The impact of generative principles on the traditional Islamic built environment: The context of the Saudi Arabian built environment

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ABSTRACT

The purpose of this paper is to explore and examine Saudi Arabian traditional architecture through the lens of broader Islamic principles, which through history have encouraged the establishment of several types of cities and towns, where each type is known by its functionality and by the way inhabitants planned each settlement. Local Saudi architecture exists in a range of styles, and it is well-known in various Saudi regions. Although there are differences in style, the study contends and discusses that similar generative principles influenced the built space of most Saudi regions. This study made use of the ethnographic approach and comparative case studies method to explore, elaborate, and synthesize the generative principles to analyze the architectural similarities across Saudi regions, even though the architecture appears, at first glance, different. The article suggests that contemporary architects should implement some of these ideas in modernization efforts to balance originality while also informing and enhancing local identity.

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1. Introduction

The teachings of Islamic law have provided an outline for Saudi culture for more than a millenia. Saudi Arabian society has been regulated by what the Prophet Mohammed (peace be upon him) instructed in the *Holy Qur'an* and *Hadith* (plural. sayings), making these the guiding teachings and directions for all Muslims in most acts of their lives.[1] Frequently, verses in the *Qur'an* and the prophet's sayings alluded to specific issues concerning how people should respect one another and the environment (this concept is further developed by the author later in this section). As a result, it is no surprise that teachings from the *Holy Qur'an*, *Hadith*, and *Sunnah* (habitual practice) inform Muslims' built environments.

Another two sources in Islamic law considered intellectual principles and acted as primary generative legislative sources. The first

source, *Al-Ijma'a* (consensus), required experts to agree on certain issues. The second source, *Al-Qiyas* (measuring), is a deductive analogy technique that permits scholars to compare *Hadith* and the *Qur'an* to generate new ideas and conclusions (Fig. 1). Many of the Saudi inhabitants' cultural generative principles were based on *Urf* (local customary law) and social traditions, which mostly related to specific interpretations of the four Islamic law sources by local scholars and people. (See more [37,64,38,32,6,27,13,29]).

Three tiers of sources led to the production of cultural generative principles in the Saudi traditional built environment. The first level includes consistent sources, which rely mostly on straight text from the Qur'an and/or the Prophet's Sayings. The intellectual sources, primarily direct interpretations of the Qur'an and Sunnah scriptures, comprise the second level. In some cases, the intellectual sources differ from one scholar to the next. The third level includes local traditions, or *"Urf's,"* which are a mix of a local people's interpretations of religious sources as well as the region's long-standing habits and traditions. As the generative principles are largely general suggestions that guide and influence the built environment, the three tiers determine the level of variation and context in different Saudi regions (Fig. 2). The implementation of such principles is dependent on how each community communicates their values on urban heritage based on their understanding

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[1] Ḥadith in Islam refers to the record of the words, actions, and silent approval of the prophet Mohammad (peace be upon him) through trustworthy narrators.
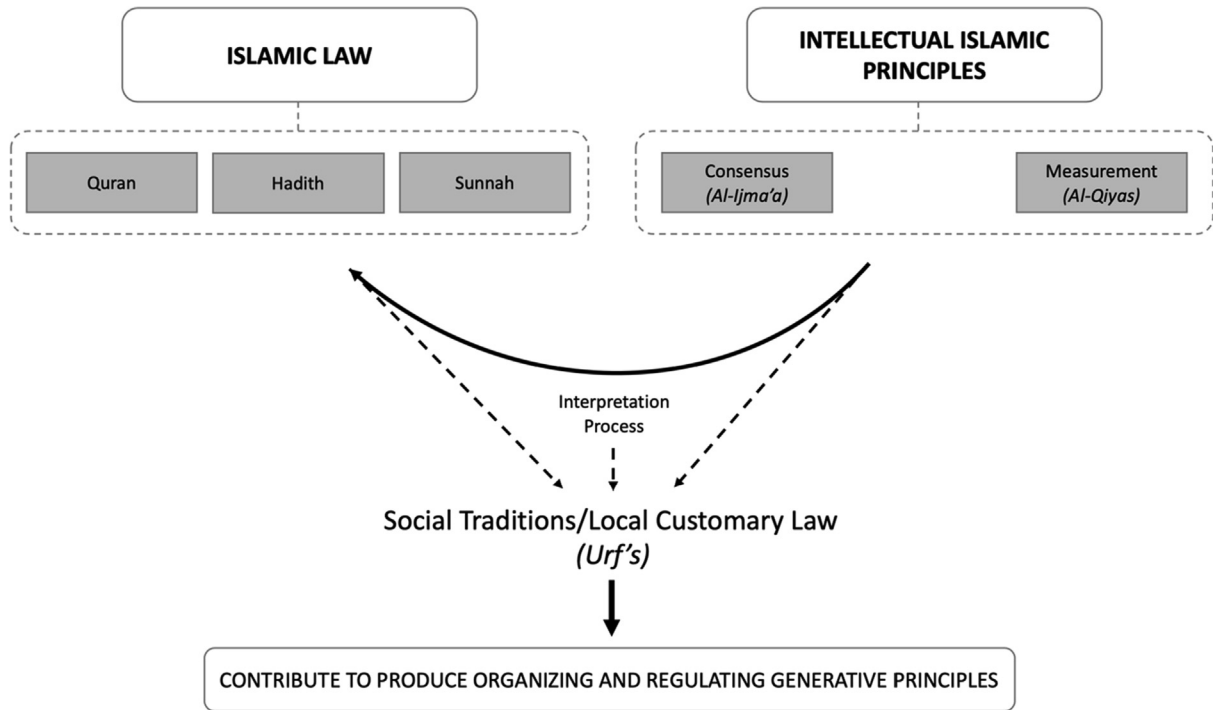
Fig. 1. The sources that contributed to the formation of the generative principles.
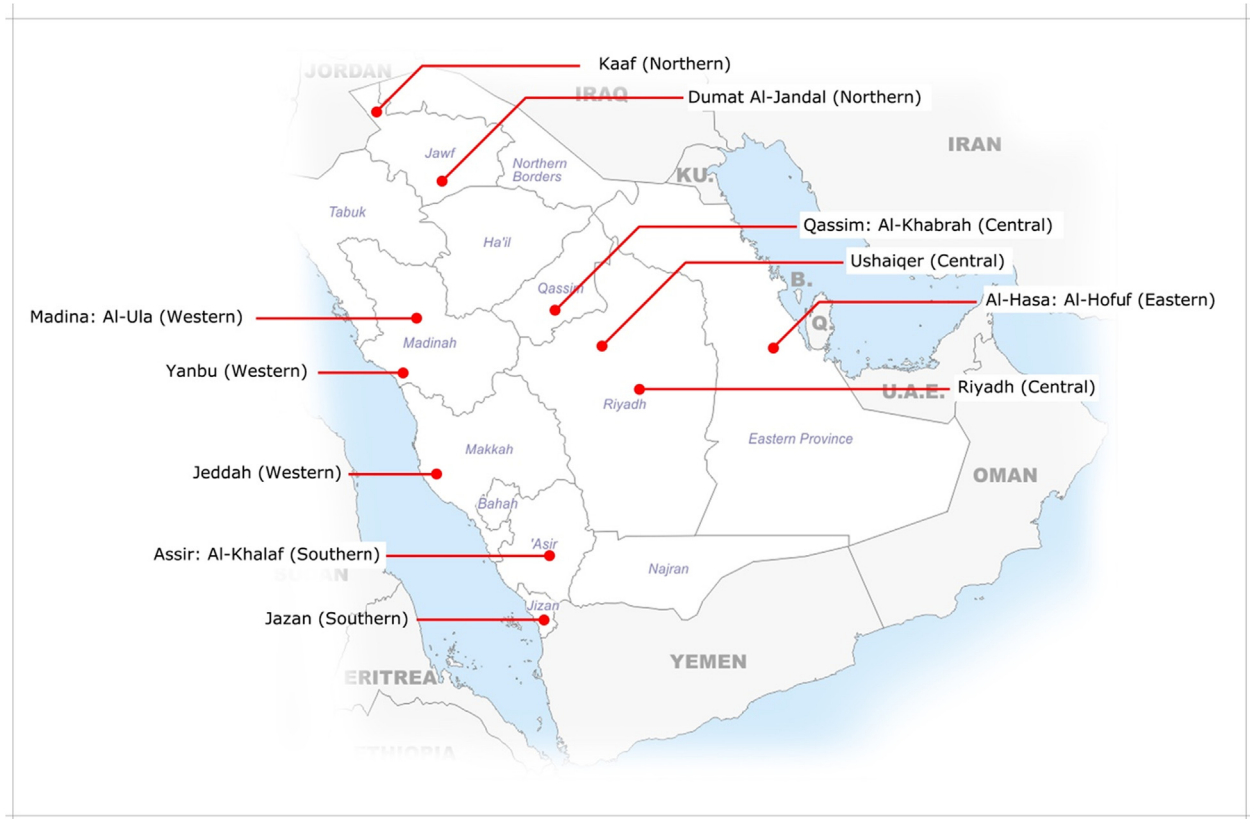

Fig. 2. The case studies location within Saudi Arabia.

of these principles and how they believe it can support their local *"Urf's"* and values.

Accordingly, urban heritage sites are valuable assets that promote urban development and innovation. However, various negative environmental effects caused by certain human activities and the introduction of non-viable places, such as deteriorating, crowding, climatic changes, lack of awareness, and failed waste management, not only impact sustainability per se, but also harm the significance and fabric of heritage assets [41]. A resource that can be further investigated to enhance local identity, cultural tourism, and improve the quality lived space.

The discussion that follows expands on nine generative principles that comprise Saudi society and its traditional built environment, describing how Islamic law and local traditions shaped the society and its values with several remarks from other Middle Eastern countries. This article classifies the generative principles into four categories: organizational, religious, socio-cultural & traditions (*Urf's),* and environmental (Fig. 3). As a result, this research aims to identify how Islamic and social principles defined some of the most important cultural generative principles and how they evolved into norms and traditions over time. Although "Sharia" (Islamic law) drove the development of these norms and traditions, it was through the actual building preferences and practices of the people, passed down from generation to generation, that these norms and traditions became the basic guidelines for generating their built environment, and which resulted in the actual built environments observable in the traditional settlements. In this case, each generative principle has a significant impact on both the production of the built form and the organization of spaces and domestic behaviors within the built environment.

2. Methodology

The term "heritage" refers to a multifaceted concept that includes innumerable facets such as the dynamics of economic, environmental, and social transformation [51]. Understanding the processes of generating the urban and architectural context in Saudi Arabia and its impacts on heritage value present significant methodological challenges due to its underlying interdisciplinary nature. As a result, the current study used a hybrid approach that included an ethnographic approach, a comparative literature search and review, archival database analysis, photo and map analysis, fieldwork investigation, and local and expert (i.e., architect) interviews.[2]

3. Organizational principles

3.1. Principle one: tribes and clans (the social structure)

Even today, Arab tribal culture influences the attitudes of people living in Saudi Arabia and plays a vital role in their lifestyle, so that the Saudi regions have a conservative social structure in terms of social and cultural issues. The Qur'an states, "*O mankind, indeed We have created you from male and female and made you peoples and tribes that you may know one another*" (Al-Hujurat, 49:13).[3] Also, Al-Qurtubi, the highly respected Islamic scholar from the 13th century, elaborates and interprets, "And the preference of some of these tribes over some is according to their predecessors of Islam" (Cited in [3]). The emphasis on the "tribe" in the Qur'an explains why preserving the tribe's name is an important social act, and it may explain why certain Arab tribes co-locate themselves in specific

areas and why groups of people formed *hellas* (neighborhoods) within a larger traditional settlement. As a result, the nomenclature of several of the residential sections (*hellas*) within the Saudi regions is based on the tribe that dominated the area, additional evidence of the importance of tribe in Saudi culture.[4]

It is helpful to conceive of Saudi society as tribal, with each tribe divided into three societal circles. The first, outermost circle is the *extended clan (macro level),* which is primarily part of a larger tribe, but a specific clan settled and living in a particular urban context. Most traditional settlements were created by a single clan, resulting in very deep social bonds and, in most cases, the people developing their own nonverbal communication codes. The second circle is the *extended family (meso level),* which is a group of small families within the clan that are related through blood. Extended families typically congregate in one neighborhood (*hella*) and construct their own private residential district. The third circle is the *clustered family (micro level),* which is frequently made up of one or more nuclear families, descendants of a single father and residing in the same house or group of houses linked by a cul-de-sac (Fig. 4) ([11,20]).

The three circles of the social structure were not inflexible, and the communities displayed a variety of social structural forms, but they functioned as concealed regulators of the urban structure. Individual houses in the *Najdi* region (also applicable to other Saudi provinces) cluster to form various private urban masses known as *Hellas* or *Harat* (residential neighborhoods or quarters); individuals locate themselves in them based on their social relationships. The formation of the residential components within the *hellas* is flexible and responds to the smaller social circles (third, inner circle: "cluster of family") and the urban forms they produce over time based on the religious principle of *Alshufa'a* (neighbors' right). Since each environment fosters mutual support and a strong sense of shared values, individuals can grow [1]. This encourages the entire urban mass to remain relatively constant, while smaller masses within the neighborhood and the components of the smaller masses, which comprise the majority of the neighborhood's huge mass, can change to provide the required flexibility (Fig. 5).

In a similar vein, Saaidy and Alobaydi [59] investigated the quality of urban form in Baghdad, Iraq, by investigating the spatial properties of street networks in relation to human group density. They discovered that by appreciating the type of group occupying the space, they can improve the quality of the urban form. When examining the walkability, sustainability, territory, and history of a place, Saaidy and Alobaydi asserted that the relationship between street network systems, group occupancy, and urban form potential can enhance the closeness and straightness values.

As a result, understanding the deep foundations of Saudi social structure within the urban form is critical when evaluating places and discovering the underlying order that dictated their spatial and physical forms. Geography and climate also had an impact on the social structure, which established its primary traits. Indeed, understanding the social structure and its impact on traditional urban architectural forms is difficult without considering the constrained life that local extended clans experienced, as well as their religious and economic practices.

Although the Saudi social structure is restricted, there are no physical barriers (controlled space) between the public and private domains; however, there is a hidden "threshold" that guides local people to distinguish between those domains (Fig. 6). In his theory of controlled space, Oscar Newman [46] mentions that the theory of controlled (defensible) space provided security of living environment to groups of people: families, friends, and neighbors. This

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[2] The interviews targeted architects with three to six years of experience and several experts in the field of traditional architecture.

[3] All Qur'an verses retrieved from an official English Qur'an site https://quran.com.

[4] For example, Al-Khalaf and Al-Yanaf tribe named in Assir, also Al-Shaike and Al-Swelem in Riyadh.
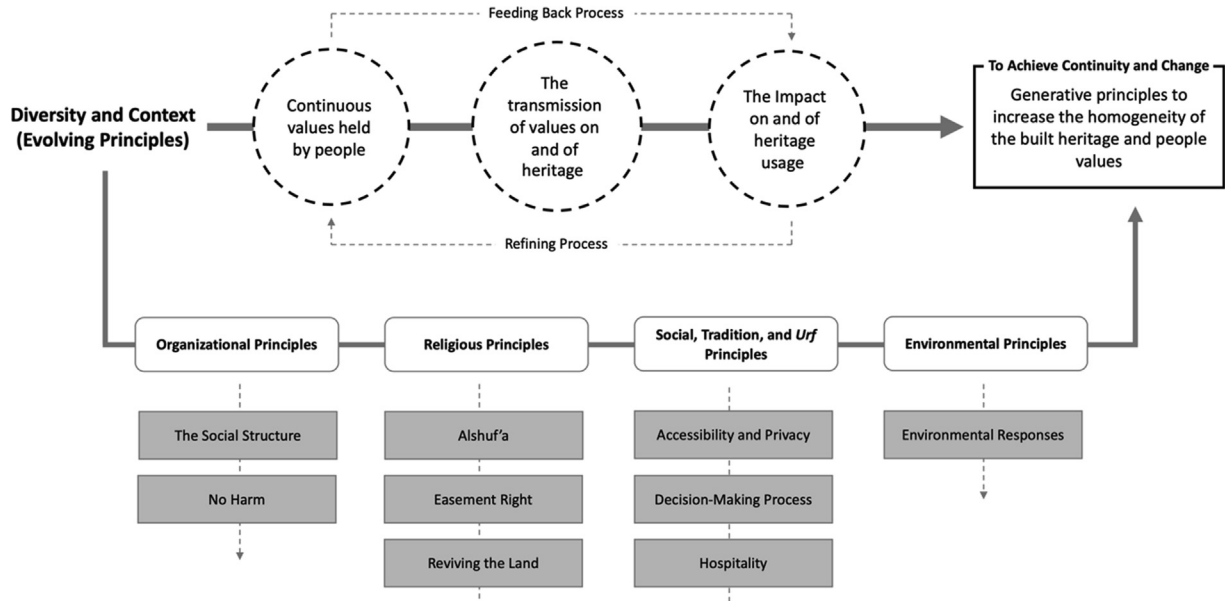
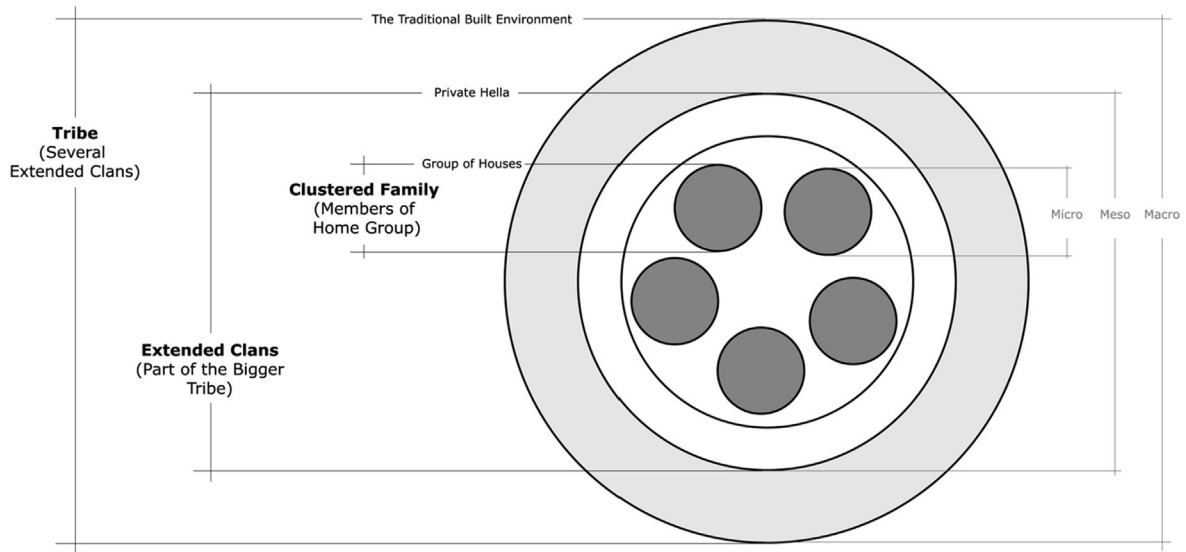**Fig. 3.** The refining process of the generative principles.

Fig. 4. The social structure. Source: Redeveloped from [23].

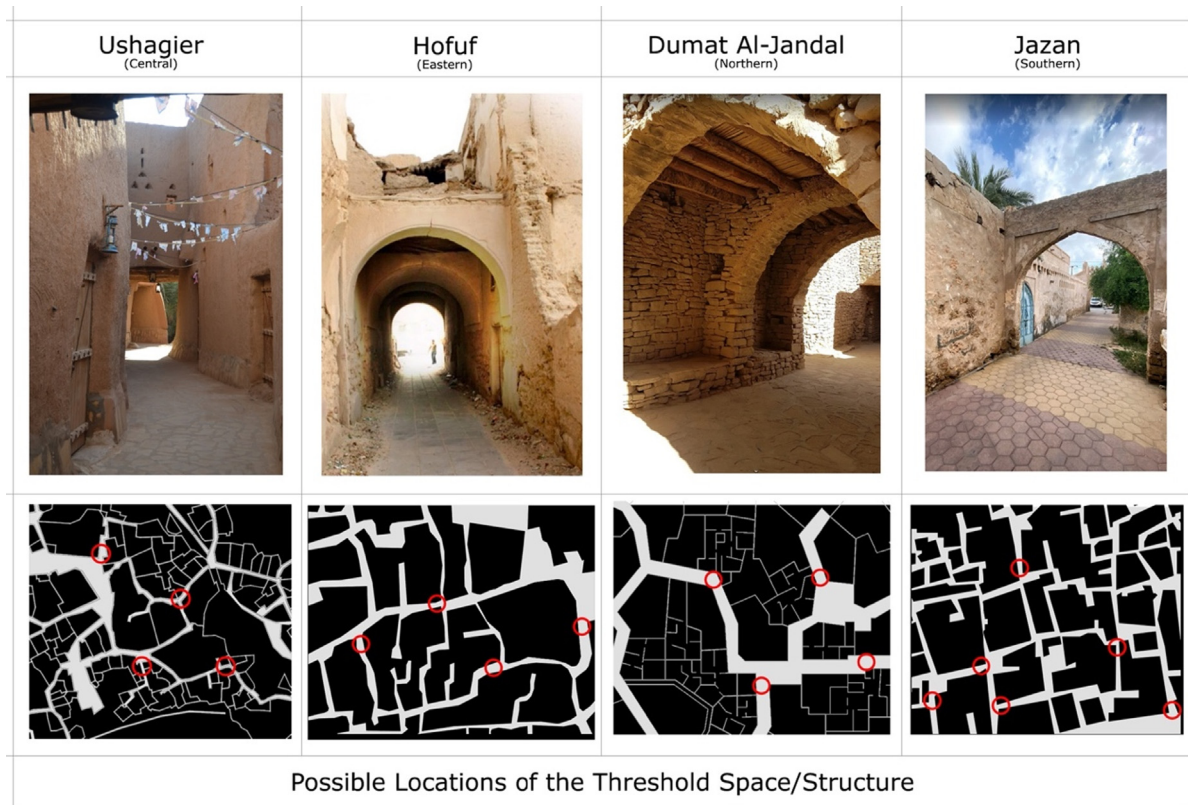**Fig. 5.** The integration of a social structure within a built form.

Fig. 6. Physical (social and controlled) barriers "Mujabab, Sabat, Saqefah" used as a threshold in the public domain.

heightened sense of security provided by controlling the space enhanced the level of life satisfaction of and bond between the group of people.[5] Thus, a threshold space can be achieved by increasing the social ties among the residents and by generating embedded meanings to physical thresholds (see [54]).[6]

The social structure (the hierarchical structure of tribes, extended clans, clans, extended families, families, and individuals), as well as natural and technical forces, work together to produce such a level of usability within the constructed environment, as was mentioned above. These two mechanisms work in tandem with each other and complement each other to produce this level of usability. The first mechanism, which was the most important, oversaw the entire urban structure and arranged the architectural components and elements, while the second mechanism made way for and influenced the final shape of the architectural components and elements.

These two dynamics are present in the multiple-use aspects of public places, such as the *souq* (market) and *barahaa* (central plaza), which are regarded as the most active spaces in a traditional settlement. Because of their combined use – by locals, the mosque, the governor's spaces, and even by strangers – the privacy in those public locations was not an issue, implying the prestige rule of Islamic law by making the urban form an interactive place among various actors [40,50]. Residents of traditional settlements developed public places and public physical structures with the goal of increasing accessibility and facilitating public engagement. In the opposing form of area, deep within the residential urban mass (*hellas*), the space is exceedingly private, and openings to the outside are rare. It is possible to argue that the socio-cultural factor is, in fact, driving the final shaping of spatial and physical forms in relation to the "no harm" principle. This is due to the "no damage" rule, which regulates how people assemble their urban and architectural components, conserving their places while also allowing the natural environment and building processes to take their natural form.

In many situations, each quarter (*hella*) has its own semi-public or semi-private small open space where the male adults congregated and interacted, as well as a playground for the children. Understanding where the space is and who it relates to in the social circles within the neighborhoods helps to explain how the open space became a semi-public or private small space (Fig. 7). Understanding how the three social circles interact and create hidden orders that contribute to the formation of urban and architectural forms is critical. The argument is that the portrayal of these circles in the conventional built environment manifests most, if not all, of the socio-cultural elements, meanings, and functions.

In general, the social structure imposes its daily routine on the spatial and physical order, and each social circle has its own degree of activity, which generates its own individual spaces to accommodate those activities. Strangers such as travelers were not permitted to enter the *hella* spaces in the middle circle (extended clan),

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[5] [47] developed the controlled (defensible) space idea to enable citizens to identify and monitor their own territorial features such as homes, streets, and corridors by understanding the spatial structure of their built environment. This reasoning is consistent with the findings of (Alnaim, 2020c) when he investigated the hierarchical order of spaces in the built environment of traditional settlements in Najd, the central region of Saudi Arabia. This idea is also investigated further by [21] in relation to affective urbanization values regarding anti-crime principles in places in Tehran Metropolis.

[6] Typically, threshold spaces are created by introducing a locally known element known as *Mujabab* (in the central, north, and part of the eastern region) or *Sabat* (in the west and south regions), both of which function similarly and impact the discontinuity of varying street types, as well as to create an integration or separation between two urban masses. Typically, the created threshold space serves as a social gathering place between various *hellas*, where occupants understand the various locations of the element and its associated meanings (threshold) within the built environment.
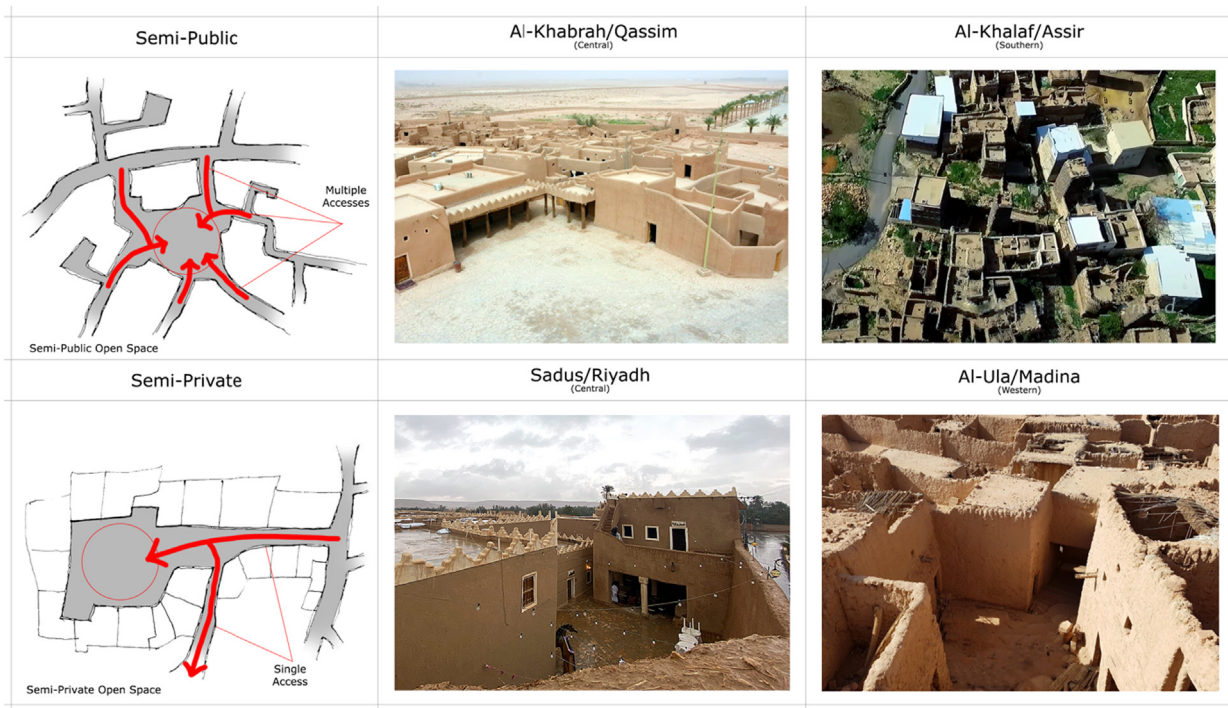
Fig. 7. The formation of small semi-public or semi-private open space within hellas (neighborhood).

where private *hellas* are formed. For example, traditionally, travelers were only permitted to pass through when the inhabitants occupied the space during the daytime, and this entry by outsiders was only permitted if it was the only option available to reach public spaces [24,9]. This necessitates a reconsideration of how occupants arranged spaces in such a cultural setting.

3.2. Principle two: no harm

No harm is the principle that guides how people engage with each other on a daily basis. It establishes the mindset that "One should exercise one's full right in what is rightfully his, provided that the decision/action will not generate harm to others" [39]. The Prophet said, "There should be neither harming (darar) nor reciprocating harm (dirar)" (Sa'eed al-Khudree). Jamel Akbar expands on this generative principle by stating that the owner of territory has the right to raise or deepen his territory as he sees fit, assuming he does not harm others [2]. This means that the owner of a house, for example, has the right to raise his building as much as he wants as long as he does not harm others by viewing their properties, invading their privacy, or limiting light and air. The Prophet gave a verdict on the encroachment on the roads, yards, and exit buildings on roads, said, "He who usurps even a span of land would be made to wear around his neck seven earths" (Sahih Muslim, Book 22, Hadith 176).

According to general observation, "consistency" and "equality" are integral concepts linked to the principle of "no harm" in the Saudi traditional built environment. In general, the principle of "no harm" has led to the observation that in the traditional *Najdi* and *Al-Hassa* built environments, readily obvious differences between wealthy and low-income family's houses are uncommon.[7] A keen observer may note differences in the richness of the ornamentation in the guest rooms, the number of openings, and, in some cases, the styling of the main doorway (Fig. 8). Even though the

houses are different sizes, they have a similar appearance and physical content. Even if a person has the right to raise his building, the majority of *Najd* and *Al-Hassa* physical forms share similar heights and elements, resulting in the settlement's wall containing the settlement's physical components. As a result, the settlement's physical components are not visible from outside the wall. Utilizing the generative principle of "no harm," the traditional environment strongly represented this social consistency and equality through its urban and architectural forms.

In fact, the compacted building arrangement resulted in the formation of several urban masses, making identifying individual buildings more difficult as they "melt" within the larger mass that consists of a group of buildings. Because of the "no harm" principle and the desire to create "consistency" and "equality" in the built form, it is difficult to distinguish between different houses except for a few visual features that may distinguish one house from surrounding houses. By engaging in this behavior, a settlement maximizes security. The behavior is also a reaction to the harsh weather, and it gives the impression that the entire community is one mass [34]. This explains why houses and public buildings with more than one floor are built in specific locations to ensure "no harm" is done to others. According to Abdal-Majeed Daghistani, the traditional house pattern defines an environmentally efficient architectural solution that has evolved and responded to the social and economic needs of residents, and which satisfies the moral and religious requirement[s] of Saudi Islamic society [31]. As long as they do no harm to their neighbors, individuals have the right under Islamic law to increase the height of their building, but Saudi local society produced a unique urban form of organization by generating specific local customary laws, *Urf's,* derived from interpreting the three levels of Islamic sources.

The entire built environment reflects the concepts of consistency and equality, which are based on people using and modifying the "no harm" principle over time, resulting in visual consistency and equality of appearance. When public and private building masses share the same heights and are close together, this generative principle takes on new meaning. In this case, both types of

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[7] This observation has also been made in other Saudi regions such as Tabuk, Najran, Ha'il, and the north.

Simple Doors	Decoration Details	Decorative Doors

Central Region

Eastern Region

Fig. 8. The various details and richness of wooden doors in the central and eastern regions of Saudi Arabia.

buildings are kept at the same height to avoid privacy conflicts and visual exposure, adhering to the "no harm" principle. This occurs when a local mosque is located near or inside a private *hella*, and the mosque roof and minaret are either equal in height to or slightly higher than the roofs of the private dwellings. The significance of this behavior is that the minaret is used to call people to prayer and the mosque and minaret are used as a guidepost to assist locals in navigating and locating the local and grand mosques (*Juma'a*/Friday Mosque), as the grand mosque has a higher minaret due to its location in a public open space or street (Fig. 9).

As a result, taller buildings are more likely to be significant. They are more visible, are near public spaces, and are located away from the condensed, private zones. Significant structures assist people in navigating their way from the dense, private urban masses to the public spaces. This behavior, however, does not contradict the built environment's consistency because all components and elements converge to represent a unified visual appearance. This dynamic behavior, derived from the generative principle of "no harm," evolved to respect residents' privacy, including the privacy of females in their homes near a public building. This behavior is related to what Basim Hakim has explained: local people develop their own "Urf's" derived from the spirit of Islam that emerged from understanding Islamic teaching and knowledge of a locality [40].

The "no harm" principle allowed the inhabitants to reproduce their social values in their built environment without causing harm to others; thus, whether houses are large or small, they reflect the local socio-cultural values and the community's collective morals ([67] Alnaim, 2015). As a result, the reason for low-rise buildings in Muslim towns may not be cultural, but rather moral, in terms of viewing other properties and avoiding invasions of privacy [2].

4. Religious principles

4.1. Principle three: Alshuf'a

Alshuf'a is a concept within Islamic law that governs people's buying and selling. It is a broad rule that governs many aspects of property in Muslim life, with the objective of causing "no harm" among neighbors and partners who share boundaries or real estate [63] (Uddin, 2015). The goal here is to understand the main usage of the concept: when neighbors have the right to buy their neighbor's house. Sahih al-Bukhari states, "*Shuf'a* is valid if the property is undivided." The Prophet gave a verdict regarding *Shuf'a* by stating, "if the limits [property] are defined (or demarcated) or the ways and streets are fixed, then there is no pre-emption" (al-Bukhari, Book 35, Hadith 458). From this point of view, the Shuf'a generative principle seeks to protect the interests of various own-

Fig. 9. The minaret of the mosque, used to call people to prayer, is the only element that is taller than the surrounding structures in these deep spaces. Source: Jeddah and Hufof reprinted with permission from (Al-Darra Foundation).

ers while ensuring that "no harm" is done to the partner. If several partners are involved in this right, it is not possible to sell to one without also selling to the others ([3] Akbar, 1998; [24]).

In 2014, Sheikh Khalid Al-Mosleh reported a case involving the Alshuf'a principle. A family member of a house who owned a portion of the house due to patrimony (the death of the house owner) wanted to sell his share to a neighbor while leaving the rest to other members (siblings). According to Alshuf'a, it is forbidden by Islamic Law for a person in this situation to sell his share to the neighbor and can only sell his share to his other family members. The intent of this restriction is to prevent a conflict of interest from arising by allowing a new party (a party other than family members) to own a portion of the property. However, Al-Mosleh points out that if the neighbor wishes to purchase the property, Islamic Law only permits the neighbor to do so if all family members wish to sell. Even if there is an outside buyer, the neighbor has an advantage in purchasing the property if he matches the outside buyer's price (Al-Mosleh, 2014).[8]

According to the Prophet, when a person came to him to sell his property and did not know who to consider the closer neighbor, he said, "O Allah's Messenger (□)! I have two neighbors and would like to know to which of them I should give presents [sell]. He replied, 'to the one whose door is nearer to you'" (al-Bukhari, Book 36, Hadith 3). Even if several buyers from the same neighborhood match the selling price, the buyer who is closest to the property has the advantage in this case. This concept, in fact, corresponds to how Saudi Arabia's social structure circles were preserved. People bought and sold their properties to their neighbors to in order to expand or decrease their homes, increasing tribe homogeneity and extending clans within the same area.

The Alshuf'a principle ranks potential buyers based on how closely they are related to the actual owner of the property. In the Al-Musleh cases, family members had an advantage in purchasing the other shares because they had a strong connection to the property owner (e.g., father). When neighbors have common property interests, they can buy partial shares of the property even if other family members do not agree. For example, if two neighbors own a shop and one of them dies, his family members divide his share; in this case, the neighbor has the shuf'a right to buy all or part of the other shares if the family members seek to sell their interest

in the shop. In this case, the neighbor has the right because he is already a part of the property interest. Purchasing more shares will only increase his share of the property, whereas the others are preserving their interests following the death of a family member.

The compactness of Saudi Arabia's traditional built environment encouraged the application of such a principle. The right of a neighbor to buy his neighbor's property arises from having a boundary interest, according to the Alshuf'a generative principle. Because buildings in most Saudi traditional settlements share boundaries, the operational aspect of the Alshuf'a principle works efficiently, expanding the house or dividing the house into several houses without affecting the hella's or settlement's urban mass (Fig. 10). This explains why most settlements' building forms have different shapes and masses, as the buildings' sizes typically have changed over time.

4.2. Principle four: Haq Alentef'a (easement right)

In addition to granting the proper right of property and freedom of usufruct (Haq Alentef'a), Islamic law permits the trading and exchange of services (water, river, wells, etc.) and edges (building walls) among neighbors and partners [42] (Jamalinezhada at el, 2012). It did, however, lay the groundwork for preventing harm and protecting neighbors while also protecting the public realm from individual violations. Thus, the "easement right" is the benefit of a property, such as drinking (from a well), traffic (on a street), land, and so on, that is located within an owned personal property that a person does not own but that another person or the entire local built environment does [52]. Possession of flowing water from a spring on one's property or a river passing through that property, for example, does not give the property owner the right to prevent others from benefiting from or using the water, provided that their use does not harm his property [16].

This generative principle has influenced the spatial organization of Ushaiger's built form. In general, the organization of the hellas in the Ushaiger community came about in such a way that no urban mass impeded others from using the settlement's water canals.For example, Ibn Ar-Rami (d. 1334) describes a case in which a man had an orchard behind another person's orchard. The owner of the external orchard desired to wall his property and erect a gate, whereas the owner of the internal orchard had an easement that ran right through the external one. The jurist's (usually an Islamic scholar's) opinion was that such a wall required the internal own-

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[8] Sheikh Khalid Al-Musleh is a "mufti" (an Islamic scholar who interprets Islamic law) and professor of jurisprudence at Saudi Arabia's Faculty of Sharia, Qassim University.
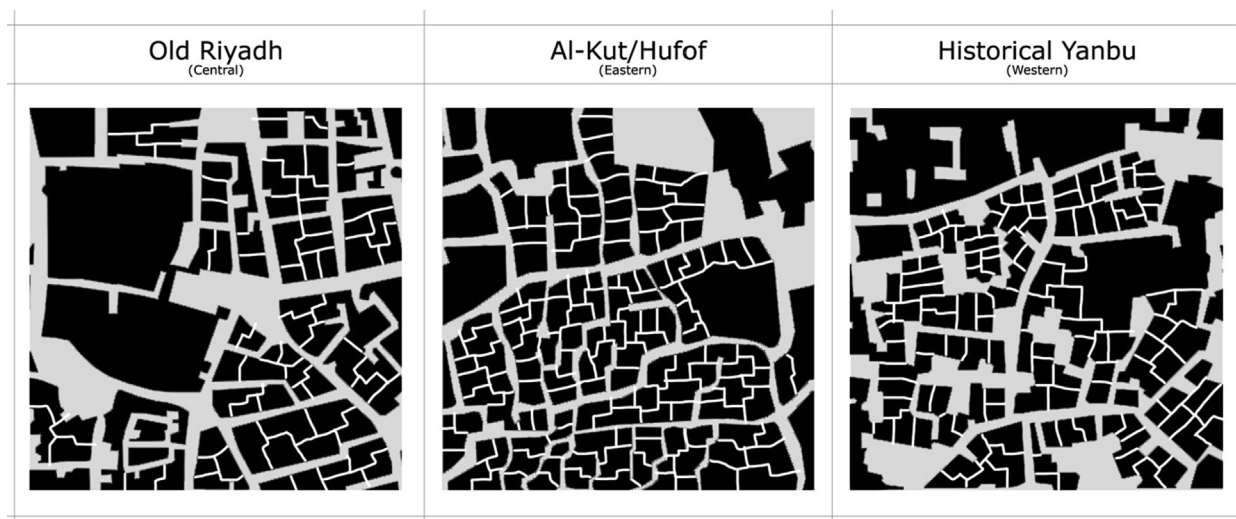
Fig. 10. Compacted urban fabric from different Saudi regions.

er's consent because the internal owner would no longer be free to pass. They might not open the gate for him if he came in at night [10]. In most cases, neighbors and partners reach an agreement after lengthy discussions in front of witnesses from the community. Most of the time, the behavior of the parties involved is influenced by Islamic teaching, which encourages good deeds [2].

The Prophet said, "Beware! Avoid sitting on the roads (ways)." The people said, "There is no way out of it as these are our sitting places where we have talks." The Prophet (□) said, "If you must sit there, then observe the rights of the way." They asked, "What are the rights of the way?" He said, "They are the lowering of your gazes (on seeing what is illegal to look at), refraining from harming people, returning greetings, advocating good and forbidding evil" (al-Bukhari, Book 46, Hadith 26).

According to Saleh Al-Hathloul, Islamic law distinguishes between public (right of way) and private (possessed by surrounding buildings) access to streets. He observes that under Islamic Law, the entire community owns the public streets, whereas private (cul-de-sacs) streets are owned by the people who occupy that space (they control it, but they do not own it) [13]. To align with the Prophet's sayings, Saudi society developed a specific *Urf* (tradition), devising a proper mechanism for doorway placement and street patterns, thereby aligning the built form of Saudi traditional settlements with the Prophet's instruction related to "the rights of the way.".

Most, if not all, doors in traditional Saudi buildings are set back from one another to protect the privacy of other nearby buildings and to ensure that brief social activity commonly occurring at doorways does not interfere with the privacy of inhabitants making use of other nearby doors. This doorway placement *Urf*, in fact, influenced the generation of cul-de-sacs in most cases to ensure that access is granted to affected buildings and other architectural elements (such as the *Al-Mehsraq* (outdoor bench, commonly used to facilitate conversation amongst neighbors) placement) in such a way that preserves privacy ([3] Akbar, 1998; [25]). This indicates that the traditional settlement societies recognized their religious convictions and found appropriate solutions that honored those convictions through each settlement's local *Urf's.* It is reasonable to argue, and astounding to realize, that this simple but deeply held easement right that flows from Islamic teaching created the majority of the cul-de-sacs in the various Saudi traditional settlements; the cul-de-sacs resulting from house subdivisions to provide the proper "right of way" as instructed by the Prophet (Fig. 11).

4.3. Principle five: Alahyaa (reviving the land)

Reviving the land is based on the principle of individual freedom of action provided by Islamic law. According to Ul-Haque Zua, *Alahyaa* is a generative principle of Islamic property law in which a person can take ownership of land from the State by rehabilitating or reviving dead *'mawat'* land [62]. This principle is broad and connects with other aspects of Islamic jurisprudence concerning Muslim land: contractual land, conquered land, state land, abandoned land, free land, and so on. Although this study does not delve into the details, recognize that Islamic law specifically addresses all these land types and real estate situations. However, in general, this generative principle governs how people own land by reviving it and making it fit for civilization (See [17]).

Allah (God) stated, "It is He who made the earth tame for you – so walk among its slopes and eat of His provision – and to Him is the resurrection" (Al-Mulk, 67:15). The Prophet said, "If anyone brings barren land into cultivation, it belongs to him, and the unjust vein has no right" (Sahih Al-Albani, Book 20, Hadith 146). The phrase "reviving the land" refers to "land that has been left fallow, barren, and uncultivated." It is neglected land and has fallen into disuse or become a wasted land over time. It has typically dried out and is no longer suitable for growing crops or vegetation. It also refers to areas that have been flooded [49].

This study contends that most Saudi settlements likely have emerged based on this principle, in which a group of people began relocating their resources and constructing a settlement. As the majority of the regions are empty lands, and given that the country of Saudi Arabia was not officially formed until 1932, these circumstances gave rise to the "*Alkhoboub*" movement.[9] *Alkhoboub,* in general, is an early process that resulted in the formation of several settlements across regions, in which a clan broke away from a larger settlement and relocated to another area due to insufficient resources. This was possible because no one owned the land at the time, and if a clan could bring a plot of land back to life and make it habitable, they could own it.

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[9] *Alkhoboub* is a socio-urban phenomenon that characterizes the majority of Saudi regions, particularly the central region. The Alkhoboub movement is typically visible when an area is occupied by one or more families who have separated from the earlier larger towns. When available resources are insufficient to sustain an overcrowded population, separation occurs (from local focus group interviews in Qassim, Saudi Arabia on 12/10/2020).
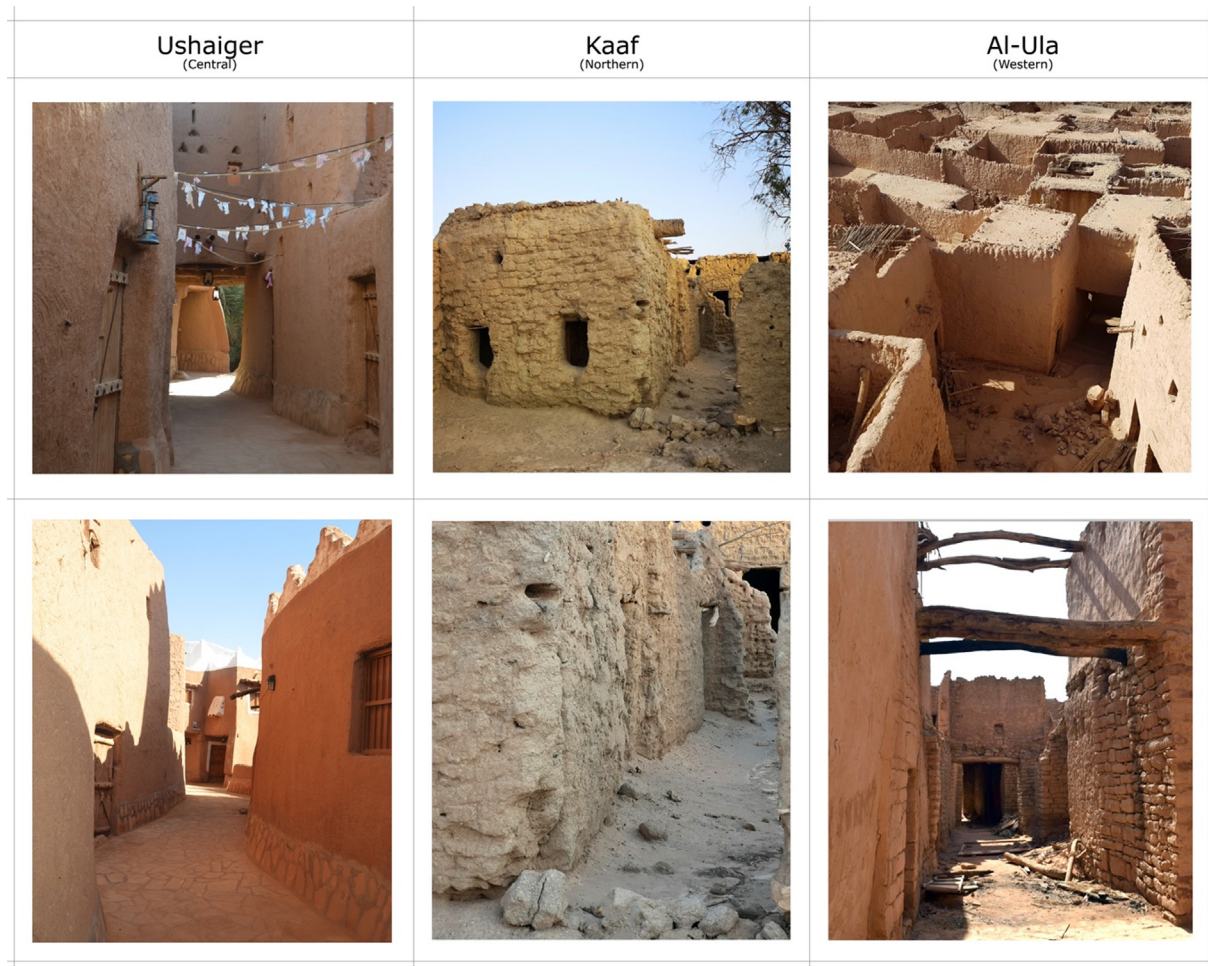
Fig. 11. Cul-de-sac samples from various Saudi regions.

This study proposes that there was a decision-making hierarchy in Saudi traditional settlements that governed actions at both the macro (rulers ruling the public realm) and micro levels as a direct result of the "reviving the land" principle and how each of the traditional settlements originally came into existence (individuals ruling private areas), while having the *meso* level a flexible zone among various interested actors. Because no single person owned the land in its entirety, but rather the settlement was owned in its entirety by the collective society that revived it from a wasteland to a habitable, vibrant settlement, revitalizing the land necessitated a collaboration of public and private interests.

5. Social, traditional, and *Urf* principles

5.1. Principle six: accessibility and privacy

In essence, privacy is made up of choices that provide people with a sense of security. It is a basic human right that reflects social preferences and controls unwanted interpersonal interaction and communication. It is also a balance between isolation and interaction that creates and categorizes spaces as intimate space (the most private space), personal space (space allowing interaction with friends), social space (space allowing temporary contact), and public space (space enabling direct contact) [36].

While visiting architecture schools, interviews of architecture students revealed their views on Saudi architecture. Almost all of the students (96 %) emphasized the importance of privacy in Arab

towns.[10] The majority agreed that the generation of urban and architectural forms in such a region was controlled by privacy. In addition, the architecture students were asked how they believe societies facilitate privacy in such an architectural context. The majority of the responses expanded on the idea of barriers and closed walls. While their responses are correct, we believe this understanding is only partially correct because the generative principle of privacy is flexible and allows individuals and communities to express their privacy in a variety of physical ways.[11]

Religious and social traditions in architecture include precepts that have direct application in interior and exterior areas of the home. The shared value of privacy toward family is one of the most important generative concepts that influenced the creation of the traditional Saudi built environment [26] (Alnaim, 2021). The Qur'an states, "O you who have believed, do not enter houses other than your own houses until you ascertain welcome and greet their inhabitants. That is best for you; perhaps you will be reminded" (An-Nur, 24:27). This study does not confine itself to people's perceptions of privacy to what is inside their homes, but everything concerning their existence.

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[10] University of Hail (Hail), King Saud University (Riyadh), and Imam Abdullrahman Bin Fasil University (Dammam).

[11] According to an interview with a prominent architect, privacy influenced the variation of architectural forms across Saudi Arabia. He emphasized that privacy is physically presented in various ways depending on the available resources in each region (10/09/2021).

Prophet Mohammed said, "It is from the excellence of (a believer's) Islam (i.e., submitting to the will of Allah, God) that he should shun that which is of no concern to him" (At-Tirmidhi, Book 1, Hadith 67).[12] Also, in the Qur'an it is stated, "O you who have believed, avoid much [negative] assumption. Indeed, some assumption is sin. And do not spy or backbite each other. Would one of you like to eat the flesh of his brother when dead?[13] You would detest it. And fear Allah[14]; indeed, Allah is Accepting of repentance and Merciful" (Al-Hujurat, 49:12). Clearly, Muslim doctrine necessitates that someone who is submitted to Allah/God (i.e., a Muslim, as "Muslim" means "submitted to God's will") does what he says and leaves what he doesn't say, making privacy a fundamental generative concept that directed the physical dimension of *Ummah*, the Islamic world (e.g., the Middle East, North Africa, Central Asia, Eastern Europe, *Al-Andalus* (present day Spain and Portugal), and elsewhere).

The architectural form exhibited accessibility and privacy in accordance with cultural and religious demands, taking into account the control of visibility through street patterns, visual privacy, dedicated zones for females for their protection, and visual protection from outside strangers (Fig. 12). The characteristics of controlled spaces had a significant impact on the social interaction of residents. This finding is consistent with the research of Saleh [56] and Dabbour [33] who state that the middle section of the house is the most important area that requires special attention to maintain privacy. Research performed in Meizhou, Guangdong Province, China, had similar findings, where the study concluded with seven types of vernacular dwellings. Each type reflects the characteristics of a typical household layout. As a result, a corridor-connected pattern facilitates the entire dwelling, whereas a unit-by-unit pattern emphasizes individual units. In terms of spatial morphology, corridor-connected dwellings function as a single building, whereas unit-by-unit dwellings function as a village [61]. In comparison, the Saudi traditional house was visually limited in a way to support the family's day-to-day activities. It was planned with the main courtyard as the main family space to control daily activities and as a space for individuals with close relationships among relatives in the same family to practice socializing within the house (brothers and their families) [4].

The house could have two doors: one for guests that leads to the *Majlis* (guest room) and another for the family that leads to the courtyard [12].[15] On the ground floor, there are usually no windows to the outside, and if there were, it would require the permission of affected neighbors [48]. This restriction exists to prevent visual interaction between houses. The openings *(furjah)* are limited and narrow, and their primary function is to provide ventilation. They are mostly located near the first-floor ceiling [5,50,19]. *Privacy* is a significant cultural value that has greatly influenced the development of Islamic architecture, from traditional built environments through today [15] (Alnaim, 2006). A street hierarchy should allow inhabitants to appreciate their surroundings while avoiding unnecessary social and psychological problems in groups that rely heavily on space, such as young children who need to form local friendships

and women's desire to enjoy outdoor spaces without being concerned about strangers occupying those said spaces [43].

For example, Basee and Abdulla [30] investigated the transformed and disconnected urban morphology of Haifa Street Area in Al-Karkh, Baghdad, in order to address accessibility and privacy concerns. They claimed that the transformation of the traditional street layout affected the bonds that connect the traditional urban structure, affecting the system's resilience represented by the traditional alleys, streets, and squares, which were once lively and filled with people and energy and had high internal bonding values. The results show that there is a balance between the elements of the vulnerability and resilience indicators in the historical area and the modern development it has suffered and neglected, which reflects the city's identity today and thus achieves critical development on a holistic level.

As a result, understanding and appreciating the social, traditional, and *Urf* principles of a place is highly critical. In the traditional Saudi settlements, for instant, women were expected by society to stay at home and care for their families while men worked and provided. Saudi women played an important part in sustaining their families and growing their communities by raising the younger generation while having the right to use the public realm. The Prophet Mohammed says, "Treat women nicely, for woman is created from a rib, and the most curved portion of the rib is its upper portion, so, if you should try to straighten it, it will break, but if you leave it as it is, it will remain crooked. So treat women nicely" (Sahih al-Bukhari, Book 60, Hadith 6). Allah calls Muslim men to protect and provide for their families and urges them to treat women well, and comfort them, as they are, or can be mother, sister, and wife.

Islamic law (Shari'a), generally, provides an equitable and fair role for women in the economic life of Muslim society. They contribute to the family's support because they share in the management of family matters, even if they are not legally obligated to provide maintenance. The maintenance of the family is legally (Shari'a) a man's obligation no matter what the woman or the man own [7].

Because Islamic Law obligates males to provide for their families, private homes (dwellings) in the traditional built environments are spatially oriented and organized to maintain the family's seclusion and comfort [52]. This is because according to Shari'a, men are responsible for going out and working for a living, while women are responsible for taking care of the house and children [57]. People's preferences and beliefs encourage them to create built forms that coincide with their religious values, such as house gateways, thresholds, guest areas, courtyards, etc., because of the compacted nature of the built form. Each of these aspects were considered to provide optimum privacy for the families while also ensuring that each place is accessible in a variety of situations. As a result, the courtyard house's open space is the result of a series of historical urban transformations in response to a set of common socio-cultural and environmental needs ([45,22]; Al-Mohannadi, & Furlan, 2020).

5.2. Principle seven: decision-making process

The preceding principles of religious and social traditions serve as the foundations for the decision-making process in the built environment. Within the Islamic traditional towns' ruling system, two venues exist: *Al-Gadhe* (the judge) and *Al-Muhtasib* (the supervisor). The Imam, or the tribe's sheikh, or his representative, appoints the *Al-Gadhe,* and the *Al-Gadhe* appoints the *Al-Muhtasib* to monitor the built environment for violations involving social and public spaces (e.g., market space, quality of goods, weight control, prices control, harmful smell or sound, maintenance, etc.) [65,13].

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[12] All sayings retrieved from an official English Hadith site https://sunnah.com.

[13] The same instruction of the Prophet is found in Paul's Letter to the Galatians, "If you bite and devour each other, watch out or you will be destroyed by each other." (5:15).

[14] "And [God's] mercy is on those who fear Him from generation to generation." (Injil (Gospel) of Luke, 1:50), with "fear" meaning deep respect, reverence.

[15] A similar observation in Chinese culture is the "ancestral hall," which is used for ancestor worship and may also serve as a place of exaltation for the traditional Chinese community. Hangings inscribed by notable calligraphers typically lauded scholarly achievements or virtuous widows, and flag masts at doors served a similar purpose. The size, quality, delicacy of decoration, and material choice all contribute to the family's glorification, while the architecture itself functions as an exhibition, much like the Saudi Arabian *majlis* [60].

Fig. 12. Main streets interconnect to ensure the accessibility of public domain and preserve the privacy of private domain.

One of the most important qualifications of the judge is his knowledge of Islamic law, which he uses to settle disputes and fulfill people's rights. From the standpoint of the built environment, the judge's role is to ensure that the built form adheres to Islamic principles and that "no harm" comes to anyone. His supervisors are responsible for monitoring the public realm and, in some cases, other private areas on a daily basis for violations and resolving them in accordance with Islamic law [40,8,11,2,33,55] (Saleh, 1998). As the Qur'an states,

"You are the best nation produced [as an example] for mankind. You enjoin what is right and forbid what is wrong and believe in Allah. If only the People of the Scripture[16] had believed, it would have been better for them. Among them are believers, but most of them are defiantly disobedient" (Ali' 'Imran, 3:110).

It is clear that Allah (God) calls them (humans) for the good and orders them for the good and forbids them from evil.

Even though Allah orders for the good, Allah states, "But he who does not respond to the Caller of Allah will not cause failure [to Him] upon earth, and he will not have besides Him any protectors. Those are in manifest error" (Al-Ahqaf, 46:32). The "protector" here means the guardian (the Imam, or the sheikh of the tribe) who helps the general people in connotation (guide to Allah Calls). As a result, a hierarchy in the decision-making process is necessary to ensure that the Islamic law in the built environment is fulfilled.

As previously stated, a decision-making hierarchy exists in traditional Saudi settlements to manage the behavior of the public (macro) by the guardians and the private domain (micro) by the residents' agreement based on the generative principle of "no harm." Individuals must follow and accept the judge's regulations and judgements while they also manage their own private places (Fig. 4).

However, the judge (as a representative of the ruler) controls the public realm and ensures that no individual interest is jeopardized within it. The difference here is that the judge and his supervisors have jurisdiction over the entire built environment, whereas the inhabitants rule the private realm and make decisions without the judge or his supervisors interfering if the condition of "no harm" is met by the individuals ([39,18] Alahmad, et al., 2014). If there is harm, the judge has the authority to intervene in private

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[16] "People of Scripture" or "People of the Book" refers to Jewish and Christian peoples. This concept echoes Isa bin Maryam's (Jesus, son of Mary's) warning to Christians: "Not every-one who says to me, 'Lord, Lord,' will enter the kingdom of heaven, but only the one who does the will of my Father who is in heaven." (Injil (Gospel) of Matthew, 7:21).

realms or jurisdictions to resolve the issue. The intent of this decision-making hierarchy is to allow groups of people in private areas to engage in their own placemaking process, while the judge and his supervisors monitor and ensure that any actions taken are not harmful to anyone and are in accordance with Islamic law regarding the built form.

5.3. Principle eight: hospitality

Guest hospitality in Islam is a worthy practice for the sincere Muslim and clear evidence of the strength of his or her faith, as emphasized by the Prophet Mohammed's (peace be upon him) teachings, who urges us to honor the guest by saying, "He who believes in Allah and the Last Day let him not harm his neighbor; and he who believes in Allah and the Last Day let him show hospitality to his guest; and he who believes in Allah and the Last Day let him speak good or remain silent" (Al- Bukhari and Muslim, Book 1, Hadith 308).

Hospitality in Islam, if understood comprehensively, is an act of both the host and of the visitor. Abu Shuraih al-Ka'bi reports the Prophet saying, "He who believes in Allah and the Last Day should honor his guest with provisions for the road, what will serve for a day and night: hospitality extends for three days; what goes after that is *sadaqah* (charity): and it is not allowable that a guest should stay till he makes himself an encumbrance" (Sahih Al-Albani, Book 28, Hadith 13). The desire and need to accommodate the generative principle of hospitality – while also maintaining family privacy – prompted the local community to develop their own *Urf's* based on their understanding of Islamic law that harmonized these commandments within the context of where they live. Local *Urf's* influenced the spatial arrangement of doorways and guest spaces (*majlis*) within the house's internal areas, as well as the process of constructing architectural forms.[17] Depending on the family's wealth and available space, a small kitchen as well as a separate entrance with limited connectivity to the rest of the household may have accompanied the *majlis* room. Due to its open nature and the climatically pleasant atmosphere created around its arcades and porches, the courtyard itself was the preferred space for social gatherings in the absence of guest rooms (Al-Mohannadi, & Furlan, 2020). Therefore, the generation of different forms, shapes and elements in the built environment was based on how each community understood and tailored their *Urf's* to suit their specific requirements [14] (Alshech, 2004) (Fig. 13).

6. Environmental principles

6.1. Principle nine: environmental responses

Saudi Arabia has various environments, topographies, and climates from desert to oasis, from mountain to marine. Because of these differences, the local architecture distinguished itself by how it adapts to the environment it is in and by following generative principles that responded to the environmental circumstances [48]. The principle we looked at didn't directly govern the process of developing architectural forms, but they did impact and improve how a group of buildings interacted with one another in a habitable space based on the environmental conditions.

One of the generative principles is "priority of land use" based on "group interest." This principle ruled from Sharia where it gives precedence to public interests over private ones [17]. It can be used to control land use, managing how inhabitants prioritize their needs and increase the efficiency in the use of resources [28]

(Ben-Hamouche, 2008).[18] For example, when people needed to develop food self-sufficiency, inhabitants prioritizes the public interest and cultivation, if they needed housing, inhabitants prioritized home building. This level of decision-making in response to circumstances helps to explain why the built environments within Saudi Arabia have a wide variety of open space sizes. This generative principle of "priority of land use", drove different actual land uses in different settlements in support of different needs such as agricultural, ranching, and social spaces, acting as a *de facto* form of urban planning for the traditional settlements [58] (Sait and Lim, 2006).

We examined the Ushaiger community in the central region, observing how locals reacted to water canals that possessed "public right of way" and aligned with the "group interest" in order to better grasp the principles of "priority of land use" based on "group interest." This study discovered a "semi-cluster" pattern in the urban fabric of Ushaiger, and this pattern followed the flow of the water canals. Furthermore, based on the position of clustered dwellings, public access to water sources is always available, which means there is a connection between how to arrange the clustered buildings and how to create a public space; this process was identified in the study by observing the location of dwellings and public access and how to access those places. This quality of social connections is linked to the existing gradients between public and private places from a spatial perspective and in informal contexts [35]. Due to the regulated generative principle of "public interest," this behavior ensured that canals and buildings would not cluster around the water (closed), and it prioritized "land usage" by not interfering with or injuring the "public right of way" (Fig. 14).

Waly et al., [66] investigated the social vulnerability of Alexandria city communities in Egypt to identify areas that are most vulnerable to environmental change. The main social vulnerability aspects that affected the area environment were attributable to multiple indicators such as neglecting environmental response, high levels of poverty, inequality, and problems relating to unemployment, housing, and access to basic civic amenities. The findings show that while some areas are considered highly vulnerable "hot spots," others are considered low vulnerable "cold spots," and planning resilient development must take these areas into account in relation to environmental repones and changes to ensure lived quality place.

In many circumstances, nature has an impact on how people react to and use the natural environment to their advantage; thus, when we look at the Ushaiger settlement, we can see how nature and the generative principle influenced how the locals developed their environment. As a result, the Ushaiger urban fabric is distinct because of its responsiveness to nature, as not many settlements imposed the "semi-cluster" pattern and have more open/green spaces than buildings in such cultural context.. This is due to the decision-making flexibility that responded to special contexts that influence distinct built environments, allowing locals to take advantage of environmental resources to develop various urban and architectural forms while adhering to unified generative principles.[19] On the other hand, neglecting the nature may result in negative places that may deplete the environment over time [44] (Khalid, 2002).

7. Conclusion and recommendations

This article addresses two linked questions: 1) how Saudi Arabian regions or sub-areas have distinct physical indigenous archi-

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[17] Interview with a number of locals asserted the importance of *majlis* placement within the house in Hail, Alkhabra, Riyadh from 11/05/2021 to 11/27/2021.

[18] This generative principle follows the foundation of the "no harm" principle to ensure justice is practiced.

[19] A focused group interview of Ushaiger locals asserted that the urban form was developed to cluster houses around water resources and provide public access when needed. Also, the urban fabric was organized to ensure water canals reach green and farm areas on 10/15/2021.

Fig. 13. Different forms and styles at the exterior and interior of Saudi Arabia traditional architecture.

tectural heritage, and 2) how they differ if they have comparable generative principles. The goal was to understand the many local architectural styles and the basic concepts that led to such building being "diverse" in style yet "unified" in terms of generating form and space. This resulted in a mechanism that guided the generating process and ensured the unity and integration of numerous variables inside traditional settlements, which the article refers to as "generative principles.".

As we can see from the examples in this study, the generating processes and decisions connected to the built environment have not diverged from religious and social ideals. As a result, most Islamic jurists consider the generative principle of "no harm" to be a vital and powerful foundation on which to develop legal provisions and judgements. Because this core principle governs and assures that any decision taken does not harm any of the parties in interest, it is the "default" guideline that supports decision-making in situations when a specific guideline does not exist.

As a result, there appears to be a strong need for architectural identity, as the survey finds that (89 %) of architectural students feel that heritage & cultural, vernacular architectural sites and buildings are a valuable source of local identity inspiration.[20] Fur-

thermore, the data also shows that (92 %) of practitioner architects are unsure or reluctant about employing such architecture or how it may be used as a source of inspiration.[21] Such a result demonstrates how the community thinks about their own local architecture, revealing a lack of understanding and studies that expose the local architecture's hidden norms, principles, and imbedded social meanings. Understanding the generative principles of local architecture, as demonstrated in this study, can be an instrument to enhance the homogeneity of the created architectural style in Saudi Arabia's regions, which is now suffering in the modern era.[22]

In similar context, in Egypt, the Authority for Urban Planning or consulting offices put forward development plans for heritage areas under its supervision, fund these plans and projects, assign contractors to carry out these plans, and manage, monitor, follow up, and maintain the sites of these areas and make use of them [53]. Thus, Saudi Arabian architecture should be highly influenced by the country's distinct indigenous architectural tradition, and fund more these distinctive areas to understand their underlying generative concepts and represent in the widespread usage of

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[20] From October to November 2021, a survey among architectural students at three major Saudi architecture schools (King Saud, Imam Abdulrahman Bn Fasil, and Hail Universities) was done.

[21] In November 2021, a number of architectural specialists in the cities of Riyadh, Jeddah, and Dammam were interviewed.

[22] The "Architecture and Design Commission" produced the King Salman Charter for Architecture and Urbanism initiative in December 2021 to address the lack of local identity inspiration in Saudi Arabia's modern architectural practices and addressing number of negative impacts of old practices in Saudi local built environment.
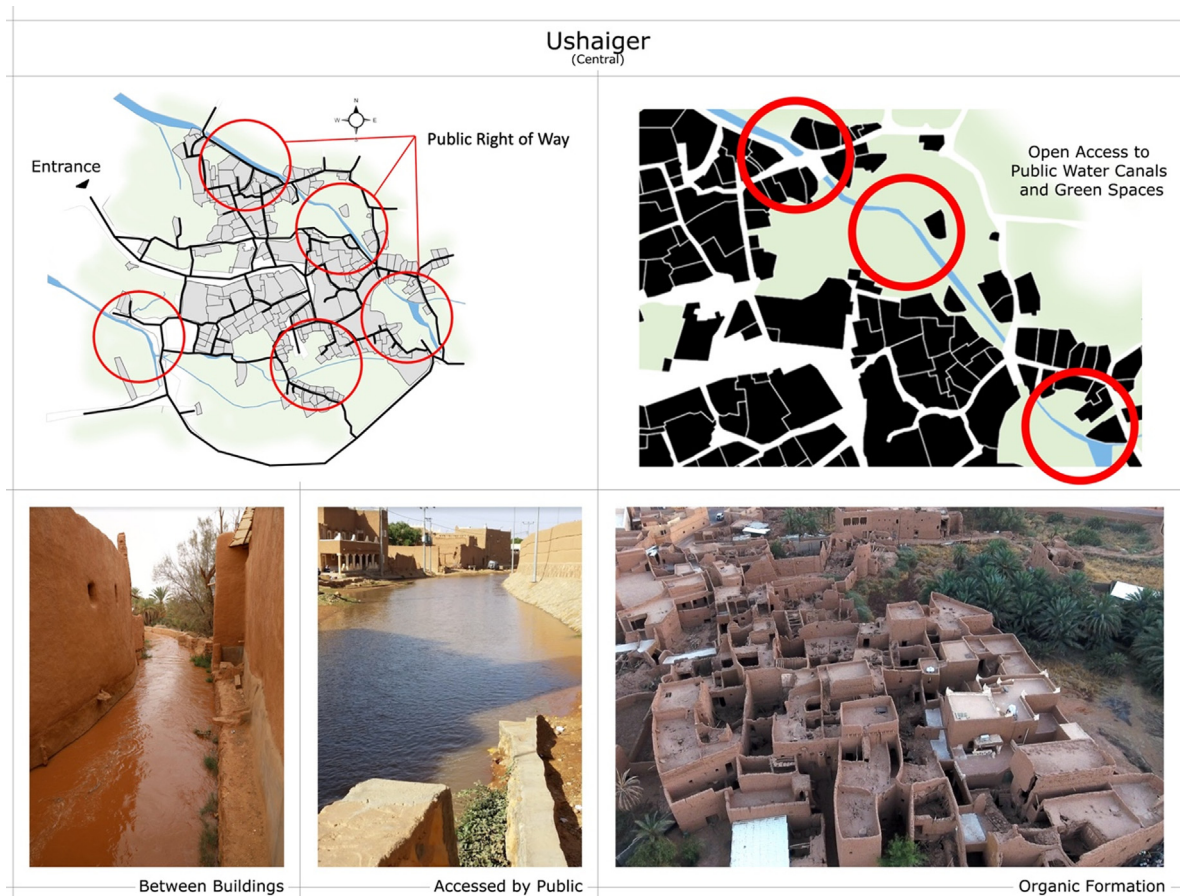
Fig. 14. The formation of Ushaiger settlement urban fabric.

styles influenced by the country's socio-cultural values, local style, and unique natural surroundings.

Since ensuring a high quality of life for Saudi society has become an increasingly important concern, architects and urban planners should seriously consider the concepts drawn from local preferences in the process of designing and developing built form. As a result, modern practice should employ such generative concepts since they raise the question of incompatibility between society and the built environment at the planning, urban, and architectural levels. The Saudi Arabian Architecture and Design Commission is currently discussing such an act to improve the quality of produced architecture in the Kingdom.[23]

This research attempted to explain these principles as well as their impact on the built environment. However, religious and social traditions, as well as their impact on the physical environment, is a vast and complex subject that this study did not examine in depth, particularly in terms of building materials. Future scholars will be able to expand on the themes of this article by looking at how to bring forward local materials and how to make use of those local materials with modern practices to improve the quality of produced local identity. The purpose of this article is to provide an overview of some of the generative principles that inspired the creation of traditional Saudi built environments, as well as those that found elsewhere in *Ummah*, the Islamic world.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgment

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[23] On 12/11/2021, an interview with a high-profile officer in the Architecture and Design Commission was conducted to understand the initiative's goals and objectives, which will impact the architectural profession in Saudi Arabia.

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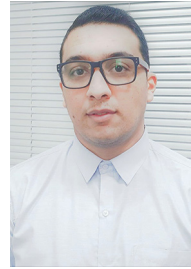
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