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An Analysis of Façade Transformation in Pasar Kayoon Surabaya

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Abstract—Pasar Kayoon in Surabaya holds historical significance and a strategic position as a hub for the flower trade and other commercial activities in the city center. Over the past decade, the area has experienced notable physical and visual transformations, especially in its building facades, a key element of the area's urban identity. This study analyzes facade development in the Pasar Kayoon area from 2015 to 2025 and identifies factors influencing these changes. An explanatory method with a qualitative descriptive approach was employed, using Google Street View terrestrial imagery for longitudinal observation from a pedestrian perspective. Visual and spatial analyses focused on facade elements, form, materials, colors, signage, and forecourt use, triangulated with maps, photographic documentation, and historical literature. Findings indicate significant changes in some segments, including conversion of open spaces into kiosks, signage redesign, facade element modifications, and building height alterations, while other segments maintained their original character with minor adjustments. These transformations were driven by commercial needs, changes in sold commodities, space demands for economic growth, and contemporary design trends. This research advances the understanding of longitudinal façade transformation by demonstrating the potential of remote-sensing imagery to document urban change within Indonesian marketscapes. The findings offer a critical evidence base for policymakers and urban designers to formulate adaptive conservation strategies that balance the transformation of commercial patterns with the preservation of historical identity. Thus, the findings are expected to serve as a reference for maintaining visual cohesion while preserving the area's historical identity in future development planning.

Keywords: Pasar Kayoon; building facades; terrestrial imagery; visual transformation; google street view.

1. Introduction

Surabaya is one of the metropolitan cities in Indonesia, comparable to Jakarta, Semarang, and Bandung. The city has a large population and rapid growth, making it a potential center for various activities in the investment, tourism, education, and trade sectors (Baliya et.al., 2021). With high levels of population mobility, it is not surprising that the presence of various types of markets, both modern and traditional, has become an integral part of the city's dynamics (Permita, 2021). One traditional market that has experienced rapid development is Pasar Kayoon Surabaya.

Pasar, a traditional market, is a meeting place between buyers and sellers where goods or services are exchanged, with the willingness to trade determined by the agreed price. It is not confined to a specific location or type of goods. In the context of a traditional market, transactions occur through direct face-to-face interaction and bargaining, as prices are not fixed, distinguishing it from modern markets. Typically consisting of kiosks or stalls selling essential household goods, traditional markets are often government-owned, rely on price negotiation, and offer locally sourced products (Amelia, 2020).

Pasar Kayoon Surabaya serves as the largest center for ornamental flower trading in the city. Situated along the Kayoon Street corridor, on a section of the Kalimas Riverbank in the heart of

Surabaya, the market benefits from a highly strategic location,adjacent to office districts, service trade hubs such as hotels and malls, as well as public, educational, and healthcare facilities. This advantageous position has significantly contributed to the expansion of the florist industry, particularly in response to the growing demand for flowers from both government and private institutions, especially during major festive occasions such as Eid al-Fitr, Christmas, and New Year. The market's dynamism is further reinforced by the presence of complementary commercial clusters within the area, including culinary centers and gemstone trading hubs (Amelia, 2020).

The visual transformation occurring along the Pasar Kayoon corridor has the potential to alter how urban users perceive and evaluate the area's identity. Changes in visual elements such as building facades, open spaces, and signage not only reflect functional adaptation to economic needs but also play a crucial role in shaping and maintaining the area's identity. The legibility of urban elements, such as paths, edges, districts, nodes, and landmarks, determines how strongly a place's image is embedded in the collective memory of its inhabitants (Lynch, 1960).

Furthermore, Trancik (1986) emphasizes the importance of the spatial interface between public and private realms in establishing visual cohesion and urban character. From the perspective of urban interface theory, the loss of visual continuity or the degradation of physical elements along a corridor can create *lost spaces* that weaken the sense of place (Trancik, 1986). Therefore, transformations in building facades, public–private interface spaces, and signage in Pasar Kayoon should be understood as part of the area's identity dynamics rather than merely as economic or physical phenomena.

Urban morphology studies in Southeast Asia also demonstrate that traditional markets play a vital role in shaping urban image and identity through visual components such as stalls, canopies, and shop signs (Ong, 2021). Thus, the visual transformation of Pasar Kayoon can be interpreted within the framework of identity preservation, aiming to understand how adaptation to social and economic dynamics can maintain the continuity of the market's local image in Surabaya.

This study aims to examine the development patterns that have occurred in the Pasar Kayoon area over the past decade, from 2015 to 2025. Through the analysis of these patterns, it is possible to determine whether the visual quality of the area has improved or declined. Previous studies conducted in this area have primarily focused on the revitalization of the riverside zone (Junita et.al., 2016) and strategies for developing the cut-flower business (Izza et.al., 2021), leaving a gap in research concerning the visual quality of the Pasar Kayoon facade. The findings of this study are expected to serve as a valuable reference for local government authorities in formulating future development or revitalization strategies.

2. Methods

This study adopts an explanatory research method, with data analysis conducted through a descriptive qualitative approach [9]. The analysis aims to examine the dynamics of facade development in the Pasar Kayoon area of Surabaya over a ten-year period (2015-2025). The investigation focuses on capturing changes in the facade elements of the area, encompassing both building facades and their associated outdoor spaces, including forecourts and other visible frontage areas.

Research samples were selected based on two photographs for each segment, obtained through terrestrial imagery via Google Street View, which represent significant facade changes over the decade. Facade changes were recorded at two-year intervals to align with the most complete longitudinal data available. According to Krier in *Architectural Composition*, a facade is the front part of a building, generally oriented towards the street, serving as the first element observed and evaluated by viewers, and playing a crucial role in conveying the building's identity [10]. Lippsmeier identifies three primary components influencing the facade: the roof, walls, and floor [11]. In the context of an urban area, the scope of facade elements extends beyond the building itself to include surrounding spaces visible from the front, such as forecourts and outdoor areas.

Data collection was carried out through visual observation using Google Street View terrestrial imagery, enabling a longitudinal review of existing conditions from a pedestrian's perspective. This technique is considered effective for efficiently and sustainably monitoring physical changes in urban areas over a defined time span [12], [13]. Google Street View imagery from the period 2015 to 2025 was documented in the form of screenshots, then classified and analyzed both visually and spatially. The analysis focused on identifying the characteristics and patterns of facade changes, supported by triangulation with secondary data such as maps, spatial planning archives, urban planning documentation, and historical literature on the Kayoon area. This approach allowed the study to explain the relationship between facade transformation and the evolution of the area's functions, as well as the economic and social factors driving these changes.

This study develops a systematic analytical matrix to examine the facade transformation of Pasar Kayoon from 2015 to 2025. The framework integrates measurable criteria, indicators, and theoretical references derived from Krier (1988) and Lippsmeier (1994), focusing on the relationship between form,

material, environmental adaptation, and identity continuity. The visual observation is structured into three main analytical categories: (A) Building Elements, (B) Outdoor Space, and (C) Signage as Identity and Commercial Components. The indicators and variables for each aspect are listed in the table below.

Table 1. Operational Framework for Visual Facade Analysis

1. **Building Elements**		
Criteria	Indicators	Description
Changes in openings	Variation in the size/number of windows, doors, or ventilation across the years (Proportion & Rhythm [10], Ventilation & Light Control [11])	Indicates adaptation to functional needs for light, air, and circulation within the building.
Changes in material and finishing	Variation in wall materials, paint, or facade coatings (Material & Climate Response [11])	Reflects climatic and aesthetic responses to tropical or economic conditions.
Addition or reduction of structural facade elements	Inclusion or removal of columns, canopies, balconies, grilles, or shading frames [11]	Represents functional or aesthetic adaptation of the facade to environmental and user needs.
2. **Outdoor Space (Forecourt Area)**		
Change in land-use function	Alteration in the use of forecourt space (e.g., parking converted into trading area or kiosk expansion) [11]	Demonstrates adaptation of outdoor areas to changing economic activities or user demands.
Addition of semi-permanent structures	Emergence of tents, canopies, or temporary enclosures (Composition through Layering [10])	Indicates spatial modification to respond to rain, heat, and increased activity intensity.
Visual and circulation relationship	Alteration in access points or openings facing the public realm (Spatial Continuity [10])	Reflects transformation in the interaction between the building and the public domain.
3. **Signage (Identity and Commercial Elements)**		
Changes in signage form, size, or position	Shifts in the position or scale of banners, signboards, and lightboxes over time (Hierarchy and Visual Order [10])	Demonstrates the evolving visual dynamics of commercial identity along the street.
Variation in style and expression	Changes in typography, color, or logo design on signage (Aesthetic Composition [10])	Indicates adaptation to emerging commercial trends and shifts in local identity.
Integration between signage and facade	Signage incorporated as part of the facade (e.g., vertical panels, hanging signs, integrated planters) [10]	Shows the extent to which signage contributes to the overall composition and facade rhythm.

Source : Junita et.al., 2025

The building elements category examines physical transformations of the façade, including the changes in openings, material and finishing, and the addition or reduction of structural elements such as columns, canopies, or shading devices. These aspects are associated with Krier's theory of proportion, rhythm, and facade articulation and Lippsmeier's view on material and climate response, reflecting how functional and climatic needs influence architectural expression.

The outdoor space category focuses on the forecourt areas in front of buildings, which often function as extensions of trading activities. Indicators include changes in land-use function, addition of semi-permanent structures, and alterations in circulation and visual relationships. These aspects are framed within Lippsmeier's concept of interaction between building and environment and Krier's spatial continuity, capturing how outdoor adaptations reflect socio-economic pressures and user behavior.

Lastly, signage is analyzed as a key element of visual identity and commercial communication. Variables such as changes in form, position, or scale, variation in graphic expression, and integration with the façade composition are interpreted through Krier's hierarchy and aesthetic composition and Lippsmeier's cultural influence theories. This category highlights how visual branding and spatial identity evolve in response to market competition and modernization.

3. Results and Discussion

Historically, the Kayoon area was an elite residential district in Surabaya during the period of 1920-1940, with an orientation towards the river. Initially, the banks of the Kalimas River in this area functioned as an open public space utilized by the community for recreational activities, particularly in a location known as Poeter Kajoon around the Embong Wijk area. The beauty of Kayoon Park had been recognized since before World War II and even became a regular topic in the Nieuw Soerabaiasche Handelsblad newspaper through a weekly column titled Poeter Kajoon, which depicted the charm of the area at that time (**Figure 1**).

Figure 1. Kayoon Area in the Past
Source: digitalcollections.universiteitleiden.nl/view/item/734105 (2025).

In 1969, the Surabaya City Government relocated flower traders from various parts of the city to Kayoon Street. Initially, trading activities were conducted using tents and umbrellas. Since then, the area has grown rapidly and has become widely known as the central hub for flower trading up to the present day [4]. The transformation continued, and in 1984, the area was officially designated as Kayoon Tourist Park and the East Java Culinary Center. Economic activity further expanded in 1989 with the arrival of gemstone traders who began occupying vacant lots in the central part of the area. This development was followed by culinary vendors and aquarium sellers who utilized unused spaces that had not yet been converted into flower stalls.

This study is limited to the Pasar Kayoon area, which stretches approximately 300 meters, with its boundaries defined as follows: the Gubeng floodgate to the north, the Kalimas River to the east, office and shop buildings to the west, and the Sonokembang Street bridge to the south (Figure 2).

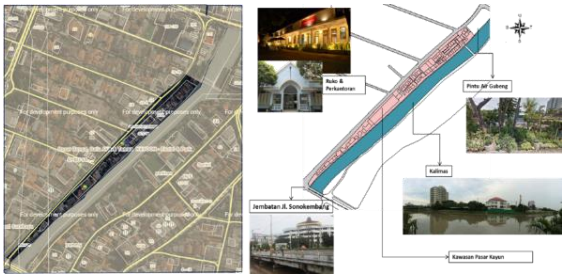

Figure 2. Boundary of the Pasar Kayoon Area
Source: IJERN, vol. 4, no. 6, pp. 381-390 (2016)

Currently, the Pasar Kayoon area consists of several hubs: the ornamental and flower arrangement hub, the fresh flower hub, the gemstone hub, and the culinary hub. The discussion in this study will be divided into five segments (Figure 3). The research will focus on the patterns of facade changes in each hub and the factors influencing these changes.

Figure 3. Research segment area of the Pasar Kayoon
Source: Researcher's Analysis, 2025

Segment 1 - Through terrestrial imagery aligned from 2015 to 2025 for Segment 1, significant differences can be observed. In Segment 1A, the building facades from 2015 to 2019 reveal that most kiosks in this segment functioned as aquarium stands, effectively forming an aquarium center. By 2021, however, aquarium kiosks had disappeared, with almost all of them converted into stands selling flower arrangements and dried flowers, while only one kiosk sold food. These changes influenced both the building frontage and the overall character of the area. The roof structure remained consistent over the years, consisting of corrugated metal, with typical shop openings in the form of rolling doors. Up to 2017, all buildings were single-storey structures made from semi-permanent materials, including metal roofs, rolling doors, and partition walls. In 2019, some stands began to extend to a second floor, still using semi-permanent materials such as metal, and without front openings. By 2021, more significant changes occurred as several stands raised their structures to two floors, with varying forms and still using semi-permanent materials, such as partitions, while maintaining metal roofing. Starting in 2023, some stands constructed the second floor using permanent materials, such as lightweight bricks, and included front-facing openings. The first-floor building forms largely retained their original shapes, though some added front canopies or rebuilt their stands using more permanent materials.

Figure 4. Facade Development of Pasar Kayoon Area, Segment 1
Source: Google Street View, 2025

The outdoor spaces in this segment also experienced functional changes over time. From 2015 to 2019, the outdoor areas were dominated by aquarium displays sold within the stands, serving as extensions of the kiosks. Only one area, equivalent to a single kiosk, functioned as access to the rear alley, marked by a front gate. By 2019, this access was blocked by merchandise, primarily aquariums, and a second floor had been added. In 2021, the area transformed into flower stands, eliminating public access to the rear. By 2024, the front gate had disappeared, and the outdoor space was filled with merchandise (store extensions), such as flower arrangements and their supporting materials. Up until 2017, outdoor areas were still enclosed by fences; however, by 2019, the fences were removed, eliminating the boundary between the outdoor commercial space and the main road. These outdoor areas were used as customer parking, and no pedestrian pathways existed along this segment.

The shop signage in this segment did not exhibit substantial changes over time. From 2015 to 2025, most shops used banners of various colours, which were replaced annually in accordance with changes in lease ownership. Since 2021, some shops began using billboards. Differences between Segment 1A and Segment 1B are evident in signage practices. In Segment 1A, almost all shops displayed their names on banners, whereas in Segment 1B, shop names were rarely visible. Some shops, such as street food stalls (*angkringan*), directly displayed their names on the shop's fascia.
The summary of findings in this segment is presented in **Table 1**, which synthesizes the physical and visual changes observed over a ten-year period.

Segment 2 - Observation of Segment 2 reveals distinct development characteristics between segment 2A and 2B, despite their location within the same street corridor. From 2015 to 2025, the building elements in this segment experienced notable transformation, largely driven by its dominant function as food stalls and eateries. In the 2015-2017 period, several kiosks displayed only the commercial signage of the eatery at the front, with limited architectural articulation visible from the street. By 2021, the buildings predominantly featured massive walls with minimal facade openings, but starting in 2023, a significant shift occurred as many structures adopted glass wall systems, allowing partial visibility of the interior from the street. This transition coincided with a change in tenancy, as numerous food stalls were converted into cafes, reflecting the area's adaptability to contemporary trends and the growing popularity of cafe culture. By 2025, the facades had become more modern and diverse, with varied design expressions corresponding to the type of products or services offered.

Commercial signage in this segment also evolved in line with functional and ownership changes. In the earlier years (2015-2017), signage was relatively simple, dominated by printed banners identifying each food stall. These banners were frequently replaced following changes in lease ownership. By 2021, more permanent signboards began to appear, and by 2023, cafe conversions brought about branding upgrades, with several tenants adopting modern, minimalist signage and illuminated lettering to attract younger customers. This shift not only reflected changes in tenancy but also a deliberate attempt to project a more contemporary and lifestyle-oriented image.

The outdoor spaces in this segment remained directly connected to the main road, with no physical boundary separating commercial areas from vehicular lanes. In the earlier years, these areas functioned primarily as parking spaces for customers and as a small transition zone for pedestrian movement. Large roadside trees provided shade and contributed to the street's visual character. Over time, especially after 2023, some cafes began to extend their functional space outdoors by adding seating areas under canopies, thereby activating the frontage and enhancing the spatial experience. Despite the functional intensification, parking continued to occupy a significant portion of the outdoor area, indicating the persistent prioritization of vehicular access over pedestrian circulation.
Table 2 presents synthesizes of the physical and visual changes observed over a ten-year period in segment 2.

Figure 5. Facade Development of Pasar Kayoon Area, Segment 2
Source: Google Street View, 2025

Segment 3 - Between 2015 and 2025, the building elements in this segment maintained a consistent form and structure without significant changes. Since its initial construction, the commercial block has been built as a permanent structure using durable materials, such as plastered and painted masonry walls, corrugated metal or asbestos roofing, and front openings in the form of rolling or folding doors. All kiosks have remained single-storey, with no addition of building levels or changes to primary materials. Until 2021, the physical condition of the buildings largely resembled their original form. Starting in 2023, improvements were mostly cosmetic, such as repainting, adding canopies, or refining the front openings, without altering the structure or typology. The physical identity of the row as a gemstone center has been consistently preserved over time.

In 2015, the outdoor space in front of kiosks was often occupied by semi-permanent street vendors (PKL) operating food stalls, which obscured kiosk facades and reduced visibility from the street. This segment features a gateway that not only serves as a visual identity marker but also functions as a physical boundary between the commercial area and the main road. The gateway remained until 2025, with only changes in paint color. Over time, the number of street vendors decreased, allowing greater exposure of kiosk facades. Nevertheless, parts of the outdoor space continued to be used for merchandise display or as customer seating areas. Large shade trees were maintained, contributing both to comfort and to the visual character of the segment.

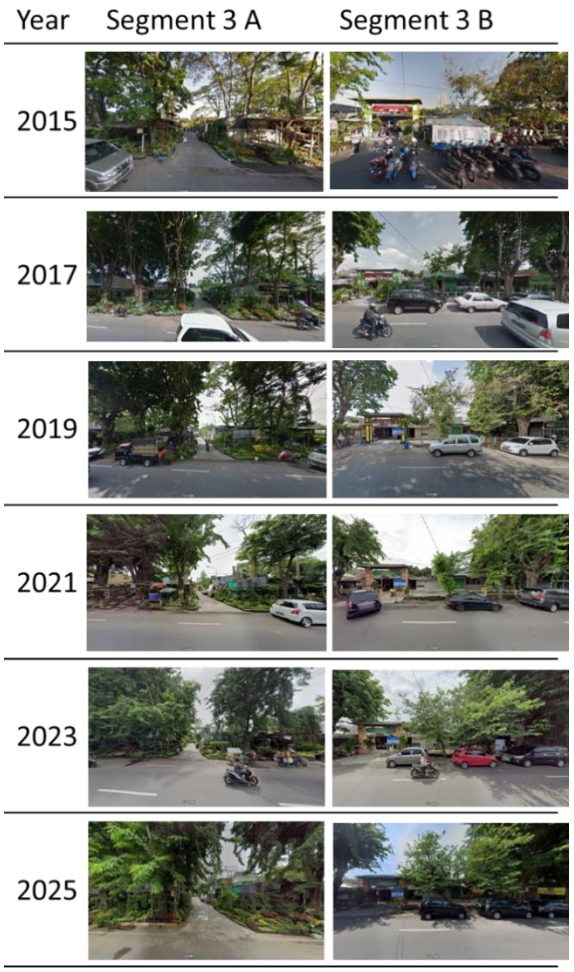

Figure 6. Facade Development of Pasar Kayoon Area, Segment 3
Source: Google Street View, 2025

Photographic documentation shows that in 2015, no commercial signage was prominently visible from the street. The area's identity was instead represented through the presence of a gateway, functioning as a marker of the gemstone center. Beginning in 2021, commercial signage started to appear in the form of banners installed in front of kiosks, while interior signage was typically mounted on the back walls. This arrangement is similar to that of jewelry stores, where signage placement avoids obstructing the display of merchandise. By 2025, some kiosks had adopted permanent signage made of acrylic or metal, yet the overall visual style of signage remained modest and functional.

Segment 4 - The dominant function in this segment is the trade of cut flowers and ornamental plants, including florists and flower arrangements. Two distinct block typologies are identified: (1) the

main building block, uniform in design and constructed by the municipal government, and (2) a row of buildings on the opposite side, managed or renovated by tenants. Between 2015 and 2017, the municipal block appeared homogeneous: single-storey, consistent rhythm of openings and columns, and a continuous canopy line, with no significant changes up to 2019. In contrast, the tenant-managed row began to display facade variations from 2017-2019, including canopy additions or closures and adjustments to openings. By 2021, the developmental contrast was more apparent,tenant rows exhibited diverse facade interventions, and some units had an added second storey. From 2023 to 2025, this pattern was reinforced: the municipal block remained largely unchanged (single-storey, uniform facade), while the tenant side underwent further updates in both facade composition and building height.

In Segment 4A, commercial signage on the municipal block was already present but aligned at a uniform height, forming a continuous visual band that did not obstruct shopfront visibility in 2015. This orderliness persisted through 2017-2019, with banner updates reflecting changes in tenancy or seasonal promotions. By 2021, more permanent name boards began appearing on tenant units, while the municipal block retained consistent alignment and scale of signage. This trend continued into 2023-2025: tenant signage became increasingly varied in size and placement, responding to evolving facades, whereas the municipal block maintained its orderly signage alignment, preserving a clean facade reading.

Figure 7. Facade Development of Pasar Kayoon Area, Segment 4
Source: Google Street View, 2025

Regarding outdoor space, the period of observation shows a consistent functional pattern. In 2015, the space in front of shops was partly used as an extension of commercial activity (flower arranging and display) and partly for parking, without a designated pedestrian pathway. This pattern was repeated in 2017-2019, with the forecourt remaining active for florist work and vehicle parking, shaded by canopies or street trees. From 2021 to 2025, the outdoor space usage changed little,the frontage continued to serve as both a workspace and parking area, without the establishment of a continuous pedestrian way. This spatial arrangement defined the edge between the commercial zone and the roadway through visible activities and vehicle rows, while the ordered signage in the municipal block helped maintain facade legibility amid the high-intensity use of the outdoor area.

Segment 5 - Based on terrestrial imagery documentation from Google Street View, this segment predominantly occupied by plant and florist shops, displays a relatively consistent commercial function over the decade while undergoing several changes in building form, outdoor space usage, and

signage placement.

In 2015, most buildings were single-storey structures with pitched roofs, often partially obscured by dense roadside trees. Around 2018-2019, some units underwent vertical expansion, adding a second level with lightweight upper-wall materials, indicating an adaptation to increased storage needs or expanded retail functions. This change is visible in several units where the upper floor appears with corrugated metal cladding, distinct from the original structure. Despite the additional level, the original rooflines in adjacent buildings remained intact, maintaining a certain degree of architectural continuity along the segment.

Throughout the observation period, the outer spaces in front of the shops have been consistently utilised for off-street parking, accommodating both cars and motorcycles. In some cases, the frontage areas function as an extension of the retail space,displaying potted plants, gardening supplies, and merchandise beyond the building facade. Certain points also feature large municipal waste bins placed directly in front of shop entrances, indicating the absence of a designated waste management area. Notably, there is no pedestrian walkway along the segment; the available space between the building line and the main road is entirely allocated to commercial display, vehicular parking, and temporary storage.

Figure 8. Facade Development of Pasar Kayoon Area, Segment 5
Source: Google Street View, 2025

Commercial signage has evolved incrementally over the years. In 2015, shop signs were relatively small, often integrated into the shopfront canopy or attached to the upper facade. By 2020, several shops replaced these with larger, more vividly coloured printed banners and boards, enhancing visibility from the street. Some signs extend horizontally across multiple units, creating a continuous visual band. Despite these updates, there is no clear implementation of coordinated area signage or thematic branding for the segment. Area-wide identifiers or wayfinding elements are absent, leaving visual communication entirely dependent on individual shop initiatives.

In summary, the key observations from the longitudinal analysis of Segments 1 to 5 between 2015 and 2025 can be synthesised into the comparative table below. This table consolidates the detailed findings on building element transformations, outdoor space utilisation, and signage evolution, alongside the overall conclusion for each segment. It serves as a condensed reference, enabling a clear comparison of development patterns, functional changes, and visual outcomes across the study area.

Table 2. Summary of Facade Transformation in the Pasar Kayoon 2015-2025

1. Building Elements		
Criteria	Indicators	Description
Changes in openings	Variation in the size/number of windows, doors, or ventilation	Changes in openings correspond with the conversion of single-storey buildings into two-storey units (Segments 1 & 5), improving natural lighting and air circulation within the interior.
Changes in material and finishing	Variation in wall materials, paint, or facade coatings [8]	The transition from massive walls to glass facades (Segment 2) and the repainting or canopy renewal (Segment 3) indicate adaptation to modernization and tropical climatic conditions.
Addition or reduction of structural facade elements	Inclusion or removal of columns, canopies, balconies, grilles, or shading frames [8]	The addition of canopies, balconies, and glass structures (Segments 1, 2, 4) demonstrates both functional and aesthetic efforts to enhance thermal comfort and visual appeal.
2. Outdoor Space (Forecourt Area)		
Change in land-use function	Alteration in the use of forecourt space (e.g., parking	Forecourts were transformed from parking and access areas into kiosks and merchandise displays

	converted into trading area or kiosk expansion)	(Segments 1, 4, 5), reflecting intensifying commercial use and economic adaptation.
Addition of semi-permanent structures	Emergence of tents, canopies, or temporary enclosures	The emergence of semi-permanent stalls and café seating areas (Segments 2 & 3) indicates spatial flexibility in response to user activity and environmental conditions.
Visual and circulation relationship	Alteration in access points or openings facing the public realm	The loss of pedestrian pathways due to parking and kiosk expansion (Segments 1 & 5) reduced visual and physical connectivity between buildings and public space.
3. Signage (Identity and Commercial Elements)		
Changes in signage form, size, or position	Shifts in the position or scale of banners, signboards, and lightboxes over time	The evolution from temporary printed banners to permanent boards and billboards (Segments 1, 2, 5) shows a growing emphasis on visual identity and commercial competition.
Variation in style and expression	Changes in typography, color, or logo design on signage	The introduction of minimalist and illuminated signage after 2023 (Segment 2) reflects a shift toward modern visual expression and contemporary retail aesthetics.
Integration between signage and facade	Signage incorporated as part of the facade (e.g., vertical panels, hanging signs, integrated planters)	Integration remains limited; some shops (Segment 5) formed continuous signage bands, though lacking cohesive design coordination across the corridor.

Source : Junita et.al., 2025

Segment 1 shows significant functional shift from aquarium trade to florists, influencing facade changes and forecourt usage; modest signage evolution with emerging billboards. Segment 2 displayed clear modernization trend with facade glazing, café-oriented layouts, and branding upgrades; outdoor space remains vehicle-prioritized. Segment 3 presents a stable physical form with minimal changes; gateway is key identity marker; gradual signage adoption improves visibility without altering heritage character. Segment 4 shows contrasting development patterns: municipal block maintains visual order, tenant side adapts dynamically with facade and signage changes; outdoor use constant. And segment 5 reveals gradual vertical growth in select units; outdoor spaces remain fully commercial/parking; signage upgrades individualised without unified identity.

4. Conclusion

From 2015 to 2025, the five segments of the study area displayed varying trajectories of physical, functional, and visual transformation, reflecting distinct commercial dynamics and management contexts. Segments 1 and 2 underwent the most pronounced changes, marked by significant alterations to building elements, outdoor space usage, and signage. Segment 1 transitioned from a specialized aquarium trade center to a florist-dominated frontage, accompanied by vertical expansion in some units and the replacement of semi-permanent materials with more permanent construction. Outdoor spaces shifted from semi-public extensions of kiosks to fully commercialized forecourts, eliminating pedestrian access and blurring boundaries with the main road. Segment 2 evolved from traditional food stalls into a cafe-oriented cluster, incorporating contemporary glass-front facades, upgraded signage, and partial activation of outdoor areas as customer seating, indicating responsiveness to shifting consumer preferences.

Segments 3, 4, and 5 displayed more moderate levels of transformation, though each retained distinctive development patterns. Segment 3 preserved its permanent single-storey block form dedicated to gemstone retail, with its most notable visual changes being the introduction of signage from 2021 onward and improved facade visibility through reduced street vending. Segment 4 reflected a governance-based duality: municipal-owned blocks maintained uniform facades and signage alignment, whereas tenant-managed units exhibited more dynamic facade alterations, signage diversity, and occasional vertical additions. Segment 5, dominated by florists, experienced selective vertical growth alongside incremental individual signage improvements, though the absence of coordinated branding preserved a fragmented streetscape.

Despite these varied trajectories, several shortcomings were identified across the segments, including the absence of consistent pedestrian pathways, excessive occupation of outdoor spaces for commercial display or parking, and the lack of cohesive signage systems in tenant-managed areas. To address these issues, the implementation of integrated urban design guidelines is recommended, focusing on harmonizing facade composition,

regulating signage placement, and reclaiming portions of outdoor space for pedestrian circulation. Future development should also prioritize balanced spatial allocation between commercial functions and public realm amenities, adopt materials and construction methods that ensure durability while respecting the existing urban fabric, and introduce coordinated area branding to reinforce identity. Such measures would not only enhance visual coherence but also improve accessibility, comfort, and the overall commercial vitality of the study area.

For future research**,** post-occupancy evaluations could be conducted to assess the effectiveness of design interventions on user satisfaction and commercial performance. Additionally, 3D morphological modeling can be utilized to simulate spatial transformations and visualize facade rhythm along the corridor. Community perception studies are also suggested to capture local users' experiences, preferences, and interpretations of the evolving urban character, providing a more comprehensive understanding of socio-spatial dynamics in the area.

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