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Identifying Key Assessment Criteria for Evaluating Facade Conditions of Early Shophouses in Malaysia

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Abstract

Early shop houses represent a key moment in the historical evolution of urban development in Malaysia. Their architectural significance lies in the uniqueness of their external facades, enriched by a diverse range of elements that reflect local culture, craftsmanship and historical influences. Preserving these early shop houses is essential due to their cultural and heritage value, particularly in architectural design and styles, which embody the historical narratives of Malaysia's urban centres. However, assessing the condition of these facades remains challenging due to the lack of specific classification criteria. This study aims to develop a comprehensive and sustainable framework for assessing and classifying early shop house facades. A mixed-method approach was employed to analyze prior research data on facade elements related to the study area. To validate the essential elements, a survey questionnaire was distributed to 74 participants from diverse professional backgrounds, including industry practitioners, heritage conservationists and academics. Using a five-point Likert scale (1 = Not Important, 5 = Very Important), feedback was collected to evaluate the importance of the criteria. Through rigorous data collection and analysis, the most significant assessment criteria were determined using the Importance Index (I). The study identified 35 potential criteria, grouped into ten main categories. Nine criteria were classified within the range of moderate importance, while 25 criteria with an I value exceeding 61% were deemed highly significant. This research lays the foundation for a classification model for the facades of early Malaysian shop houses, ensuring their preservation, sustainable management and continued contribution to cultural heritage.

Keywords: Facade Condition Assessment, Heritage preservation, Importance Index, Shop houses.

Introduction

An early shophouse refers to a premise constructed on or before 31 January 1948, characterized by its historical and architectural significance, forming an integral part of Malaysia's urban heritage (Azmi et. al., 2017; Mohit and Sulaiman, 2006). These historic buildings are rich in unique architectural styles and appearances. The facade, which refers to the front appearance of a building as seen from the street, is a crucial architectural component given its role in formal and trading activities (Hakim et. al., 2023, Wan Ismail and Ching, 2016). In Malaysia, the design of shophouse facades typically consists of a recessed ground floor front wall, an upper floor facade and a distinctive roof (Cantarelli et. al., 2018; Saylor, 1958).

Facades are the most important architectural elements of shophouses, capable of conveying the building's function and defining the interior space it shelters. However, various problems threaten the integrity of these facades, including demolition, being obscured by billboards or signage, lack of awareness of their historical significance, deterioration due to neglect and insensitive renovations or extensions that deface their original design (Mohamed et. al., 2023).

Facade condition assessment has therefore emerged as a crucial priority, aimed at evaluating the physical state of facade elements and identifying necessary maintenance measures (Che Ani et. al., 2015). To ensure the safety and preservation of old shophouse facades, periodic inspections must be conducted to assess their condition and plan appropriate remedial measures (Mohamad, Akasah and Rahman, 2015). A systematic evaluation is essential for identifying key assessment criteria that accurately reflect the overall state of these facades. Although prior research has explored various criteria for assessing the condition of shophouse facades, existing findings lack specificity and remain limited in scope. As a result, there is a pressing need to develop a comprehensive and standardized set of assessment criteria for evaluating the condition of early shophouse facades.

This study seeks to bridge this gap by proposing a structured framework for assessing facade conditions. By doing so, it aims to provide a scientific and systematic approach to heritage conservation, facilitating better decision-making among conservation practitioners, researchers and policymakers. A well-maintained facade contributes to the historical authenticity of the building, enhances the aesthetic value of urban streetscapes and promotes sustainable tourism (Hou et. al., 2024; Perovic and Sestovic, 2019). Furthermore, a standardized assessment framework will aid in the allocation of resources for restoration projects (Adegoriola et. al., 2024), ensuring that critical structural and aesthetic elements are prioritized in conservation efforts (Zhang and Dong, 2021; Fahim and Mou, 2024).

Key beneficiaries of this study include heritage conservationists, architects, urban planners and local authorities responsible for maintaining historic districts. The findings will help in formulating policies and guidelines for conservation practices, ensuring that restoration efforts align with heritage values. Additionally, building owners and stakeholders will benefit from the proposed assessment framework, as it provides a practical approach to prioritizing maintenance efforts.

Facade Preservation and Its Significance

A building's facade is more than just an exterior. It is a statement of identity, history and architectural brilliance. In historic structures, particularly early shophouses, facades showcase intricate craftsmanship, blending cultural traditions with colonial influences (Vafaie, Remoy and Gruis, 2023). Ornate details such as decorative plasterwork, carved timber and vibrant colours not only enhance visual appeal but also tell stories of the past. Architectural styles like Dutch Patrician, Straits Electric, Neo-classical and Art Deco bring character to heritage streetscapes as well as shaping the charm and uniqueness of historic districts (Kadyrbekova et. al., 2024). Beyond aesthetics, facades are designed with functional elements such as louvered shutters and deep overhangs to improve ventilation and protect against harsh weather.

Preserving these facades is crucial, as they represent a city's historical and cultural legacy. Without proper care, exposure to pollution, humidity and neglect can lead to deterioration, structural weaknesses and loss of heritage value (Mohamed et. al., 2023). Regular assessments help identify early signs of damage, ensuring safety and guiding conservation efforts using appropriate materials and methods. Well-maintained facades not only protect architectural authenticity but also boost tourism, attracting visitors to heritage districts and supporting local economies (Noor et. al., 2020). Furthermore, restoration aligns with sustainable urban development, reducing waste by promoting adaptive reuse instead of demolition. Ultimately, preserving facades is not just about maintaining beauty but it is about safeguarding history, enhancing economic vitality and ensuring that the legacy of our built heritage continues to inspire future generations.

Facade Condition Assessment

Assessing the condition of early shophouse facades is crucial for preserving important architectural heritage in Malaysia. These buildings embody local cultural identity and significantly boost tourism and the economy, making their upkeep essential. The assessment process is systematic and includes visual inspections, documentation and non-destructive tests to detect damages like cracks, paint peeling, and material deterioration. A scoring system ranging from 1 for severe damage to 5 for excellent condition is commonly used to gauge the facade's state and determine conservation needs (Rossalina and Farid, 2018).

Various tools are used in façade assessments, including checklists, digital technologies, and laboratory tests (Adysa, Suriadikusumah and Arifin; 2023, Johar et. al., 2011). Manual inspections rely on damaged benchmark forms and visual scale charts, which are general but not always specific. Advanced digital technologies, such as LiDAR, photogrammetric mapping, and 3D modeling, offer a comprehensive façade analysis (Abd Rahman, Abdul Rahman and Adnan, 2017). However, these methods can be costly and time-consuming. Laboratory tests are conducted to analyze building materials such as bricks, mortar, and wood, assessing their strength and degradation levels.

While Malaysia still lacks a comprehensive assessment system, initiatives in Melaka and Penang designated as UNESCO World Heritage Sites, represent early efforts toward effective preservation. In contrast, countries like Singapore and several European nations employ advanced technologies and holistic methodologies to ensure precise evaluations and sustainable maintenance strategies.

Categorizing Building Facade

The facade of a shophouse can generally be divided into three main sections which are the lower level, the upper level, and the cornice level (Abd Rahman et. al., 2023). Figure 1 below illustrates the sections of the facade in an early shophouse.

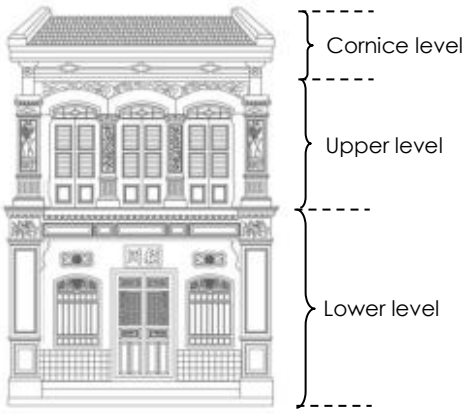

Figure 1: Typical Early Shop House building facade

The lower level, often referred to as the shopfront, typically features a pair of square or cylindrical columns. This section encompasses fundamental architectural elements, including the five-foot walkway and the main entrance. While, the upper level serves as the primary residential space and exhibits more pronounced aesthetic values, adorned with finer architectural details compared to the lower level. The cornice level, also known as the finishing level, is located just below the ceiling and is characterized by decorative moldings that enhance the overall visual appeal of the façade (Azmi et. al., 2017).

Each level features distinct architectural elements that visually define and enhance the uniqueness of the facade (Mohd Baroldin and Mohd Din, 2018). Table 1 describes the elements of facade in detail. The lower level, often referred to as the storefront, typically features two pillars of either square or round shape (Majid and Rasyidi, 2023, Wan Ali and Ahmad, 2021; Jaafar, 2019; Karya, 2012; Nafida, 2007, Matondana, 2005). The key components within the lower level are situated between the five-footway and the main entrance (Saari et. al., 2021, Zwain and Bahauddin, 2017). In contrast, the upper level serves primarily as a residential space and exhibits more prominent decorative elements compared to the lower level (Nik Hanapi and Tugang, 2021; Rahman et. al., 2021; Zwain and Bahauddin, 2021; Han and Beisi, 2015). Finally, the cornice, an ornamental molding positioned just below the ceiling, adds further visual interest to the facade (Wagner, 2017; Ali, Hadi and Ishak, 2015).

Table 1
Elements of building facade

Element	Sub-Element	Call
Parapet (PR)	Cornice	PR01
	Brackets	PR02
	Corbel	PR03
	Dentils	PR04
	Pediments	PR05
	Ornaments	PR06
Balcony (BL)	Balustrade	BL01
	Cornice	BL02
Canopy Roof (CR)	Form	CR01
	Material	CR02
Signage (SG)	Material	SG01
	Size	SG02
Roof (RF)	Roof materials	RF01
	Eaves	RF02
	Fascia board	RF03
	Jack roof	RF04
Window (WD)	Head	WD01
	Window design	WD02
	Sill	WD03
	Transom	WD04
	Bulkhead	WD05
Wall (WL)	External finish	WL01
	Ornaments	WL02
	Vents	WL03
Column (CL)	Circular/ Square shafts	CL01
	Capital	CL02
	Pilasters	CL03
	Plinth/ Base	CL04
Door (DR)	Door design	DR01
	Door frame	DR02
	Door head	DR03
	Fanlight	DR04
Walkway (WW)	Arcade	WW01
	Floor finishes	WW02
	Ceiling	WW03

Methodology

The initial step in developing a facade condition assessment system involves the identification of crucial assessment criteria. In order to evaluate and classify the condition of building facades, potential assessment criteria were extracted from the relevant literature review conducted by previous researcher. These identified criteria served as the foundation for a questionnaire that was administered to gather the opinions of respondents regarding the significance of the assessment criteria. The respondents, comprising professionals and scholars with over five years of experience in the management of heritage buildings, were selected from a panel of experts. A Likert scale consisting of five points, ranging from "1 = Not Important" to "5 = Very Important," was employed to collect feedback on the perceived importance of the criteria. By employing data collection and analysis techniques, the most

significant assessment criteria were determined using the Importance Index (I), which was computed using the following equation (Nuaraheni et. al., 2023):

$$\left(\sum_{i=1}^{5} wi \quad x \quad fxi\right) x \quad 100/5n$$

Where:
wi = constant specifies the weight assigned to i
fxi = variables that specify the frequency of i,
n = respondents n.o.s.
Table 2 displays the Importance Index (I) values pertaining to the interpretations.

Table 2
Importance index range value and interpretation

Range Value	Interpretation (Int.)
81% ≤ I < 100%	Very important
61% ≤ I < 80%	Important
41% ≤ I < 60%	Moderate important
21% ≤ I < 40%	Less important
0% ≤ I < 20%	Not important

Findings and Analysis

The analysis of findings provides critical insights into the key criteria for assessing the condition of old shophouse facades in Malaysia. The data collected from 74 respondents represents a diverse group of professionals, including academicians (39%), engineers (28%), architects (11%), building surveyors (11%) and contractors (4%), offering a well-rounded perspective on the subject. Male respondents dominate at 67%, while females make up 33%. Most respondents are mid-career professionals aged 41–50 (51%), with significant field experience at 51% have 11–15 years and 39% have 16–20 years. This extensive experience strengthens the reliability of the results, complemented by high educational qualifications with 67% holding a first degree, 22% possessing a master's degree and 11% having a Ph.D.

The response rate of 66.6% indicates strong engagement and highlights the presence of well-informed opinions. The integration of academic expertise, diverse professional backgrounds and practical experience ensures robust insights. This multidisciplinary approach enables a reliable evaluation of the condition, architectural significance and maintenance needs of old shophouse facades in Malaysia, contributing to their preservation and relevance in the modern urban landscape.

Figure 2 to Figure 6 below present the demographic analysis, categorized and illustrated through detailed graphs.

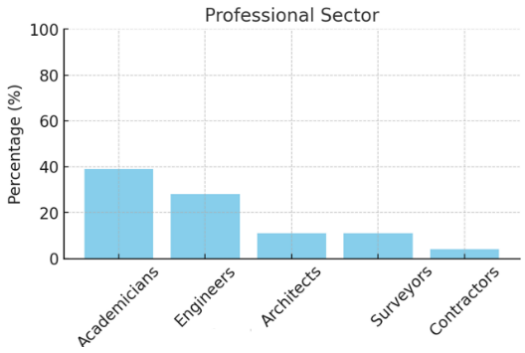

Figure 2: Professional Sector Distribution

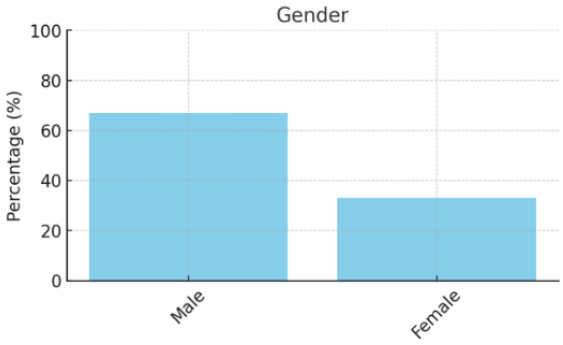

Figure 3: Gender Distribution

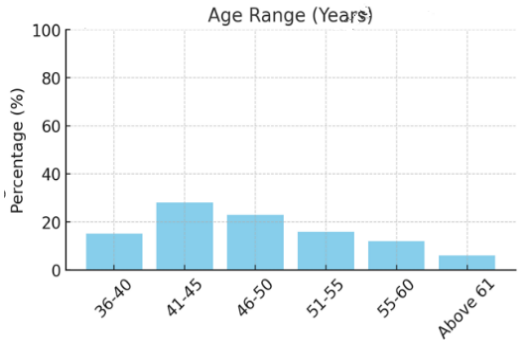

Figure 4: Age Range of Respondents

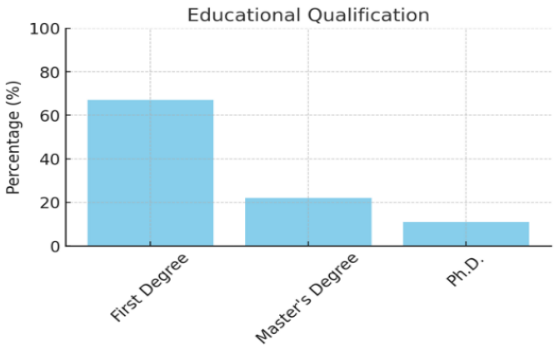

Figure 5: Educational Qualification Distribution

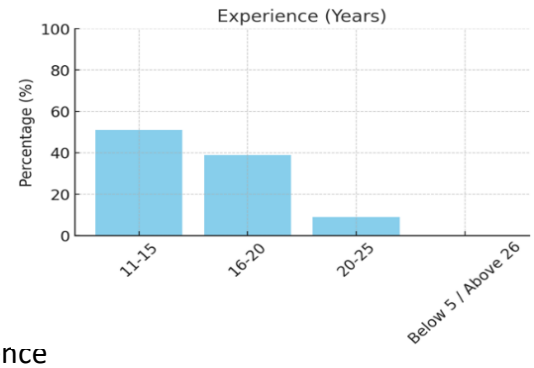

Figure 6: Years of Experience

Findings

The criteria listed were ranked in order of importance using the Importance Index (I) calculation. The results, indicating the significant criteria for assessing the condition of old shophouse facades in Malaysia, are presented in Table 3.

Table 3
Important criteria for measuring the facade condition

Call	Element	Important Index (%)	Rank	Int.
WL01	External finish	96.1	1	
RF01	Roof materials	95.7	2	
WD02	Window design	95.2	3	
DR01	Door design	94.6	4	
SG02	Signage size	94.3	5	
BL02	Balcony cornice	93.9	6	
PR01	Parapet cornice	93.5	7	
PR04	Dentils	92.9	8	
RF03	Fascia board	92.3	9	
PR06	Ornaments	88.5	10	
WD03	Sill	85.0	11	
RF02	Eaves	84.2	12	Very Important
SG01	Signage material	83.5	13	
WD04	Transom	80.0	14	
WD01	Window head	79.2	15	
WD05	Bulkhead	78.1	16	
CL04	Plinth/ Base	77.7	17	
WL03	Vents	77.3	18	
CL01	Cir./ Sq. shafts	76.9	19	
DR02	Door frame	71.2	20	
DR03	Door head	70.0	21	
WW01	Arcade	66.1	22	
WW02	Floor finishes	63.8	23	
WW03	Ceiling	62.7	24	
PR05	Pediments	61.4	25	important
BL01	Balustrade	60.6	26	
WL02	Wall ornaments	59.8	27	
PR03	Corbel	59.1	28	
WL01	Pilasters	58.3	29	
RF01	Fanlight	57.5	30	
WD02	Brackets	57.2	31	
DR01	Canopy form	56.7	32	
SG02	Canopy material	55.4	33	
BL02	Jack roof	53.7	34	
PR01	Capital	51.9	35	Moderate Important

Key Assessment Criteria

Based on the results and findings presented in Table 3, the essential assessment criteria for evaluating the condition of old shophouse facades have been carefully identified and detailed in Table 4. This compilation highlights the key factors derived from the data, ensuring a comprehensive framework for assessing the structural and aesthetic aspects of these heritage structures. The elaboration of these criteria in Table 4 serves as a crucial reference point for future evaluations and restoration efforts, promoting a deeper understanding of the underlying considerations essential for maintaining the integrity and value of these historical facades.

Table 4
Establishment of Key Assessment Criteria

Element	Old Call	New Call	Key Assessment Criteria
Parapet (PR)	PR01	PR01	Cornice
	PR04	PR02	Dentils
	PR05	PR03	Pediments
	PR06	PR04	Ornaments
Balcony (BL)	BL01	BL01	Cornice
Signage (SG)	SG01	SG01	Material
	SG02	SG02	Size
Roof (RF)	RF01	RF01	Roof materials
	RF02	RF02	Eaves
	RF03	RF03	Fascia board
Window (WD)	WD01	WD01	Window head
	WD02	WD02	Window design
	WD03	WD03	Sill
	WD04	WD04	Transom
	WD05	WD05	Bulkhead
Wall (WL)	WL01	WL01	External finishes
	WL03	WL02	Vents
Column (CL)	CL01	CL01	Cir./ Sq. shafts
	CL04	CL02	Plinth/ Base
Door (DR)	DR01	DR01	Door design
	DR02	DR02	Door frame
	DR03	DR03	Door head
Walkway (WW)	WW01	WW01	Arcade
	WW02	WW02	Floor finishes
	WW03	WW03	Ceiling

Discussion

The Importance Index analysis's conclusions offer insightful information about the most important factors to consider when evaluating the state of Malaysia's historic shophouse facade. With a 96.1% relevance index, the external finish seems to be the most crucial component. This illustrates how crucial surface beauty and long-lasting materials are to maintaining the building's architectural character and historical significance. High rankings for door design (94.6%), window design (95.2%) and roofing materials (95.7%) highlight the significance of functional components that support the building's structural and aesthetic integrity. These elements are significant not just for their functional use but also for adding to the facade's historical appeal.

The significance of intricate carpentry in historic buildings is demonstrated by decorative components that rank highly, such as signboard size (94.3%), balcony carvings (93.9%) and wall carvings (93.5%). This implies that in order to maintain the original structural integrity, conservation efforts should concentrate on these elaborate design elements. The idea that the ornamental and functional elements are essential to maintaining the old shophouse's cultural and historical relevance is reinforced by the placement of aesthetic elements in the top position.

As demonstrated in Table 4, combining these criteria into more general categories makes the review process easier to understand by putting similar items together. For instance, wall elements like dentils, pediments, embellishments and carvings are grouped together under a single category to recognize their combined contribution to the building's unique architectural style. Comparably, roof components such as fascia boards, eaves and roofing materials are grouped together into a single category, emphasizing the roof's vital role in maintaining structural integrity and historic authenticity. The holistic approach to tackling these components can help conservation efforts become more targeted and effective.

Because windows are grouped together in one category and have high design rankings along with related components (such casements, transoms and caps), this emphasizes the significance of these characteristics even more. Windows are a notable decorative element as well as a practical part of a shophouse's front. Maintaining the original architectural significance and design intent is made possible by careful conservation, which also adds to the heritage structure's overall integrity.

The assessment procedure is made simpler by this unified approach, which also offers a more precise framework for setting conservation efforts in order of priority. Preservationists can make sure that restoration work complies with the structural and preservation requirements of major historic features by concentrating on the most crucial components: windows, roofing materials and external treatments. The preservation of Malaysia's old shophouse architectural legacy in a sustainable and culturally sensitive manner is guaranteed by this blending of utilitarian and aesthetic considerations.

Implications for Conservation Practices

These results have significant ramifications for the preservation of cultural heritage, especially when it comes to giving facade features first priority during restoration and upkeep initiatives. The necessity for interventions that concentrate on the functional and aesthetic features of this structure is demonstrated by the high ranking of the external finishes, roofs, windows and wall decoration details.

In practical terms, these findings can help lead the creation of conservation guidelines, which will help contractors, building surveyors and architects better target their efforts. The structural integrity and historical relevance of the facade can be respected while carrying out conservation work by starting with the most crucial components, such as window design, outside finishes and roofing materials.

These results also add to the conversation about sustainable conservation methods. Conservation experts can maximize resource allocation, minimize material waste and boost the overall effectiveness of restoration projects by determining the most important facade features. This is consistent with more general sustainability objectives, especially when it comes to heritage protection, where environmental responsibility and long-term sustainability are becoming more and more crucial.

Conclusion

This study has comprehensively analyzed and identified the primary evaluation criteria for assessing and classifying the condition of old shophouse facades in Malaysia. From an initial pool of 35 potential criteria, ten key categories were established: walls, balconies, signs, roofs, windows, columns, canopy roofs, doors and walkways. These categories were prioritized using the Importance Index (I), which determined that criteria with values below 61% were less significant, leaving 25 criteria with higher significance. Among these, ten criteria stood out as the most critical for evaluating facade conditions, forming the basis for a classification model tailored to the unique characteristics of old shophouses in Malaysia. The findings of this study provide a robust framework for assessing facade conditions, offering practical insights for preservation and restoration efforts. However, to enhance the reliability and applicability of these results, it is recommended that the framework be tested across a broader range of shophouses in various regions. This would account for architectural and material variations and validate the criteria's universality. Incorporating feedback from stakeholders, including local communities and heritage organizations, would further refine the framework, ensuring it aligns with technical and cultural considerations. Future studies could explore the integration of advanced technologies such as 3D scanning, artificial intelligence (AI) and geographic information systems (GIS) to improve the accuracy and efficiency of facade assessments. Additionally, research into the environmental and climatic impacts on facade deterioration would provide valuable insights for targeted preservation strategies. Investigating the economic and social implications of facade restoration, including cost-effectiveness and heritage tourism potential, could also contribute to more sustainable conservation efforts. These future actions will not only build upon the findings of this research but also strengthen the collective effort to preserve Malaysia's architectural heritage.

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