

User Behaviour and Urban Facade Design: Insights from a Book Street in Vietnam

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Abstract: This study examines Nguyen Van Binh Book Street in Ho Chi Minh City, a public space that integrates literary culture with flexible urban design. It explores how facade characteristics and spatial configurations influence patterns of public behaviour. Using photo-based capture evaluation method surveys (CEMS), semantic analysis and multivariate techniques, the study identifies design features that shape user activity. There are 13 recurring behaviour patterns observed and grouped into six categories: (1) Places for Making, (2) Places to Pause and Share, (3) Paths and Play, (4) Watching and Wandering, (5) Places for Conversation and Reflection, and (6) Gathering and Discovery. These patterns reflect a broad spectrum of activities, including creative work, rest, movement and cultural participation. Principal component analysis and cluster analysis revealed five key facade dimensions that influence these behaviours: structural composition, lighting and colour, cultural expression, spatial symmetry and architectural detailing. The results show that materials such as brick, wood and glass, along with human-scale ornamentation and balanced forms, shape how people interact with and perceive space. Warm colours and symbolic features support social and reflective behaviours, while clear spatial organisation enhances flow and engagement. These findings suggest that facade design plays a vital role in supporting diverse patterns of use. The study offers evidence-based guidance for designers and policymakers aiming to enhance street environments, particularly in dense urban contexts. By focusing on a culturally specific and adaptively reused public space, it emphasises the value of context-responsive design in creating vibrant, inclusive and meaningful urban places.

Keywords: Urban facade design, Spatial interaction, Cultural public space, Adaptive reuse, Environment-behaviour studies

INTRODUCTION

Background

Urban public spaces, particularly open green spaces, form an essential backbone of urban life. They serve as dynamic settings for social contact, community engagement and shared experiences (Harun, Jaffar and Mansor, 2021; Javadi and Nasrollahi, 2021). In high-density metropolitan areas, where building intensity and population pressures are immense, these spaces greatly

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enhance quality of life (Jim and Chen, 2003). Recognising their importance, many cities around the world have pursued open-space reforms to address the social and environmental challenges associated with rapid urbanisation (Akamine et al., 2003). These reform efforts often blur the boundaries between public and private domains, giving rise to innovative spatial solutions such as privately owned public spaces, pocket parks and floor area ratio incentives aimed at expanding accessibility.

Such interventions reaffirm the essential role of green and open spaces in urban living. Beyond offering settings for leisure and social interaction, these environments help people reconnect with nature and foster a sense of belonging and community (Javadi and Nasrollahi, 2021). They also act as platforms for democratic participation, encouraging civic engagement and cultural dialogue among people from diverse backgrounds (Soares, Weitkamp and Yamu, 2020). The importance of public space, particularly green urban space, is therefore undisputed. It promotes physical and mental well-being, supports local economies and facilitates cultural exchange (Javadi and Nasrollahi, 2021). In doing so, such spaces enrich urban life, making cities more vibrant, attractive and resilient while advancing inclusive, cohesive and sustainable urban systems (Johansson, 2024).

In the Vietnamese context, public space has historically been limited and, in many cases, confined to political functions (Drummond, 2000; Drummond and Lien, 2008). Although the concept began to emerge after the 1986 economic reforms, it remained largely overlooked for decades. Only recently, as the negative impacts of unchecked urban growth have become more visible, has society started to value the role of public space in enhancing well-being and liveability (Gehl, 2007; Halpern, 2014; Do et al., 2018; 2019). Nevertheless, Vietnam continues to face a chronic shortage of quality public spaces (Linh, Erasmi and Kappas, 2012; Japan International Cooperation Agency, 2010; Thinh, 2015; Loan, 2016; Quang, 2018).

In response, local governments have implemented various strategies, including reactivating underused waterfronts and revitalising aging green areas. Notably, they have converted spaces that were once closed to the public, such as fee-based amusement parks, into freely accessible areas that welcome a broader population (Do et al., 2019). One emerging typology is the book street (Mai, 2016; Phan et al., 2025). A book street is an urban pedestrian zone embedded within the dense fabric of traditional shophouses. It features public amenities such as seating, shaded canopies and visual art that enhance the pedestrian experience. This new type of public space supports a reading culture and encourages community interaction through knowledge sharing and artistic activity (Vu, Pham and Pham, 2018).

Among these examples, Nguyen Van Binh Book Street in Ho Chi Minh City is particularly notable. Since its opening in 2016, it has become a vibrant cultural and recreational landmark (Mai, 2016; Hồng, 2017; Thu, 2023). Although book enthusiasts form its primary audience, the street also attracts families, students, tourists and residents seeking leisure and interaction. Beyond its literary focus, it hosts diverse cultural events, readings and exhibitions, creating a lively atmosphere for relaxation, socialising and public enjoyment. Following its success, local authorities plan to replicate the model in other districts (Thu, 2023; Minh, 2024). The appeal of Nguyen Van Binh Book Street lies not only in its functions but also in how visitors perceive its visual environment. It is important to recognise that different user groups experience and interpret urban spaces in distinct ways (Foresta, 1980; Francis, Cashdan and Paxson, 1984; Kaplan, 1985). As Francis (2003) notes, designers and urban planners often prioritise visual quality in public space design, whereas everyday users tend to place less emphasis on this aspect.

Many existing approaches still focus primarily on morphological features and the aesthetic qualities of building facades, without clarifying the systemic relationships among spatial configuration, environmental conditions, behavioural patterns and design implications. Identifying behaviour-based patterns in public space and understanding how people interact with facades are valuable for urban design because they allow for a user-centred classification framework rather than one based only on physical form (Lago, Jiménez-Guarín and Roncancio, 2014; Do, Mori and Nomura, 2019a; Do and Do, 2024). As emphasised by Whyte (1980), Francis (2003) and Gehl (2011), human activity and perception are fundamental to creating sustainable, attractive and socially cohesive public spaces (Whyte, 1980; Francis, 2003; Gehl, 2011). Without incorporating behavioural perspectives into typological thinking, design proposals risk lacking both practical relevance and community connection. Advancing research on environment-behaviour patterns in public spaces such as Nguyen Van Binh Book Street is therefore essential to generating meaningful, transferable insights and fostering scalable urban solutions.

To properly evaluate such a complex urban setting, it is necessary to consider both the functional qualities of the space and the aesthetic influence of facades on patterns of human behaviour. This study therefore aims to establish a strong academic foundation to support urban policy, strategic planning and the careful design of open street environments, as illustrated by Nguyen Van Binh Book Street. It also offers practical insights for architects, urban designers and professionals managing facade environments, encouraging the creation of socially cohesive, multifunctional and context-sensitive public spaces that strengthen the urban fabric and enrich collective experience.

Research Status

Scholars have long explored the relationship between the built environment and human behaviour in urban open spaces. For example, Do et al. (2019) examined behavioural patterns in district-level parks, while Tan, Tang and Wu (2019) evaluated the distributional equity of urban green spaces in relation to population density. Similarly, Iojă et al. (2011) investigated how park visitors perceive and interact with their environments and offered recommendations for more sustainable planning practices. These studies consistently highlight the close connection between human activity and spatial configuration. However, there remains a lack of research on specialised public spaces such as book streets, which uniquely combine cultural, commercial and recreational functions.

A recent contribution by Covatta and Ikalović (2022) discussed book street environments as part of a broader examination of urban public spaces, focusing mainly on spatial layout and design elements. Nevertheless, their analysis did not sufficiently explore how the visual and aesthetic qualities of facades shape user behaviour, which is an important factor in assessing the success and vitality of public spaces. At the same time, the visual dimension of urban facades has attracted growing academic attention. For instance, Lee and Ostwald (2023) applied computational models to examine aesthetic preferences, focusing on how visual complexity and attraction strength influence people's perceptions of facades. Although their methods advanced the technical analysis of facade attributes, there remains a gap in translating these computational insights into frameworks that urban designers and architects can practically apply. Ghomeishi (2021) also emphasised the importance of clearly defining facade characteristics to improve communication between designers and the public, although most users continue to describe their preferences in broad and subjective terms. Complementary studies by Sadeghifar, Pazhouhanfar and Farrokhzad (2019) and Prieto and Oldenhave (2021) identified specific factors such as colour, shape and proportion that influence aesthetic judgements. However, these studies rarely connect these preferences to users' spatial behaviours (Sadeghifar, Pazhouhanfar and Farrokhzad 2019; Prieto and Oldenhave, 2021).

Taken together, this body of research indicates the need for a more integrated perspective that systematically examines how people behave around facades and how design can encourage positive interaction. As Koh (2007) argues, effective public spaces must address both functional needs and higher-level experiential qualities. While Do and Do (2024) analysed how adjacent land uses affect street activities, few studies have gone further to link spatial typologies directly with user behaviour in the distinctive setting of Nguyen Van Binh Book Street. This site represents a hybrid typology that integrates pedestrian pathways, pocket parks and cultural marketplaces into a cohesive

urban environment. Its layered functions provide an opportunity to move beyond form-based analysis and explore how environmental and behavioural patterns interact. A deeper investigation into these environment-behaviour relationships can yield insights vital to urban design and placemaking (Whyte, 1980; Marcus and Francis, 1998; Gehl, 2011). Mapping these interactions enables scholars and practitioners to move past static descriptions of urban form and develop typologies rooted in human use, perception and social interaction (Rapoport, 1990; Francis, 2003). Such an approach holds strong potential for creating public spaces that are not only visually appealing but also inclusive, adaptable and meaningful for their communities. Without attention to behavioural dimensions, design proposals risk becoming impractical or disconnected from local needs (Lang, 1987; Nasar, 1994). Therefore, advancing research on environment-behaviour patterns in book street spaces, including Nguyen Van Binh, is essential for building transferable, evidence-based frameworks that can guide effective and sustainable urban design interventions.

Objective and Significance of Research

This study examines book streets in Vietnam as a new and promising public-space typology within the broader urban open-space system, focusing on Nguyen Van Binh Book Street in Ho Chi Minh City. To ensure rigor and contextual relevance, the study analyses the site's spatial and social dynamics, identifies typical environment-behaviour patterns, and assesses how spatial structure, activity types and user interactions unfold in situ. The core aim is to identify, classify and interpret recurring patterns of use, and to examine how facade design, materials, layout and public amenities shape and sustain those behaviours.

Building on these insights, the study develops a spatial classification framework grounded in actual user experience and behavioural needs rather than in formal or aesthetic criteria alone. This approach yields context-sensitive design guidance and provides a practical foundation for improving architectural design and public-space management in similar urban settings.

Academically, the study advances theoretical links between urban morphology and human behaviour and expands the literature on the emerging “book street” typology in Vietnam. Its findings clarify how facades and spatial features shape user experience, underscoring the value of behavioural analysis in urban design evaluation.

In practice, the study offers targeted recommendations for each behaviour-based spatial group, guiding planners, architects and policymakers in designing inclusive, lively and culturally relevant public spaces. These recommendations are transferable to other high-density cities seeking to balance modernisation with local identity through human-centred spatial design.

METHODOLOGY

To ensure a rigorous and meaningful investigation of book street spaces, this study conducts a comprehensive analysis of the distinctive features of the selected case, Nguyen Van Binh Book Street. The analysis identifies typical environment-behaviour patterns and assesses the site’s spatial structure, activity patterns and social behaviours in detail.

This approach focuses on patterns most relevant to human interest and engagement, providing a solid basis for precise and practical recommendations in architectural and urban design for similar book street environments. Figure 1 presents the research framework, clarifying the study’s core subject and the relationships among its key components. This framework guides the research toward achieving its stated objectives.

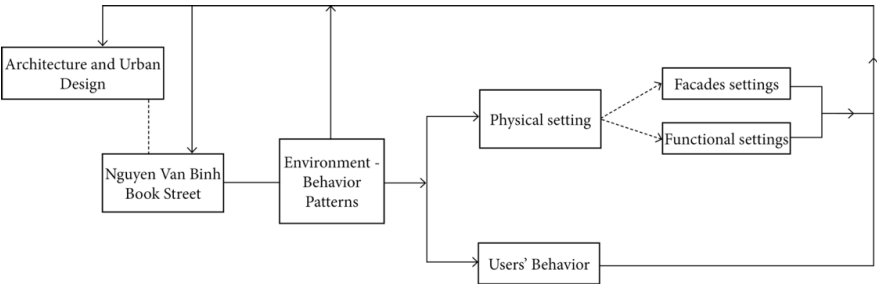


Figure 1. Conceptual framework of research methodology

Research Area

Located in the heart of District 1, Ho Chi Minh City, Nguyen Van Binh Book Street covers approximately 3,200 m² and measures about 144 m in length and 6 m in width (as shown in Figure 2). More than a literary marketplace, it is a lively cultural hub that hosts a wide range of activities, including readings, seminars and art events that attract both residents and international visitors.

Its open-air layout, abundant greenery and well-integrated amenities, such as cafés, children’s play areas and comfortable seating, create an inclusive and engaging setting for diverse users. Situated at the intersection of commerce, culture and public life, Nguyen Van Binh Book Street exemplifies contemporary placemaking and offers practical lessons for the design and strategic development of multifunctional public spaces. As a case study, it is highly relevant to this research and provides a strong reference point for future public space planning and design initiatives.



Figure 2. Study area and existing urban conditions

Pattern Language and Environment-Behaviour Patterns

The concept of pattern language, introduced by Christopher Alexander and colleagues in the late 1970s, offers a systematic framework for describing recurring spatial solutions to common human needs in the built environment (Alexander, Ishikawa and Silverstein, 1977). A pattern language consists of interconnected “patterns”, each describing a problem–solution pair grounded in human experience and local context. These patterns range from small-scale details, such as seating arrangements, to larger structural configurations, such as neighbourhood layouts. Together, they provide a foundation for creating spaces that are meaningful, functional and responsive to human activity (Alexander, 1979).

Closely related is the study of environment-behaviour patterns, which examines how people interact with their surroundings and how spatial configurations influence behaviour, perception and social interaction (Lang, 1987; Zacharias, 2001). This line of research systematically analyses observable phenomena such as movement flows, gathering points and the use of public amenities to understand how built environments shape everyday life (Whyte, 1980). By identifying these patterns, planners and designers can align spatial strategies with human tendencies and improve usability, comfort and social sustainability (Gehl, 2013).

Integrating a pattern language approach with environment-behaviour analysis yields powerful insights for urban design. This integration moves beyond purely morphological or aesthetic concerns and addresses the experiential and behavioural qualities of space, recognising that spatial form should support patterns of human activity to promote liveable and equitable places (Franck and Stevens, 2006). In this way, urban environments can be planned and designed to enhance community well-being, foster social connection and encourage vibrant, inclusive public life (Mehta, 2013).

Accordingly, this study applies Alexander's pattern language to identify environment-behaviour patterns relevant to its objectives and then uses environment-behaviour studies (to analyse their constituent factors).

Investigation of Environment-Behaviour Patterns

To understand user perceptions of environment-behaviour patterns at Nguyen Van Binh Book Street, this study employed capture evaluation method surveys (CEMS). The method, adapted by Koga from Noda's photo projective method (PPM) and the evaluation grid method developed by Sanui and Inui, was applied to the book street context (Sanui and Inui, 1986; Koga et al., 1999). Noda's photo projective approach, rooted in psychological research, elicits participants' perceptions through images that they capture themselves. This technique is widely used in urban architectural studies for its ability to surface authentic user viewpoints (Neto et al., 2016; Do, Mori and Nomura, 2019b; Do et al., 2024; Do and Do, 2024).

Participants moved freely along Nguyen Van Binh Book Street and photographed features, spaces and scenes that drew their attention or stirred curiosity. They proceeded at their own pace, used cameras to record observations, and then completed evaluation cards. On each card, they rated the photographed element as "good" or "not good" and added brief notes on its perceived identity, distinguishing characteristics and overall impression (as shown in Figure 3). The sample included 104 architecture students, 53 female and 51 male, aged 19 to 24 years old. Prior research indicates that architects and non-specialists show only modest perceptual differences when evaluating urban environments, which supports the suitability of architecture students for this investigation (Nasar, 1994; Šafářová et al., 2019).

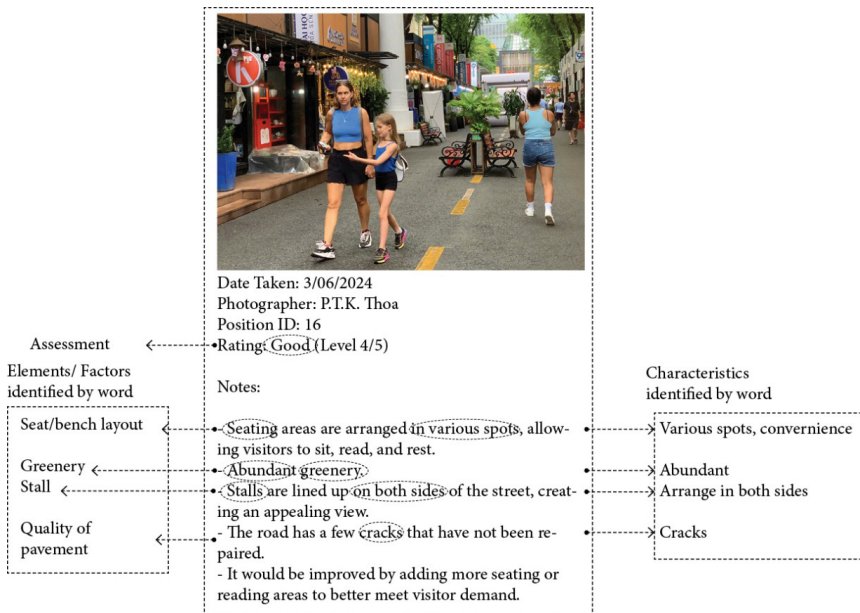


Figure 3. The CEMS report card was semantically analysed

Data collection took place from April 2024 through 9th June 2024, during the dry season, when low rainfall and moderate humidity provided favourable outdoor research conditions. In total, 1,040 evaluation cards were collected and analysed using semantic content analysis. Items were grouped by affinity using the KJ method, also known as an affinity diagram. This categorisation was essential for identifying the principal elements that contribute to the public appeal of Nguyen Van Binh Book Street in Ho Chi Minh City.

Data Processing

The evaluation cards were grouped by content similarity. Behaviour patterns related to maintenance, such as cleaning, sweeping and other upkeep tasks, were excluded because they fall outside the scope of this study. The analysis focuses on interactions between users and their surrounding environment.

Using participants' photographs, the facade characteristics and functional elements of Nguyen Van Binh Book Street were identified, documented and coded in binary form, with "1" indicating the presence of an attribute and "0" indicating its absence. To examine spatial attributes, principal component analysis and cluster analysis were performed in XLSTAT (Addinsoft, Paris, France), a statistical add-in for Microsoft Excel. These methods were used to identify and interpret the key physical features that shape users' environmental experience.

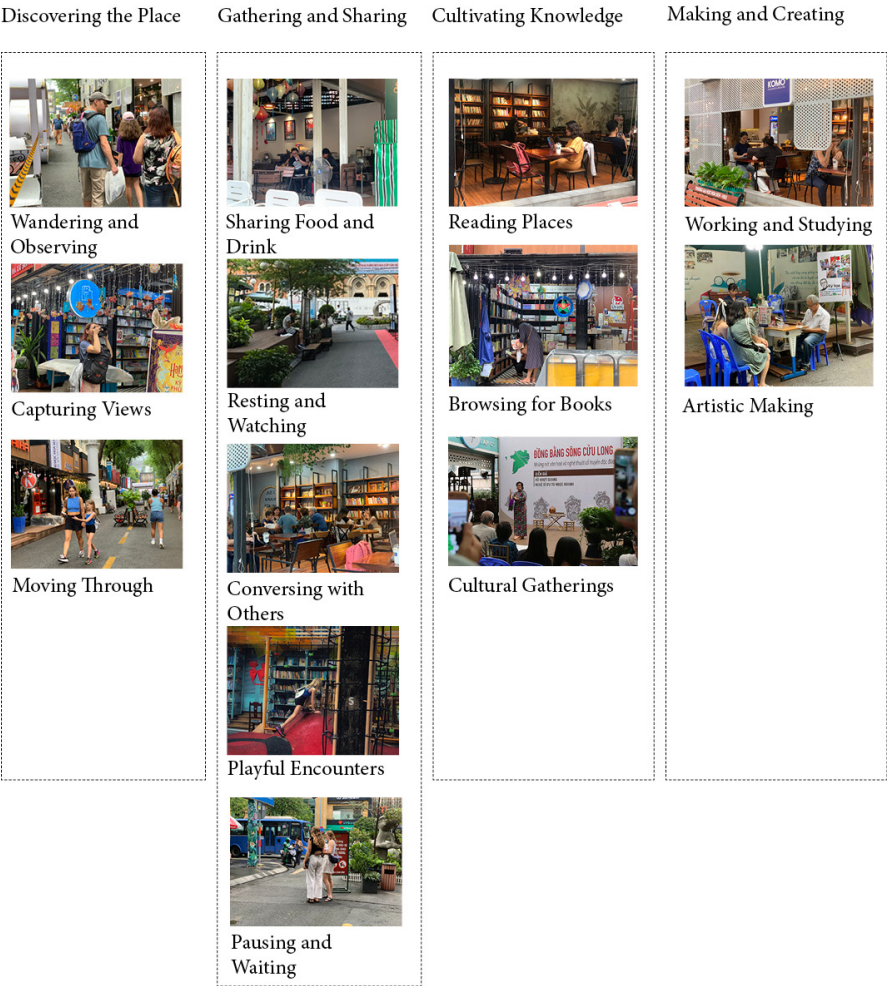


Figure 4. Categorisation of environment-behaviour patterns on Nguyen Van Binh Book Street

RESULTS

Environment-Behaviour Patterns in Nguyen Van Binh Book Street

All environment-behaviour settings were systematically gathered and organised into four primary categories (as shown in Figure 4 and Table 1), each representing a distinct functional purpose:

1. “Discovering the Place” which encompasses exploration-driven activities and spatial navigation.
2. “Gathering and Sharing” designed for social interaction and relaxation.
3. “Cultivating Knowledge” focused on intellectual enrichment and cultural participation.
4. “Making and Creating” tailored for work-related tasks and creative pursuits.

Table 1. Classification of 13 environment-behaviour patterns by category and detail

Category	Detail
Discovering the Place	Pattern #1 (Wandering and observing) Pattern #2 (Capturing views) Pattern #3 (Moving through)
Gathering and Sharing	Pattern #4 (Sharing food and drink) Pattern #5 (Resting and watching) Pattern #6 (Conversing with others) Pattern #7 (Playful encounters) Pattern #8 (Pausing and waiting)
Cultivating Knowledge	Pattern #9 (Reading places) Pattern #10 (Browsing for books) Pattern #11 (Cultural gatherings)
Making and Creating	Pattern #12 (Working and studying) Pattern #13 (Artistic making)

The first group, “Discovering the Place”, focuses on movement, observation and discovery within the space. These activities typically occur along open pathways, around book stalls and near scenic or architecturally significant areas. In this study, “Discovering the Place” behaviour settings are defined as those that encourage users to wander, observe, and visually engage with their surroundings. The first subcategory is “Wandering and observing”, which occurs when users stroll along paths, admiring book stalls, exhibitions and scenic displays. The second subcategory is “Capturing views”, which takes place when visitors photograph cultural and architectural elements to document and share their experiences. The third, “Moving through”, involves walking between stalls, exhibits and activity areas, allowing users to experience the spatial sequence and rhythm of the environment.

The second group, “Gathering and Sharing”, encompasses activities focused on social interaction, casual enjoyment and moments of rest. These activities are commonly found in designated seating areas, cafés and play zones. In this study, “Gathering and Sharing” behaviour settings are defined as those that facilitate social connection, relaxation and collective enjoyment. The first subcategory is “Sharing food and drink”, which occurs when visitors enjoy coffee, tea, snacks or meals at cafés and rest areas. The second is “Resting and watching”, where users pause on benches or in seating areas to observe the activity around them. The third, “Conversing with others”, includes informal conversations with friends, family or vendors that enrich the social experience. The fourth, “Playful encounters”, primarily involves children engaging in light-hearted play within safe, designated areas. The fifth, “Pausing and waiting”, describes users who stop temporarily to meet others, wait in queues or prepare to enter different sections.

The third group, “Cultivating Knowledge”, includes activities related to intellectual enrichment, cultural participation and book-centred interactions. These activities are generally located around book stalls, reading nooks and event spaces. In this study, “Cultivating Knowledge” behaviour settings are defined as those that provide opportunities for learning, cultural engagement and book-related exploration. The first subcategory is “Reading places”, which occurs when users immerse themselves in books at reading spots or book cafés. The second is “Browsing for books”, which takes place as visitors explore and select titles from various book stalls. The third, “Cultural gatherings”, includes participation in book signings, cultural discussions and reading forums that foster a sense of community and shared knowledge.

The fourth group, “Making and Creating”, represents actions centred on focused tasks and artistic expression. These activities are often found in quieter zones, with some areas designated for artistic or individual work. In this research, “Making and Creating” behaviour settings are defined as those that enable productivity and nurture creative output. The first subcategory is “Working and studying”, in which individuals use laptops, read or perform professional tasks in calm, structured environments. The second, “Artistic making”, includes drawing, painting or craftwork, typically located in spaces that encourage personal expression and creativity.

Surrounding Environment Settings in Nguyen Van Binh Book Street

The principal component analysis results show that the first five principal components account for 84.5% of the cumulative variance, as detailed in Table 2. This indicates that most of the variance in the dataset is captured within these five axes, providing a robust basis for dimensionality reduction and subsequent analysis.

Table 2. Principal component analysis results

Facade Characteristic	F1	F2	F3	F4	F5
Concrete	0.574	0.028	0.104	0.049	0.055
Canvas	0.042	0.048	0.018	0.176	0.510
Wood	0.465	0.309	0.007	0.070	0.027
Brick	0.841	0.000	0.002	0.025	0.021
Patterned brick	0.773	0.004	0.089	0.002	–
Steel frame	0.850	0.002	0.091	0.020	–
Mica	0.841	0.013	0.006	0.008	0.006
Glass	0.800	0.003	0.000	0.007	0.001
Cladding systems	0.841	–	0.002	0.025	0.021
Archways or portals	0.596	0.004	0.093	0.147	0.008
Doors	0.727	0.197	0.003	0.009	0.002
Brown	0.638	0.165	0.055	0.063	0.012
Black	0.690	0.102	0.064	0.103	0.009
Green	0.454	0.166	0.115	0.001	0.013
Blue	0.177	0.058	0.076	0.073	0.053
Yellow	0.661	0.009	0.068	0.006	0.002
Orange	0.614	–	0.011	–	0.052
Red	0.052	0.066	0.109	0.243	0.086
White	0.746	0.007	0.032	0.028	0.008
Ornamentation	0.193	0.177	0.041	0.110	0.234
Cultural expression/ conceptual symbolic	0.746	0.003	0.003	0.037	0.038
Canopy	0.418	0.015	0.342	0.009	–
Porch	0.643	0.085	0.093	0.046	0.018
Architectural lighting	0.746	0.184	–	–	0.005
Signage	0.746	0.184	–	–	0.005
Balanced forms	0.268	0.033	0.172	0.246	0.044
Dynamic	0.692	0.045	0.035	0.005	0.004
Irregular	0.788	0.031	0.018	0.000	0.012
Straight lines	0.821	0.003	0.109	0.019	0.001
Curved lines	0.841	0.000	0.002	0.025	0.021

(Continued on next page)

Table 2. Continued

Facade Characteristic	F1	F2	F3	F4	F5
Eigenvalue	22.960	2.809	2.197	1.880	1.429
Variability (%)	62.054	7.593	5.937	5.081	3.862
Cumulative (%)	62.054	69.647	75.583	80.664	84.526

Based on these results, five distinctive typologies of book street environmental settings were identified (as shown in Figure 5). Together, they summarise key characteristics that explain environment-behaviour patterns, user engagement and overall urban aesthetics, offering a structured framework for understanding how the environmental setting, including facades, shapes public space.



Figure 5. Five distinctive typologies of book street environmental setting

On the first axis (F1), the significant positive squared cosines indicate the dominance of brick, steel frame, glass, cladding systems, and straight lines, while lower values correspond to more flexible materials. This suggests that F1 represents “Structural and Material Characteristics”, emphasising the use of durable construction materials in facade design.

The second axis (F2) is strongly associated with wood, doors, black, and architectural lighting, indicating a focus on “Colour and Lighting Effects”. The combination of natural materials and artificial illumination implies that

F2 captures facade ambiance and visual impact, particularly in relation to nighttime aesthetics and material warmth.

The third axis (F3) shows high squared cosines for canopy, archways, and cultural expression, which are commonly linked to traditional ornamentation and symbolic architecture. Therefore, F3 represents “Decorative and Cultural Expressions”, highlighting how facades convey local identity and heritage.

On the fourth axis (F4), the major contributions come from balanced forms, red and ornamentation, reflecting symmetry and overall facade composition. This indicates that F4 represents “Spatial Composition and Symmetry”, describing how facades maintain visual harmony and balance within urban spaces.

Finally, the fifth axis (F5) emphasises canvas, ornamentation and red, pointing to “Detailed Design and Architectural Style”. This axis focuses on the finer aesthetic details of facades, including flexible design features and stylistic elements that contribute to architectural expression.

Taken together, the five axes capture the principal qualities of the street environments analysed in this study. Using environmental attributes extracted from the 13 environment-behaviour patterns, a cluster analysis was performed. The sections were classified into six broad groups (as shown in Figure 6 and Table 3).

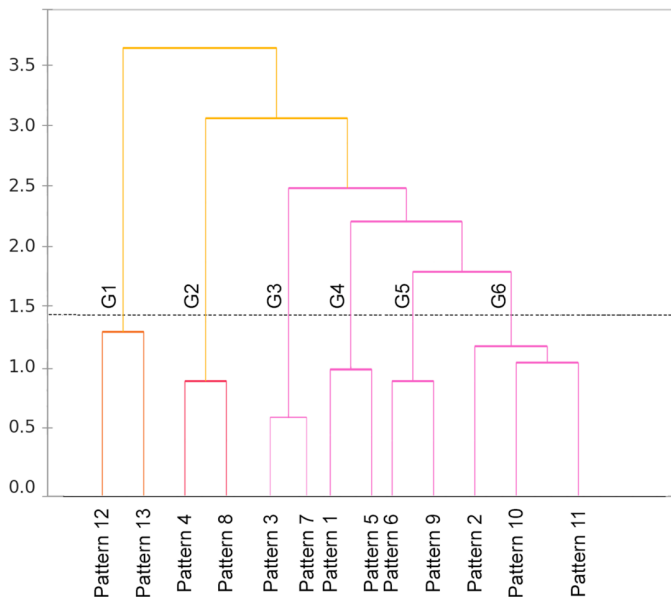


Figure 6. Cluster analysis of sections in Nguyen Van Binh Book Street

Table 3. Cluster-based grouping of environment-behaviour patterns

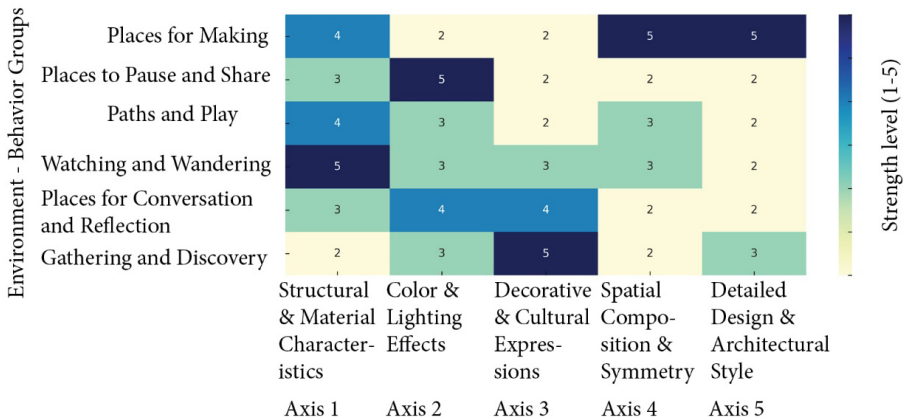
Group	Patterns Included	Semantic Name
1	12 and 13	Places for Making
2	4 and 8	Places to Pause and Share
3	3 and 7	Paths and Play
4	1 and 5	Watching and Wandering
5	6 and 9	Places for Conversation and Reflection
6	2, 10 and 11	Gathering and Discovery

The first group, “Places for Making”, includes “Working and studying” and “Artistic making” (Patterns 12 and 13). This group emphasises creative and productive settings that support focused, expressive and personal activities, fostering a sense of agency and craftsmanship. The second group, “Places to Pause and Share”, combines “Sharing food and drink” with “Pausing and waiting” (Patterns 4 and 8). It captures transitional spaces that support gathering and informal breaks, creating opportunities for spontaneous conversation, refreshment and temporary rest within the urban flow. The third group, “Paths and Play”, integrates “Moving through” and “Playful encounters” (Patterns 3 and 7). It highlights dynamic public-space functions where circulation and exploratory play intersect, encouraging movement while allowing moments of joy and active engagement. The fourth group, “Watching and Wandering”, combines “Wandering and observing” with “Resting and watching” (Patterns 1 and 5). It aligns with promenade-like behaviour, where people stroll, observe and pause to enjoy the public realm, supporting calm exploration. The fifth group, “Places for Conversation and Reflection”, brings together “Conversing with others” and “Reading places (Patterns 6 and 9). It underscores spaces for meaningful dialogue and thoughtful reflection, balancing social exchange with individual contemplation. Finally, the sixth group, “Gathering and Discovery”, includes “Capturing views”, “Browsing for books” and “Cultural gatherings” (Patterns 2, 10, and 11). It embodies public gathering for cultural enrichment and shared curiosity, encouraging discovery and participation in events that build community identity.

The Relationship of Behaviours Patterns and Surrounding Environmental Characteristics

To clarify how spatial configurations and facade characteristics influence specific user behaviour patterns, this study compares six environment-behaviour groups (Groups 1 to 6) with five environmental dimensions derived from the principal components of a principal component analysis. Their

relationships are summarised in a colour-coded matrix (as shown in Figure 7) that synthesises behaviour-environment associations across the spatial typologies.



Note: Assessment based on principal component analysis-derived factor scores

Figure 7. Cross comparison of environment-behaviour groups with surrounding environment settings

“Places for Making”, which includes working, studying and artistic production, shows the strongest association with PC1 (Structural and Material Characteristics) and PC4 (Spatial Composition and Symmetry). This pattern reflects the need for physically stable, geometrically coherent and materially consistent settings that support focused tasks and creative engagement. PC5 (Detailed Design and Architectural Style), which captures features such as ornament and flexible elements like canvas, also plays a notable role, suggesting that nuanced, visually stimulating details enhance concentration and inspiration in productive spaces.

“Places to Pause and Share”, which covers informal social activities such as eating, drinking and waiting, aligns most strongly with PC2 (Colour and Lighting Effects). This connection underscores the importance of warm material palettes, ambient lighting and atmospheric comfort in fostering relaxed, socially engaging environments. A moderate association with PC1 further suggests that structural clarity and accessible spatial organisation support the transitional nature of these semi-fixed activity zones.

“Paths and Play”, characterised by movement, exploration and children’s play, is most strongly linked to PC1. This finding highlights the need for durable, legible spatial systems that accommodate dynamic activity. Moderate associations with PC2 and PC4 suggest that visual cues, such as lighting variation and balanced spatial arrangement, help guide flow, support safety and enable varied kinetic behaviours.

“Watching and Wandering”, which includes observing, strolling and resting, shows prominent associations with PC1 and PC4. These relationships highlight the role of path coherence, facade continuity and structural rhythm in shaping slow-paced, exploratory behaviour. A secondary link with PC2 indicates that colour and ambient effects, while not primary drivers, still enhance perceptual engagement and visual comfort.

“Places for Conversation and Reflection” shows balanced associations with PC2 (Colour and Lighting Effects) and PC3 (Decorative and Cultural Expression). These results point to the importance of human-scaled, culturally expressive facades and ambient environments in supporting both social interaction and introspection. Elements such as soft lighting, symbolic motifs and textured finishes appear to enrich users’ emotional connection to place.

“Gathering and Discovery”, which includes browsing for books, capturing scenic views and attending public events, aligns most closely with PC3, followed by PC5. This pattern suggests that symbolic detailing, historical references and rich architectural articulation catalyse curiosity, shared cultural experience and the formation of place identity.

Overall, the multidimensional synthesis underscores patterned relationships between spatial aesthetics and behaviour settings. It provides empirical support for the principle that successful public-space design depends not only on physical accessibility but also on the cultural, emotional and functional resonance between environment and user. Aligning material expression with behavioural intent and contextual meaning is central to fostering sustainable, inclusive and experientially rich urban environments.

DISCUSSION

Environment-behaviour Affordances in Urban Design

Materiality and spatial legibility play a central role in how people perceive and interact with public space. At Nguyen Van Binh Book Street, activities such as creative engagement, physical movement and observation consistently align with spatial arrangements defined by solid materials, transparent surfaces and clearly ordered compositions. This relationship reflects Gibson’s (1979) ecological perspective on affordances, which holds that people perceive environmental features in terms of the actions they enable. For example, brick facades, steel frameworks and glass panels are not neutral design elements; they offer visual and tactile cues that support wayfinding, attention and behavioural orientation.

The findings reinforce that facade attributes and spatial arrangements influence more than visual character; they also shape how people engage with and move through public environments. This insight aligns with the work of Ratanawichit, Arifwidodo and Anambutr (2025) in Bangkok, which shows that neighbourhood walkability and spatial legibility strongly affect residents' levels of physical activity (Ratanawichit, Arifwidodo and Anambutr, 2025). Similarly, along Nguyen Van Binh Book Street, familiar materials, clear spatial hierarchies and navigable pathways appear to encourage exploration, pausing and cultural interaction.

Vedel, Jacobsen and Skov-Petersen (2017) further demonstrate that public space users respond positively to routes with moderate crowding, aesthetic coherence and perceptible spatial orientation. These preferences mirror observations on the book street, where warm lighting, rhythmic facade elements and balanced composition foster both behavioural flow and emotional comfort.

Recent empirical research supports these associations. Carmona (2019) has shown that visually coherent material combinations in dense urban environments contribute to user clarity and spatial engagement. Likewise, Cheshmehzangi (2015) emphasises that spatial legibility, reinforced by consistent material rhythms and facade articulation, fosters social interaction and adaptive behaviour in complex public settings. These findings echo earlier observations by Nasar (1994), who notes that affective and perceptual responses to space are shaped by clarity, coherence and structural rhythm. Zacharias (2001) also observes that the spatial logic embedded in urban design significantly influences pedestrian flow and orientation.

Given these findings, decisions about facade treatment and material configuration should be approached not only as aesthetic choices but also as behavioural strategies. Environments with clearly defined spatial organisation and durable, legible surfaces are more likely to promote inclusive, navigable and socially responsive public spaces.

Cultural Resonance and the Construction of Place Identity

Cultural expression and symbolic articulation are fundamental to how people engage with and interpret public space. Activities such as photographing, browsing books and participating in cultural events in the "Gathering and Discovery" category are strongly associated with architectural detailing and culturally resonant design features. These findings show that users are drawn to environments where heritage, symbolism and visual narrative are expressed through the built form. Madanipour (2019) argues that public space becomes meaningful when it incorporates recognisable cultural codes that

foster memory, identity and emotional belonging. Nguyen Van Binh Book Street exemplifies this through ornamental signage, traditional materials and human-scale compositions that support both activity and symbolic interpretation (Madanipour, 2019).

This view aligns with place theory, which understands place as a synthesis of form, activity and meaning (Canter, 2023). In Ho Chi Minh City, where rapid urban transformation often puts local identity at risk, culturally expressive design provides continuity and coherence. Carmona (2014) underscores that cultural and aesthetic cues are not merely visual embellishments but mechanisms of place-shaping, helping users connect more deeply with their surroundings. Likewise, Gehl and Svarre (2013) note that facade design, through texture, colour and composition, influences behaviour by encouraging curiosity, interaction and reflection. When cultural symbolism is embedded in architectural elements, spaces move beyond basic functionality to become vessels of shared memory and civic meaning. These qualities are essential for creating public places that are inclusive, emotionally engaging and resilient to homogenising urban forces.

Facades, Materials and User Behaviour: Unfolding a Pattern Language in Urban Public Space

The analysis of environment-behaviour patterns on Nguyen Van Binh Book Street reveals clear relationships between user activity and specific physical characteristics of the built environment. These relationships show how facade design, materials and spatial elements together influence behavioural engagement, forming a coherent pattern language within the public realm (as shown in Table 4).

Table 4. Design attributes and spatial intentions across identified user activity groups

User Activity Group	Key Activity	Material	Colour	Feature	Spatial Intent
Discovering the Place	Wandering, observing, capturing views and moving through	Wood-like plastic, glass, brick and steel frame	Yellow, orange, white and blue	Doors, canopies and porches	Open and visually inviting
Gathering and Sharing	Sharing food and drink, conversing, resting and playing	Wood, patterned brick and glass	Warm and friendly tones	Curtains, porches and canopies	Comfortable micro-environments for socialising

(Continued on next page)

Table 4. *Continued*

User Activity Group	Key Activity	Material	Colour	Feature	Spatial Intent
Cultivating Knowledge	Reading, browsing books and cultural events	Wood, patterned brick and steel frame	Moderate bright tones	Book-centred spaces and event venues	Culturally vibrant and intellectually stimulating
Making and Creating	Working, studying and artistic making	Wood-like plastic, canvas and signage	Green tones and natural colours	Canopies and event stages	Productive and creative settings

The category “Discovering the Place”, which includes wandering, observing, capturing views and moving through the space, is strongly associated with materials such as wood, patterned brick and transparent surfaces like glass. Bright, familiar colours including yellow, orange and white create a visually open and inviting ambiance. Architectural features such as porches, canopies and doorways further support these exploratory behaviours by structuring circulation and enhancing spatial legibility.

“Gathering and Sharing”, which covers social activities such as dining, resting, conversing and children’s play, is supported by warm materials, particularly wood, as well as by soft spatial enclosures formed by curtains, porches and canopies. These design elements foster comfort, sociability and informality, aligning with behaviours that occur in transitional and semi-fixed settings. Spatial anchors such as cafés, playgrounds and seating zones reinforce this behavioural typology.

The group “Cultivating Knowledge”, including reading, browsing and attending cultural events, is framed by stable facade elements such as steel framing, wood textures and moderate tones. These features create a calm and intellectually supportive backdrop for learning-oriented activities. The integration of book stalls and event spaces strengthens thematic continuity and cultural resonance.

In “Making and Creating” settings, where users engage in artistic production or focused tasks, materials such as canvas, signage and wood-composite finishes frequently appear. Combined with soft colour accents and clear structural order, these elements provide both discipline and expressive freedom, creating conditions conducive to creativity and productivity.

Taken together, these four groups show how Nguyen Van Binh Book Street operates as a pattern language in built form. The deliberate orchestration of facade materials, colour palettes, structural elements and spatial functions

correlates directly with behaviour-specific settings. Warm, familiar materials encourage social engagement and openness, while culturally expressive and clearly articulated structures foster cognitive stimulation, aesthetic appreciation and sustained use. These insights underscore the importance of aligning facade articulation with anticipated behaviour settings to create urban environments that are inclusive, dynamic and contextually resonant.

CONCLUSION

Book streets have recently emerged as a distinctive form of public space in Vietnam's urban environment. Among them, Nguyen Van Binh Book Street is a noteworthy example. It functions not only as a cultural and commercial destination but also as a socially active setting that fosters diverse patterns of behaviour and interaction. Its ability to sustain public engagement raises important questions about the relationship between environmental design and user experience in contemporary city spaces.

The objective of this study is to examine how environmental characteristics, including facade materials, spatial composition and public amenities, shape patterns of behaviour along Nguyen Van Binh Book Street. Using a mixed-methods approach that combines qualitative observation with statistical analysis, the research identifies 13 environment-behaviour patterns. These patterns are grouped into six categories that reflect different modes of public engagement, including cultural participation, creative work, leisure and exploration.

The findings show that physical attributes of the built environment strongly influence user behaviour. Materials such as brick, wood, steel and glass, together with specific spatial arrangements and colour palettes, correspond to particular activities. Structured and visually coherent environments encourage focused behaviours such as working or studying, while culturally expressive and visually warm settings attract social and discovery-oriented activities. These results affirm environmental design as an active agent in shaping how people move through and respond to urban public spaces.

From a theoretical perspective, the study reinforces key principles in environmental psychology and urban design. It supports the view that physical space affords certain behaviours, as described in Gibson's theory of affordances, and it aligns with Canter's concept of place, which understands spatial meaning as the product of relationships among environment, activity and experience. Nguyen Van Binh Book Street exemplifies these ideas through familiar materials, symbolic details, and spatial organisation that support a wide range of user needs.

Beyond academic implications, the study offers practical guidance for architects, planners and policymakers. It suggests that the success of public spaces depends not only on functional layout but also on the sensory and cultural qualities that invite participation. Design strategies should consider how materials, lighting, ornamentation and facade articulation contribute to atmosphere, usability and inclusivity. These insights are especially relevant for cities seeking adaptable and socially engaging spaces rooted in local identity.

Although this research focuses on a single site, the methodological approach offers a transferable framework for evaluating similar spaces. Future studies could extend this work by examining other book streets or comparable public environments across different cultural contexts. Additional research might also investigate how aesthetic preference and memory shape long-term attachment to place.

In conclusion, Nguyen Van Binh Book Street illustrates how well-integrated spatial design can support a wide range of human activities and foster a strong sense of place. By aligning physical characteristics with behavioural patterns and cultural meaning, designers and urban managers can create environments that function effectively and resonate with the communities they serve.

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