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Conceptual inspiration from heritage: the design philosophy surrounding the Saudi Arabian Rowshan

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Abstract

Rowshan is a distinctive architectural element and a primary component of the façades of traditional houses in western Saudi Arabia. It is window type primarily made from wood and is incorporated in contemporary architecture to express the identity of the Hejazi architectural heritage without the realization of the advantages of this rich architectural element. This study examines the Rowshan design philosophy by identifying its visual, functional, and structural determinants, and applying them to a model to reflect it in a modern context. The study adopts an analytical approach in addition to interviewing elders who lived in traditional houses. The results show that the Rowshan philosophy must apply all its structural, functional, and aesthetic characteristics like seating function, privacy, visual continuity, use of light, exploitation for shade, and the use of ornamental patterns and, openings, while adopting modularity, flexibility, and adaptability as important principles in its composition. This design philosophy can be a fundamental resource for creative designs to preserve Hejazi architectural identity. This study aims to renew interest in Rowshan elements in contemporary houses in the Mecca region and highlights the advantages of this unique architectural element by applying the Rowshan design philosophy.

Keywords Rowshan, Hejazi architecture, Historic Jeddah district, Jeddah's traditional houses, Inspiration, Aesthetics

Introduction

Rowshan is a representative architectural element of the Hejaz area in western Saudi Arabia and is representative of the region's aesthetic, social, cultural, and human aspects. The literature is inconclusive about the origin of the term *Rowshan*. Some resources claim a Persian origin for the term, meaning glow or window (Department for Publishing and Documentation 2001), while other resources suggest an Indian origin, as a derivative of the word *rowshandan*, which means a light source (Hariri 1991). Haseen suggested an Arabic origin for Rowshan

derived from *rshn* or *roshn* (Al Kawwah) (Al Haseen 2002).

Rawasheen (plural of Rowshan) are a window style that characterize houses in western Saudi Arabia (Jeddah, Mecca, Madinah, Yunbu, and Taif). They can also be considered an extension of the indoor space beyond the house's boundaries, similar to contemporary windows and balconies. The difference lies in the cladding materials—wood is utilized for Rawasheen while glass for windows. Rawasheen have been used in several Islamic and Arab countries, such as Pakistan, Iraq, Tunisia, and Egypt, and in the Arabian Gulf, the Levant, and the Hejaz region (Al Haseen 2002), and are still visible in Jeddah city. A Rowshan is used in many heritage houses as a part of their façade and is a distinctive and iconic element of the Hejazi architecture. Together with its functional and aesthetical aspects, the Rowshan reflects the skills of the

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artists and craftsmen who mastered this craft. Thus, it can be compared to a painting that narrates stories about the history of the space. Figure 1 illustrates the Rowshan in cities like Jeddah, Mecca, and Madinah in the Hejazi region.

Thus, the research question explored is: what are the functional, aesthetic, and structural characteristics of the Rowshan element that can best reflect the identity of the Hejazi architecture, while simultaneously remaining harmonious to the socio-cultural developments and changes of the present time?

Rowshan types

The Rowshan is a space that extends from the original building mass and is shaped, attached, or detached in vertical or horizontal groups. The horizontal and vertical lines represent a complete unit of equal proportions without a dominant side. The literature does not agree on how to determine the various Rowshan types. The following types are the most popular. The lower type is usually located on the ground floor and does not extend from the house's boundary so as to not block the air flow and circulation and includes steel bars to protect against intrusion (Al Haseen 2002). The detached type is found in the window area of a room (Hariri 1991). The attached type follows the lines of the building, either horizontal or vertical or in both directions. In this context, a horizontally attached Rowshan is similar to an ornamental belt, while the vertically attached is similar to decorative wooden strips (Al Haseen 2002). Finally, the *morakab* is known as a composite type, in which the *mashrabiya* incorporates three types—the front *mashrabiya*, the side *mashrabiya*, and the front and side *mashrabiya* (Al Haseen 2002).

Thus, Rawasheen differ in size depending on their functions (Attia 2022). In houses in the Hejazi region, Rawasheen are 3 m in height and 2.5 m in width, with a depth of 1 m or more to allow up to two users to sleep at night.

Batterjee explains that a Rowshan with a width of 2.4 m provides enough space for one person to lie down

(Batterjee 2010). The height is usually 3 m—consistent with a room's height—with a 60 cm outdoor extension. An additional 120–140 cm is usually added to the interior spaces when the wall's thickness is 80 cm (Batterjee 2010). Other sources indicate that the extensions should not be less than 60 cm (Al Haseen 2002; Taha 1984) with a height of 90 cm (Al Haseen 2002) and have the simple function of allowing daylight to enter the room and improve the ventilation.

Rowshan in the traditional houses—structure and function

Rawasheen also exhibit a seating and sleeping function and serve as a connecting element between indoors and outdoors that allow the inhabitants to observe the outdoor environment. They also control the amount of daylight, improve natural ventilation, create privacy, and shade the outdoor alleys.

Daylight and ventilation control

The structure of the Rowshan can control the direct glare of sunlight. The upper part is designed with wide grids to allow indirect sunlight to enter the space. Layers of shading elements (Al Makaseb) allow enough daylight to enter the space and are an adaptation to hot environments (Al-Hashimi and Semidor 2013). Rawasheen are also suitable for temperature fluctuations between summer and winter, and effective in different environmental conditions (Bayomi 2016).

Thus, the air entering from outside, which passes through the water-filled *mashrabiya*, helps to cool and humidify the internal ventilation of the space (Sirryeh 2021). These elements of the Rowshan also control the number of insects and the amount of dust carried into the house by the dry and hot winds (Al Amari 2006). Due to the Rowshan's extension and large size, it is able to capture the wind from three sides, which allows the area to be a multifunctional zone that is large enough for two users to sleep and stand in. This space in the house is usually favored by the household's elders. It is usually

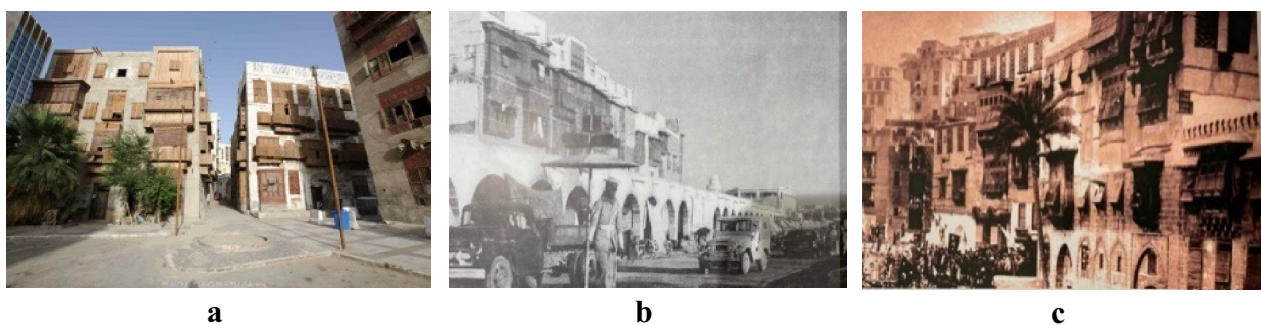


Fig. 1 Rawasheen found in western Saudi Arabia. Rawasheen in Jeddah **a** (source: the authors), Al Madinah Monwarah **b** [6], and Holy Mecca **c**.

furnished with mattresses, cotton cushions, carpets, and oil lamps and is always ready to receive guests (Encyclopaedia of Traditional Saudi Culture 2000). Because it is the main part of the gathering room, the users enjoy the daylight and natural ventilation (Al Awaji 2012).

Indoor–outdoor relationship

The outdoor functionality of Rowshan is equally practical as its indoor functionality. Rawasheen that extend from adjacent buildings function as a shading element for the street alleys, similar to umbrellas protecting a pedestrian from direct sunlight and excessive heat during summer and from rain during winter (Al Ansari and Rau 2016). Additionally, its frames cast shadows onto the façades of buildings, limiting exposure to direct sunlight, and reflecting the glare of other buildings (Al Amari 2006).

Rawasheen also provide privacy to the women, which is urged by Islam in general and by the Hejazi culture in particular; thereby lending them a religious and cultural context in the Hejazi regions. The streets' passageways are generally narrow, therefore, Rawasheen are close to adjacent buildings and facilitate connections between women from across the balconies, allowing them to observe the outdoor world without being seen. The level of privacy increases when the Rowshan is deeper and higher (Batterjee 2010) due to the small openings between the Rowshan's wooden components, which ensures residents' privacy while keeping them connected to the outside world (Al Sulami 2014). These small openings are called *sheesh* and are designed to provide privacy because the Rawasheen of the adjacent buildings are relatively close to each other (Akbar 1988).

Rowshan in traditional houses—structure and aesthetics

The aesthetic aspect of the Rowshan appears either as an independent or as a repeated element on a building's façade. Each context has particularities in which the aesthetic specificities of its components and decoration refer to the nature of their existence. When the Rowshan is a repetitive element on a building's façade, various elements, such as a belt (or a lower belt) or wooden rafters, are used to separate the Rawasheen. The lower part of the Rowshan that is covered by wood is called the *maabara*. A triangular-shaped pillar, called the *karadi*, is also present under the corners of the Rowshan to support the structure (Hariri 1991). The anchor point rests on stone or wooden racks (Ka'aki 2002). All these details are specific in the context of the integration, repetition, and extension of shapes, decorations, lines, materials, and other details that holistically reflect the specificity of Hejazi architecture in general and the traditional houses of Jeddah in particular.

There is no consensus in the literature on the Rowshan as an independent element, especially in terms of the different types, sizes, and ornamentation. Some researchers have divided the Rowshan into upper, middle, and lower parts. The upper part is similar to an ornamental crown and constitutes a wide grid that allows daylight to enter—a shading system that controls daylight entering inside the building. These parts are followed by a wooden layer covered by geometrical or floral ornaments that extends between the crown and the upper openings, and is known as the upper belt. While the middle part is equal with the lower part as a vertical movable door, it is made from hard, horizontal wooden panels to allow the flow of fresh air. The lower part of the Rowshan has dark, vertical movable doors. The Rowshan's base is a horizontal layer that extends from its lower part to the floor level (Hariri 1991).

It must be pointed out that Rawasheen follow a modular grid that is capable of infinite repetition. As for the Rowshan's repetitive horizontal and vertical elements, the *rafrac* is an ornamental horizontal wooden piece that is rotated to the lower side (Al Nataf) and functions as an umbrella to protect the Rowshan from rain and direct light. Furthermore, the wooden beams are long wooden pieces that hold the filling together—known as *hashwat* in Arabic. The filling (*hashwat*), which are square wooden pieces covered with different ornaments or rectangular wooden pieces, create diamond- or rhombus-shaped grids. Lastly, the ornamental units make up the upper part of the Rowshan (Al Haseen 2002). The methods used to manufacture the Rowshan include assembly, interlocking, and modelling in the sense of perforation, turning, and digging (Kattabi 2017).

The important characteristics of the Rowshan form

The beauty of the Rowshan emerges with the value of the timber's colors and geometric, floral, and typographical decorations that formed its parts, which account for the attraction and beauty of the building façades. Geometrical ornamentation is used on most Rawasheen due to the ease of engraving (Al Haseen 2002).

The geometrical ornamentation includes star pentagons, hexagrams, and octagonal shapes in addition to the use of different motifs (Al Mafroukah and Al Maaqali) and orientations (Fig. 2).

The floral ornamentation or motifs are usually inspired by nature and applied either by simulating or altering the objects' natural shape on the wooden surfaces. The motifs include the iris, carnation, or lady's mantle (*Alchemilla vulgaris*), or calligraphic phrases from the Quran, *duaa*, or historical events that are written in the Al Tuluth font using different techniques like wiring by color. Ornamental animal patterns and

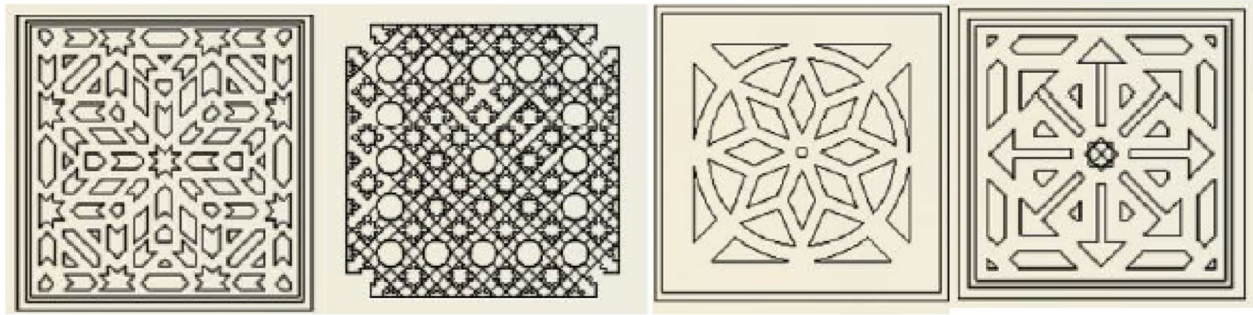


Fig. 2 Examples of geometrical motifs (Al-Uqbi 2014)

motifs are fairly rare (Kattabi 2017). Drills and saws, called *darabkeen* and *ezmeel*, respectively, are used to engrave the floral motifs.

Wood is the main building material for Rawasheen, in addition to the use of plaster in the ornaments (Bahammam 2000). Nails and steel hinges are minor components. Rawasheen are made from the finest and strongest woods that are dried for three months, in order to strengthen them to bear extreme environmental conditions for years without maintenance. Additionally, using specialized ‘Hinges’ gives them extra strength (Hariri 1991).

The Rowshan is an expensive element of the traditional houses in the Hejaz region (Darwish 2017) considering that wood, especially imported wood, is expensive. Jeddah is a coastal and commercial city located in the Hejaz region. Its strategic location facilitated the importation of wood that was locally unavailable. Teak or *jawi* wood (Al Haseen 2002) was imported from Jawa in Indonesia and was popular for constructing Rawasheen (Ghabra 2012). *Jawi* wood is known for its strength, long grain, and length (logs were between 3 and 5 m). Additionally, the wood is easy to install and highly resistant to weather conditions and insects and contains natural oil (Ka’aki 2004).

In Madinah, the local palm trunks have been replaced with *jawi* or the Egyptian wood (the white wood). After drying, the wood is painted with aloe sap to protect it from insects (Ka’aki 2004). Since the wood is the main material in the Rowshan, it was unlike glass or aluminum (Al-Sulami 2014).

Due to the high cost of the wood and difficulties encountered in manufacturing and procuring it, the Rowshan was preferred by affluent families who could afford the high cost of wood, its import, and skilled artisans who were talented in manufacturing, engraving, and installing Rawasheen. As Hariri rightly observed, the Rowshan represents the economic status of house owner (Hariri 1991).

Research methodology

This study relied on analytical and applied approaches (Fig. 3).

An analysis of existing literature introduced concepts related to Rowshan’s design characteristics in traditional Hejazi buildings, and explored Rawasheen’s structural, functional, and aesthetic characteristics. Details of Rawasheen were intensively observed and documented through images as the use of the architectural feature has diminished. Examination of old images of Rowshan ornamentation and motifs constituted the indirect observation, especially old images of Mecca’s Rawasheen that were demolished due to the Mecca Holy Mosque expansion, and the Al Madinah Rawasheen.

Additionally, the results of semi-structured interviews were analyzed and the salient points regarding the structure, function, and aesthetic qualities of Rawasheen were extracted for the theoretical framework in different contexts (Jeddah, Mecca, and Madinah). This was done to identify the elements of the design philosophy and focus on contemporary solutions that could be applied to modern buildings.

The study sample

The study sample consisted of 30 elders (between the ages of 60 and 80) who lived in traditional houses in Jeddah province (Table 1).

Interview

Due to the COVID-19 pandemic, some interviews were conducted over the phone, while others were conducted in person. The interview tool was reviewed by specialists familiar with the Hejazi architectural heritage. Participants comprised elders who had lived the Rowshan experience and provided descriptions, which served as records of the past. The interviews lasted between 30 and 40 min. The researchers clarified the purpose of the study and emphasized the interviewee’s right to confidentiality; the information would only be used in the field of

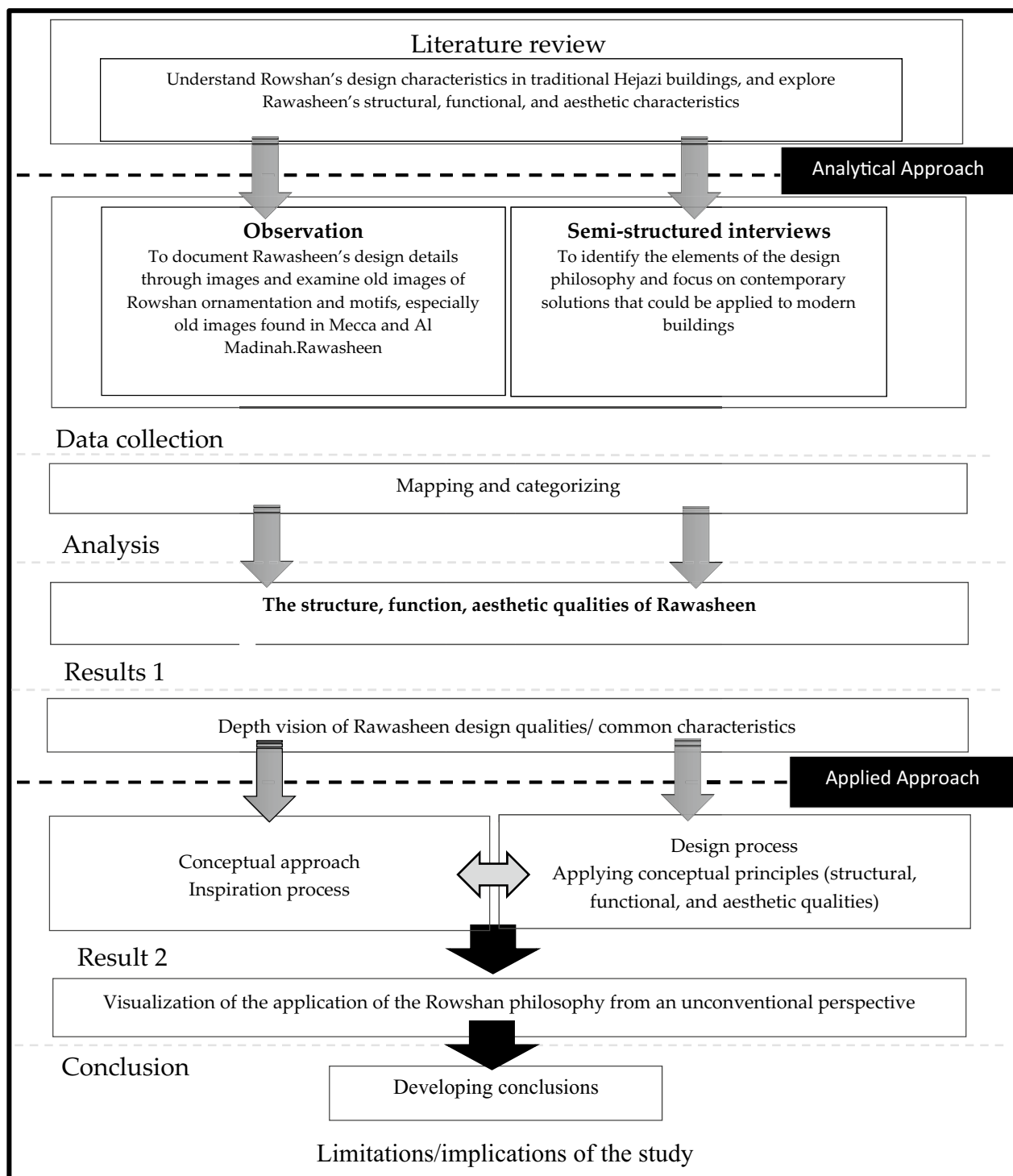


Fig. 3 Methodology

scientific research. Researchers took notes during each interview. The answers were categorized as visions or opinions, and the key words were highlighted. This data was then interpreted.

Research tools

The interview was conducted using an open-ended question according to the context of the study. The questions were posed to seniors who had previously lived

Table 1 Number of study participants

City	Number of residents in traditional houses
Jeddah	10
Al Madinah	15
Mecca	5

in traditional houses and experienced this unique element. Questions on the cultural, social, and economic aspects of the use of Rowshan in traditional houses were included. They were also related to the history of the Rowshan, its different sizes, functions, parts, materials, colors, and maintenance methods.

Inspiration procedures

The inspiration

The inspiration from cultural heritage is based on ornamentation and the use of patterns, which constitute an important visual reference that a designer infuses in a contemporary design. Research has demonstrated the importance of heritage inspiration with a deep understanding and analysis to achieve a balance between authenticity and contemporary design; not every heritage element can be a source of the inspiration. The choice of appropriate symbols is based mainly on its formal and symbolic richness and its meaning within a cultural and social context (Al-Jubouri et al. 2009; Alawad and Alsobahi 2021).

Al Awad and Al Subahi's (Alawad and Alsobahi 2021) research emphasized that the superficial results of the inspiration process are an outcome of a narrow understanding of the inspiration source. A visual inspiration that is based on unjustified form integration could reduce the value of the heritage in the long run. Their research highlighted the importance of authenticity and contemporary balance to maintain the dignity and sustainability of heritage values.

In this context, we consider the Rowshan as a source of visual design inspiration that is consumed based on its ornamental, material, and other elements. In this study, inspiration is derived from dismantling the Rowshan, analyzing its elements, and using these elements with their different components in a way that is based on the identification of a range of functional and structural characteristics.

The inspiration process

The conceptual inspiration process is based on the following stages (Fig. 4).

Phase 1: extracting the most important concepts adopted in the design philosophy of Rowshan.

Conceptual inspiration: Rowshan.

- Functionality: seating function, sleeping function, privacy, optical stretch, and control of lighting.
- Aesthetics: pattern, motifs, and lighting effects.
- Structure: modularity, flexibility, and adaptability (varying types, sizes, and surfaces).

Phase 2: applying concepts at the seating area design level and defining the relationship between function and mass.

Phase 3: developing the idea of the seating unit by structuring the relationship with its function: the design of the seating unit.

Phase 4: developing the idea of the seating units through the relationship of the function by repeating the unit.

The philosophy of the spatial organization.

Structure: modularity, flexibility, adaptability (varying types, sizes, and surfaces).

Results

Due to the urban and economic development in the regions of the Kingdom of Saudi Arabia, property owners left their old houses and built modern buildings. This led to the demolition and deterioration of several heritage houses, although some are still used as tourist attractions in various governorates. In addition to the remarkable efforts of the state to preserve this architectural heritage, organizations and institutes have been established that are concerned with the research, documentation, monitoring, and preservation of heritage buildings. The historic Jeddah area was declared a tangible heritage site by UNESCO in 2014, as a testament to their value and to protect the remaining buildings (Fig. 5).

Results reveal that the Rowshan, as an architectural feature, dated from the period in which the Ottomans ruled the region. This information is consistent with the research of Al Hassen (Al Haseen 2002) that proved that the Rawasheen originated with the Ottomans and Mamluk. This study attributes the Rowshan to the artisans and carpenters from many different cultures who travelled from different Islamic regions and settled in the country. Consequently, a Rowshan can be distinguished based on their maker's origin, such as an Egyptian Rowshan or Al Shami Rowshan (Fig. 6).

The participants in this study were questioned about the meaning behind the different sizes of the Rawasheen. Some replied that Rawasheen differ from region: for example, they were larger in Mecca than in Jeddah, and Madinah has the smallest Rawasheen. A Rowshan's size is often dictated by the climate: the cooler the outdoor climate, the smaller the size of the Rowshan. However,

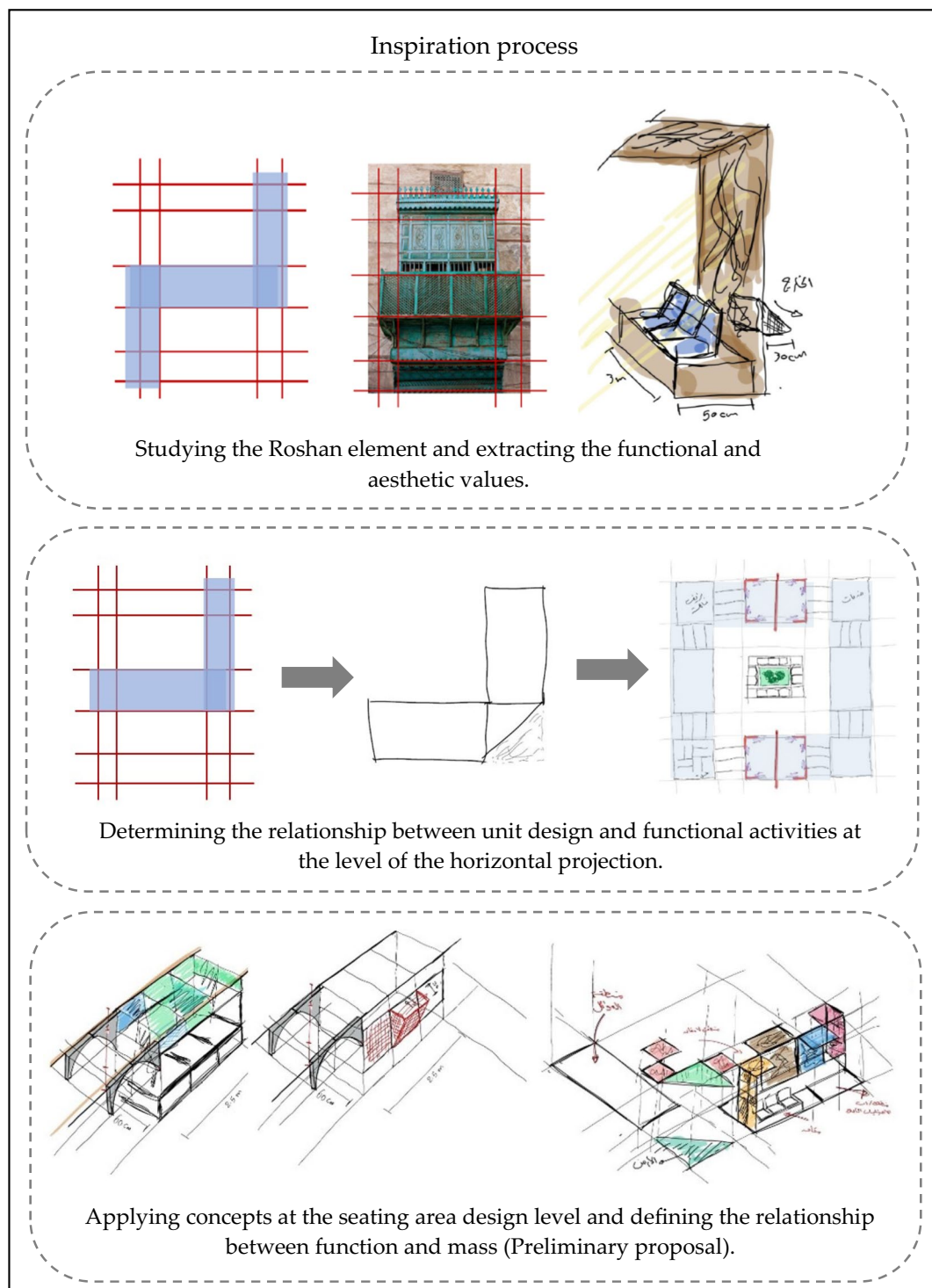


Fig. 4 Applying the concepts and defining the relationships

while the weather in the western region varies in terms of heat and relative humidity, it is noticeable that Rawasheen are not affected by the weather, although the weather differs between the three cities. In Mecca and

Al Madinah where the climate is dry, water jars called *mashrabiya* were added to increase the humidity (Fig. 7).

One of the interviewees mentioned that the large size of a Rowshan indicates a large indoor space. During a

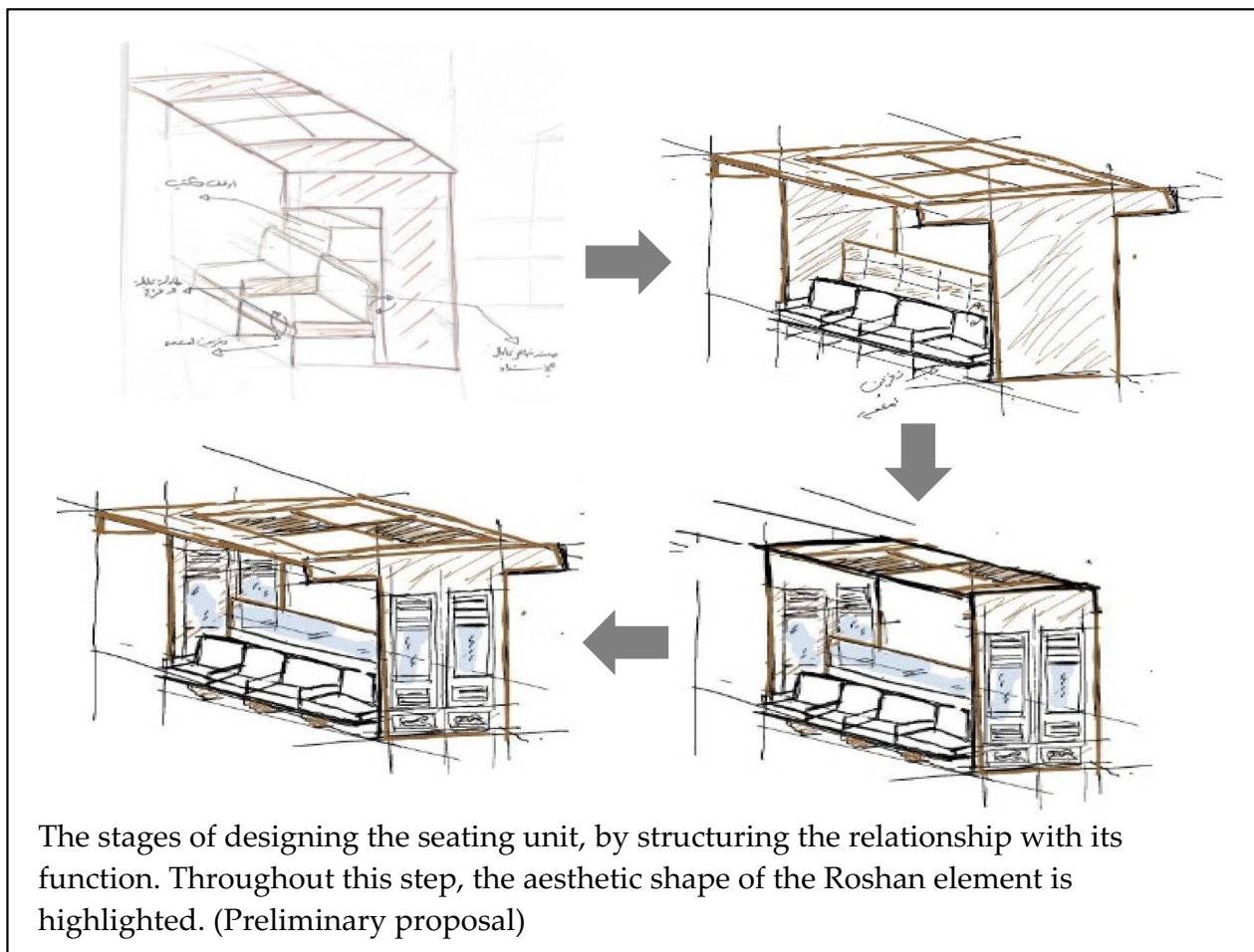


Fig. 5 Developing the idea: stage one: sketching the seating unit design

field visit, (Ba Eshen house), we noted that the house's Rowshan covered the whole façade. On entering the house, we found that the house has numerous floors: the first floor was reserved for guests, while the other floors were assigned for the residents. All the interviewees who lived in traditional houses agreed that the Rowshan was used as a decorative element; at their time, most Hejazi houses had a Rowshan. It was considered an essential decorative element. Al Madinah and Jeddah residents agreed that the extent to which the Rowshan extends from the façade of a house reflects the economic and social status of a house's residents. This is consistent with Hariri's findings (Hariri 1991). Hence, the significance of the Rowshan's size lies in its functionality and its representation of the socioeconomic status of the house's owner (Fig. 8).

The participants agreed that the Rawasheen initially catered to the residents' privacy before they became a decorative element. In the beginning, it was purely functional and was a small area that extended from a building

to increase the size of the main area connected to the Rowshan, and was utilized by sitting in it and observing the streets below. It also allowed for lighting and natural ventilation from different sides of the building's façade. Later, it became more decorative and added an aesthetic element to the façades. This corresponds to the theoretical framework. Participants considered a Rowshan as a channel for its residents as it allowed the daylight and natural ventilation to enter the house's interior spaces.

People of the Al Madinah province pointed out that a Rowshan served as a social platform between neighbors and the alley's pedestrians, and was a favorite seating area for drinking tea at the end of the day. It was also the only window to the outside world, when privacy was prioritized, and women did not go out very often. The Rowshan was the Hejazi women's eye on the world. A female interviewee said, 'some ladies added greenery in the Rowshan (*ghawlah*), treating it as a garden.' Pottery jars (*barareed* or *qelal*) filled with water were also placed in the Rowshan to cool the space; the porousness of the

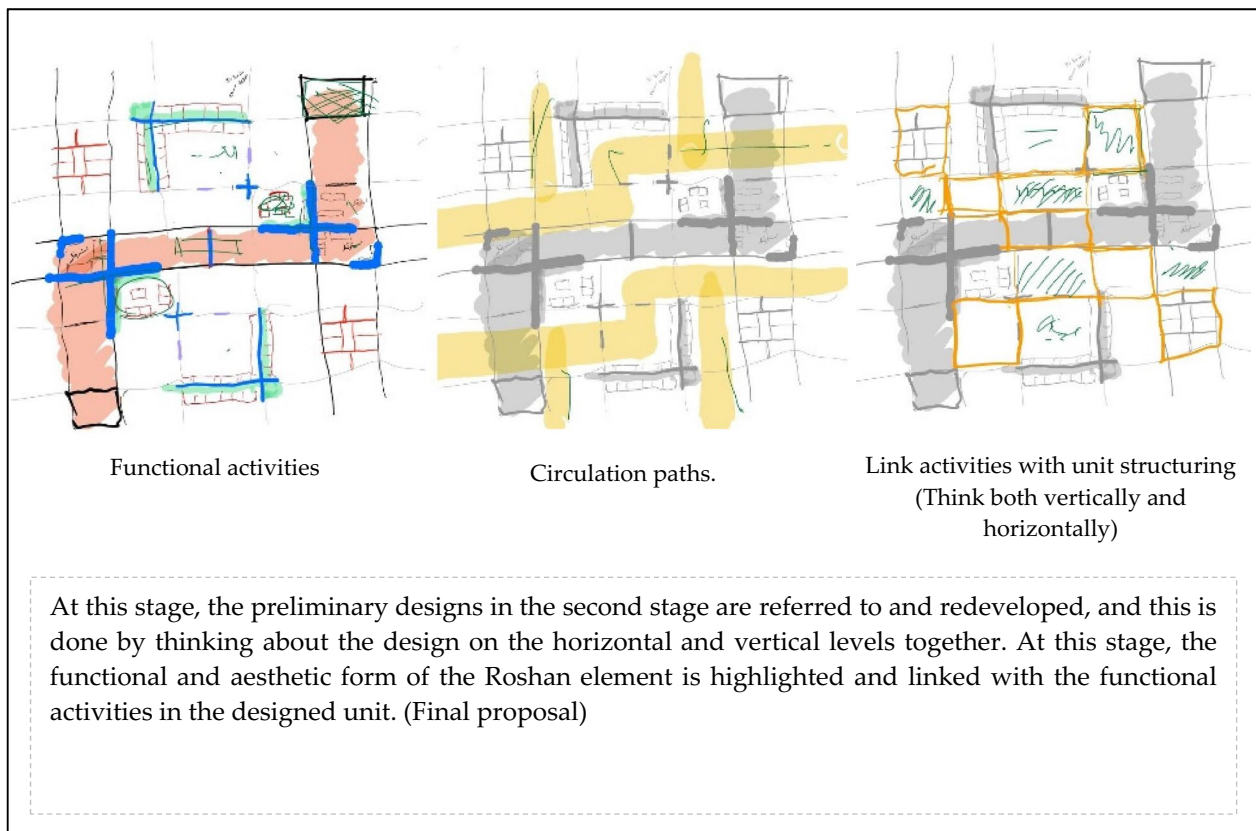


Fig. 6 Developing the idea: stage two

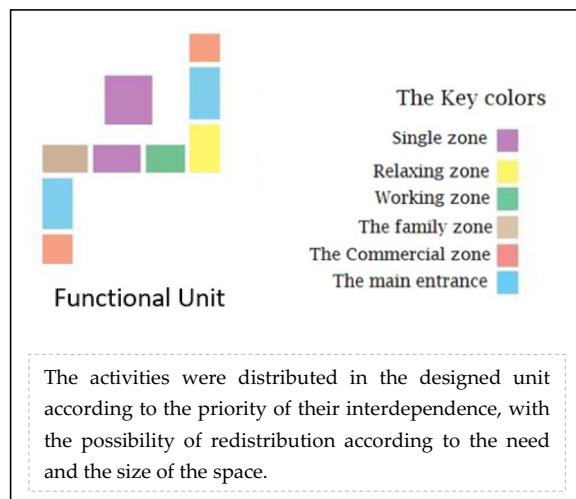


Fig. 7 Developing the idea: stage three

jars increased the humidity and cooled the air. The greenery also helped to regulate and cool the space's microclimate. Another female interviewee said, 'we entertained our guests and beloved ones in the area where the Rowshan was because it gave the space elegance and

style'. Others recalled the Rowshan's reflection in the inner space because of the natural lighting and configuration of the shutters. Residents of Jeddah and Al Madinah stressed the difficulty of finding artisans with the knowledge of the traditional maintenance methods because most Rowshan makers had passed away.

Our observations showed that Rowshan parts were often similar but varied between cities; however the differences were distinguishable only to the specialists. Participants also agreed that five parts of the Rowshan were hidden while some were visible. As the Rowshan is an extension of a building, it needs a structure to be installed on, called the *kabbosh*, which was hidden. The Rowshan can be classified into two main sections: vertical and horizontal. The horizontal section is symmetrical, and the vertical parts are asymmetric due to their different elements and uses. The upper part of the Rowshan is the crown or *burnittah*, which protects the Rowshan from rainfall and is, therefore, slanted towards the street. It has an ornate and graded ribbon that is wider than the Rowshan and varies between houses, depending on the owner's economic status. The upper belt is horizontal and has repetitive decorative units, including windows or square or rectangular openings in varying proportions

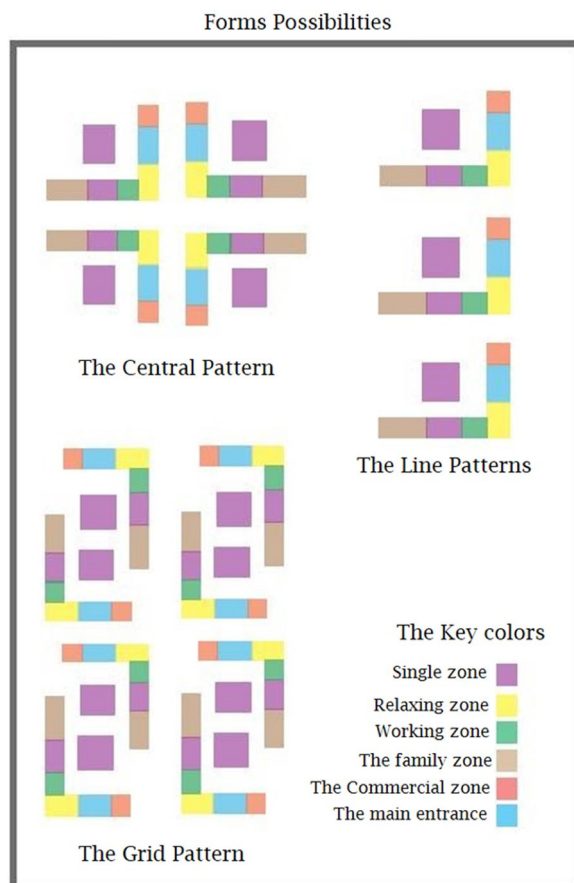


Fig. 8 The grid

that allow light to enter. Its height ranges from 1 m to 1.20 m, and it is fixed (not movable). The opening's movable parts are usually covered by the *sheesh* in Madinah city, and have 1 cm wide layers that intersect to allow air and light to enter, which is the most important part of the design. In Jeddah and Mecca, it is common to use a movable *abajorah* instead of the *sheesh*. The lower belt is between 50 and 40 cm from the Rowshan's floor, to accommodate decorative engraved seating with a geometrical shape from the inside to outside that can be used for sleeping or as storage. It can equal the room's height or can be extended to cover other floors. Residents of the Al Madinah providence pointed out the use of glass in the upper part of the Rowshan—usually transparent or occasionally colored. Thus, there are different types of Rowshan: single Rowshan distributed on the façade at every individual window and vertical types that are connected to more than window.

Concerning the question of materials and methods for maintaining the Rawasheen, the interviewees living in traditional houses confirmed that they were only made of.

One of the participants mentioned the wood types that were used in Madinah province, such as teak and their characteristics, and the use of local woods in Al Madinah because they were easy to maintain and had strong natural qualities that allowed them to remain consistent with various environmental factors. If the wood was of high quality, it was easier to engrave patterns and carve shapes. Some participants mentioned Hejazi Rowshan maintenance methods. Madinah and Jeddah residents used to clean their Rowshan with a palm branch and cloth fabric without using water to avoid plumping water and to prevent the metal nails from corroding. A participant from Jeddah providence said they used silicon to moisture their Rowshan and varnished it every five years in addition to periodic treatment by carpenters. Some participants emphasized that the carpenters were responsible for the maintenance of Rawasheen in the olden days. They would repair them using raw materials and paint, along with walnut oil and flaxseed oil.

Most interviewees emphasized the color indications and what colors were popular for Rawasheen. The natural wooden color was the primary color. The use of other colors depended on the house owner's personal preference, such as green, blue, and burgundy. They specified that colors were added later to the Rawasheen. One of the interviewees said the colors varied between cities: 'the green color represented Al Madinah Al Monwarah, the palm land. It was initially part of the visual landscape of Al Madinah and Jeddah, while it was not common in Mecca city. The use of grey was limited in Al Madinah Al Monwarah, while it was common in Jeddah and Yunbu, in addition to the bluish turquoise that represents the clear horizontal sky and water'. Other participants stressed that blue and green are artificial colors and were not used in the past.

During the field visit to Jeddah, we observed that in one of the traditional houses, the Rowshan was not painted and the initial wooden color has been preserved. The wood's natural grain was visible, and there were additional elements called *mashrabiah* that formed a grid system, adding water pottery. The eight-pointed star could also be seen in the upper part of the Rowshan. This is consistent with what the residents of the traditional houses had mentioned (Table 2- Photo 1). The blue color of the Rowshan can be observed in Table 2- Photo 2, along with the use of iron bars on the first floor for protection. We also observed the use of green colors with *rafrac* in the base of the Rowshan (Table 2- Photo 3). The Rowshan that is made to match the width of the interior space is usually reserved for guests (Table 2- Photo 4). The next image is an example of a *sheesh*, which has a window called a *taqah*; it differs from a Rowshan because it is flat, and it does not extend from the building (Table 2- Photo

Table 2 Photos of various Roshan shapes and colors

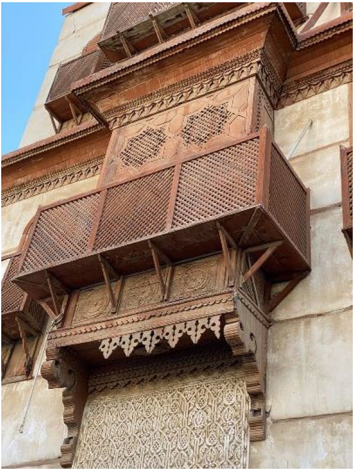


Photo 1 (Source: authors.)



Photo 2 (Source: authors.)

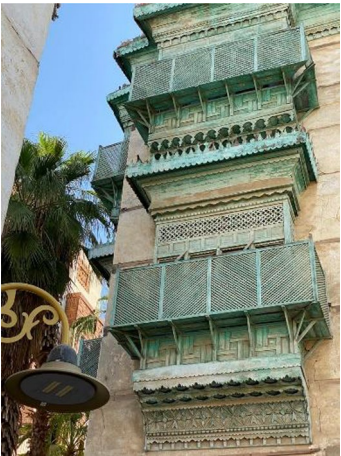


Photo 3 (Source: authors.)



Photo 4 (Source: authors.)



Photo 5 (Source: authors.)



Photo 6 (Source: authors.)

Table 2 (continued)



Photo 7 (Source: authors.)



Photo 8 (Source: authors.)

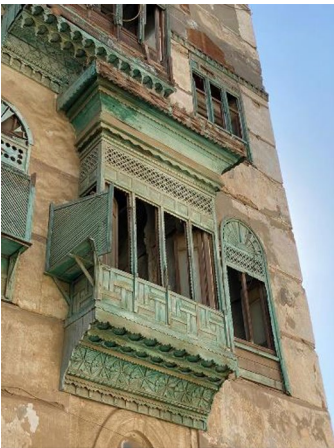


Photo 9 (Source: authors.)



Photo 10 (Source: authors.)



Photo 11 (Source: authors.)



Photo 12 (Source: authors.)

5). A ground floor Rowshan has a concrete base and uses glass behind it, as interior windows (Table 2- Photo 6). Table 2- Photo 7 illustrates the horizontal connection between Rawasheen with the upper belt, where wooden beams connect the Rawasheen. An interior view of a Rowshan shows the *dakkah* or seating area, where people can sit or lie down. It is covered by fabrics and has a mattress to add further comfort (Table 2- Photo 8). Table 2- Photo 9 shows the use of geometrical ornamentation on the upper and lower parts of a Rowshan, in addition to floral ornamentation at the base. The crown ornaments at the top of the Rowshan are illustrated in Table 2- Photo 10, along with the use of floral ornaments in its upper and lower parts, and geometrical ornaments in the base of the Rowshan. The Rowshan façade in Madinah city belongs to the Al Madani family and shows a mix of geometrical and floral ornamentation (Table 2- Photo 11). Lastly, Table 2- Photo 12 shows noticeable calligraphic elements in the lower part of the Rowshan, and includes a phrase from the Quran (Table 3).

Discussion

We conclude from this research that the Rawasheen in the Hejazi region represent all the social, cultural, economic, and environmental aspects of their history, with various forms, sizes, ornamentation, and functions. We believe that adopting the right philosophy towards the Rowshan's design can help preserve and protect this Hejazi element through a deeper understanding of this heritage. Through a better understanding of this Hejazi element, it is possible to preserve this legacy and ensure its continuation in innovative and creative ways that emphasize the Hejazi identity, so that this element can contribute to its employment in modern architecture. The functional and structural characteristics are summarized in Figs. 9 and 10.

Many of these characteristics have been applied to the modern model through a non-traditional perspective.

Conclusion

Rowshan is a distinctive architectural element and a primary component of the façades of traditional houses in western Saudi Arabia. It is a type of window made primarily from wood and is incorporated in contemporary architecture to express the identity of the Hejazi architectural heritage; however, contemporary use of Rowshan views it as a purely ornamental element and fails to fully utilize the advantages of this rich architectural element.

The Rawasheen in the Hejazi region reflect the social, cultural, economic, and environmental aspects of their history, through variations in their forms, sizes,

ornamentation, and functions. Rawasheen, thus, differ across regions: for example, they were larger in Mecca than in Jeddah, and Madinah has the smallest Rawasheen. The significance of the Rowshan's size lies in its functionality and its representation of the socio-economic status of the house's owner. Nevertheless, the Rowshan was considered an essential decorative element across Hejaz.

Rawasheen incorporate structural, aesthetic, and functional elements that can be utilized by applying their philosophy to create new frameworks inspired by them. This philosophy could be the base of new design forms that can relate and combine contemporary design and architectural heritage that represents a blend of the historical cultural depth with the contemporary cultural dimension of Saudi Arabia.

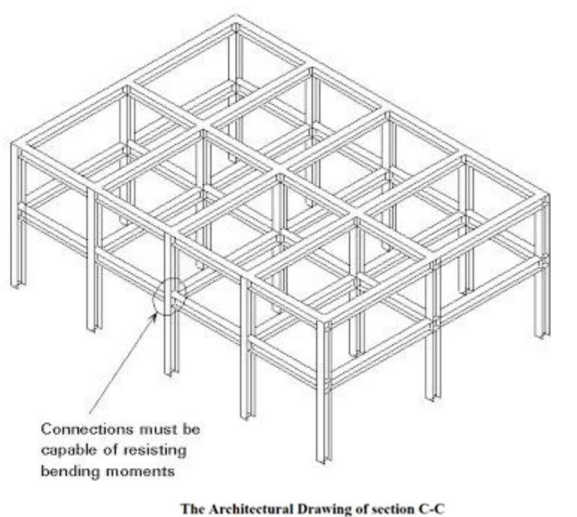
Away from the shallow inspiration of shapes, the Rowshan philosophy is based on a deep reflection on the design of several unique properties that should be re-introduced to society so that it can be inherited by future generations and thus achieve cultural sustainability.

Future research should focus on developing creative methods for applying the Rowshan's features (aesthetic, functional, and structural) while preserving its principles. Additionally, they should aim to contribute towards identifying alternative eco-friendly material to offset the limitations of wood supply. Finally, future studies could also focus on inventing new functions integrating the Rowshan element.

Thus, the possibilities and the outcomes of the process of conceptual inspiration based on the Rowshan are multiple. It is a source of inspiration based on finding balance between originality and renewal from a historical perspective, and could be a very strong topic for future research.

In this context, the researchers suggest that it may be necessary to arrange workshops that aim to educate the new generation, children, and those who are studying Rawasheen, about the importance of preserving this inherited architectural element. Specialized craftsmen and carpenters need to be identified and trained to build Rawasheen using the old methods. Furthermore, besides urging people to design Rawasheen according to the size of interior spaces while taking into account the old visual proportions, a Rowshan organization needs to be established to protect the Rawasheen from non-professional opinions and recommendations that may lead to a loss of its aesthetic, functional, and structural value. This organization should be divided into different specialties, such as carpenters who are skilled at wood carving and artists who have an adequate background in all types of geometrical and floral ornamentation and calligraphy.

Table 3 The design processes



The Architectural Drawing of section C-C



the Architectural Drawing of Reflected Ceiling

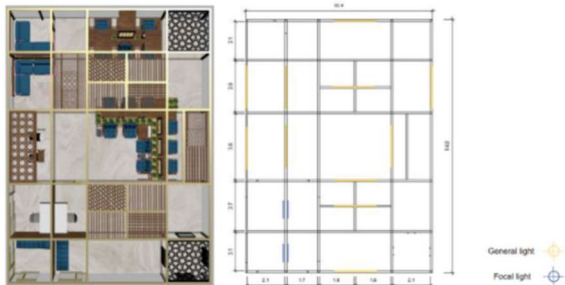
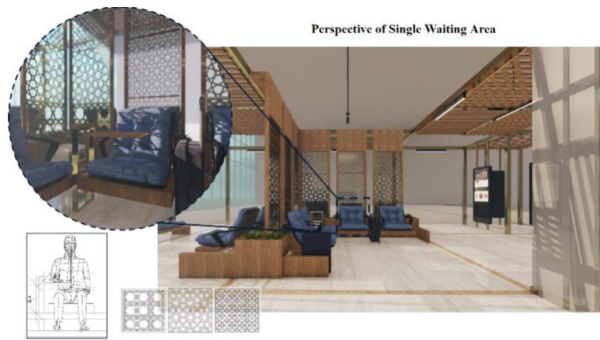
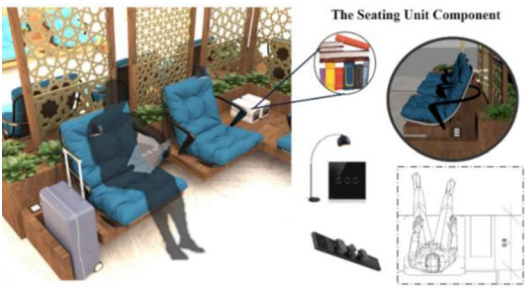


Table 3 (continued)

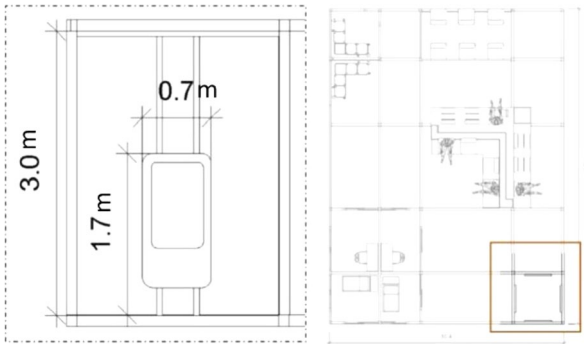
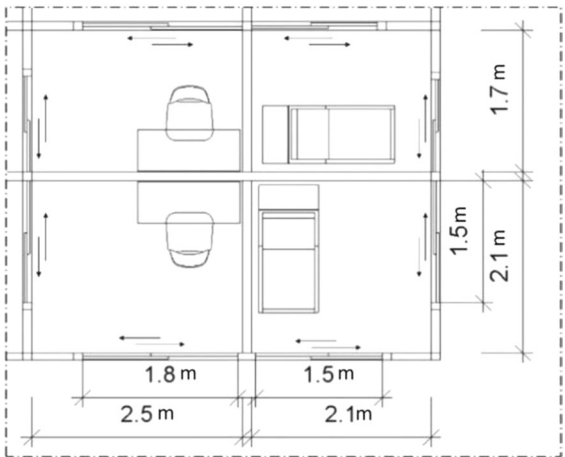
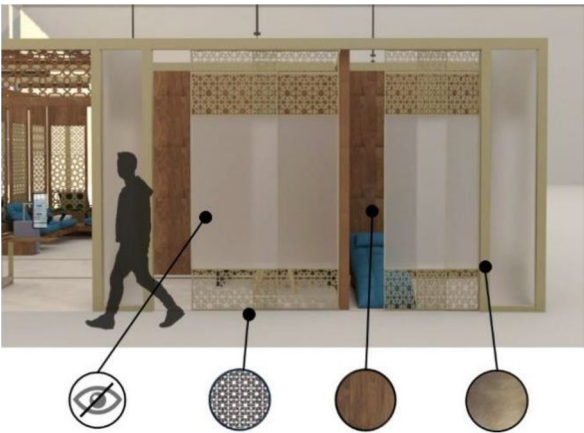


Functionality: Seating function, privacy, optical stretch, and control lighting
The structure and overall aesthetic composition of the seating area
It has repetitive seating units according to the architectural programme
The principle of repetition is achieved on different levels:
- Functional seating
- Private seating
- The ornaments
Structure/function using structure to allocate units



Aesthetics: Patterns, motifs, lighting effects
The functional aesthetic units/seating:
Utilize the ornaments
Achieve privacy and luxury through the seating elements in the respective spaces
Utilize lighting, materials, and ornaments based on the Rowshan philosophy
The color scheme:

the color scheme	justification
	These colors that traditional Rowshan used to be painted with. Blue is used in King Abdul Aziz Airport



The waiting area: repetitive units according to the architectural programme
Utilizing the ornaments to achieve visual continuity and light based on the Rowshan philosophy

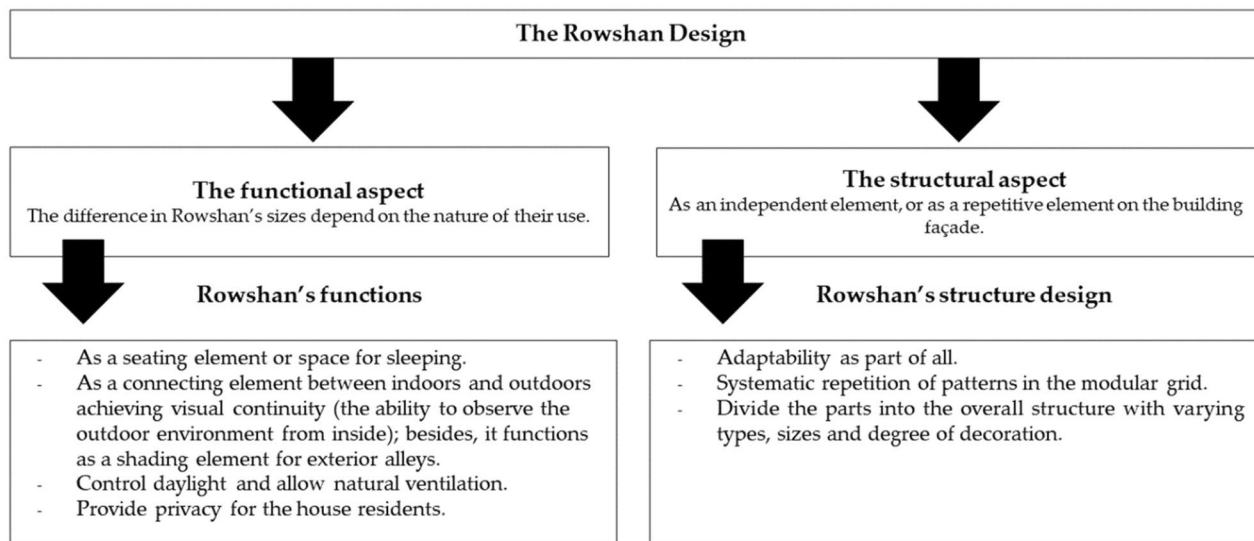


Fig. 9 Functional characteristics of Rowshan elements

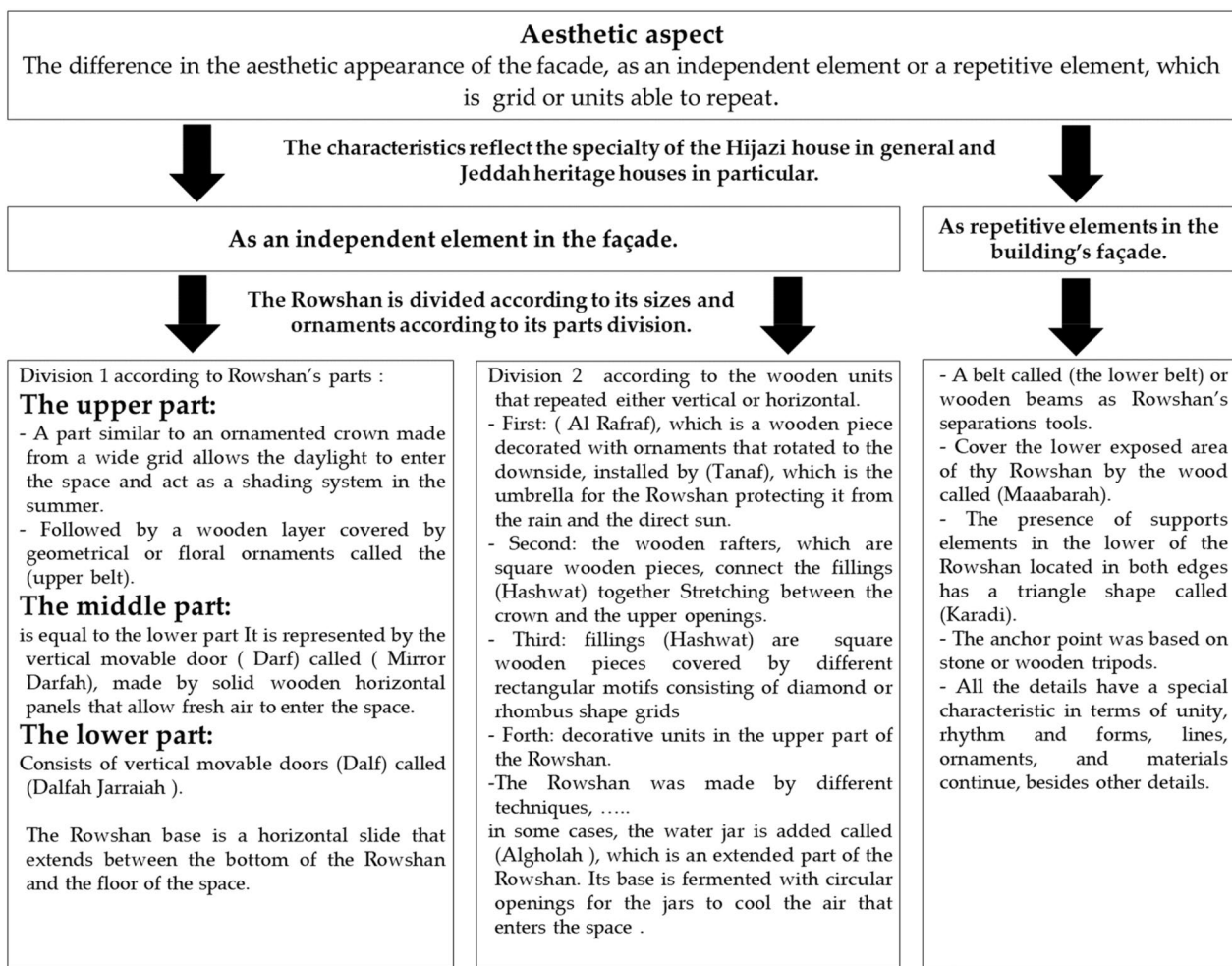


Fig. 10 Aesthetic characteristics of Rowshan elements

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Author contributions

Conceptualization, DB, AA and KT; Data curation, MA, GA, BAS and KT; Formal analysis, GA, DB, AA; Investigation, MA, BAS and KT; Methodology, DB, GA and AA; Project administration, MA and DB; Resources, MA, GA and BAS; Software, MA; Supervision, DB and AA; Validation, DB, AA and KT; Visualization, MA and GA; Writing—original draft, MA, GA and BAS; Writing—review & editing, DB, AA and KT. All author(s) read and approved the final manuscript.

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Declaration**Competing interests**

The authors declare no competing interests.

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