



Visual Identity and Architectural Character of Residential Architecture in Jeddah (Continuity, Transformation, and Contemporary Adaptation)

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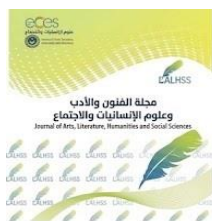
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ABSTRACT

Historic Jeddah represents a distinctive architectural and urban environment in which visual identity developed through the interaction of environmental conditions, cultural practices, social requirements, and traditional construction techniques. This study examines the visual character of residential architecture in Historic Jeddah, focusing on the relationship between traditional architectural principles and contemporary transformation. A qualitative visual and documentary analysis is used to examine the traditional urban fabric, residential building forms, façade elements, materials, and environmental responses, together with documented contemporary examples. Particular attention is given to features such as compact and vertically organized buildings, narrow and irregular passages, roshan, mashrabiya, takaleel, roof spaces, and locally adapted materials. The analysis indicates that traditional visual identity was not based primarily on ornamentation but emerged from the integration of environmental adaptation, privacy, spatial organization, construction, and cultural practices. Contemporary development has altered this relationship through rapid urbanization, technological change, modern construction materials, standardized planning, changing lifestyles, and globalization. The study further identifies contemporary examples in which traditional principles are reinterpreted rather than literally replicated. It concludes that maintaining Jeddah's architectural identity requires contextual adaptation of environmental, spatial, cultural, and visual principles while accommodating contemporary residential needs and technologies.

Keywords: Historic Jeddah; architectural identity; visual character; residential architecture; vernacular architecture; roshan; mashrabiya; urban morphology; heritage; Saudi Arabia.



1. Introduction

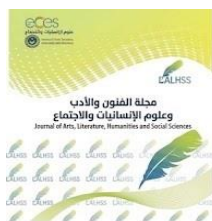
Architecture is not merely a physical response to functional requirements; it expresses the relationship between people, culture, environment, and place (Rapoport, 1977). The visual character of a city emerges from the interaction of buildings, streets, open spaces, materials, construction techniques, architectural details, and patterns of movement and occupation (Lynch, 1964; Pop, 2013). Accordingly, architectural identity is expressed not only through individual buildings but also through their relationships with the surrounding urban environment (Rapoport, 1977; Mortada, 2014).

This relationship is particularly evident in historic settlements, where architectural form developed progressively in response to environmental and social conditions. Traditional environments demonstrate close relationships between climate, materials, construction technology, social customs, privacy, and spatial organization (Altman & Chemers, 1980; Rapoport, 1977). Thus, visual character often results from accumulated practical and cultural solutions rather than from a predetermined aesthetic style (Fathy, 1986; Eyuce, 2012).

Historic Jeddah provides an important context for examining this relationship. Located on Saudi Arabia's western coast, the city historically functioned as a major port and gateway to Makkah, facilitating extensive cultural and commercial exchange that influenced its construction practices and architectural vocabulary (Farsi, 1991; Khan, 1981; Al-Harbi, 2002). As part of the Hijazi architectural region, its development was shaped by the hot and humid coastal climate, pilgrimage, commerce, and interaction with other parts of the Islamic world (Khan, 1981; Mortada, 2014).

The traditional residential environment of Historic Jeddah was characterized by dense building masses, narrow and irregular passages, localized open spaces, and strong relationships between movement and visual perception (Abu-Ghazze, 1994; Mortada, 2014). Enclosed by a wall with several gates, the historic fabric consisted of interconnected alleys, residential buildings, meeting points, and open spaces known as barahat (Khan, 1981; Mortada & Eissa, 2011–2014). Variations in passage widths, bends, and spatial sequences created a dynamic visual experience that differed from the repetitive layouts of many modern residential areas (Lynch, 1964; Pop, 2013; Mortada, 2014).

Traditional residential buildings developed in response to these urban and environmental conditions. Houses were commonly vertically organized within compact footprints and incorporated thick stone walls, timber elements, and carefully designed openings to address climatic requirements (Fathy, 1986; Khan, 1981; Kamal, 2014). Among the most distinctive façade elements was the roshan, which connected interior and exterior spaces while contributing to ventilation, daylight control, solar protection, and privacy (Al-Shareef, 1996; Hariri, 1991). Similarly, the mashrabiya balanced environmental performance and social privacy, while takaleel developed from structural elements into recognizable components of the façade (Khan, 1981; Mortada & Eissa, 2011–2014). Roof spaces and kharajat also provided domestic



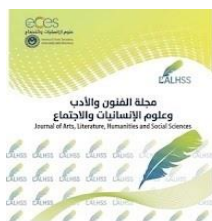
functions while contributing to the architectural expression of upper levels (Khan, 1981; Kamal, 2014).

The architectural character of Historic Jeddah therefore resulted from the integration of environmental, social, cultural, technological, and material factors. Climate influenced orientation, openings, shading, ventilation, and massing (Fathy, 1986; Al-Shareef, 1996), while social practices shaped privacy, domestic organization, entrances, and gendered spatial relationships (Altman & Chemers, 1980; Rapoport, 1977; Abu-Ghazzeh, 1994). Available materials and construction technologies further influenced building height, wall construction, structural articulation, and façade treatment (Khan, 1981; Mortada & Eissa, 2011–2014), producing a recognizable architectural language associated with Jeddah (Farsi, 1991; Mortada, 2014). The visual identity of the historic environment was therefore rooted in the interaction of these conditions rather than in isolated decorative elements (Ahmed, 2026).

Rapid economic and urban development subsequently transformed Jeddah's residential environment. New construction systems, materials, mechanical cooling, glazing, aluminum windows, and standardized building components increasingly replaced traditional responses to climate and privacy (Al-Hashimi, 2000; Al-Harbi, 2002). Contemporary residential areas also adopted more regular street networks and repetitive building configurations, with fewer of the spatial transitions, irregularities, meeting points, and human-scale sequences characteristic of the historic fabric (Abu-Ghazzeh, 1994; Mortada, 2014). These transformations have contributed to a growing separation between contemporary residential development and the environmental and cultural conditions that historically shaped Jeddah's architecture (Al-Hashimi, 2000; Al-Harbi, 2002).

However, contemporary architecture does not necessarily need to reproduce historic buildings literally. Modern housing must respond to changing demographics, technologies, regulations, economic conditions, lifestyles, and environmental requirements. The challenge is therefore to identify and reinterpret the principles embedded in traditional architecture rather than merely reproduce its forms (Kamal, 2014; Mortada, 2014). Superficial reproduction of traditional motifs may create buildings that resemble heritage architecture without retaining its environmental, spatial, or cultural logic, while completely rejecting traditional vocabulary may disconnect architecture from local identity. A more productive approach is to translate underlying traditional principles into contemporary design (Fathy, 1986; Rapoport, 1977; El-Shorbagy, 2010).

Examples discussed in previous studies demonstrate the potential for such reinterpretation. Residential projects associated with Hassan Fathy and Sami Angawi attempted to connect contemporary domestic requirements with principles derived from traditional Hijazi architecture (Alkhateeb, 1979; El-Shorbagy, 2010; Badia, 2012). Other experiments explored the adaptation of the roshan through modern materials and technologies while retaining aspects of its visual and functional characteristics (Hariri, 1991).



Accordingly, this paper approaches Jeddah's residential architectural identity as a dynamic relationship between continuity and transformation. Rather than viewing identity as a fixed collection of historical forms, it examines how visual character was historically generated, how it has been transformed by contemporary development, and how traditional principles can be reinterpreted within present-day residential architecture (Mortada, 2014; Kamal, 2014).

1.2 Research Gap

Previous studies have addressed important dimensions of Historic Jeddah's architectural heritage from different perspectives. Abu-Ghazze (1994) examined the relationship between built form, religion, and the historic urban structure; Khan (1981) documented traditional Jeddah houses and their architectural characteristics; and Al-Shareef (1996) investigated the environmental performance of the roshan. Eyuce (2012) explored the relationship between traditional house form and settlement pattern, while Kamal (2014) examined the morphology, climatic design, and environmental sustainability of traditional Jeddah architecture. Mortada (2014) addressed the architectural and urban characteristics of Historic Jeddah, and Mortada and Eissa (2011–2014) contributed to documenting traditional Saudi architecture.

Despite this substantial body of research, the literature provides limited integration of urban morphology, building form, environmental performance, social requirements, architectural vocabulary, materials, and visual perception as interconnected dimensions of architectural identity. Existing studies have also documented changes associated with technological development and globalization, particularly in façade composition, materials, and architectural expression (Al-Hashimi, 2000; Al-Harbi, 2002), but fewer studies have examined these transformations through a unified comparison of traditional and contemporary residential visual character.

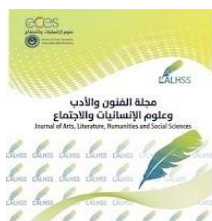
A further gap concerns architectural continuity. Elements such as the roshan developed in response to environmental, social, and functional requirements (Al-Shareef, 1996; Fathy, 1986). Therefore, continuity may depend not simply on reproducing historical forms but on adapting the principles underlying them to contemporary conditions (El-Shorbagy, 2010; Kamal, 2014).

Accordingly, this study addresses these gaps by integrating the urban, architectural, environmental, social, and visual dimensions of residential architecture in Historic Jeddah, comparing traditional characteristics with contemporary transformations, and examining how traditional architectural principles can be adapted to contemporary residential requirements.

1.3 Aim of the Study

The aim of this study is to examine the visual character and architectural identity of residential environments in Historic Jeddah and to analyze the transformation of this character in contemporary residential development.

More specifically, the study seeks to identify the environmental, cultural, social, functional, and architectural factors that contributed to the formation of the traditional visual character of Jeddah's residential architecture and to examine how contemporary development has altered these relationships. It further explores how traditional



architectural principles and vocabulary may be reinterpreted in contemporary residential design without reducing architectural identity to the superficial replication of historical forms.

The overall objective is therefore consistent with the original study's aim of developing recommendations that support the identity and environmental character of contemporary residential architecture in Jeddah.

1.4 Research Questions

The study addresses the following research questions:

RQ1. What are the principal visual characteristics of traditional residential architecture and urban fabric in Historic Jeddah?

RQ2. What environmental, social, cultural, functional, and constructional factors contributed to the formation of this traditional visual character?

RQ3. How have economic development, technological change, globalization, building regulations, and changing residential requirements transformed the visual character of residential architecture in Jeddah?

RQ4. How can the principles underlying Jeddah's traditional architectural identity be adaptively reinterpreted in contemporary residential architecture?

2. Literature Review and Theoretical Framework

2.1 Architectural Identity and Visual Character

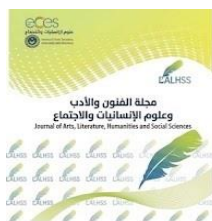
Architectural identity emerges from the interaction between built form, culture, environment, and social practices. The visual character of an urban area is shaped by elements such as paths, districts, nodes, landmarks, building profiles, façades, openings, and the relationship between solid and void (Lynch, 1964; Rapoport, 1977). Thus, visual identity is not limited to architectural ornament but reflects the broader relationship between people and place.

In traditional environments, architectural form develops through adaptation to local climatic and cultural conditions. Environmental requirements, available materials, construction techniques, and social values collectively influence building form and visual expression (Fathy, 1986; Altman & Chemers, 1980). Previous studies of Historic Jeddah have documented a distinctive residential character associated with dense urban form, vertical development, shaded openings, timber elements, and privacy-oriented spatial organization.”

2.2 Visual Perception and Urban Form

Visual perception plays a central role in understanding architectural character because people experience the built environment through sequences of views, spatial boundaries, movement, scale, light, color, and form (Pop, 2013). Lynch (1964) similarly emphasized the importance of legibility and identifiable urban elements in forming mental images of cities.

Previous documentation of Historic Jeddah indicates that irregular alleys, changing spatial widths, barahat, building masses, and gateways contributed to sequential visual experiences within the historic urban fabric.



2.3 Vernacular Architecture and Environmental Adaptation

Vernacular architecture represents accumulated responses to local environmental and social conditions. Fathy (1986) emphasized the importance of climate-responsive architectural solutions, while Al-Shareef (1996) demonstrated the environmental significance of traditional Hijazi roshan systems. In traditional Hijazi architecture, the roshan has been documented as combining ventilation, daylight control, solar protection, and privacy, while also becoming an important component of architectural identity (Al-Shareef, 1996; Fathy, 1986).

2.4 Heritage Continuity and Contemporary Adaptation

Architectural identity is dynamic rather than static. Contemporary development can maintain continuity by adapting the principles of traditional architecture to new technologies, lifestyles, and functional requirements. In Jeddah, rapid economic growth, technological change, imported materials, and contemporary regulations have weakened several traditional relationships between architecture and its environmental context.

Therefore, continuity should not depend on copying historical forms. Instead, contemporary design can reinterpret principles such as climatic responsiveness, privacy, human scale, material expression, and controlled relationships between interior and exterior. Examples such as the Sami Angawi House and contemporary adaptations of the roshan demonstrate the possibility of connecting traditional identity with contemporary requirements.

2.5 Historic Jeddah: Environmental, Cultural, and Urban Context

Historic Jeddah is located on the western Red Sea coast of Saudi Arabia and historically functioned as an important port and gateway to Makkah. Its commercial and pilgrimage connections encouraged cultural exchange that influenced local construction techniques and architectural vocabulary (Farsi, 1991; Mortada, 2014). Previous studies have associated Jeddah's hot and humid coastal climate with residential strategies such as compact building forms, thick stone walls, shaded openings, timber screens, and vertical development (Fathy, 1986; Al-Shareef, 1996). Historical documentation describes the urban fabric as comprising dense residential blocks, irregular alleys, gateways, and small open spaces known locally as barahat (Abu-Ghazze, 1994; Mortada & Eissa, 2011–2014).



Figure 1. Visual and Spatial Characteristics of the Historic Jeddah Urban Fabric (Ahmad, 2016).

Previous studies have associated the vertical development of traditional houses with limited plots and environmental and social requirements (Akbar, 1998; Eyuce, 2012; Kamal, 2014). The roshan was particularly significant because it combined ventilation, daylight, solar protection, and privacy while establishing a strong visual relationship between the interior and exterior (Al-Shareef, 1996; Fathy, 1986). Thus, the visual identity of traditional Jeddah resulted from the integration of environmental, social, cultural, functional, and constructional factors rather than from ornament alone.

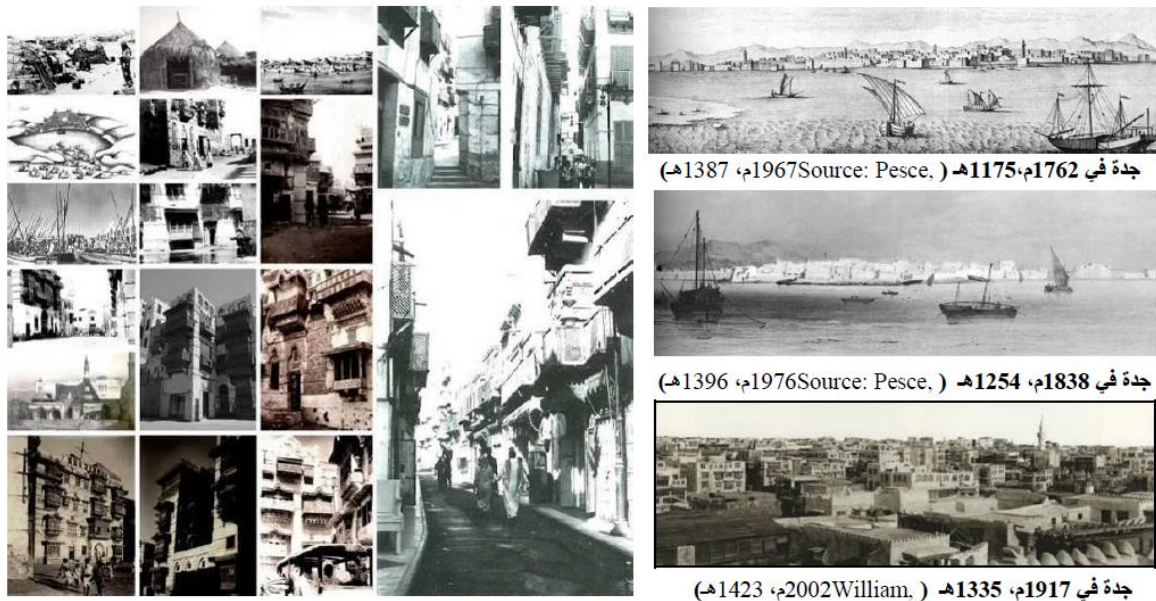


Figure 2. Historical Development and Architectural Character of Traditional Jeddah (Ahmad, 2016).

2.6 Components Forming the Visual Character of Heritage Dwellings in Jeddah

The main visible structure of the traditional house in Jeddah generally consists of several floors whose characteristics and uses are reflected in clear visual features on the residential façades (Figure 9). The buildings are constructed from coral-stone masonry and covered with a thick layer of plaster and lime to protect them from air and moisture. They are supported and reinforced by horizontal teak-wood members known as takaleel. These takaleel create horizontal lines across the façades, providing a sense of visual balance and structural security. The structure extends vertically in order to maximize natural ventilation within the house.

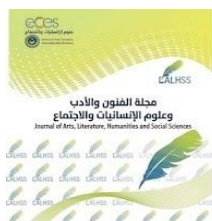
A dominant element that characterizes the visual appearance of most dwellings is the roshan, which covers the openings of the house, particularly the larger ones. These wooden elements, including doors, windows, and roshans, are fixed to the main structural framework. Most houses in the Hijaz region consisted of two to five floors, with a total floor area of approximately 200–500 m² for most dwellings (Al-Shareef, F. M., 1996). Buildings in this region are generally rich in carved wooden or plaster ornamentation featuring geometric and vegetal decorative patterns. These elements provide large areas of shade on building façades, thereby enhancing the building's resistance to external heat (Ibrahim Abdel-Baqi Mohammed, 1999).



Figure 3. Visual Features and Elements Forming Residential Façades

Source: Researcher's field study, 2016 (1437 AH). (Ahmad, 2016)

The surrounding city wall and adaptation to Jeddah's hot and humid climate contributed to the concentration and vertical development of residential buildings, which became a distinctive visual characteristic of Historic Jeddah and facilitated air



movement. Traditional houses can generally be classified by the number of exposed façades into single-, double-, and multiple-façade houses. This classification influenced the distribution and treatment of openings with roshans. Single-façade houses could extend roshans across the façade to maximize airflow, while double-façade houses combined partially solid façades with roshans overlooking another façade or malqaf. Multiple-façade houses, resulting from their relationship to streets or irregular plans functioning as malqafs, commonly used tall windows fitted with wooden shutters (shish) (Umm Al-Qura University, 1999).

The architectural vocabulary of Jeddah's traditional dwellings combines visual and functional elements, including roshans, mashrabiya, projecting elements, takaleel, entrances, roof terminations, tayrima, shaboura, rainwater spouts, and qamariyya. Together, these elements contributed to the distinctive visual character of Historic Jeddah's residential architecture.

Roshan

The roshan is one of the most important visual elements of traditional architecture in the Hijaz region of Saudi Arabia. The term is derived from the Indian word *rushaandan*, referring to a source of light or clerestory, namely windows located near the ceiling (Al-Shareef, F. M., 1996, 1416 AH). Hassan Fathy suggested that the term originated from *sharab*, meaning a place for drinking, and described the roshan as a projecting space covered with openwork wooden screens (Fathy, H., 1986, 1406 AH).

The roshan has three orientations that help capture air currents and distribute light within the house. In Jeddah's hot and humid climate, ventilation was essential, while the roshan also provided protection from solar radiation. Wood contributed to thermal insulation, and façades were therefore designed with openings covered by perforated and decorated wooden screens (Khan, Sultan Mahamud, 1981, 1401 AH).

Originally serving environmental, climatic, and privacy-related functions, the roshan gradually became a prominent component of Jeddah's traditional residential façades. In some houses, it extends from the ground floor through four or five upper floors. According to their formal characteristics, roshans can be classified into different types and components, generally consisting of three vertically arranged parts: the base, the main structure, and the crown or head (Abbas Adas, Adnan A. Alitany, & E. Redondo, 2013, 1434 AH).

The roshan also provided spaces for sitting, communication between interior and exterior areas, sleeping, and maintaining privacy.



Figure 4. Traditional Roshan and Its Functional and Visual Components
Source: Researcher's field study, 2016 (1437 AH); Akbar, Sameer, 2013 (1434 AH) (Ahmad, 2016)

Takaleel

The takaleel represent a clearly visible horizontal element in the architecture of Historic Jeddah dwellings. Although they became an important visual feature of Jeddah's architecture, they were originally structural elements associated with the method of construction. Stones were laid in courses separated at intervals by wooden members known as takaleel. These members provided horizontal connections within the building, increased structural cohesion, and contributed to the distribution of loads across the walls at approximately one-meter intervals. Through their repeated horizontal arrangement across the façades, the takaleel gradually became an important component of the visual character of residential architecture in Historic Jeddah. Their presence creates a strong horizontal articulation that contrasts with the vertical development of the buildings.



Figure 5. Takaleel as Structural and Visual Elements of Traditional Jeddah Dwellings

Source: Researcher's field study, 2016 (1437 AH) (Ahmad, 2016).

Kharajat

Kharajat are compensatory open spaces in Historic Jeddah architecture that served as an alternative to the internal courtyard, which disappeared from many dwellings because of limited available space. They are open-to-sky spaces enclosed by walls that provide a high degree of privacy. Their enclosing walls contain architectural elements that give them a distinctive visual character.

The kharaja functions as an open extension of an enclosed residential space and can be used for sleeping, family gatherings, and drying clothes. As buildings rise above the third floor, the built-up area may be reduced by approximately the area of one room to create a kharaja above it. These spaces commonly occur at the third, fourth, and fifth levels. Their enclosing walls allow air movement while maintaining privacy. Through their repetition across upper levels, kharajat became an important visual component of Historic Jeddah's residential architecture.



Figure 6. Kharajat as Open Residential Spaces and Visual Elements in Historic Jeddah

Source: Researcher's field study, 2016 (1437 AH) (Ahmad, 2016)

Residential Roof Terminations and Roof Treatments

Roof terminations represent formal treatments derived from functional and social requirements at the upper levels of residential buildings. In many cases, these treatments are related to the kharajat and share similar architectural characteristics. They have social and functional dimensions associated with privacy and the use of roofs for activities and sleeping during hot summer nights.

At the same time, roof treatments contribute to the visual composition of the dwelling through varied patterns and forms that integrate with the other elements of the residential façade and upper levels.



Figure 7. Roof Terminations and Surface Treatments in Traditional Jeddah Dwellings (Ahmad, 2016).

Entrances and Residential Gates

The traditional Hijazi house generally contains two entrances to ensure privacy (Ebn Saleh, 1996, 1416 AH). From a visual perspective, residential doors were positioned so that they did not directly face one another, providing greater privacy. The entrance gate is an important element in establishing a relationship between individual identity within the dwelling and social identity in the external environment.

In Jeddah, residential gates were also used to express the social status of the occupants and to emphasize the grandeur of the dwelling. Their visual treatment was often developed in relation to the mashrabiya, which was one of the prominent elements used on residential façades (Al-Naeem, Mishari, 1999, 1420 AH). Many doors were characterized by two superimposed arches, adding to their visual articulation.



Figure 8. Entrances and Residential Gates in Historic Jeddah (Ahmad, 2016).



Tayrima and Shaboura

The tayrima is a spatial element located above the roof of the dwelling. It is characterized by wooden openings treated with mashrabiya, together with carved wooden decorative elements and ornamentation extending around the roof. It was generally introduced where the internal spaces of the dwelling were insufficient and therefore functioned as a supplementary space. It was primarily used for sleeping and for storing excess furniture and furnishings.

The shaboura, in contrast, consists of openings in the walls of the roof or kharajat. These openings are visually treated with wooden mashrabiya that harmonize with the treatment of the roshans. They facilitate air movement while maintaining privacy.



Figure 9. Tayrima and Shaboura in Traditional Jeddah Residential Architecture (Ahmad, 2016).

Rainwater Spouts and Qamariyya

The rainwater spout is the element used to drain rainwater from the building. Although functional in purpose, its repeated presence on residential façades makes it a recognizable visual component of traditional Jeddah architecture.

The qamariyya consists of small openings located above ordinary openings. They are visually distinguished by their relatively small size and are commonly treated with wood. Their function is associated with the movement of hot air: as warm air rises, the upper openings facilitate its escape and assist the replacement of hot air with cooler air.



Figure 10. Rainwater Spouts and Qamariyya in Traditional Jeddah Façades (Ahmad, 2016).

2.6 Theoretical and Analytical Framework

Based on the reviewed literature, the study conceptualizes the visual identity of residential architecture in Historic Jeddah through five interconnected dimensions: environmental responsiveness, social and cultural requirements, urban morphology and spatial organization, architectural vocabulary and material expression, and contemporary adaptation and continuity (Fathy, 1986; Rapoport, 1977; Al-Shareef, 1996; Mortada, 2014). These dimensions were used as analytical categories for examining the traditional residential environment, identifying transformations in contemporary development, and evaluating approaches to architectural continuity.

Table 1. Theoretical and Analytical Dimensions for Examining the Visual Identity of Residential Architecture in Historic Jeddah

Analytical dimension	Analytical indicators	Application in the study
Environmental responsiveness	Ventilation, daylight, shading, solar protection, thermal response, building massing	Examines how traditional and contemporary buildings respond to Jeddah's climatic conditions
Social and cultural requirements	Privacy, entrances, domestic organization, interior–exterior relationships, social practices	Examines how cultural and social requirements influenced spatial and architectural form
Urban morphology and spatial organization	Density, street and alley configuration, building alignment, barahat, spatial sequences, building height	Examines the relationship between residential buildings and the historic/contemporary urban fabric
Architectural vocabulary and material	Roshan, mashrabiya, takaleel, openings, façades, roof spaces, stone, timber,	Identifies the visual and material characteristics of traditional and contemporary residential



expression	plaster, glass, aluminum	architecture
Contemporary	Reinterpretation	of
adaptation	traditional elements,	Evaluates how traditional
and	modern materials,	principles and architectural
continuity	technologies, climatic	vocabulary are adapted to
	strategies, contextual	contemporary residential
	expression	requirements

The analysis applies these dimensions at two interconnected scales. At the urban scale, attention is given to morphology, density, streets, alleys, open spaces, spatial sequences, and the relationship between buildings and movement. At the building scale, the analysis examines massing, façades, openings, architectural elements, materials, environmental functions, and privacy.

The five dimensions are not treated as independent variables. Rather, they are considered interconnected aspects of the visual system through which architectural identity is produced. For example, the roshan is examined simultaneously as an environmental device, a response to privacy requirements, a component of façade composition, and a potential element for contemporary adaptation (Al-Shareef, 1996; Hariri, 1991). Similarly, urban density and narrow passages are considered in relation to environmental conditions, social practices, building form, and visual perception (Abu-Ghazzeh, 1994; Mortada, 2014).

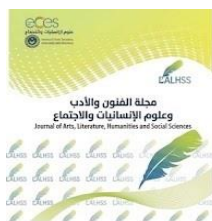
This framework provides the basis for the comparative analysis between traditional and contemporary residential architecture and ensures that the research questions are addressed through clearly defined analytical criteria.

3. Methodology

This study adopts a qualitative visual and documentary analysis based on field documentation and architectural examples. Field documentation conducted by the researcher in 2016 examined residential architecture in Historic Jeddah and contemporary urban extensions, including streets, lanes, spatial sequences, façades, openings, roof spaces, architectural elements, materials, and relationships between buildings and urban spaces.

The study does not use a statistically defined building sample; instead, documented visual and architectural material constitutes the unit of analysis. The analysis compares traditional and contemporary conditions at urban and building scales. The traditional component examines urban morphology, density, spatial enclosure, movement, building massing, façades, roshans, mashrabiya, takaleel, entrances, roof spaces, and materials. The contemporary component examines changes in urban form, street configuration, building height, façades, openings, materials, and environmental responses, including the Al-Naseem neighborhood.

Three adaptation examples—Nasseif Villa, Sami Angawi House, and contemporary roshan adaptations—illustrate continuity and reinterpretation. Analysis follows five



dimensions: environmental responsiveness; social and cultural requirements; urban morphology; architectural vocabulary and materials; and contemporary adaptation and continuity. Traditional and contemporary conditions are compared to identify continuity, transformation, reduction, and reinterpretation.

3.1 Scope and Selection of the Documented Material

The documented material was organized into three analytical groups: (1) traditional residential architecture and urban fabric in Historic Jeddah, including buildings, streets, spatial sequences, façades, openings, roof spaces, and architectural elements; (2) contemporary residential environments in Jeddah's urban extensions, including streets and building configurations; and (3) documented adaptation examples connecting traditional principles with contemporary requirements, namely Nasseif Villa, the Sami Angawi House, and contemporary roshan adaptations.

Material was included when it provided direct visual or architectural evidence related to at least one of five dimensions: environmental responsiveness; social and cultural requirements; urban morphology and spatial organization; architectural vocabulary and materials; or contemporary adaptation and continuity. The figures therefore serve as visual evidence for qualitative analysis rather than as a statistically representative building sample.

4. Results

4.1 Visual Characteristics of Traditional Residential Architecture

The visual analysis examined traditional residential architecture in Historic Jeddah through the relationships among urban fabric, building form, façade elements, materials, environmental functions, and social requirements. The documented material revealed dense building masses connected by narrow and irregular alleys, variations in passage widths, and small open spaces known as barahat. Gates and the former city wall functioned as visual boundaries and landmarks, creating varied spatial sequences and strengthening the legibility of the historic settlement (Abu-Ghazze, 1994; Mortada & Eissa, 2011–2014).

Compactness and vertical development were recurring characteristics, reflecting the relationship between limited plots, multi-storey construction, and narrow surrounding streets (Khan, 1981; Kamal, 2014). At the building scale, the roshan emerged as one of the most prominent façade elements. Its projecting form and treated timber articulation contributed to the building envelope while supporting ventilation, daylight control, shading, privacy, and controlled visual connection with the exterior (Al-Shareef, 1996; Fathy, 1986). The mashrabiya similarly combined environmental and social functions.

Kharajat and roof-related open spaces contributed to the articulation of upper levels and accommodated domestic activities such as sleeping, family gatherings, and drying clothes. Entrance configurations were organized to control direct visual access. Finally, the contrast between solid masonry and lighter timber elements, together with coral stone, timber, plaster, and lime, contributed to the material articulation and visual composition of traditional residential façades.



4.2 Transformation of Residential Architecture in Contemporary Jeddah

The transformation of residential architecture in Jeddah accompanied rapid economic growth, urban expansion, technological development, and changing housing requirements. The contemporary examples examined showed increased use of manufactured materials, aluminum, glass, mechanical cooling, and modern construction systems, alongside reduced visual prominence of traditional timber and stone elements.

Urban form also became more regular, with wider streets and more standardized spatial configurations, contrasting with the irregularity, varied enclosure, and sequential spatial experiences of the historic fabric (Abu-Ghazze, 1994; Mortada, 2014). The literature links globalization and technological development to architectural forms, materials, and design approaches that were less directly derived from Jeddah's traditional environmental and cultural context (Al-Harbi, 2002; Al-Hashimi, 2000).

Changing residential requirements further modified relationships between interior and exterior spaces. Compared with traditional architecture, elements associated with environmental adaptation, privacy, and controlled visual connections became less prominent in the contemporary configurations examined. These transformations indicate a reduction in the visible presence of several traditional environmental and social principles, with implications for the continuity of Jeddah's residential architectural identity (Kamal, 2014; Al-Shareef, 1996).

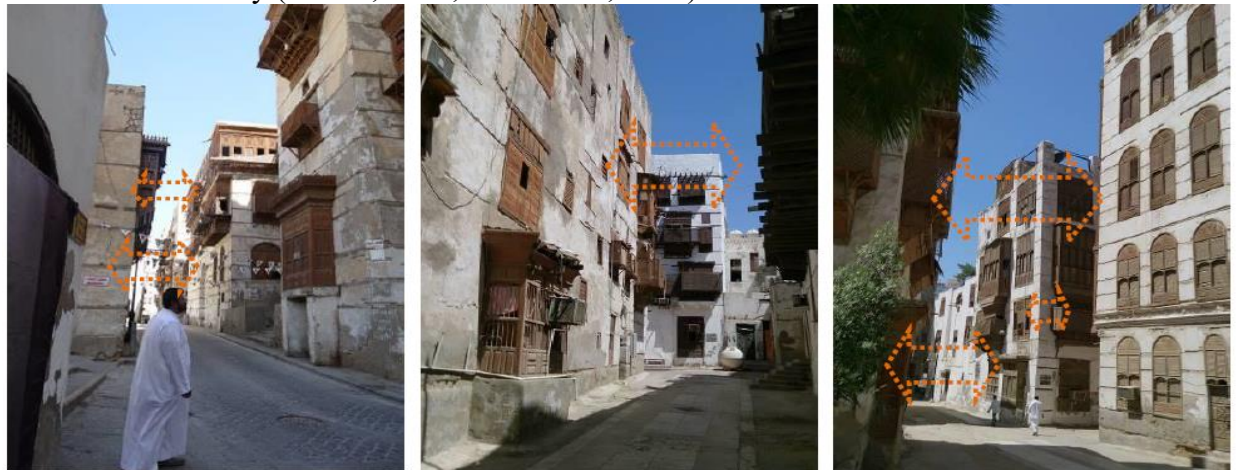


Figure 11. Traditional Residential Streetscapes and Vertical Architectural Character in Historic Jeddah

4.3 Comparative Analysis: Traditional and Contemporary Residential Architecture

The comparison was conducted across the five analytical dimensions established in the theoretical framework. The characteristics of traditional and contemporary



residential architecture were identified from the reviewed literature and the visual analysis of the study. The resulting comparison is presented in Table 2.

Table 2. Comparative Characteristics of Traditional and Contemporary Residential Architecture in Jeddah

Aspect	Traditional Residential Architecture	Contemporary Residential Architecture
Urban form	Dense and irregular fabric, narrow alleys, barahat, and varied spatial sequences (Abu-Ghazze, 1994; Mortada, 2014)	More regular layouts, wider streets, and repetitive spatial configurations (Mortada, 2014; Al-Harbi, 2002)
Building form	Compact and vertically articulated buildings responding to limited plots and local conditions (Khan, 1981; Kamal, 2014)	More standardized configurations and relatively uniform forms in the contemporary examples examined (Al-Hashimi, 2000; Al-Harbi, 2002).
Climate response	Natural ventilation, shading, thick walls, roshans, and mashrabiya (Fathy, 1986; Al-Shareef, 1996)	Greater reliance on mechanical cooling, sealed or controlled openings, modern glazing systems, and contemporary environmental-control technologies. (Al-Hashimi, 2000; Kamal, 2014)
Privacy	Integrated through screened openings, spatial organization, entrances, and controlled visual connections (Abu-Ghazze, 1994; Al-Shareef, 1996)	Greater reliance on enclosed façades and fewer visibly expressed traditional screened openings in the contemporary examples examined (Al-Hashimi, 2000; Al-Harbi, 2002)
Façades	Articulated through timber elements, roshans, mashrabiya, takaleel, and varied openings (Khan, 1981; Al-Shareef, 1996)	Greater use of glass, aluminum, standardized openings, and simpler façade treatments (Al-Hashimi, 2000; Al-Harbi, 2002)
Materials	Coral stone, timber, plaster, lime, and other locally adapted materials (Khan, 1981; Mortada & Eissa, 2011–2014)	Greater use of manufactured and imported materials, particularly aluminum and glass (Al-Hashimi, 2000; Al-Harbi, 2002)
Roof spaces	Kharajat and roof areas supported domestic activities and contributed to upper-level articulation (Khan, 1981; Kamal, 2014)	Traditional roof-related elements have become less prominent in contemporary residential configurations (Kamal, 2014)
Visual identity	Strong integration of environmental, cultural, social, and constructional	Greater variation and standardization influenced by contemporary technologies, materials, and global



Aspect	Traditional Architecture	Residential Contemporary Architecture	Residential
	characteristics (Fathy, 1986; Rapoport, 1977; Mortada, 2014)	design approaches (Al-Harbi, 2002; Al-Hashimi, 2000)	

The comparative analysis indicates that the principal difference extends beyond stylistic appearance to the relationships among environmental response, social requirements, spatial organization, construction, and visual expression. In the traditional condition documented in the literature and visual material, these requirements were closely integrated. In the contemporary examples examined, greater reliance on standardized planning, modern materials, mechanical environmental control, and contemporary construction technologies was observed (Fathy, 1986; Al-Shareef, 1996; Al-Hashimi, 2000; Al-Harbi, 2002).

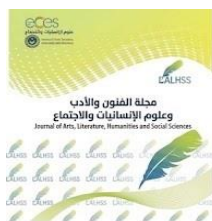
4.4 Documented Examples of Contemporary Architectural Adaptation

The documented examples illustrate different approaches to reinterpreting traditional architectural principles within contemporary residential requirements. The Nasseif House, Sami Angawi House, and contemporary roshan adaptations demonstrate continuity without direct reproduction of historic forms. The Nasseif House incorporates elements of the traditional Islamic-Arab house, including the courtyard, mashrabiya, shukhshikha, and malqaf. Its design emphasizes climate, internal spatial organization, and environmental conditions rather than external decoration alone (Alkhateeb, 1979; El-Shorbagy, 2010). Designed by Sami Angawi in 1995, the Sami Angawi House combines roshans, wooden windows, Islamic patterns, arches, and other traditional elements with contemporary residential requirements. Natural ventilation, daylight, spatial variation, and façade articulation are also incorporated into the design (Isteaque, 1990; Badia, 2012).

Contemporary roshan adaptations demonstrate further technological possibilities. One approach combines traditional visual details with internal glass and screening, while another replaces movable wooden components with aluminum and incorporates glass. These adaptations retain aspects of the roshan's environmental and visual roles while responding to contemporary materials and technologies (Hariri, 1991). Together, the examples demonstrate continuity through reinterpretation of traditional principles, environmental functions, spatial relationships, and architectural vocabulary rather than direct imitation.

5. Discussion

The findings indicate that architectural identity in Jeddah emerges from the relationship between inherited architectural principles and changing environmental, social, technological, and residential conditions. Rather than treating traditional and contemporary architecture as separate conditions, the discussion considers how architectural character develops, how transformation affects its underlying principles, and how continuity may be achieved through adaptation.



5.1 Architectural Identity as an Integrated System

Architectural identity extends beyond individual buildings to include their relationships with streets, open spaces, movement, materials, environmental conditions, and cultural practices. In Historic Jeddah, residential character can therefore be understood as a multi-scalar system operating at both urban and building levels. At the urban scale, streets, passages, density, spatial enclosure, movement, and relationships between buildings and public spaces shape visual character. At the building scale, massing, façades, openings, materials, and architectural elements contribute to the perception of individual buildings. These scales are interconnected, as buildings influence the collective urban character while their position within the urban fabric affects their visual perception.

The findings also indicate that individual heritage elements cannot be fully understood independently from the conditions in which they developed. Their significance derives partly from relationships with streets, interior organization, environmental conditions, and privacy requirements. Thus, architectural identity is better understood as a system of spatial and architectural relationships rather than a collection of recognizable motifs. This addresses the first research question concerning the visual characteristics of traditional residential architecture and urban fabric in Historic Jeddah.

5.2 From Functional Adaptation to Visual Identity

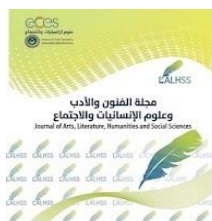
The traditional visual character of Jeddah developed through responses to environmental, social, domestic, constructional, and material requirements. The roshan provides a clear example: its appearance was associated with ventilation, daylight, shading, privacy, and controlled visual connections between interior and exterior spaces. Similar relationships can be observed in screened openings, entrances, roof spaces, spatial organization, and material articulation.

Accordingly, architectural identity is partly the visible expression of functional and sociocultural adaptation. Preserving identity therefore involves not only maintaining the appearance of individual elements but also understanding the principles and relationships that gave them significance. This finding addresses the second research question concerning the factors that shaped Jeddah's traditional visual character.

5.3 Transformation under Contemporary Conditions

Contemporary residential architecture reflects changes in construction systems, materials, environmental-control technologies, planning practices, lifestyles, and housing requirements. The documented examples show greater use of mechanical cooling, manufactured materials, contemporary glazing, and standardized configurations. These changes affect not only individual materials or elements but also the relationships among environmental response, spatial organization, privacy, construction, and façade expression.

This transformation should not be interpreted simply as a conflict between traditional and contemporary architecture. Contemporary housing must accommodate requirements that differ from those of the historic environment. The issue is therefore how inherited principles relate to changing conditions rather than whether



contemporary buildings reproduce historic forms. Because the contemporary material was qualitative and documentary rather than statistically representative, the findings describe the documented examples rather than all contemporary residential development in Jeddah. Within this scope, they address the third research question concerning economic development, technological change, globalization, regulations, and changing residential requirements.

5.4 Continuity through Adaptive Reinterpretation

The documented Nasseif House, Sami Angawi House, and contemporary roshan adaptations demonstrate ways of connecting traditional principles with contemporary residential requirements without directly reproducing historic forms. Traditional elements can be modified through contemporary materials, technologies, spatial requirements, and environmental strategies while retaining connections with inherited architectural character.

The roshan particularly illustrates this possibility through adaptations that retain selected visual and environmental characteristics while incorporating modern materials and construction methods. Continuity may therefore occur through recognizable elements, reinterpretation of functional principles, or translation of broader spatial and environmental relationships. This distinction between formal continuity and principle-based continuity allows architectural development while maintaining connections with local identity, addressing the fourth research question.

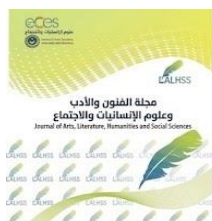
5.5 Overall Interpretation

Architectural identity in Jeddah can be understood as dynamic rather than static. Traditional character emerged through the interaction of urban form, environmental adaptation, social requirements, construction practices, and visual expression, while contemporary development has altered some of these relationships without necessarily eliminating continuity.

At the urban scale, continuity may involve spatial configuration, density, movement, enclosure, streets, open spaces, and public-space relationships. At the building scale, it may involve environmental response, privacy, massing, façade articulation, materials, openings, and architectural vocabulary. Considering these dimensions together distinguishes superficial reproduction of heritage forms from adaptation of the principles underlying them. Thus, contemporary architecture can evolve in response to present requirements while maintaining meaningful environmental, social, spatial, and visual relationships with Jeddah's architectural heritage.

6. Conclusions

This study examined the visual identity of residential architecture in Historic Jeddah through the relationship between traditional characteristics and contemporary transformation. Four main findings emerged. First, traditional architecture formed a coherent visual system characterized by dense and irregular urban fabric, vertically organized buildings, narrow alleys, barahat, articulated façades, roshans, mashrabiya, takaleel, and locally adapted materials (Abu-Ghazze, 1994; Al-Shareef, 1996; Mortada, 2014). Second, these characteristics reflected environmental, social, cultural,



functional, and constructional requirements, including climate adaptation, privacy, domestic organization, material availability, and traditional construction practices (Fathy, 1986; Rapoport, 1977; Al-Shareef, 1996). Third, contemporary development has altered these relationships through standardized configurations, modern materials, mechanical environmental control, and changing façade treatments associated with technological development, globalization, economic growth, and changing residential requirements (Al-Hashimi, 2000; Al-Harbi, 2002; Kamal, 2014). Fourth, documented contemporary examples indicate that continuity can be pursued through adaptive reinterpretation of traditional principles rather than literal reproduction, including environmental responsiveness, privacy, spatial articulation, material expression, and reinterpretation of the roshan (Alkhateeb, 1979; El-Shorbagy, 2010; Hariri, 1991). Thus, Jeddah's architectural identity can be understood as dynamic, allowing traditional principles to evolve within contemporary conditions.

7. Recommendations

1. Address architectural identity at both urban and building scales by considering streets, movement, density, open spaces, façades, and visual sequences.
2. Reinterpret environmental and social principles such as shading, privacy, ventilation, and the roshan through contemporary technologies rather than superficial imitation.
3. Integrate contemporary materials while maintaining appropriate relationships among openings, shading, façade articulation, and local architectural vocabulary.
4. Develop flexible contextual guidelines addressing massing, privacy, environmental response, materials, façades, and relationships with streets.
5. Conduct further empirical studies using systematic samples, visual assessment, environmental measurements, and comparative case studies.

8. Future Research

Future research should examine systematically defined samples of traditional and contemporary residential buildings using standardized visual criteria. Quantitative assessment of ventilation, daylight, shading, and thermal comfort could evaluate the performance of traditional strategies such as the roshan, mashrabiya, shaded openings, orientation, and façade configurations. Studies could also investigate perceptions of architectural identity among residents, architects, planners, and heritage specialists through surveys, interviews, or mixed methods. Comparative research across Hijazi and Saudi cities could identify locally specific and regionally shared characteristics, while longitudinal studies could examine whether contemporary adaptations contribute to sustained architectural continuity. Such research may support context-sensitive guidelines integrating heritage principles, environmental performance, social requirements, and contemporary technologies.



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Authors' Contributions

The author was responsible for the conceptualization of the study, development of the analytical framework, analysis and interpretation of the architectural and documentary material, writing of the manuscript, revision of the manuscript, and approval of the final version.

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