures and colors, or bold spatial transitions (Roberts, 2007). A complex design, like the ornate facades of a Gothic cathedral, engages viewers through its detailed craftsmanship. By balancing these factors, Birkhoff's measure offers a tool to evaluate a structure's aesthetic impact objectively.

2.3.1 Application of Color in Birkhoff's Aesthetic Measures

Applying color to Birkhoff's aesthetic measure, which quantifies beauty involves translating color properties into measurable components of order and complexity in architectural patterns Birkhoff quantifies beauty as a balance of order (O) and complexity (M) through the mentioned formula (see Eq.1). Birkhoff's framework, developed in his 1933 work "Aesthetic Measure", evaluates aesthetic quality by balancing structured coherence (order) against intricate variation

(complexity) (Megahed and Gabr, 2010). However, to apply this framework in architecture, the following measurable elements will be considered.

A) Defining Order in Color Application

Order refers to the degree of harmony, unity, or coherence (Roberts, 2007) in a design. In the context of color in architectural patterns, order can be measured through:

1. Color Harmony: using harmonious color schemes, such as analogous (hues within 30°-60° on the color wheel) or monochromatic (single hue with varying saturation' brightness) (Westland et al., 2007). For example, a room with shades of blue (hue 180°-240°) has high order. A smaller angular difference (e.g., a difference in H less than 60°) increases order. (Rossi, 2012).
2. Repetition and Rhythm: Frequency of repeated color elements, such as alternating color bands or tiles (e.g., 5 repetitions of red and white stripes per meter). This is through counting the number of color repetitions per unit area or length, and higher repetition increases order (Soegaard, 2025).
3. Symmetry in color placement involves evenly distributing colors across a space or façade, such as mirrored color blocks. This can be measured by calculating the number of symmetrical color pairings or the balance of color areas. For example, having 50% red on the left wall and the same percentage of red on the right wall. An entrance with identical color blocks on each side that appears balanced scores a high order (Azemati et al., 2020).
4. Contrast Control: Controlling contrast ratios to avoid visual chaos, such as maintaining luminance differences within a specific range. Using light reflectance value (LRV) differences or luminance ratios, where lower variation in contrast increases order (Wiebel et al., 2016). See Figure 3.

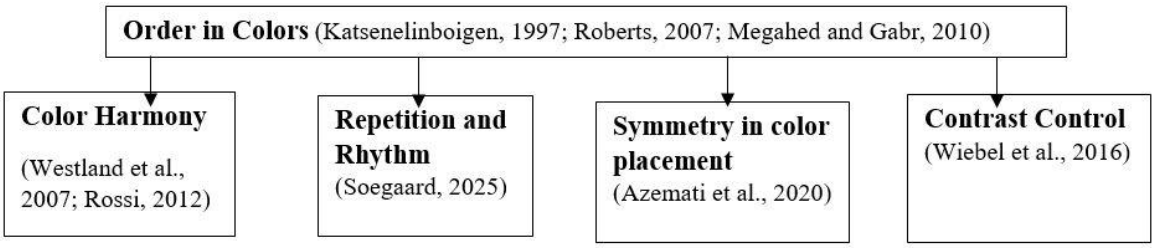


Figure 3. The order's measurable factors in color.

B) Defining Complexity in Color Application

Complexity refers to the variety, richness, or intricacy of elements (Turner et al., 2019). In color application, complexity is measured by:

1. Color Variety: which is the number of the distinct hues, saturations, or brightness levels used in a pattern, where more colors increase complexity. It can be made by counting the distinct hues; if the number is more means the complexity is higher (Kanuri et al., 2024).
2. Spatial Distribution: It refers to irregular or varied placement of colors across surfaces, like randomizing tile patterns. It could be evaluated by quantifying the randomness of color placement using statistical entropy or variance (Krishnamoorthy and Ganesh, 2016). For example, a mosaic floor with 20 different colors in a non-repeating pattern scores high complexity.
3. Contrast Variation: It is the range of contrast levels between colors, such as high-contrast accent, like the black vs. white LRV 10 vs. 90; A Wider range increases complexity (Baxant et al., 2016). Furthermore, sharp color contrast, e.g., red accents on white walls, adds complexity (Arend and Spehar, 1993).
4. Texture and material interaction: it is the interaction of color with material texture, creating visual intricacy like glossy vs. matte finish in the same hue. A pattern with colored glass, matte

paint, and polished stone in similar hues increases complexity through material interplay (Tkalec et al., 2024). See Figure 4.

Figure 4. Example of texture and material interaction.

Figure 5 shows the measurable factors to evaluate complexity in colors.

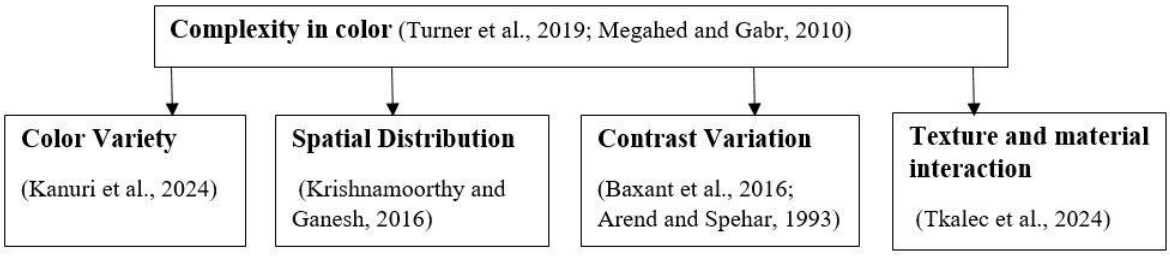


Figure 2. The complexity's measurable factors in color.

The initial factors extracted from a review of the literature will be applied in the methodology to evaluate the order and complexity in color by applying them to selected case studies.

3. Materials and Methods

By conducting a literature review and establishing a theoretical framework, the study aimed to pinpoint essential information that might assist in recognizing the aesthetic qualities of interior spaces within hotel structures, with a focus on the impact of color.

To validate and augment the credibility of the research, a real-world case study involving samples of hotels from various global locations has been selected, followed by data gathering and analysis. The study aims to gain a thorough understanding of the key ideas and theories related to the topic. The literature review was conducted utilizing many sources, including documents,

images, prior research and studies, both published and unpublished materials, as well as online and electronic resources. This research utilized secondary data collection, wherein the analysis of case studies was conducted based on the assessment of the 'Checklist'. This checklist was employed to evaluate order and complexity in the interior spaces of each case study. Through document analysis, self-observation was carried out by looking at the images, plans, and sections of each case study sample. As shown in Figures 4 and 5, the evaluation of the aspects was carried out for each measurable factor in question, which was based on an earlier literature review.

Table 1. Order and Complexity evaluation parameters based on Birkhoff's aesthetic measurement.

No.	Items of Order (P)	Strongly available	Moderately available	Absent
1	Color Harmony			
2	Repetition and Rhythm			
3	Symmetry in color placement			
4	Contrast Control			
	Total of (P)			
	Items of Complexity (M)			
1	Color Variety			
2	Spatial Distribution			
3	Contrast Variation			
4	Texture and material interaction			
	Total of (M)			
	The Aesthetic value = P/M (%)			

A researcher has developed a checklist to evaluate the aesthetic value of hotels, focusing on the colors of the lobby and room interior surfaces using Birkhoff's criteria. To achieve this, four measurable factors have been identified for each of the two dimensions: order and complexity. These factors were chosen to encompass the order and complexity aspects of Birkhoff's aesthetic assessment tools, which will be applied to the case studies to gain a clearer understanding of how color contributes to the perception of beauty in hotels. The assessment checklist for beauty, which includes various factors, has also been analyzed using Descriptive Statistical Tools (DST), with percentages used as a scale to identify the presence of beauty in each case study. This assessment considers the availability of four factors each for order and complexity, calculating percentages based on the presence of these factors in the case studies across three levels: strongly available, scoring 2; moderately available, scoring 1; and absent, which scores zero. The evaluation conducted by the researcher relies on theoretical analysis. The results indicate the significance of the colors on interior surfaces about beauty as it pertains to Order and Complexity. Finally, the total scores of the order (P), divided by the total score of the complexity (M), to obtain the ratio of the beauty for each case study.

3.1 Case Studies

Three hotel buildings were selected in different countries to be aesthetically measured by Birkhoff's measure.

1. Atlantis Hotel, the Palm, Dubai, UAE

Atlantis, The Palm, Dubai, is a luxury hotel resort situated at the head of the Palm Jumeirah in Dubai, United Arab Emirates. See Figure 6.

(a)

(b)

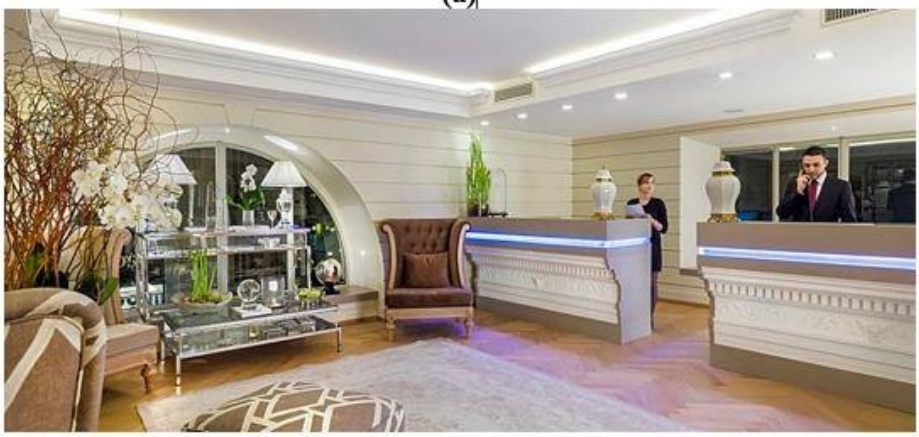
(c)

Figure 6. (a) Atlantis, Dubai Hotel-UAE; (b) Lobby of the Hotel; (c) Residential Rooms. (Ward, 2023).

2. Town House Galleria Hotel, Milan, Italy

Town House Galleria is a luxurious 5-star hotel conveniently located near the center of Milan in Italy. See Figure 7.

(a)



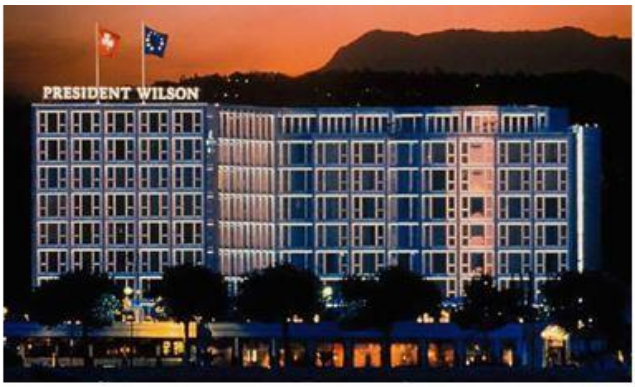
(b)

(c)

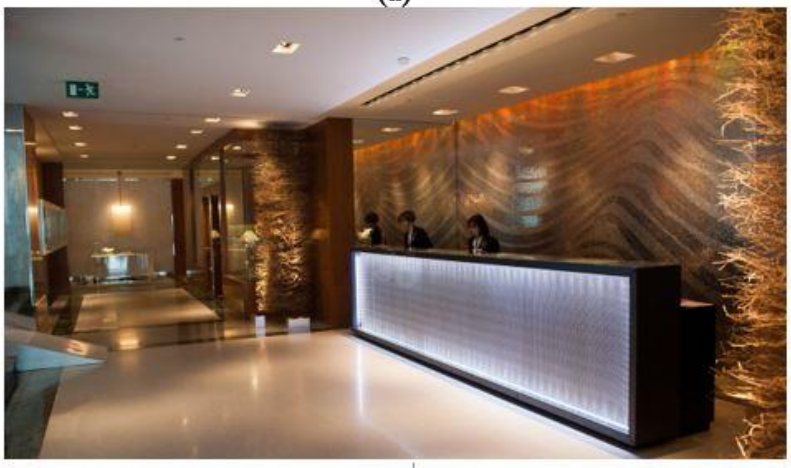
Figure 7. (a) Town House Hotel, Milan, Italy; (b) The Lobby; (c) Rooms. (Rey, 2007).

3. Hotel President Wilson, Geneva, Switzerland

The Hotel President Wilson is located in Geneva, Switzerland, near the United Nations building on Lake Geneva. See Figure 8.



(a)



(b)

(c)

Figure 8. (a) Hotel President Wilson, Geneva, Switzerland; (b) Hotel's Lobby; (c) Sweets and Rooms. (Pascal, 2017).

4. Results and Discussion

4.1 Results

A checklist has been created to assess the presence of Order and Complexity for Birkhoff's aesthetic measure based on recognized items. The presence (Strongly present, Moderately present, or Absent) of these items has been examined in the case study (lobby and rooms) to determine aesthetic value.

1. Atlantis Hotel, the Palm, Dubai, UAE

Aesthetic value for this hotel based on Birkhoff's aesthetic measure has been approached, as seen in Table 2.

Table 2. Beauty's evaluation in Atlantis Hotel, The Palm, Dubai, UAE, based on Birkhoff's aesthetic measurement.

No.	Items of Order (P)	Strongly available	Moderately available	Absent
1	Color Harmony			0
2	Repetition and Rhythm	2		
3	Symmetry in color placement		1	
4	Contrast Control			0
	Total of (P)	4		
	Items of Complexity (M)			
1	Color Variety	2		
2	Spatial Distribution		1	
3	Contrast Variation	2		
4	Texture and material interaction	2		
	Total of (M)	7		
	The Aesthetic value = P/M	4/7= 0.57		

Based on Birkhoff's aesthetic measure, Aesthetic value = Order/ Complexity. Hence, Aesthetic Value = 4/7= 0.57, the rate of beauty in the Atlantis Hotel

2. Town House Galleria Hotel, Milan, Italy

With the same way and steps followed in the first case study (Atlantis Hotel, Dubai), the Order and Complexity have been found in Town House Galleria Hotel. See Table 3.

Table 3. The evaluation of beauty in Town House Galleria Hotel, Milan, Italy, based on Birkhoff's aesthetic measurement.

No.	Items of Order (P)	Strongly available	Moderately available	Absent
1	Color Harmony	2		
2	Repetition and Rhythm		1	
3	Symmetry in color placement	2		
4	Contrast Control	2		
	Total of (P)	7		
	Items of Complexity (M)			
1	Color Variety			0
2	Spatial Distribution		1	
3	Contrast Variation		1	
4	Texture and material interaction		1	
	Total of (M)	3		
	The Aesthetic value = P/M	7/3= 2.33		

Thus, according to Birkhoff's formulae, Aesthetic value in both lobby and rooms for Town House Galleria Hotel, Milan, Italy, has been found as follows;

Aesthetic Value = 7/3= 2.33, the rating of beauty in the House Galleria Hotel
3. Hotel President Wilson, Geneva, Switzerland
The Order and Complexity have been examined in Hotel President Wilson, Geneva, Switzerland, as shown in Table 4

Table 4. Order and complexity evaluation in Hotel President Wilson, based on Birkhoff's aesthetic measurement.

No.	Items of Order (P)	Strongly available	Moderately available	Absent
1	Color Harmony	2		
2	Repetition and Rhythm		1	
3	Symmetry in color placement	2		
4	Contrast Control		1	
	Total of (P)	6		
	Items of Complexity (M)			
1	Color Variety	2		
2	Spatial Distribution		1	
3	Contrast Variation	2		
4	Texture and material interaction		1	
	Total of (M)	6		
	The Aesthetic value = P/M	6/6= 1.00		

The order and the complexity in both lobbies were same level, and according to Birkhoff's formulae, the aesthetic value for Hotel President Wilson, Geneva, Switzerland, was;
Aesthetic Value = 6/6= 1.0, the rating of beauty in the lobby.
The aesthetic value measurement in the three case study hotels has been carried out according to Birkhoff's aesthetic measure, which depends on the ratio of (order over complexity). The analysis of the availability of order and complexity items has been conducted based on the interior photos for lobbies and residential rooms. The findings demonstrate that the Town House hotel gains the highest aesthetic value based on the (order to complexity) ratio. The second hotel in the evaluation was Hotel President Wilson, and the less aesthetic value was obtained by Atlantis Hotel, as seen in Table 5.

Table 5. The aesthetic value based on Birkhoff's formulae.

Case study Hotel Name	Aesthetic Value in Lobbies
1. Atlantis Hotel, the Palm, Dubai, UAE	0.57
2. Town House Galleria Hotel, Milan, Italy	2.33
3. Hotel President Wilson, Geneva, Switzerland	1.00

5. Conclusions

The goal of the study was to see whether it was possible to assess the aesthetic value of color as a design strategy for hotel interior surface colors. Therefore, it takes the stance of assessing aesthetic worth using Birkhoff's aesthetic metric for intrinsic beauty. To determine the methods and approaches, as well as the range of credibility in using Birkhoff's aesthetic measure in

evaluating beauty, the findings of this evaluation were compared. The findings revealed diversity among the assessed samples and presented novel approaches to using Birkhoff's aesthetic measure as a tool to assess the aesthetic value of hotel interior surface colors. The Town House Galleria Hotel achieved the maximum aesthetic value, with the highest order reaching 7 and the lowest complexity reaching 3. As a result, the ratio was 2.33. With comparable order and complexity factor scores, Hotel President Wilson obtained the second ratio; as a result, the ratio of aesthetic value was 1.00. The Atlantis Hotel, the Palm, had the lowest rating, nevertheless, with a ratio of order to complexity of just 0.57. The results show that Birkhoff's measurement tools are in opposition to ornamentation and diversity, making them more suitable for evaluating contemporary architectural styles than the traditional ones like Art Nouveau, Art Deco, or Gothic. The aesthetic value increases as the number of objects in the order increases, which includes color harmony, rhythm and repetition, symmetry in color location, and contrast control. Additionally, when the complexity of the following elements decreases—color variety, spatial distribution, contrast variation, and texture and material interaction—the aesthetic value will also increase. To gain a thorough grasp of the most effective architectural aspects of the aesthetic evaluation in architecture, more research is advised to evaluate other architectural elements than just color. Furthermore, it is necessary to test various typologies to determine whether they have varying effects on the evaluation value based on Birkhoff's measurement formulas.

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Conflicts of interest
The Authors declare that there is no conflict of interest.

Data availability statement
The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding authors/s.

References

Aquinas, T. (2006). Summa Theologica. Part I (Prima pars). [Retrieved] from Documenta Catholica Omnia, http://www.documentacatholicaomnia.eu/03d/1225-1274,_Thomas_Aquinas,_Summa_Theologiae-Prima_Pars_Edente,_EN.pdf

Archie, L., and Archie, J. G. (2006). Readings in the History of Æsthetics: An Open-Source Reader. Retrieved from, http://philosophy.lander.edu/intro/artbook.pdf

Arend, L. E., & Spehar, B. (1993). Lightness, brightness, and brightness contrast: 1. Illuminance variation. Perception & Psychophysics, 54(4), 446–456. https://doi.org/10.3758/BF03211767

Azemati, H.; Jam, F.; Ghorbani, M.; Dehmer, M.; Ebrahimpour, R.; Ghanbaran, A.; Emmert-Streib, F. The Role of Symmetry in the Aesthetics of Residential Building Façades Using Cognitive Science Methods. Symmetry 2020, 12, 1438. https://doi.org/10.3390/sym12091438

Baek, J. (2017). Church of The Light: Tadao Ando. Companion to the History of Architecture, 1–10. https://doi.org/10.1002/9781118887226.wbcha161

Baxant, P., Sumec, S., Skoda, J. (2016). Contrast analysis in lighting technology, Proceedings of 2016 IEEE Lighting Conference of the Visegrad Countries, Lumen V4 2016. https://doi.org/10.1109/LUMENV.2016.7745507

Caivano J. L. (2006), The research on environmental color design: Brief history, current developments, and possible future, Color Research & Application 31(4):350-363. https://doi.org/10.1002/col.20224

Chen, Z., & Wang, X. (2020). Application of AI technology in interior design. In E3S Web of Conferences (Vol. 179, p. 02105). E3S Web of Conferences. https://doi.org/10.1051/e3sconf/202017902105

Grieze, E., & Miķelsone, E. (2021). Biomimicry element application in the interior design product development. Economics. Ecology. Socium, 5(2), 59–70. https://doi.org/10.31520/2616-7107/2021.5.2-7

Hasti, N., & Kusnia, G. (2019, November). Role of Technology for Interior Design Sectors in Creative Economic Development. In IOP Conference Series: Materials Science and Engineering (Vol. 662, No. 4). IOP Publishing. https://doi.org/10.1088/1757-899X/662/4/042027

Kanuri, V. K., Hughes, C., & Hodges, B. T. (2024). Standing out from the crowd: When and why color complexity in social media images increases user engagement. International Journal of Research in Marketing, 41(2), 174–193. https://doi.org/10.1016/j.ijresmar.2023.08.007

Katsenelinboigen A. (1997). *The Concept of Indeterminism and Its Applications***.** Westport, Connecticut, Brno, London: Praeger Publishers

Krishnamoorthy, R., & Ganesh, M. (2016). A simple computational framework for defect detection system with orthogonal polynomials transcoded coefficients, *J. Vis. Commun. Image Represent. 41* (2016) 31–46. https://doi.org/10.1016/j.jvcir.2016.09.003

Kumar, M., Garg, N. (2010). Aesthetic principles and cognitive emotion appraisals: How much of the beauty lies in the eye of the beholder? *Journal of Consumer Psychology*, *20*, 485–494. https://doi.org/10.1016/j.jcps.2010.06.015

Lozanovska, M. (2010). Hagia Sofia (532–537AD): a study of centrality, interiority and transcendence in architecture. The Journal of Architecture, 15(4), 425–448. https://doi.org/10.1080/13602365.2010.507521

Llorens-Gámez, M., Higuera-Trujillo, J.L., Omarrementeria, C.S., Llinares, C. (2022). The impact of the design of learning spaces on attention and memory from a neuroarchitectural approach: A systematic review, *Frontiers of Architectural Research*, *11*(3), 542-560, https://doi.org/10.1016/j.foar.2021.12.002

Lewis, Miles, ed. 2008. Architectura: Elements of Architectural Style. Australia: Global Book Publishing Pty Ltd., pp. 320–35.

Leick, G. (2002). Mesopotamia: The Invention of the City. United Kingdom: Penguin Books Limited.

Mahdavinejada, M., Bahtooeia, R. Hosseinikiab, S. M., Bagheric, M., Motlaghd A. A. and Farhatb, F. (2013). Aesthetics and Architectural Education and Learning Process. Procedia - Social and Behavioral Sciences, (116), 4443 – 4448. https://doi.org/10.1016/j.sbspro.2014.01.963

Mahnke, F.H. (1996). Color, Environment, and Human Response: An Interdisciplinary Understanding of Color and Its Use as A Beneficial Element in The Design and The Architectural Environment. New York, USA: John Wiley & Sons.

Megahed, Y., Gabr, H. (2010). Quantitative architectural aesthetic assessment, in: Aesthetics + Design: Dresden International Symposium; 21st Biennial Congress of International Association of Empirical Aesthetics, IAEAAt: Dresden, Germany, Retrieved from, https://www.researchgate.net/publication/260710349

Muhy Al-Din, S. S., & Pakravan, S. (2022). The Nexus of the Objective Assessment of Beauty and the Subjective Aesthetic Cognition. *Journal of Salutogenic Architecture*, *1*(1), 19-31. https://doi.org/10.38027/jsalutogenic_vol1no1_2

Pallasmaa, J. (2010). The eyes of the skin: Architecture and the senses. (2nd Ed.). Chichester, UK: Wiley.

Pascal, J. F. (2017). IPSAC's 8th body lift course: Hotel President Wilson, Geneva - Switzerland. International Plastic Surgery Advanced Course (IPSAC). Retrieved from https://baaps.org.uk/_userfiles/pages/files/body_lift_pascal.pdf

Pereira, M. (2009). The Role of Color in Architecture: Visual Effects and Psychological Stimuli. Urban Next Lexicon. Retrieved from, https://urbannext.net/the-role-of-color-in-architecture/

Rey, D. (2007). Town House Galleria. Milano seven stars. Ediz. italiana e inglese. Italy: Alessandro Rosso Editore.

Roberts, M. N. (2007). *Complexity and Aesthetic Preference for Diverse Visual Stimuli***.** Ph.D. Thesis, Departament de Psicologia, Universitat de les Illes Balears, Palma, Spain.

Rossi, M. (2012). Color and Colorimetry. Multidisciplinary Contributions. Italy: Maggioli Editore. https://doi.org/10.1111/j.1463-1318.2012.03086.x

Salingaros, N. (2007). A Theory of Architecture. Solingen, Germany: Umbau-Verlag Publications.

Soegaard, M. (2025, February 28). Repetition, Pattern, and Rhythm. Interaction Design Foundation - IxDF. https://www.interaction-design.org/literature/article/repetition-pattern-and-rhythm

Tkalec, M., Glogar, M., Penava, Z., Tavˇcer, P., Kušˇcer, D. and Stojanoska, I. (2024). The Complexity of Colour/Textile Interaction in Digital Printing as an Integral Part of Environmental Design. *Arts 13*, 29. https://doi.org/10.3390/arts13010029

Thadani, Dhiru A. 2010. Color. In The Language of Towns & Cities. A Visual Dictionary. New York: Rizzoli International Publications Inc., pp. 184–85.

Turner, J. R., & Baker, R. M. (2019). Complexity Theory: An Overview with Potential Applications for the Social Sciences. Systems, 7(1), 4. https://doi.org/10.3390/systems7010004

Vosbeck R. R. (2009), Color in architecture, Color Research & Application 9(2):103-105. https://doi.org/10.1002/col.5080090209

Ward, E. R. (2023). Hubbing for Tourists: Airports, Hotels and Tourism Development in the Indo-Pacific, 1934–2019. Austria: De Gruyter. https://doi.org/10.1515/9783111326641

Weingarden, L. S. (1985). Aesthetics Politicized: William Morris to the Bauhaus. Journal of Architectural Education (1984-), 38(3), 8-13. https://doi.org/10.2307/1424877

Westland, S., Laycock, K., Cheung, V., Henry, P., and Mahyar, F. (2007). ColourHarmony. *Design & Creativity*, 1 (1), 1–15.

Wiebel, C. B., Singh, M., & Maertens, M. (2016). Testing the role of Michelson contrast for the perception of surface lightness. Journal of Vision, 16(11):17, 1–19. https://doi.org/10.1167/16.11.17

Zimnicka, A., Balanicka, E., and Kroll, A. (2022). Evolution in Approach to Colour in Tall Buildings' Architecture on the Isle of Dogs, London, UK. Arts 11: 9. https://doi.org/10.3390/ arts11010009

Zybaczynski, V.M. (2013). The Colour of Architecture: Past and Present. *Urbanism. Arhitectură. Construcţii, 4*(4), 93-96.