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VII. Colour in Culture and Society | Literature Review

Colour and spatialities: A literature review

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Abstract

This paper focuses on the relationship between spatialities and colour. It explores the concepts, methods and tools that can be employed to study this correlation. Further, it discusses how these concepts, methods and tools redefine the integration of colour as a spatial mediator through its materiality, immateriality, and ambient dimensions. The aim of this paper is to establish a theoretical framework relating to the theme of colour and spatialities, and to evaluate its relevance. The methodology is based on a literature review of research published within the last ten years by the International Colour Association (AIC) and the Color Culture and Science Journal (CCSJ). Criteria were defined to classify the literature review into three main topics: materialities, immaterialities, and ambient spaces. The diversity and complexity of the concepts, methods and tools presented in scientific papers support the idea that colour goes far beyond its aesthetic function to play significant emotional, social and ambient roles.

Keywords: spatialities, colour, materialities, immaterialities, ambiances, research, methodology, design, architecture, urbanism

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1 INTRODUCTION

Spatiality is a paradigm that refers to "a geography of social practices."[1] This approach explores how people interact with their immediate surrounding space and the wider environment. In these interactions, colour plays a key role as a spatial mediator. Colour influences how spaces are perceived and used.

Colour is a complex, multidimensional phenomenon. Studying it requires a careful understanding of the interactions between the natural and built environment, physical elements (urban form, materials, light) and human activities (social practices). Therefore, conducting a literature review is essential to synthesize existing knowledge, highlight key concepts and methodologies, and identify gaps in research on colour and spatialities.

In her introduction to the International Online Symposium on Spatialities and Colour, which took place in March 2025, based on Peter Sloterdijk's philosophical approach to spherology, Faten Hussein and Verena M. Schindler noted that spatiality can be viewed from three different perspectives. The first, materiality, refers to physical and tangible spaces. The second, immateriality, refers to the abstract and intangible features of spaces. The third, ambient spaces, refers to the perceptual experience of space. [2]

[1] Michel Lussault, "Spatialité," in Dictionnaire de la géographie et de l'espace des sociétés, ed. Jacques Lévy and Michel Lussault (Belin, 2003), 866–868.

[2] Faten Hussein and Verena M. Schindler, "Call for Papers," SC'25 Book of Abstracts: International Online Symposium "Spatialities and Colour (Encyclopédie numérique des couleurs, 2025), https://www.aicecd.org/media/sc25_boa-4mb.pdf.

This literature review examines findings based on these three main topics: materialities, immaterialities and ambient spaces. The aim is to develop a theoretical framework relating to colour and spatiality, and to evaluate its relevance. Two key research questions arise:

Firstly, what is the nature of the relationship between colour and the three dimensions of spatiality? Secondly, what concepts, methods and tools can be used to better understand this relationship?

2 METHODOLOGY

Key questions are explored through a review of recent scientific literature. The first question focuses on identifying the intricate connection between colour and spatiality in architecture, urbanism, landscape, design, and art. The investigation emphasizes research primarily published between 2014 and 2023. A comprehensive analysis should be conducted to consider several factors such as discipline, journal source, publication timeline, and research location. This analysis aims to offer valuable insights into the study of colour and spatialities research. It emphasizes key content and significant contributions. The second question explores various aspects of the relationship between colour and spatiality. These include definitions of key concepts, analysis of their interactions and explanation of the methodological approaches used to investigate them. The study focuses on tools that facilitate the collection, visualization, analysis, interpretation, and use of colour data in the context of spatialities. This research employed a systematic methodology involving the identification of relevant databases, keywords for information retrieval, and cross-checking of references.

2.1 Data Source Selection

The bibliographical analysis and exploration of the relationship between colour and spatialities were the two main steps of this study. Due to the complexity of the topic, it has been difficult to anticipate the vast amount of research. Using common research tools, including Google Scholar, Scopus, Web of Science, and JSTOR, a large number of results were found when searching terms such as ‘architectural colour’, ‘urban colour’, ‘environmental colour design’, ‘environmental

colour', 'heritage colour', 'design colour', 'colour psychology', 'light ambiance', 'colour perception', and 'colour emotion'.

To guide our investigation, three primary research sources were selected:

- Proceedings of the International Colour Association (AIC) conferences.1
- Journal of the International Colour Association (JAIC).
- Color Culture and Science Journal (CCSJ).[2]

These sources were chosen for their authoritative and specialized focus on colour research. They provide state-of-the-art studies and discussions in the field. They publish peer-reviewed research that addresses both theoretical and the applied aspects of colour in various contexts. These sources are open access.

To ensure relevance, our selection was limited to articles published from 2014 to 2023 inclusive. This approach provides access to the most recent research and emerging trends in the field of colour and spatiality.

Due to the large quantity of references and data to be processed, as well as time constraints, it was not possible to include articles published in the journal *Color Research and Application*[3] in the current study. This review will serve as the basis for further research, and the results will be compared with those of the present study.

2.2 Article Selection and Analysis

Through the three selected sources, the identification process resulted in an initial list of 1,342 articles published within the specified period. The first selection phase involved removing 26 duplicate articles that articles were published simultaneously in both the AIC Proceedings and the AIC Journal. The remaining articles were examined and evaluated based on their titles, abstracts and keywords, leading to the exclusion of 1,166 articles.

During the second selection phase, a full-text review was conducted. This resulted in 150 articles that met both the inclusion

[1] The International Colour Association (AIC) website (https://aic-color.org) is a repository for both the conference proceedings and the journal articles.

[2] Color Culture and Science Journal, https://jcolore.gruppodelcolore.it.

[3] Color Research and Application, https://onlinelibrary.wiley.com/journal/15206378.

and exclusion criteria. These articles were retained for quantitative and qualitative analysis.

A thematic analysis was conducted by identifying specific themes after a thorough reading of the full texts of the articles. Each article was categorized by author, source and year of publication. Quantitative and qualitative analyses were then performed.

The quantitative analysis was based on the distribution of articles by theme. The studies were grouped into three main topics: materialities, immaterialities, and ambient spaces.

Qualitative analysis was used to classify and summarize the articles into sub-themes, using criteria such as frequency, research area, study type (practical, theoretical, or sociocultural) and sensory experience. The process began with familiarization with the content of the articles. Frequently occurring thematic terms, such as spatial identity, use of colours, ambiance and emotion, were coded. The established themes were then reviewed and organized by similarity, refinement, and synthesis.

Four main concepts emerged: 1) polychromy, 2) supergraphics, 3) chromatic identity, and 4) colour as an emotional material. Details of these sub-themes are presented in the Results section.

3 Results

The analysis of the literature review revealed four primary concepts. Each one illustrates a different approach to studying colour and spatialities.

3.1 Polychromy

Polychromy is the use of multiple colours within a single composition. The concept applies to art, architecture, and urban design. The concept of polychromatic spaces as spatial experiments emerged in Europe at the beginning of the 20th century based on the work of architects and artists such as Le Corbusier, Theo van Doesburg, Piet Mondrian and Jozef Peeters.[4]

[4] Eva Storgaard, “Polychromic Space: Architectural Agencies of Colour,” in Proceedings of the International Colour Association (AIC) Conference 2022 (International Colour Association, 2022).

In 2021, architects Eva Storgaard and Marjan Michels created a polychrome space installation in Copenhagen, reflecting on the concept of polychromy in interior design. Through their composition of colour planes, the architects manipulated spatial dimensions such as height, distance and proximity, transforming static surfaces into dynamic elements (Fig. 1). In their installation, Storgaard and Michels support the idea that "space can be shaped through the use of colour."[5]

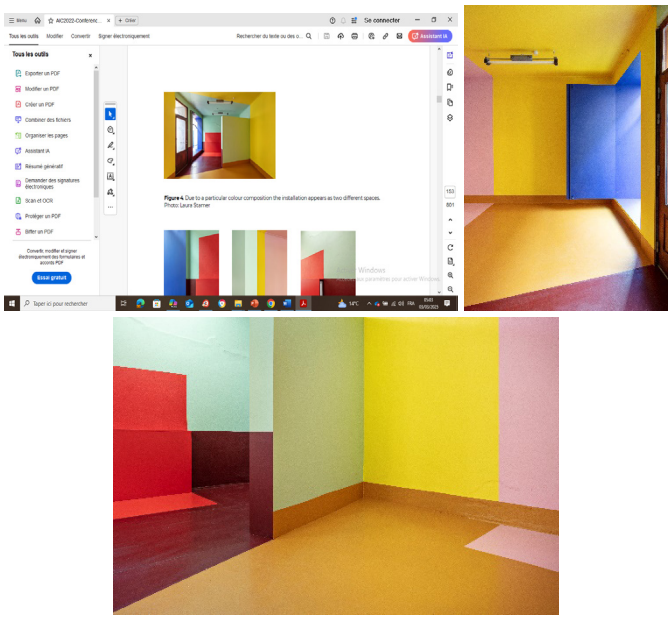

Figure 1. *Polychromic Space*, designed by Eva Storgaard and Marjan Michels, Copenhagen, Denmark, 2021. Photographs by Laura Stamer. © Eva Storgaard.

3.2 Supergraphics

Supergraphics consists of using monumental graphic designs to change the appearance of an architectural space.

Barbara Stauffacher Solomon was a pioneering American artist of the Supergraphics Movement. In the 1960s, she designed interior supergraphics for the Moonraker Athletic Centre and many other spaces in Northern California. Throughout her career, she transformed conventional built spaces into dynamic and vibrant environments by applying large-scale graphics in bright colours.

[5] Storgaard, "Polychromic Space," 152.

Jean-Philippe Lenclos, a French colour designer, was inspired by the work of Barbara Stauffacher Solomon.[6] The use of supergraphics is key to Lenclos' work, defining architectural space through colour. Supergraphics transform volumes, walls and spaces into large-scale works of art, creating visual rhythms and enhancing spatial perception (Fig. 2).

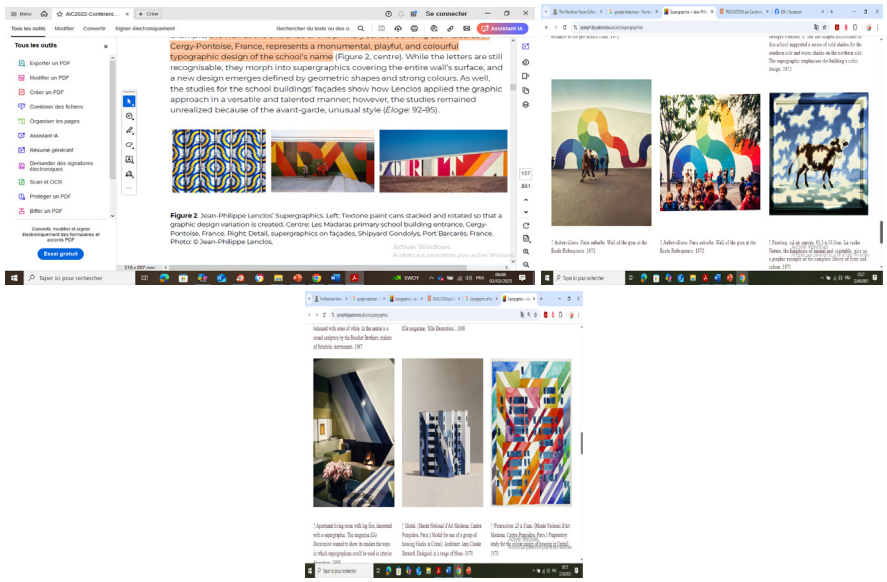

Figure 2. *Supergraphics*, designed by Jean-Philippe Lenclos. Shipyard Gondolys (left), Gymnasium, Aubervilliers (centre), and apartment living room (right), https://www.jeanphilippelenclos.uk/en/supergraphics. © Jean-Philippe Lenclos.

In urban spaces around the world, there are many examples of supergraphics. There are pedestrian crossings that combine bright colours and large-scale graphic designs. Research by Zena O'Connor[7] demonstrated the effect of colour contrast and supergraphics in

[6] Verena M. Schindler, "On Different Colour Approaches to Architecture," in Proceedings of the International Colour Association (AIC) Conference 2022 (International Colour Association, 2022); Also see, Beichen Yu and Simon Bell, "Emerging Colours: New Trends, Demands and Challenges in Contemporary Urban Environments," Color Culture and Science Journal 12, no. 1, (2020), https://doi.org/10.23738/CCSJ.120104.

[7] Zena O'Connor, "Environmental Visual Literacy: Examining the Roles of Colour and Contrast," in Proceedings of the International Colour Association (AIC) Conference 2018 (International Colour Association, 2018); Zena O'Connor, "Effective Environmental Visual Literacy: Pedestrian Crossing Design and the Key Roles of Colour and Contrast," in Proceedings of the International Colour Association (AIC) Conference 2019 (International Colour Association, 2019).

enhancing pedestrian safety, especially at pedestrian crossings in urban areas (Fig. 3).

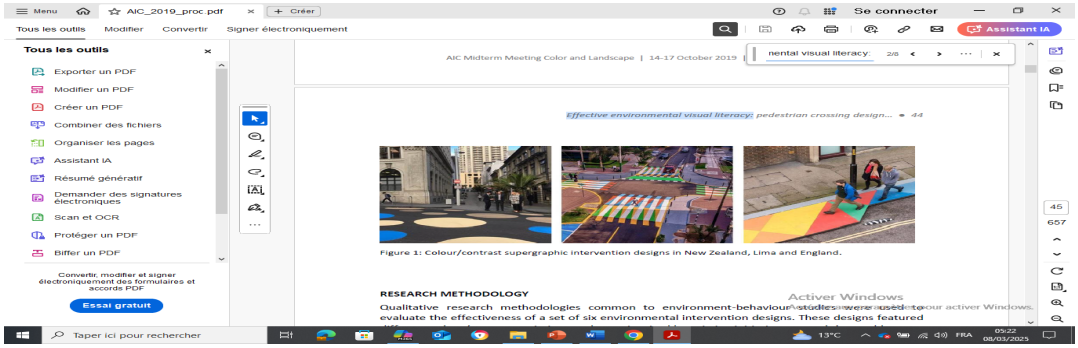

Figure 3. *Supergraphic intervention designs featuring colour contrast*, New Zealand (left), Peru (centre) and England (right). © Zena O'Connor.

3.3 Chromatic Identity

Beyond its aesthetic dimension, colour acts as a powerful vector of identity in architectural and urban spaces. In fact, colour contributes to the definition of "place" through its dual nature.[8] It functions as both a tangible, material element and an immaterial, perceptual and cultural phenomenon. Together, these dimensions shape how a place is experienced and understood.

Colour operates on material dimensions through the texture of surfaces and its interaction with light. Simultaneously, colour influences immaterial dimensions, evoking perceptions, emotions and a sense of cultural belonging. Much of the literature agrees that colour is a vector of spatial and cultural identity. The concept of chromatic identity refers to how colours shape the visual and symbolic character of a place. These colours may come from natural materials, building

[8] Henriette Jarild-Koblanck and Monica Moro, "Colours of Designed Nature: Growing Seeds from a Cultural Think-Thank, Artistic Readings on Colour and Nature in Sweden," Journal of the International Colour Association 19, (2017); Verena M. Schindler, "Jean-Philippe Lenclos' Methodology of 'The Geography of Colour': Back to the Origins and its International Impact," in Proceedings of the International Colour Association (AIC) Conference 2019 (International Colour Association, 2019); Jean-Philippe Lenclos, "Living in Colour," in Proceedings of the International Colour Association (AIC) Conference 2021 (International Colour Association, 2021); Verena M. Schindler, "Jean-Philippe Lenclos: Recipient of the AIC Award for Colour in Art, Design and Environment (CADE)," in Proceedings of the International Colour Association (AIC) Conference 2021 (International Colour Association, 2021).

practices, or aesthetic choices.[9] Johnny Jie Xu[10] views colour as a language that links buildings to collective memory and imagination.

The reviewed studies highlight the dual (material and immaterial) dimension of this identity.[11] Colours, pigments, and patinas reflect construction history and local climate, while colour perception conveys cultural and sensory relationships with space.[12] Furthermore, colour is not a fixed attribute; Its perception evolves with lighting conditions, the changing of the seasons, and how spaces are used socially.[13] Consequently, chromatic identity emerges as both a historical trace and a living experience, continually renewed through use, light, and the inhabitants' perceptions.[14] Within this framework, chromatic identity plays a key role in urban planning, heritage conservation, and renewal. Colour acts as a lever to foster a sense of belonging, improve legibility and enhance user well-being.[15]

The study of chromatic identity is embedded in a multidisciplinary approach. This approach integrates geography, sociology, history and the sciences of perception to understand how colour shapes territories, built environments and spatial experiences. Several studies emphasize the importance of diverse methodologies, such as the geography of colour, urban colour mapping and colorimetric analysis. Numerous studies highlight the value of combined methodologies, such as using instrumental measurements (e.g. spectrophotometry and image analysis) alongside qualitative approaches (e.g. surveys, participatory

9 Lenclos, "Living in Colour"; Anna Marotta, "Colour in Architecture Among Futurism, Neoplasticism, Rationalism (and more...)," Color Culture and Science Journal 13, no. 1, (2021), https://doi.org/10.23738/CCSJ.130104.

10 Johnny Jie Xu, "Notes on Interdisciplinary Perspectives of Local Colour Identity," Journal of the International Colour Association 19, (2017).

11 Pietro Zennaro, "Strategies in Colour Choice for Architectural Built Environment," Journal of the International Colour Association 19, (2017).

12 Xu, "Notes"; Zennaro, "Strategies."

13 Jarild-Koblanck and Moro, "Colours of Designed Nature."

14 Lenclos, "Living in Colour."

15 Catarina Diz de Almeida, Cristina Caramelo Gomes, and José Afonso, "Colour Functions in Urban Design: Communication, Identity and User Behaviour," in Proceedings of the International Colour Association (AIC) Conference 2019 (International Colour Association, 2019).

workshops and ethnographic analysis), in order to capture the complexity of chromatic phenomena in context.[16]

3.3.1 The Geography of Colour

Within the framework of chromatic identity, the concept of "The Geography of Colour" emerges as an important approach for interpreting how chromatic variations reflect the material, environmental and cultural specificities of a place (Fig. 4). This methodology was pioneered by Jean-Philippe Lenclos, who began developing the Geography of Colour in the mid-1960s. His work marked a turning point in the study of colour in architecture and urban design. Lenclos argued that colour is not merely a visual phenomenon. Instead, it serves as a key indicator of the relationship between humans, their built environment, and the surrounding landscape. Lenclos' approach is both systematic and holistic. He studied vernacular architecture and regional colours across different areas.[17] From 1965 onwards, he conducted extensive field surveys. He analyzed colour in relation to geography, climate, local materials, and cultural heritage.[18]

Lenclos expanded the scope of his research to include countries beyond France. He created chromatic inventories and colour palettes for cities, including Tokyo. Drawing inspiration from the interplay of light, shadow and materials in traditional Japanese architecture, he drew comparisons with the contrasting colours of his native Pas-de-Calais region, where brick-red facades, orange tiles and green vegetation come together to create a distinct northern identity.[19] These comparisons show that, in his words, colour is a "living material." It evolves with environmental conditions and social practices. Through his work,[20] colour became a tool for interpreting identity, history and

16 Claudia Valge et al., "Colour Measurement and Documentation in Historical Buildings: The Case Study of the Kirna Manor House in Estonia," Color Culture and Science Journal 14, no. 1, (2022), https://doi.org/10.23738/CCSJ.140115.

17 Lenclos, "Living in Colour."

18 Lenclos, "Living in Colour"; Schindler, "Lenclos' Methodology."

19 Schindler, "Lenclos' Methodology."

20 Major publications by Jean-Philippe Lenclos and Dominique Lenclos include the following titles: Les couleurs de la France: Maisons et paysages (1982); Les couleurs de l'Europe: Géographie de la couleur (1995); Couleurs du monde: Géographie de la

context. The Geography of Colour concept highlights how the colours of architecture reflect a place's unique identity at a given point in time.

The Geography of Colour takes an interdisciplinary approach. It combines architecture, ethnography, sociology and semiotics in order to interpret the symbolic meanings of colour.21 This systematic methodology works in two stages. First, the analysis of colour, and then its synthesis to reflect a space's identity.22 Lenclos employed tools such as material sampling, photography and hand-painted watercolours. He distinguished between a general palette for façades and roofs, and a more specific one for details such as doors and shutters (Fig. 4). This approach links colours directly to local identity. It has been applied in urban planning, restoration and design to preserve chromatic heritage and prevent "visual pollution." 23

Recent studies have continued to apply this concept to urban and architectural contexts in order to gain a better understanding of colours in these settings. Researchers such as Verena M. Schindler[24] have traced its evolution and global influence. Alberto Reyes-González et al.[25] linked physical colour palettes to the cultural meanings attributed to them by city inhabitants, offering a dynamic view of urban colour. A recent study in Iran[26] has integrated natural, social, and historical factors to

couleur (1999); and Couleurs de la Méditerranée: Géographie de la couleur (2016), all published by Éditions du Moniteur.

21 Lenclos, "Living in Colour."

22 Schindler, "Lenclos' Methodology."

23 Schindler, "Lenclos' Methodology."

24 Schindler, "Jean-Philippe Lenclos' Methodology."

25 Alberto Reyes González, Andrés Enrique Reyes González, and Jimena Vanina Odetti, "The Chromatic Intervention as a Proposal of Urban Image Design for University Contexts: The Case of Coapinole, Puerto Vallarta, Jalisco, Mexico," in Proceedings of the International Colour Association (AIC) Conference 2019 (International Colour Association, 2019); Jimena Vanina Odetti, Alberto Reyes González, Andrés Enrique Reyes González, and Fernando Daniel Valdez Olmos. "The Chromatic Intervention as a Strategy for the Revaluation of Facades in Peri-Urban Areas: The Case of the Historic Centre of Ixtapa, Jalisco, Mexico," Color Culture and Science Journal 16, no. 2, (2024), https://doi.org/10.23738/CCSJ.160208.

26 Zena O'Connor and Hamidreza Sheibani, "Environmental Colour Mapping Case Study: Uramanat Region, Iran," in Proceedings of the International Colour Association (AIC) Conference 2022 (International Colour Association, 2022).

produce chromatic maps that preserve regional identity. These studies show that the concept of Geography of Colour is multidimensional and essential for urban planning, heritage restoration and design. It helps to maintain a unique territorial character in the face of contemporary urban change.

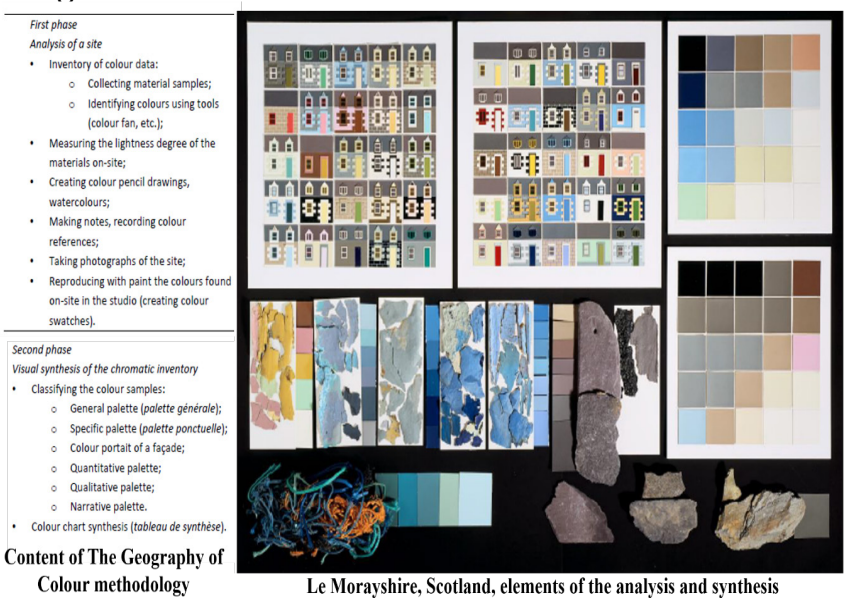

Figure 4. *Methodology of the Geography of Colour*, by Jean-Philippe Lenclos. Le Morayshire, Scotland. Photo René Robert. © Jean-Philippe Lenclos.

3.3.2 Colour Mapping

Building on the concept of the Geography of Colour, Colour Mapping offers a systematic analysis of the chromatic characteristics in architectural and urban spaces. This method investigates both architectural and contextual colours. It documents, visualizes, analyzes, and evaluates building façade colours, as well as regional and urban colour patterns. Colour Mapping uses both qualitative and quantitative tools.[27]

[27] Asako Nakamura, Fabrizio Ivan Apollonio, and Marco Gaiani, "Urban Colour Mapping in Tokyo: The Case Study of Hillside Terrace," in Proceedings of the International Colour Association (AIC) Conference 2021 (International Colour Association, 2021); O'Connor and Sheibani, "Environmental Colour Mapping"; Zena O'Connor, "Exploring the Origins of Itten's Colour Theories Using Digital Colour Mapping," in Proceedings of the International Colour Association (AIC) Conference 2022 (International Colour Association, 2022).

Colour mapping involves collecting photographs, sketches and in-situ observations of architectural and urban colours.[28] These data are then classified using colour systems such as the Munsell system[29] and the Natural Colour System (NCS).[30] This classification allows researchers to build coherent chromatic databases of the environment. It also enables to evaluate similarities and differences according to the three main colour attributes: hue, value, and chroma.[31] The resulting data and analyses are then visualized in colour map diagrams or colour palettes.[32] These tools provide a visual representation of the colours present in a given space. The colour map then serves as the basis for the colour plan. It links the analysis of existing colours to the design of future chromatic guidelines. The colour plan is a useful instrument for planning colours intended to preserve or restore historical centres.[33]

Within this framework, the colour palette is a useful tool. It is a set of colours that characterizes buildings and serves as a guide for renovations. Several studies have highlighted its contribution to expressing local identity by translating cultural, historical and environmental specificities.[34]

28 Elif Ensari and Saadet Akbay, "Walkability and Colour Experience: Façade Colours and Pedestrian Walking Preferences on Urban Streets," in Proceedings of the International Colour Association (AIC) Conference 2018 (International Colour Association, 2018); Nakamura et al., "Urban Colour Mapping."

29 Nakamura et al., "Urban Colour Mapping."

30 Ensari and Akbay, "Walkability and Colour Experience"; O'Connor, "Exploring the Origins"; O'Connor and Sheibani, "Environmental Colour Mapping."

31 Nakamura et al., "Urban Colour Mapping"; O'Connor, "Exploring the Origins."

32 Esra Küçükkılıç Özcan and Rengin Ünver, "Environmental Colour Mapping and a Case Study for Istanbul, Beşiktaş," in Proceedings of the International Colour Association (AIC) Conference 2018 (International Colour Association, 2018); Ensari and Akbay, "Walkability and Colour Experience."

33 Carlos Mario Rodríguez and Elisa Teresa Violante, "Colour Territories: The Colours of Boyaca, a Palette for its Identity," in Proceedings of the International Colour Association (AIC) Conference 2019 (International Colour Association, 2019); Vanessa Peres Martins and Natalia Naoumova, "Colour and Heritage: Analysis of the Evolution of the Methodology used in Italian Colour Plans," in Proceedings of the International Colour Association (AIC) Conference 2019 (International Colour Association, 2019).

34 De Almeida et al., "Colour Functions"; Reyes González et al., "The Chromatic Intervention"; Schindler, "Lenclos' Methodology"; Lenclos, "Living in Colour";

Colour mapping provides the basis for multiscale analysis, allowing a more in-depth interpretation of spatial and chromatic patterns in urban and architectural contexts.[35]

3.3.3 Multiscale Urban Colour Analysis

Multiscale urban colour analysis is an essential approach for understanding the chromatic identity of urban spaces and heritage sites. It combines multiple levels of observation, from façade details to urban spaces and landscapes. One study proposed a multiscale method for colour mapping Tokyo's Hillside Terrace, a development built between the late 1960s and early 1990s.[36] The researchers combined aerial and façade analyses to trace changes in colour and materials over time. Their results revealed a dominance of grey shades and chromatic changes across the decades, thereby highlighting the temporal dimension of urban colour.

Similarly, another study[37] showed that colour-corrected digital images can facilitate urban colour analysis at multiple spatial scales, from the city and neighbourhood level to the street, building and architectural element level.

Zena O'Connor and Hamidreza Sheibani[38] applied a multiscale colour mapping approach to study Sherkan Village, a UNESCO World Heritage Site located in Iran. They analyzed building materials at the macro scale and painted details at the micro scale. They found a strong colour harmony between the architecture and the landscape. This coherence reinforces the village's chromatic and cultural identity (Fig. 5).

Schindler, "Lenclos: Recipient."

35 Nakamura et al., "Urban Colour Mapping"; Zhaohua Lei, Fabrizio Ivan Apollonio, and Marco Gaiani, "A Multiscale Approach to the Urban Space Colour Analysis Starting from the Case of Study of the Collegio di Milano," in Proceedings of the International Colour Association (AIC) Conference 2021 (International Colour Association, 2021); O'Connor and Sheibani, "Environmental Colour Mapping."

36 Nakamura et al., "Urban Colour Mapping."

37 Lei et al., "A Multiscale Approach."

38 O'Connor and Sheibani, "Environmental Colour Mapping."

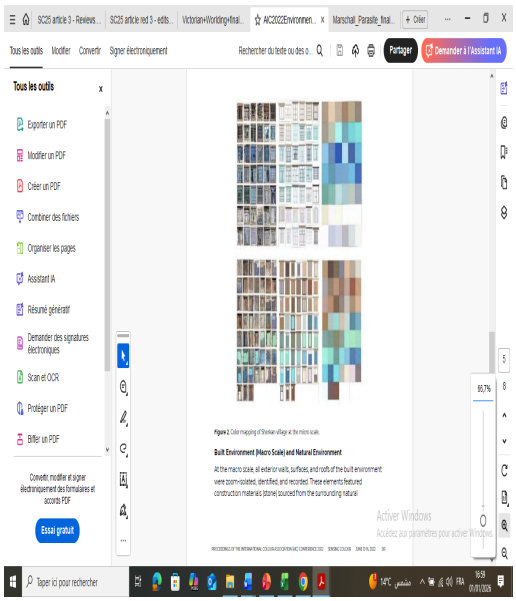

Figure 5. *Example of colour mapping at the micro scale*, by Zena O'Connor and Hamidreza Sheibani. Sherkan Village, Iran. © Zena O'Connor.

These studies show that multiscale urban colour mapping enables detailed visualization and quantification of colour landscapes over time and space. While colour mapping provides spatial and visual data, multiscale analysis contextualizes this data and reveals the interactions that shape urban colour. This integrated approach supports more effective urban planning, heritage conservation and colour design, linking colour identification with a perceptual and temporal understanding.

3.3.4 Colorimetric Analysis

To complement previous methods, colorimetric analysis adds a quantitative precision to urban colour studies. This method combines science and creativity. It ensures precision and consistency in colour choices while respecting cultural and environmental contexts.

Colorimetric analysis uses scientific tools such as wireless digital colour readers, hyperspectral cameras and spectrophotometers to measure colours. Colorimetric analysis employs spectrophotometers to accurately quantify architectural colours based on their hue, brightness and saturation.[39] For example, a study of the polychrome

[39] Yutong Jiang, Luke Li, and Yihua Zheng, "Quantitative Colour Examination and Restoration of Historical Architecture: The Study of Polychrome Decoration of a Qing-Style Timber-Frame Structure in Tsinghua University (Beijing, China)," in Proceedings of the International Colour Association (AIC) Conference 2021 (International Colour Association, 2021).

decoration on a Qing-style architectural model at Tsinghua University used quantitative colorimetric analysis to determine the original, current and ideal states of the polychromy, and to guide the restoration process with greater scientific rigour.[40]

A study of Kirna Manor House in Estonia used a hybrid methodology combining on-site colorimetric surveys, spectrophotometer and colorimeter measurements, and data analysis using specialized software.[41] This approach examined the historical and current colours of buildings and neighbourhoods. Previous studies have shown that colorimetric analysis complements the study of chromatic identity by providing precise, measurable insights into urban and architectural colour.

3.4 Colour as Emotional Material

The final concept presented in this literature review is colour as "an emotional material." This concept is illustrated through the work of the architects Luis Barragán and Emmanuelle Moureaux, and the landscape art installations of Bernard Lassus.

3.4.1 Philosophy of Luis Barragán

Luis Barragán is the most prominent figure in modern Mexican architecture. He composed with light, shadows and colour to create emotionally evocative spaces and spiritual atmospheres.[42] His use of colour was deeply rooted in his understanding of culture, spirituality and the essence of place (Fig. 6). Barragán experimented with colours. He made his colour choices based on large sheets of cardboard attached to the walls. To select an appropriate colour, he would leave the coloured panels in place and observe them at various times over the course of several days.[43]

[40] Jiang et al., "Quantitative Colour Examination."

[41] Valge et al., "Colour Measurement."

[42] Sarah Frances Dias and Maria João Durão, "Significance and Creation: Emotion and the Primacy of Colour in Art (Architecture and Painting," in Proceedings of the International Colour Association (AIC) Conference 2014 (Mexico: AMEXINC, 2015).

[43] Cristiana Bartolomei, Cecilia Mazzoli, and Caterina Morganti, "The Building Materials of Luis Barragán: Light and Colour," in Proceedings of the International Colour Association (AIC) Conference 2021 (International Colour Association, 2021).

Figure 6. *Gilardi House*, designed by Luis Barragán, Mexico City, 1975–1977. Access to the indoor swimming pool and dining area. Photo Armando Salas Portugal, https://www.barragan-foundation.org/works/list/gilardi-house. © Barragán Foundation, Switzerland.

3.4.2 Philosophy of Emmanuelle Moureaux

Emmanuelle Moureaux is a renowned French architect and artist living in Japan (Fig. 7). In her design process, she created the concept of "shikiri," which translates as "dividing and creating space through colours."[44] Moureaux, whose practice is fundamentally rooted in the use of colour as a generative element of the project, presents a research path that explores the emotional and perceptive potential of combined chromatic and architectural systems.[45] The philosophy behind Moureaux's work is summarized in the following quotation: "I use colours as three-dimensional elements, like layers, in order to create spaces. [...] I want to give emotion through colours, whether it is architecture or an art piece. Through my creation, I want people to see colours, touch colours, and feel colours with their senses. The overflowing effects of colours in space will show that colours can give more than a space, but a space with additional layers of human emotion."[46]

[44] Emmanuelle Moureaux, "About: Concept," Emmanuelle Moureaux Inc., accessed January 28, 2026, https://www.emmanuellemoureaux.com/shikiri.

[45] Marco Borsotti, "Contemporary Architecture and Colour: Final Definitions for Mapping Intent," Color Culture and Science Journal 11, no. 1, (2019), https://doi.org/10.23738/CCSJ.110101.

[46] Emmanuelle Moureaux, "About: Concept."

Figure 7. *Sugamo Shinkin Bank Shimura Branch*, Tokyo, 2011, and *100 colors no. 28 'Universe of Words'*, Tokyo, 2019, designed by Emmanuelle Moureaux Architecture + Design, https://www.emmanuellemoureaux.com/. © Emmanuelle Moureaux.

3.4.3 Work of Bernard Lassus

Bernard Lassus is a French landscape architect, colourist and visual artist. He adopts a holistic approach to colour, which means using colour in relation to "light, material, movement and many other dimensions and qualities that make up the atmosphere."47 His project *Le Jardin du Monde* at the Pompidou Centre, for example, is a synthesis of art, architecture and environment, providing visitors with a sensory experience.

The work of Luis Barragán, Emmanuelle Moureaux and Bernard Lassus clearly demonstrates that colour can be the foundation of an architectural project, influencing design intentions and producing interesting sensory, emotional and ambient effects.

3.4.4 Anne Petit's Experiential Walks

Research by Anne Petit[48] on urban atmospheres has focused on the chromatic effects. Petit[49] defined a chromatic effect as the visual and perceptual impact of colours on users' experiences. The Chromatic Effects Repository is a tool developed to list and analyze the different

47 Schindler, "On Different Colour Approaches."

48 Anne Petit, "Effets chromatiques et méthodes d'approche de la couleur dans la démarche de projet architectural et urbain" PhD diss. (University of Nantes, 2015), https://hal.science/tel-01248894; Anne Petit, "The 'Haut de Jaurès' Project in Brest: The Collective Reconquest of a Street Identity, From the Former Sailors' District to 3D Colour Modelling," in Proceedings of the International Colour Association (AIC) Conference 2020 (International Colour Association, 2020); Anne Petit, Daniel Siret, and Nathalie Simonnot, "Couleurs et paysages: une nouvelle approche de planification de la couleur par les effets chromatiques," VertigO 18, no. 3 (2018), https://doi.org/10.4000/vertigo.25106.

49 Petit et al., "Couleurs et paysages."

effects that colours can produce in a space. It serves as a guide for designers, urban planners and colourists. It anticipates how colours will be used in architectural and urban projects by considering how users will experience the space emotionally and sensorially.

3.4.5 Interactive Installations

Another example that illustrates the emotional effect of colour is the "Nature Trail," an interactive installation at the Great Ormond Street Hospital for Children in London. Designed by Jason Bruges Studio, the installation combines colour, technology and art to create an interactive canvas featuring virtual forest creatures and trees on the interior walls of several corridors, particularly those leading to the anaesthesia room. The installation is a positive sensory experience for children and contributes to their wellbeing and healing.[50]

4 Discussion

The quantitative analysis indicates that research on colour and spatialities remains predominantly focused on materialities (M), accounting for 50% of studies. Whereas studies addressing immaterialities (I) and ambient space (A) are comparatively balanced, at 24.5 % and 25.5% respectively (Fig. 8). It is important to note that some of the scientific papers included in this study cannot be classified under one of these three categories. This reflects the complexity and interconnectedness of the three topics studied. This interrelation shows a growing awareness of the connections between colour, perception and spatial experience. It situates colour as a relational and environmental factor.

The Concept-Topic Overlap Diagram shows that many important concepts are related to colour and spatiality, including polychromy, supergraphics, chromatic identity, and colour as an emotional material. However, chromatic identity and colour as an emotional material emerge as the two most frequently discussed concepts in the literature review, accounting for 38% of the scientific papers analyzed each. This highlights the extent to which colour can shape the identity

[50] Anna Marotta and Alessandra Brosio, "Colour as a Therapeutic Adjuvant: Theories and Applications in the Hospital Setting," in Proceedings of the International Colour Association (AIC) Conference 2021 (International Colour Association, 2021).

of spaces and influence their atmosphere and emotional impact (Fig. 8). Regarding the tools that were used, colour palettes were mentioned in 38% of the reviewed papers. This underscores their role as methodological tools for analyzing and conceptualizing colour in spatial and architectural contexts.

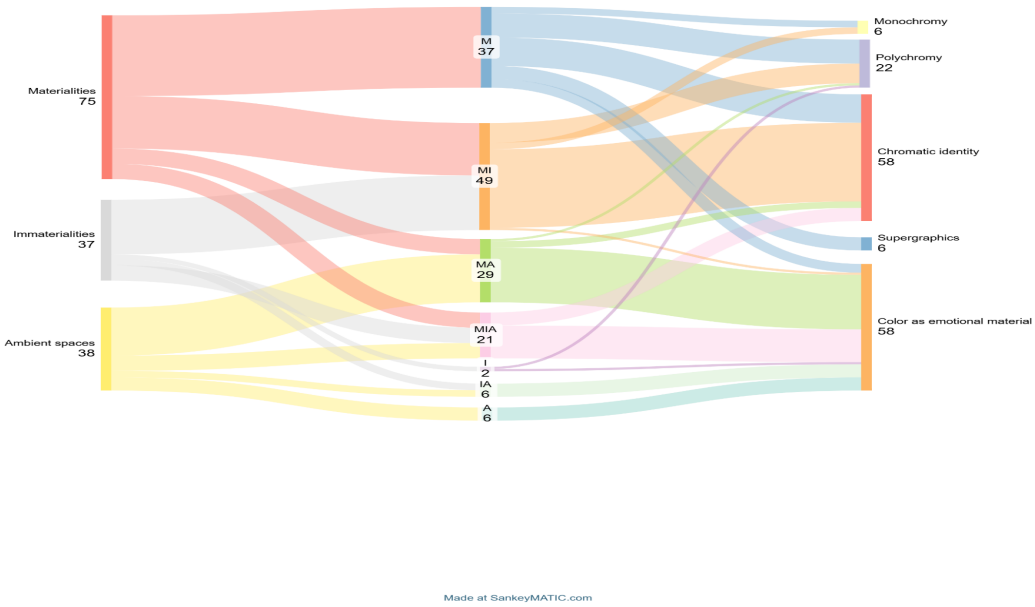

Figure 8. *Concept-Topic Overlap Diagram*. Created by the authors.

In addition to concepts, tools and methods, this literature review highlights several interesting colour strategies, such as the social role of colour and its application to sustainability.

Colours can play an important social role in a city. The design of the Superkilen Urban Park in Copenhagen is the perfect example of this.[51] The designers invited the residents living surrounding the park, representing sixty different countries, to suggest symbolic objects from their home countries. These objects were then used to enhance the park's features. The park was then divided into three areas, each

[51] Francesca Salvetti and Michela Scaglione, "The Use of Colour in the Urban Landscape Through Regeneration Projects of the Degraded Open Spaces of the City," in Proceedings of the International Colour Association (AIC) Conference 2021 (International Colour Association, 2021).

marked by a different colour: the red zone, the black zone and the green zone. Each area has specific spatial and functional features. The park now offers the local community social spaces containing symbolic objects that evoke their home countries, such as the Moroccan fountain and Turkish benches. This kind of participatory project engages local communities and transforms neglected spaces into vibrant hubs for connection and social interaction.[52] Using colour in the urban environment can regenerate abandoned spaces and contribute to the creation of inclusive cities.

Another example illustrating this concept is the Luz Nas Vielas urban art project, created by the multidisciplinary collective Boa Mistura in the Vila Brasilândia favela in São Paulo, Brazil, in 2012 (Fig. 9). By engaging with the local community, the artists identified terms that reflected the held deeply values of the residents, such as beleza (beauty), orgulho (pride) and amor (love). Inhabitants of the favela were involved in all phases of the artistic project. As Marco Borsotti notes, they were "encouraged to paint alleys and streets with vivid and bright colours, applied by brush and roller directly onto the improvised conglomerates that make up the houses, to redefine them, through large chromatic backgrounds from which emerge graphic signs that, by adopting the technique of anamorphism, in a single fleeting point of view, conquer form and legibility of words."[53] Conceived as a manifestation of collective consciousness, this intervention rearticulates a marginalized urban space. It achieves this through the strategic use of colour and values embedded in the daily experience of the inhabitants.

52 Salvetti and Scaglione, "The Use of Colour."

53 Borsotti, "Contemporary Architecture and Colour."

Figure 9. *Luz Nas Vielas*, by Boa Mistura, Vila Brasilândia, São Paulo, Brazil, https://boamistura.com/en/proyectos/luz-nas-vielas-3/. © Boa Mistura.

In modern design, colour is integrated into sustainable design projects, such as colourful photovoltaic façades. The Hong Kong University of Science and Technology, for example, illustrates how coloured photovoltaic panels were used in the renovation of the buildings' façades, combining aesthetics with energy performance.[54]

5 Conclusion

This literature review on colour and spatialities synthesizes existing knowledge, identifies key concepts and outlines theoretical and methodological approaches within the field. The most recurring concepts in this literature review are polychromy, supergraphics, chromatic identity and colour as an emotional material. In addition to these, the review revealed several methodological approaches, including the geography of colour, colour mapping, multiscale urban

[54] Wanting Wang, Kaiyan Xu, and Changying Xiang, "Colour Design for Façade Integrated Photovoltaics on Campus: A Case Study in Hong Kong," in Proceedings of the 15th Congress of the International Colour Association 2023 (International Colour Association, 2023).

colour analysis and colorimetric analysis. The diversity and complexity of the concepts, methods and tools used in scientific papers supports the idea that colour goes beyond its aesthetic role to play emotional, social and ambient roles. Several of the scientific papers examined in this study cannot be classified into a single category, such as materiality, immateriality, or ambient space. This reflects the inherent complexity and interconnectedness of the three themes under investigation. Finally, colour can be considered a spatial mediator serving the interconnection between materialities, immaterialities and ambient spaces.

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