

Social Logic of Kitchen Space in Vernacular Architecture (Case Study: Qeshm Housing) – Examination and Analysis

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Abstract

In every society, culture and social relations play a significant role in the formation of the structure of vernacular housing of any region, especially in the Islamic countries where privacy has a considerable effect on the vernacular culture, and consequently, on the structure of the house. Among the various spaces of the house, the kitchen is more affected than other spaces by such issues, such that its patterns of connection with other spaces and its establishment in the building can be directly considered as a result of the importance of this space and its privacy in different cultures, that is, the definition of this space in different cultures. Thus, in this study, the logical reasoning and space syntax approach, which are among the more prevalent methods in the social logic of space, were employed to obtain the social-cultural concept of the kitchen space. The social logic of space is a method to discover the cultural-social relationships lying in the architectural plan, and to extract the concepts of privacy, the relation and connection of the spaces, the level of space integration, access hierarchy, and permeability of spaces through converting the plan to a graph. The methodology employed in this research is case study, and since the reliability of the results obtained from this method is often sought in its repeatability, the research was performed on 4 different samples. By plotting justified graph for the samples, the values of three criteria of depth, relative depth, and integration have been observed. Despite the popular belief regarding the position of the kitchen in Islamic housing, in that it is a latent and private space behind the living spaces and thus situated the farthest to the entrance of the house, the kitchen in vernacular houses of Qeshm is a space between the private and semi-public spaces that is linked consistently to other living spaces of the building, including chamber, the wind catcher room, and the private room, while observing access hierarchy.

Keywords: space syntax, kitchen, Qeshm.

1. Introduction

Many current problems of the architectural housing can be traced back to “the difference of micro-cultures of designers with those of space users”, which are formed owing to different interpretations and concepts of space designers to its users. It is the concept of space which causes spaces with similar name be used in different ways. This is while “the concept and meaning of space is not something that would be added to after design and formation of space”, as it is heavily involved in the process of space formation. It is of paramount importance that designers, with suitable investigation and analysis before the design procedure, try to identify “the users’ priority about each space” which is rooted in “cultural grounds” and their social relationships so that the created space in this procedure would be “consistent with the best conditions for satisfying the needs of users” (Pourdeihimi, 2011: 6).

One of the reliable tools for designers in such studies is to examine vernacular housing samples, which are constructed by the people themselves, and having in mind all their needs and beliefs which is also considered as the material culture of that region. Space social logic is a system for this purpose which introduces a framework and various methods for extracting cultural-social

concepts hidden behind the space structures. By examining the space configuration, this system seeks to provide a descriptive presentation by which the social logic hidden in the lower layers could be discovered (Grout and Wang, 2012: 305).

Among housing spaces, kitchen is considered as the heart of the house, which has its special meaning considering the consistency with needs and life habits of the residents in every culture (Mohajerpour Iravani, 2014: 9). Therefore, contrasting the cultures in explaining the meaning of this space has become a challenge. Its extent of privacy and its hierarchical relationship with other spaces are issues that form different concepts for this space considering the culture difference and social interactions. In this research, the authors seek to study the space sample in Qeshm vernacular housing by using opinions, tool, and other space social logic methods. Furthermore, the cultural-social principles of kitchen space design in Qeshm vernacular housing could be sought by answering following questions:

1. To what extent the kitchen of Qeshm vernacular housing is considered as a private space?
2. Is the kitchen in Qeshm housing considered as a separated space from other spaces or it is considered as a space joined with other spaces?

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3. How the kitchen space relationships are defined with other spaces?

In order to answer the second question, the following hypothesis is also proposed:

Hypothesis 1: kitchen space must have privacy in the Islamic housing, and its access must be limited.

Space syntax and justified graph, which is rooted in the social logic of space, have been used to answer the questions and the aforementioned hypothesis.

2. Theoretical Foundations of Research

2.1. Housing and culture

According to Gifford, houses are consistent with cultures and their space arrangement reveals the social relationship of its residents (Aminpour & others, 2015). Culture is a theoretical concept and structure. One the other hand, it is a manifestation of many notions such as human thought, worldview, standpoint and behavior. The people and their behaviors are part of the residential environment systems, to the extent that they are inseparable. Human behaviors are always formed in the context of varying environments, and as such, they cannot be analyzed without considering the effect of environment (Pourdeihimi, 2011: 3). Vernacular architecture of each region is considered its cultural information source, the examination which reveals the manifestation of culture in housing. Vernacular architecture is a type of architecture which thrives inside the societies, being exclusively consistent with social, technological, and climate conditions therein. In fact, it represents the architecture *of* people not architecture *for* people. According to Rapaport, this type of architecture exhibits the values and patterns of individual life in the construction (Damyar & Nari Qomi, 2012: 66). Cultural differences may results in a plethora of difficulties for the users owing to different interpretations of the environments and their internal behaviors by designers. Therefore, it is necessary to properly define analyze all their conditions, deployments and internal behaviors (Pourdeihimi, 2011: 3). In the following, the approaches to recognizing vernacular housing are studied.

2.2 Dimensions of housing recognition

The space body structure recognition and their latent bio-patterns facilitate the recognition vernacular housing recognition. In the physical aspect, physical features of the house are studied through profile of "having housing spaces" such as rooms, floors, and infrastructure (Sartipipour, 2012: 138). In the cultural-social aspect of housing, the space orders inside the building is explored.

2.2.1 The social recognition of vernacular housing

Genotype is the genetic formula of each trait whose function is manifested as a phenotype (Bahrami Monjemi, 2013: 23). Genotype or bio-pattern is the abstract laws hidden in a space form. Its general meaning is the set of studies which exist in a type or species and governs the

form. The species or type is linked to its kingdom in the past and future by the genotype. Life and similarity with species makes possible the survival of species. Bio-species or bio-pattern hidden in the architecture is are the very inherent studies latent in the architecture space. In the architecture space, the social behaviors which are stemmed from the behavior or its consumers are re-identifiable.

Phenotype, i.e. the body form, is alterable to different forms for which a genotype emerges. Understanding genotype means recognizing social structure, the relationships of components with each other, organized activity patterns and their social load. Therefore, the number of genotypes could be less than that of phenotype. No time and space constraints could be laid for the genotype because perhaps a genotype could be seen in one or more building and inside two different places in different times (Memarian & Tabarsa 2013: 108). Therefore, genotype recognition needs a methodical study of set of samples, the extraction of which proves challenging at times. Therefore, the existing theories and methods in housing cultural-social dimension are discussed in the following.

2.3 Social logic in physical analysis of housing space

In 1984, Bill Hillier and Julienne Hanson described a new theory of space as an aspect of social life in *The Social Logic of Space* (Hillier, 1984). In this book, the authors introduce a called space syntax to discover rules obtained from studying different patterns of arrangement in different spaces. According to him, different spaces reflect "different lifestyles" of their users, and one can achieve the social and cultural features of the residents affecting the forming of the different spatial patterns by using the space syntax method (Hillier & Sahbaz, 2005; Turner, 2007:105; Markhede & Hillier, 2007: 44). The pioneers of this method intended to, contrary to the common procedure, promote the general knowledge by working on the applied knowledge (Bahrainy & Taghabon, 2015: 2). One of the principles of Space Syntax is a mutual relationship between space and socio-cultural patterns (Bahrainy & Taghabon, 2015: 2). Hiller describes the social-cultural logic of space as the following: cultural and social aspects in every spatial configuration play the role of grammar rules in the formation of a literature text, that is, cultural and social features of the residents of every settlement are the main factor in forming the spatial structure of that settlement. According to Rappaport, other factors including climate, technique, and technology of the building are in the next layers in forming the configuration (Rapaport, 2010). "This is manifested more in the vernacular housing, as the building elements and geometrical harmonies in the construction are carefully controlled which in turn leads to the social-cultural sustainability of the space" (Hillier, 2007:77).

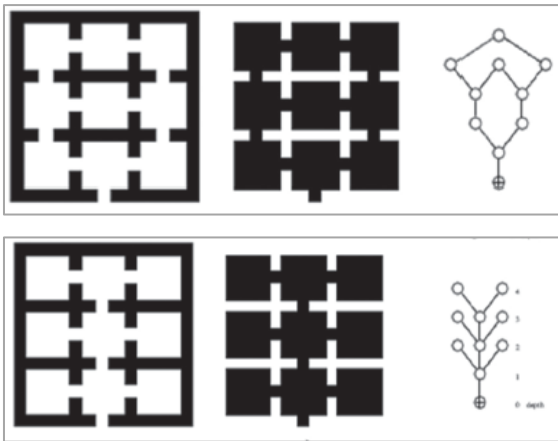


Fig. 1. an example in understanding the spatial configuration (Hillier, 2007:20)

Furthermore, after years of studying and investigating the factors affecting the latent patterns in vernacular settlements, Hillier and Hanson proposed space syntax, which includes the theories and methods for analyzing and social and cultural interpretation of spaces based on the previous studies conducted by researchers such as Phillip Steadman. The main idea of their theory is “the ability to decompose a space to its components, to analyze it as a network of choices, and to interpret in the form of a map and an illustration representing the relationships and integration of the spaces”. In other words, space syntax is an approach developed in the analysis of spatial structured of human-made environments (Manum, 2009: 3), the purpose of which is to describe the spatial models and to depict them in graphic forms, and as a result, facilitating the scientific interpretation of the spaces (Mostafa & Hassan, 2013:445). This method has been known as the space syntax technique in architecture and urbanism. In this method, the spatial structure of the man-made space is converted to the graphic patterns to represent the relations among its various spaces as mathematical data, through analysis of which, the interactions between the form of environments and the behavior of users can be discovered (Hillier & Hanson, 1984: 294).

According to Hillier and Hanson, the lack of a general model representing the mechanism of spatial relationship and social organization is an issue that leads to the de-socialization of the space and de-spatialization of the society. To overcome this challenge, the society should be defined in terms of its social space and space should be defined in terms of its inherent societies (Hillier & Hanson, 1984). Understanding these theories paves the ground for studies of the social aspect of space, housing in particular.

2.3.1 Configurational theory of architecture

The idea of space syntax is that manmade societies utilize space as a crucial and essential source for organizing themselves (Safari et al., 2018: 36). The configuration of space term in space syntax is recognized as converting the continuous space to a linked set of separate units (Safari et al., 2018: 36). Based on the aforementioned theory, the relation between spaces with each other has more

influence on the experience sensed from each environment, that is space configuration, than other features such as form, color, and texture among others, which are the individual features of space. In this theory, mathematical graph analyses are used to recognize the space configurations in a building and, as such, a qualitative phenomenon is analyzed as quantitative model, so that each space is shown with a node and relationships are shown with edges. This type of attitude toward space makes possible the recognition of social behaviors, a qualitative phenomenon, in a quantitative way (Hillier, 1996: 20).

2.3.2 Natural movement theory

This theory emphasizes the impact of spatial configuration on directing the natural movement of people. According to this theory, the movement is the product of the configuration and the connection between the spaces, in that it can predict the movement of a person in space, independently. Hillier considers this notion the primary cause of the idea of movement, the recognition of which is essential to recognize the movement pattern in the environment (Hillier et al., 1992: 30-31). Therefore, this method can help the researcher identify the patterns of movement in the housing environment. Also, the foundations of this theory can be used to identify the most accessible and most isolated paths for best guiding and managing people in an environment (Jiang et al., 2000: 2).

2.4 Islamic culture and kitchen design

So far, various studies have been performed with the purpose of examining the effect of Islamic culture on the housing structure, some of which have counted specific characteristics for the kitchen in Islamic housing. In describing the spatial structure of Islamic homes in Sudan, Othman and Suleiman (1996: 424) argue that: “In the structure of Islamic houses, the spaces for women are separated from those of men, as the female spaces are located in the back of the building, and the kitchen is separated from other living spaces.”

In examining Saudi houses, Al-Khatib et al. (2014: 6-7) point out that: “The kitchen is located near the semi-official and official spaces they ought to serve.”

In a research on Qatari houses, Sobh and Belk (2011) point to the importance of separating the kitchen from other spaces: “The significance of a good scent in Islam and the concept of purity that refers to spiritual and physical cleanliness have led to the separation of the kitchen from other spaces. This space is apart from other spaces, yet should be nearby and have easy to access from other spaces.”

Al-Zubaidi (2007: 217-218) examined the vernacular houses of the UAE and reported that the place of the kitchen is located in the middle layer along with other servicing spaces, while the private spaces are deployed in behind layers. In that research, the kitchen was considered to be a semi-public space, which has good access to the chamber space.

Nari Qumi (2014: 155) examined the socio-cultural concept of the kitchen, defining it as follows: “The kitchen is the main stage of the family life, and not the backstage. It is a private place with its own rules and ceremonies, and is not in the front because the privacy of women must be retained. Kitchen is a womanly, privatized space with respect to all other individuals.”

Raviz, Guardiola, and Aira (2015: 22) have introduced the kitchens of central-courtyard houses in Iran to be the most “hidden” and “private” part of the house under the influence of cultural and social factors as

Hashim and Abdul Rahim (2010) and Mahmud (2007) have separately examined the changes that Muslims have made in indigenous Malaysia to comply with Islamic principles, and reported that one of the most important changes is observed in the kitchen environment, and thus have pointed out “the separation of the kitchen from other public and living spaces,” and “shifting of kitchen to the back of the house.”

As mentioned, various studies have offered different definitions for the kitchen under the influence of local, Islamic cultures. This research employs a different approach and applies the concept of space syntax to the kitchen in Qeshm vernacular housing using established documentary methods.

2.5 indicators of spatial structure analysis using space syntax technique

Structure analysis of every spatial configuration in the space syntax method is performed using the following indicators:

- **Connectivity:** Connectivity or connection refers to the number of links created directly between a space with other spaces (Klarqvist, 1993:11). Connection of spaces to each other leads to a proper spatial recognition and also, facilitation of movement and understanding of relations between the spaces (Young et al., 2001:16). The more connections each space has to its adjacent spaces, the more public that space is considered, while the lower the value, the more private that space is.
- **Depth:** Depth has two meanings in the space syntax technique. In the first meaning, known as the metric depth, it is defined as the distance between two nodes (the number of steps), while its second meaning, called step depth, refers to the number of spaces that a person has to go through from one point to reach another space (in most cases, the depth is measured

relative to the entrance of the building; Memarian, 2002). Metric depth can be obtained using Depthmap software, and step depth can be extracted using justified graphs analysis. The shallower the space, the lower the spatial separation, and, as a result, the more integrated space, which indicates the higher integration value and the more accessible space (Haq, 1999:4). It is noteworthy that an increase in spatial depth leads to an increased spatial privacy in addition to more separation. In other words, a higher depth in a set of spaces set leads to a spatial hierarchy, and reduced accessibility and permeability of some of the spaces, resulting in more control over the space. Therefore, by increasing the depth, the controllability of the space is increased, leading to the formation of privacy in the environment.

- **Integration:** Integration of any space in the spatial configuration refers to the connection or separation of that space to other spaces in that configuration. A space is said to have a high integration when it has more connection with other spaces. Integration is in a way related to the depth, that is, a space is integrated when other spaces of the environment are at a relatively lower depth. Therefore, to move from space with high integration to the other spaces of the system, fewer shifts occur in the movement direction of the person (Peponis et al., 1990:765; Penn, 2003:45). It is also directly and linearly correlated with connectivity. In other words, the more the number of connections to space from adjacent spaces, the more integrated that space is. Through analyzing the two indicators of connectivity and integration, the readability of the building is determined, indicating the extent of complexity or the facilitation of the spatial relations.
- **Access:** This measure is studied in two categories of physical access and visual access in the space syntax technique. The visual access is called isovist, while the physical access is called metric depth.
- **Control value:** It is a parameter that indicates the degree of selectivity of a point to other points to which they are connected. In other words, the less the degree of selectivity of a node to another one, the less the control over a given point (Kamalipour, 2012:4). Figure 2 shows the summary of the aforementioned definitions in line with the dimensions of recognition of vernacular housing based on the space syntax indicators and their social relations in a conceptual model.

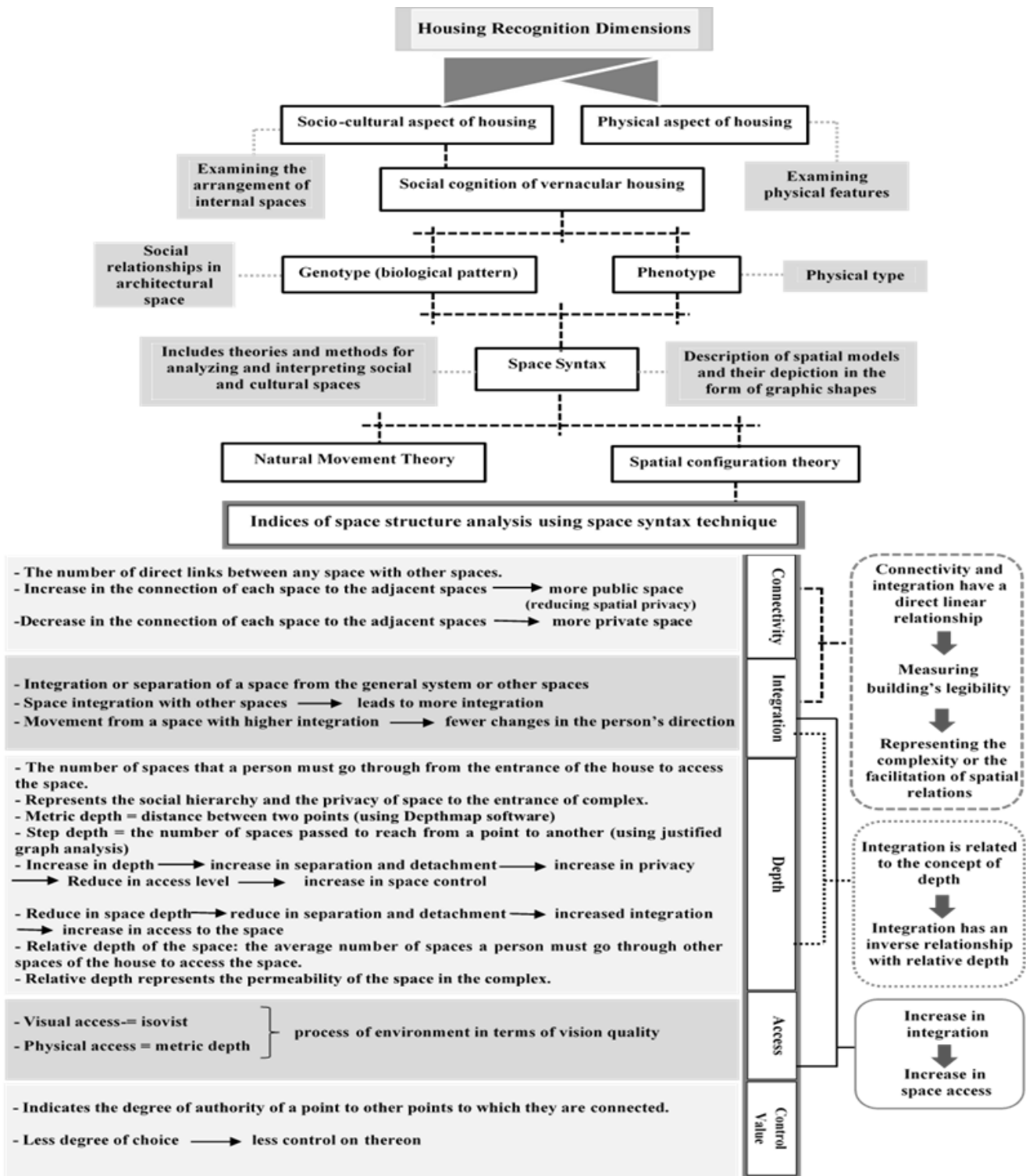


Fig. 2. Conceptual model of the dimensions of recognizing of vernacular housing based on the space syntax indicators and their social relations.

3. Research Theoretical Framework

According to the aforementioned discussion, it is evident that the role of culture and social interactions highly influence some of the features of space that specify the quality of the environment. Furthermore, space syntax includes a set of techniques for “modeling”, “quantifying” and analyzing the structure of the “spatial organization” in the buildings and monuments, which are presented to examine and discover the effective factors and latent patterns in the vernacular settlements. By studying the space organization and spatial arrangement, this theory determined the manner of its interaction with the social structures and behaviors as well as the activities of its users (Hillier et al, 1987:365). Examination of the space syntax in the current study is in fact an attempt to discover how the configuration of the kitchen’s space in the vernacular housing of Qeshm can explain a cultural or social meaning. Here, syntax refers to studying the relation of every spatial unit in a set of adjacent spaces, just like studying a word in a text and its relationship with other words. Given the nature of this study (i.e. analysis of space structure), the computer simulation tools for space

syntax were employed to perform the process related to the analysis of the configuration of the kitchen’s space by the indices of space syntax in creating the privacy in space. Therefore, the space of kitchen is examined in 4 samples of vernacular houses of Laft village, in Qeshm Island using the variables of “depth”, “relative depth”, and “integration”, and extracting the concepts of permeability, access hierarchy, privacy, integration of spaces, and connections and relations of the spaces. The permeability concept and access hierarchy are studied using “relative depth”. Depth refers to extent of visibility of a space by an unfamiliar individual entering a building, the higher of which might even lead to reduced possibility of individuals’ influence in the place. In other words, more time is needed to have access, or plot a route, to space, leading to the formation of perceived privacy (Heydari et al, 2018:57). The concept of privacy of the space and the hierarchy of access from the entrance using the index of “kitchen depth” and determining the degree of controllability of the space can also be a solution to formation of a privacy factor in the environment. In addition to limiting and preventing direct visibility, hierarchy also means introducing and determining public,

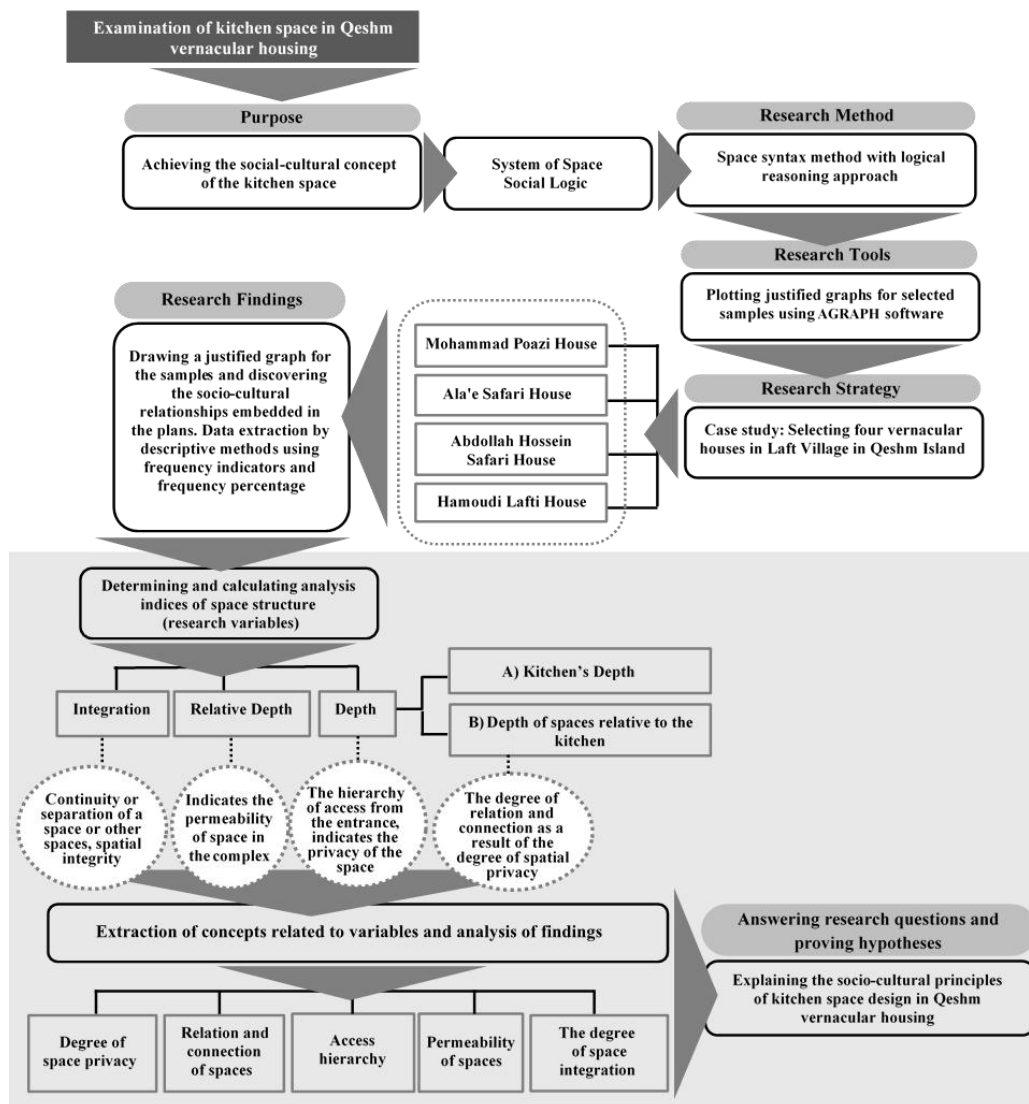


Fig. 3. Research process and conceptual framework

private, and other forms of spatial domains. Moreover, the concept of connection and relations of spaces can be studied by using “depth of spaces relative to the kitchen”, which represents the degree of each space’s connectivity to the kitchen, in that an increase in the connectivity of space to other spaces facilitates access to that particular space, hence increasing the spatial privacy. On the other hand, the integration graph in the space syntax software contributes to the degree of separation of continuity of the space from a general system or other spaces and measure the integration, or lack thereof, in any given space. Figure 3 shows the research process and conceptual framework in the form of a graph.

4. Research Method

In this research, a case study approach was employed using estimation and evaluation methods. This part of the research is quantitative in terms of the nature of the research. In terms of purpose, the research is a fundamental exploration, the purpose of which is to discover and describe the social logic of kitchen space. In order to be able to repeat, compare and ensure the validity of the results, a multiple case study design was used in this study.

4.1 Statistic Population and the case study sample size

There is no clear and decisive rule for determining the number of samples in multiple case studies. In this type of research, the number of samples depends on the nature of the research questions and the role of repeatability in the test or confirmation of its results, as the generalizability relies rather on the concept of the repeatability of the research than that of sampling (Grout and Wang, 2012: 356). In this strategy, multiple cases are considered as multiple experiences, which mean complying with the logic of test–retest reliability and not with the sampling logic that is often discussed in survey studies (ibid.: 17). Accordingly, this research is repeated on four samples of vernacular houses in the village of Laft in Qeshm Island so that by comparing the samples, the possibility of recognizing its species would be facilitated.

4.2 Research variables

In the following, independent variables are presented.

4.2.1 Space depth

Depth is defined as “the smallest step in the space to reach from a particular node to each of the nodes in the graph” (Rismanchian and Bell, 2010: 54), thereby embedding “concept of social hierarchy” and the “degree of privacy of a given space” (Memarian, 2002: 81).

4.2.2 Mean depth

By dividing the total space depths (TD) by the number of spaces (K) minus one, the mean depth (MD) of that space is determined (Bendik et al., 2005).

$$MD = TD / (K - 1) \quad \text{Eqs. (1): Mean Depth}$$

4.2.3 Integration

“This index has a reverse relationship with the relative depth (Dalton, 2001: 9). That is, the greater the value of this measure, the greater the accessibility of the space” (Rismanchian and Bell, 2010: 54). The integration of a node represent the “continuity or separation of a space from the general system or other spaces. A space is said to have more integration when it is more connected to other spaces” (Kamalipour et al., 2012: 4).

4.3 Data collection method and tool

the method of structured non-participative observation was employed to collect data in this study. In this method of analysis, justified has are plotted to examine the latent patterns and social relations in the spaces. The justified graph depicts the internal communication features of the plan. it is consisted of nodes and edges. The components of this graph are each interpreters of the spatial relationships (Memarian, 2002: 79). In order to plot and analyze this graph, the AGRAPH software, which is based on the principles of space syntax theory, was used. Here, descriptive data using frequency and percentage were employed

In the following, the plan of each sample along with its justified graph, integration graph and relative depth graph are plotted.

5. Research Findings

After plotting the justified graph and calculating the depth, relative, and integration indicators with the AGRAPH software, we obtained the following data for each of the following variables:

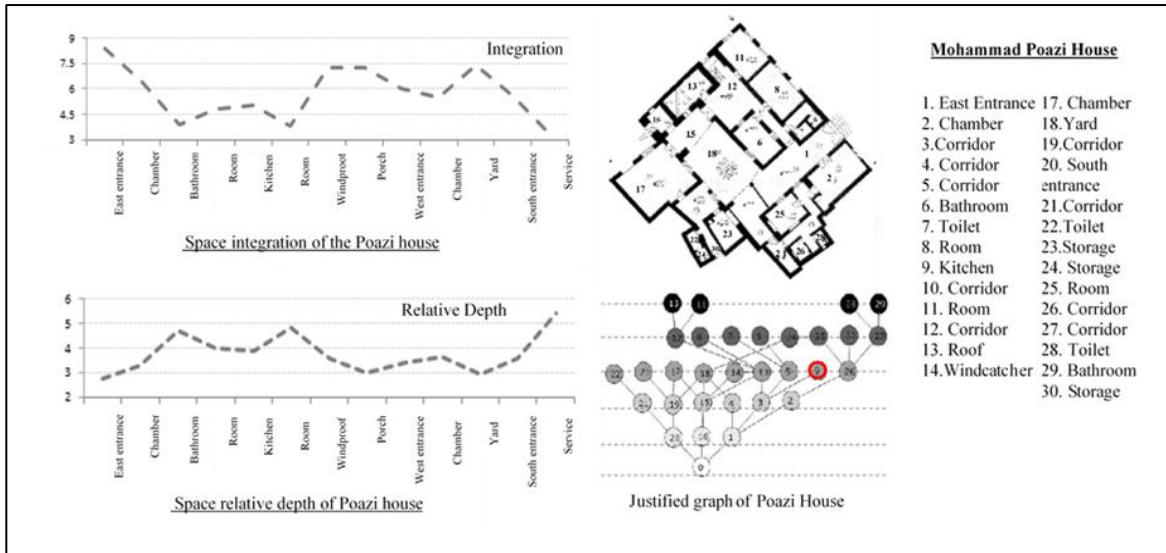


Fig. 4. Justified Graph of Poazi House

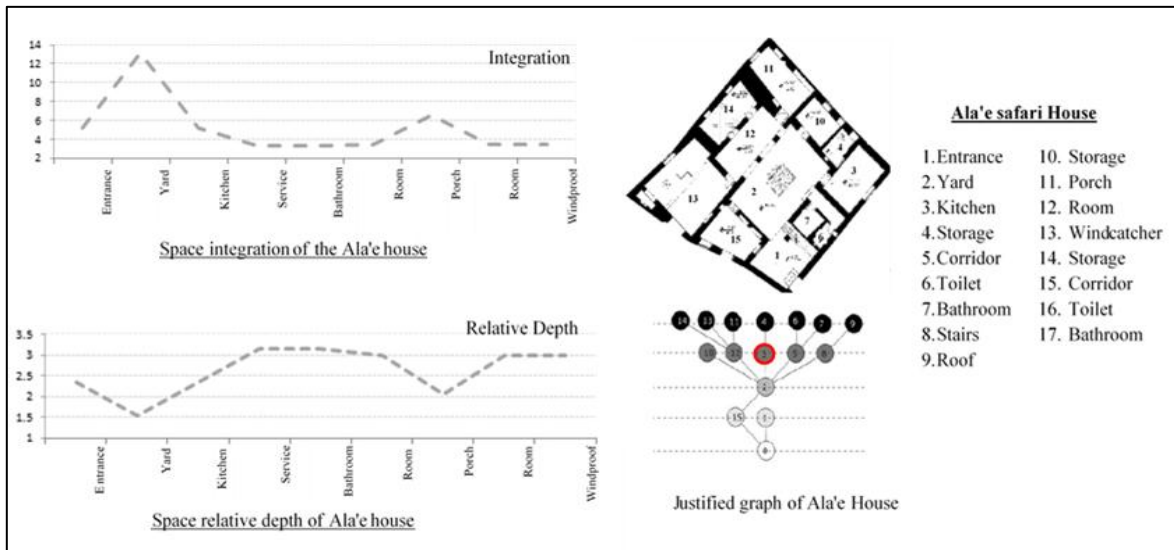


Fig. 5. Justified Graph of Ala'e House

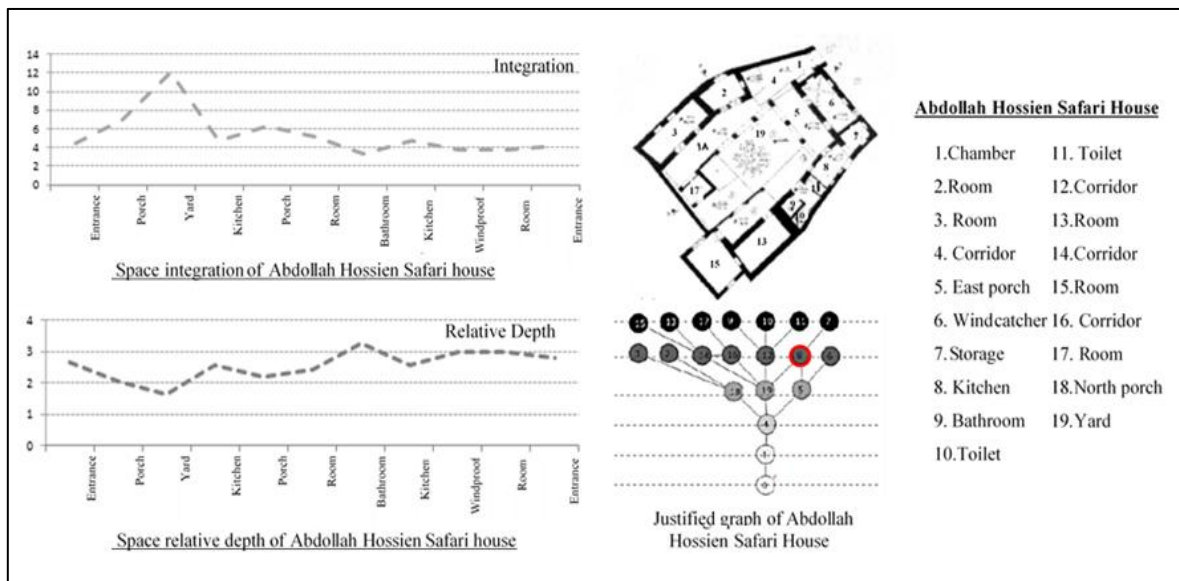


Fig. 6. Justified Graph of Abdollah Hossein Safari House

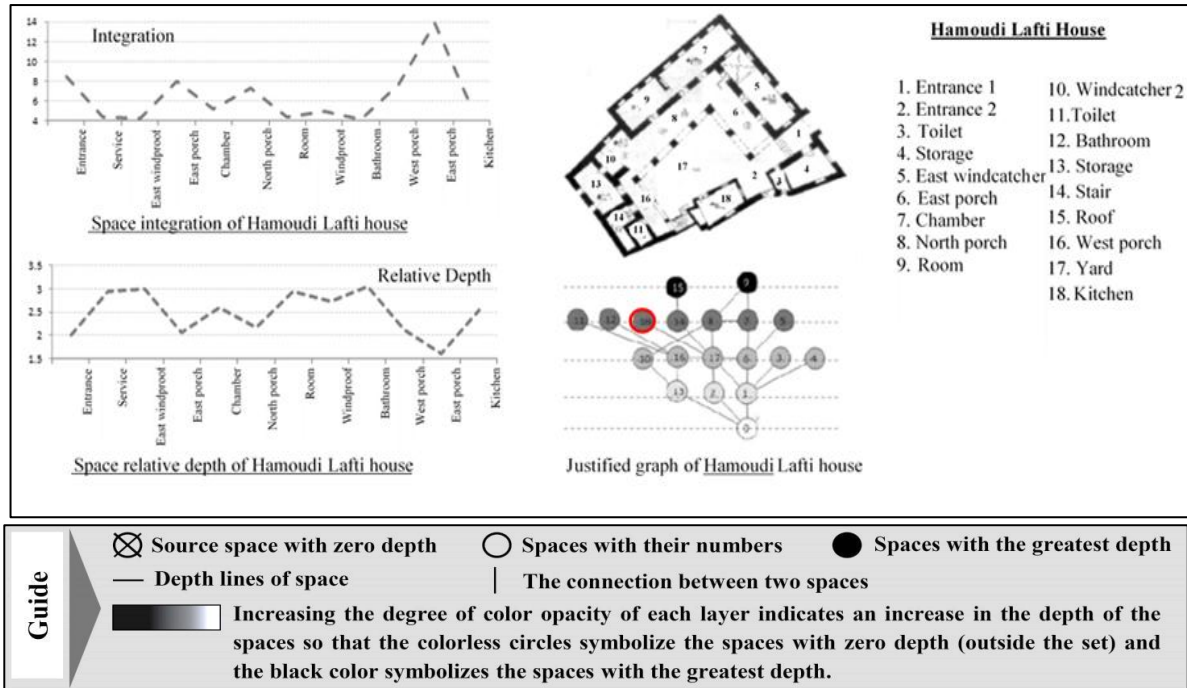


Fig. 7. Justified Graph of Hamoudi House

6. Discussion and Analysis of Findings

6.1 Kitchen Depth

The depth of space represents the number of spaces that a person for reaching the spaces must pass from the house entrance. This indicator shows the social hierarchy and the degree of privacy of the space in relation to the complex entrance. The results from examining the the depth of kitchen revealed the following:

In the residence of Mohammed Poazi's, the kitchen is located at depth level of 3 out of 5 level, which is deeper than semi-public spaces such as chambers and courtyards, and less deep than the private room, the bathroom, and the toilet (Figure 4). The sequence of space depth in this set is as follows:

Entrance > Courtyard = Corridor = Chamber > Storage = Kitchen = Toilet = Yard = Windcatcher > Storage = Bathroom = Toilet = Bedroom

In the residence of Ala'e Safari, the kitchen is located at depth level of 3 out of 4. That is, the kitchen is on degree deeper than courtyard and one degree shallower than more private spaces, such as a private room, a windproof, Toilet room and bathroom (Figure 5). The sequence of space depth in this set is as follows:

Entrance = Storage > yard > Storage = Kitchen = Porch = Corridor = Staircase > Windcatcher = Bedroom = Roof = Bath = Toilet

In the house of Abdollah Hossein Safari, the kitchen is located at depth level of 3 out of 4, that is, at a depth greater than the courtyard and porch and a depth less the

private spaces of the private room, toilet and bathroom (Figure 6). The sequence of space depth in this set is as follows:

Entrance > Corridor > Porch = Yard > Kitchen = Corridor = Windcatcher = Bedroom > Toilet = Bath = Bedroom = Roof

In house of the Hamoudi Lafti, the kitchen is located in third level of depth out of 4 levels, that is, at a depth greater than the courtyard and porch, and a depth less than that of the toilet, the bathroom and the private room (Figure 7). The sequence of space depth in this set is as follows:

Entrance = Storage > Porch = Yard = Warehouse > Staircase = Kitchen = Porch = Chambers = Windcatcher = Corridor > Toilet = Bath = Bedroom = Roof.

6.2 Relative depth of the kitchen

The relative depth of a space represents the average number of spaces an individual needs to pass to reach a particular space. This indicator shows the social hierarchy and the degree of privacy of space relative to other spaces in the building. the results from examining the relative depth of kitchen revealed the following:

In the house of Muhammad Poazi, access from the rest of the spaces to the kitchen has more hierarchy than access to spaces such as the courtyard, the porch and the chamber, while access to private spaces in of the private room, the bathroom, and toilet is more difficult than that to the kitchen.

Entrance > Yard > Porch > chamber = Windcatcher = sub-entrance > kitchen > bedroom >> bathroom > bedroom > Toilet

In the Ala'e Safari house, access to the kitchen from other areas of the house has a more hierarchy than access to the courtyard, entrance and Porch and entrance. However, as with the previous example, access to privacy spaces in private rooms, bathrooms, and Toilets is more difficult than access to the kitchen.

Yard > Porch > Entrance > Kitchen > Windcatcher = Private Room = Private Room > Bathroom = Toilet

In the residence of Abdollah Hossein Safari, access to the kitchen is easier than access to the two entrances, the bathroom and the toilet, the windcatcher room and one of the bedrooms. While accessing the kitchen from other spaces has more hierarchy than access to the chamber, the porch and the courtyard.

Yard > Porch > Chamber > kitchen > Entrance > Bedroom = Windcatcher > Bathroom and Toilet

In the Hamoudi Lafti house, similar to other samples, the relative depth of the kitchen is greater than the that of porches and entrance and less than that of other private spaces such as private room, bathroom and the toilet. In this building, the hierarchy of access to the kitchen and chamber from other spaces of the complex is similar.

Yard > Entrance > Porch >> Kitchen = Chamber > Windcatcher > Private room = Toilet > Windcatcher > bathroom

6.3 The Integration of kitchen

As noted above, the integration represents the degree of differentiation or correlation of space with the whole set. In the house of Muhammad Poazi, the kitchen is more differentiated than the spaces of the entrance, the courtyard, the porch and the chamber, and is more integrated than the rooms of the private room, the bathroom and the toilet.

Entrance > Yard > Porch > Chamber > Chamber = Windcatcher = Sub-entrance > Kitchen > Bedroom > Bathroom > Bedroom > Toilet

In the Ala'e Safari House, the Kitchen is more differentiated than the yard, the porch and the entrance, but it is more integrated to the building compared to the windcatcher and private rooms, especially the bathroom and the toilet.

Yard > Porch > Entrance > Kitchen > Windcatcher = Private Room > Bathroom = Toilet

In the house of Abdollah Hossein Safari, the yard, porch, and the chamber are more integrated with the building

than the kitchen, while in the private room, the windcatcher, the bathroom, and the toilet, the integration of the spaces with the entire building is less than.

Yard > Porch > Chamber Room > Kitchen > Entrance > Entrance > Bedroom = Windcatcher > Bathroom & Toilet

Regarding the residence of Hamoudi Lafti, similar to previous samples, the kitchen has more differentiation than the porch and entrance, and is more integrated than the windcatcher room, the private room, the toilet and the bathroom.

Yard > Entrance > Porch >> Kitchen = Chamber > Windcatcher > Bedroom = Toilet > Windcatcher > Bathroom

6.4 Depth of Spaces with respect to the Kitchen

This indicator represents the smallest number of spatial steps between the kitchen and other spaces. According to the graphs and the results of the AGRAPH software, the following were observed:

In the house of Mohammad Poazi, the spaces arrangement in term of ease of access to the kitchen is as follows:

Corridor > Entrance > Chamber = Windcatcher Room = Porch = Bedroom = Bathroom = Toilet > Chamber > Yard > Bathroom = Toilet

Therefore, access to the kitchen is provided through a corridor that all residents have to cross it to first. This corridor has an immediate access to the entrance. On the other hand, it is connected linked to the Hall-like space, access to which is provided through the porch. It is observed that the windcatcher room and the private room (through hall) and one of the chamber rooms (through the entrance space) are situated lower in the access hierarchy to the kitchen. All other spaces have either access to the kitchen from the porch, as is the case for the second chamber room, or from the yard and porch to the hall and then the corridor, as in other spaces. The building also has two bathrooms, one connected with a corridor to the kitchen corridor and the other connected with a corridor to the courtyard. In general, the ease of access from the kitchen to other spaces is almost identical.

In the residences of Ala'e and Hamoudi Lafti, the spaces arrangement in terms of ease of access to the kitchen is as follows:

Yard > Entrance = Porch > Private Room = Bath = Toilet = Windcatcher Room

In these two houses, the yard has immediate access to the kitchen. As such, one needs to first pass the yard to access the kitchen. Therefore, after entering the building, one has direct access to the kitchen of the building through the yard. This is while access from other living spaces to the kitchen is provided with two buffer spaces of the courtyard and porch. Access to bathroom and toilet is

provided through the corridor that connects them to the courtyard. Accordingly, both the living spaces of the private and windcatcher rooms are in the same condition in terms of ease of access to the kitchen. The same applies to the bathroom, the difference being that access to thereto is provided elsewhere.

In the house of Abdullah Hossein Safari, the spaces arrangement in terms of ease of access to the kitchen is as follows:

Yard > Porch = Private Room > Entrance = Private Room = Windcatcher Room = Chamber = Bath = Toilet

The access to the kitchen is provided through the yard in this sample as well. Except for two private rooms that have direct access to the yard, accessing the kitchen from other living spaces is provided with two buffers of yard and porch. So in this house, like the three previous ones, most of the spaces have the same hierarchy in terms of access from the kitchen.

According to the research findings, to answer the research hypothesis, that “kitchen space in the Islamic housing must have privacy, and its access must be limited”, it is safe to say, after examining the relative depth of spaces in 4 samples, the relative depth of kitchen was lower than that of the yard, porch, entrance, and was higher than that of the bathroom and toilet. Considering that the relative depth is the access hierarchy from other spaces to one space, its value represents the degree of space’s permeability in the building. The results from examining this criterion indicates that the degree of the kitchen’s permeability was higher than that of other private spaces of room and toilet. In other words, its access to other spaces of the building is easier than the private spaces and is harder than the semi-public spaces of the yard, entrance, and porch. Also, considering that depth is the access hierarchy from the entrance and thus represents the privacy of the spaces, the kitchen is not as private as the bedroom, toilet, and bathroom, and is not as public as the yard and entrance, but it is placed in the semi-private layer that in addition to maintaining the required privacy for creating a private womanly space and privacy, it is placed in a way to meet the functional needs of this space in proper servicing to the other spaces of the building.

7. Discussion and Conclusion

The purpose of the current research was to evaluate the social logic of kitchen space in the vernacular housing of Qeshm island. To this end, space syntax theory was employed, by the criteria of which, four vernacular samples were selected for examination.

Therefore, to answer the first research question, that is “to what extent the kitchen of the vernacular house of Qeshm is considered a private space?”, it can be said that, comparing the depth to the entrance or the minimum number of space steps by an entering person has to take to access the space, it was observed that the kitchen is located at a lower depth than the private spaces of the bedroom, bathroom, and toilet. Also, in the case of having

a distinct chamber space, its depth would be less than or equal to that of the kitchen. Thus, considering that the depth is, in fact, the access hierarchy from the entrance and thus represents the privacy of a given space, the kitchen is deemed not as private as the bedroom, toilet, or bathroom, and not as public as the yard or entrance, and as such, it is placed in the semi-private layer. Therefore, as Nari Qomi (2014), and Alzobeydi (2007) have previously mentioned, the kitchen is in the middle layer of the building, located between the private and public spaces, that is, neither at front nor back of the building. However, these results are not in line with those of Othman and Soleyman (1996), and Ravyez, Guardiolla, and Ayra (2015), which consider the kitchen as a space behind the living and most private spaces in the houses affected by the Islamic culture.

To answer the second question of research, that is, “is the kitchen in the vernacular housing a separated space from other spaces or is connected to other spaces of the building?”, as mentioned, the integration criterion is inversely related to the relative depth and represents the intensity of the integration or separation of the spaces with the building. The findings from examining the samples indicate that in the vernacular houses of Qeshm, after the yard and porch which are considered the core connection of the complex and thus have high integration with the whole building, kitchen and chamber have the next most integration with the building. Therefore, it cannot be claimed that the kitchen is a separate space from other spaces, and this finding is not in line with those of the study conducted by Othman and Solyeman (1996).

To answer the third question of the research, that is, “how the spatial relations of the kitchen with other spaces of the building is defined?”, it can be said that examining the depth of each one of the spaces with the kitchen, i.e. the degree of each space’s connectivity to the kitchen, indicates that none of the living spaces has direct access to the kitchen, and yard, porch, corridor or the combination of them provide the access of other spaces to the kitchen. Every living space is connected to the kitchen through at least two buffer spaces, while the degree of connectivity of all these spaces to the kitchen is almost similar.

Therefore, as stated by Othman and Soleyman (1996), Alzobeydi (2007), Sabah and Black (2011), and Humphries and Eves (2014), easy access from the kitchen to all the spaces to which it serves, and even chamber space, has been provided in vernacular houses.

In conclusion, according to the space syntax theory, it can be argued that despite what has been imagined regarding the kitchen’s manifestation in some previous studies, it should not be considered a separate and remote space at the end of the house. In the vernacular culture of Qeshm, the kitchen is a space between the private spaces and semi-public spaces that has been uniformly linked to all the spaces to provide the considered Toilet to space by observing the access hierarchy and considering the presence customs in this space. The spaces related to the kitchen are divided into groups that although each has

their own hierarchy to access from entrance, all have almost the same hierarchy to the kitchen, and each group enters the kitchen through a specific buffer space (yard, corridor or porch). Thus, while properly separating the spaces, the access paths of the spaces are properly separated as well, and the accessibility to the kitchen has been provided without disturbing the access path. Therefore, the kitchen in the vernacular house of Qeshm Island is a semi-public space that, in addition to providing the privacy required for a space in which women feel safe, has been located such as to meet the functional needs of this space in serving properly the other spaces of the building. This definition is in line with those provided for this space in the vernacular houses of the Islamic countries of the Persian Gulf such as the United Arab Emirates, Qatar, and Saudi Arabia. However, it is not consistent with the definitions for this space in the vernacular architecture of Sudan and Malaysia as a space in the farthest part of the house and behind the living spaces that, considering the two patterns as affected by the Islamic cultures and privacy in particular, such a difference can only be traced back to the native culture of these regions.

Reference

- 1) AlKhateeb, M. S., Humphries-Smith, T. & Eves, B. (2014). *Space Design and Privacy in a Saudi House*. [http://eprints.bournemouth.ac.uk/\(accesssd4](http://eprints.bournemouth.ac.uk/(accesssd4) October 2018).
- 2) Aminpour, A. Madani, R. Hayati, H. & Daldadeh, M.A. (2015). 'Re-recognition of Housing and Residence Concepts Based on Islamic teachings', *Urban Management Journal*, 14(40): 47-60.
- 3) Al-Zubaidi, M. S. S. (2007). 'The sustainability potential of traditional architecture in the Arab world-with reference to domestic buildings in the UAE' (Doctoral dissertation, University of Huddersfield).
- 4) Bendik, M. Espen, R. & Paul, B. (2005). 'Agraph, Software For Drawing And Calculating Space Syntax Graphs'. Delft, Netherlands.
- 5) Bahrami Monajemi, Gh.R. (2013). 'Genetics'. Tehran: Anvar Knowledge of Asr.
- 6) Bahrainy, H. & Taghabon, S. (2015). Deficiency of the Space Syntax method as an urban design tool in designing traditional urban space and the need for some supplementary methods. *Space Ontology International Journal (SOIJ)*, 4(3), 1-18.
- 7) Dalton, N. (2001). 'Fractional configurational analysis and a solution to the Manhattan problem'. In *Space Syntax 3rd International Symposium*, Atlanta.
- 8) Damyar, S. & nari Qomi, M. (2012). 'Understanding the Nature of Architectural Space by Thinking about the Similarity of Space in Vernacular Settlements', *The Journal of Fine Arts and Architecture*, 17(1): 65-73.
- 9) Dursun, P. (2007). 'Space Syntax In architectural design', 6th International Space Syntax Symposium, Istanbul, Turkey.
- 10) Grote, L. and Wang, D. (2005). 'Research Method in Architecture', translated by Alireza Ainifer, Tehran: Tehran University Press.
- 11) Hashem, A.H. and Abdul Rahim, Z. (2010). 'Privacy and housing modifications among Malay urban dwellers in Selangor', *Pertanika Journal of Social Sciences & Humanities*, 18(2): 259-269.
- 12) Haq, S. (1999). 'Can Space syntax Predict Environmental Cognition', 2th International Space Syntax Symposium.
- 13) Heidari, A.A. peyvastehgar, Y. mohebi nejad, S. and kiaee, M. (2019). 'Evaluation the methods of confidentiality in three Peymoon of large, small and break in the articulation of Iranian-Islamic housing using space syntax techniques', *Maremat & Me'mari-e Iran*, 1 (16): 51-68.
- 14) Hillier, B. Honson, J. and Graham, H. (1987). 'Ideas are in things: an Application of space syntax method to discovering house genotype', *Environment and Planning B: Planning and Design*, 14(4): 363-385.
- 15) Hillier, B. (1996). 'Space Is The Machine , A Configurational Theory Of Architecture Space Syntax'. Cambridge: Uk: Cambridge University Press.
- 16) Hillier, B. (2007). 'Space is the Machine, A configurational theory of architecture Space Syntax'. Cambridge: Cambridge University Press.
- 17) Hillier, B. and Hanson, J. (1984). 'The Social Logic Of Space', Cambridge University Press.
- 18) Hillier, B. & Sahbaz, O. (2005), High Resolution Analysis of Crime Patterns in Urban Street Networks: An Initial Statistical Sketch from an Ongoing Study of a London Borough, *Proceedings, 5th International Space Syntax Symposium, TU Delft*.
- 19) Hillier, B. Penn, A. Hanson, J. Grajewski, T. and Xu, J. (1992). 'Natural Movement: Or, Configuration And Attraction In Urban Pedestrian Movement', *Environment And Planning B Planning And Design*, 29-66.
- 20) Jiang, B. Claramunt, C. and Batty, M. (2000). 'Geometric Accessibility And Geographic Information: Extending Desktop Gis To Space Syntax', *International Journal Of Applied Earth Observation And Geoinformation*, 3-4(2): 161-171.
- 21) Kamalipour, H. Memarian, Gh.H, Feizi, M. and Mousavian, M.F. (2012). 'Formation and spatial configuration of vernacular housing: Comparative Comparison of the Arrangement of Guestroom Space in Kerman's Traditional Houses', *Housing and Village Environment Journal* , 30 (138): 16-3.
- 22) Klarqvist, B. (1993). 'A space syntax glossary', *nordisk arkitektur for skning*, (2): 11-22.
- 23) Mahmud, S. (2007). 'Identity crisis due to transformation of home environment: The case for two Muslim cities, Dhaka and Hofuf', *METU JFA*, 24(2): 37-56.
- 24) Memarian, Gh.H. (2002). 'Syntax of Architectural Space', *soffeh Journal*, 12(3): 75-83.
- 25) Memarian, Gh.H. & Tabarsa, M.A. (2013). 'Types and Typologies in Architecture', *Journal of the*

- Iranian Association of Architecture and Urban Development, 6: 103-114.
- 26) Mohajerpour Irvani, S. (2015). 'Kitchen Design and Deployment', Tehran: Novin Resanesh Publications.
- 27) Mostafa .A & Hassan, F. (2013). 'Mosque layout design: An analytical study of mosque layouts in the early Ot-toman period', *Frontiers of Architectural Research 2*
- 28) Nari Qomi, M. (2014). 'Modern Kitchen and Its Social-Cultural Concept in the Family Life of the Religious group of Iran: A Case Study of Qom City', *Cultural Society Journal*, 5 (3): 157-133.
- 29) Osman, K.M. & Suliman, M. (1996). 'Spatial and cultural dimensions of the houses of Omdurman, Sudan', *Human Relations Journal*, 49(4), 395-428.
- 30) Penn, A. (2003) 'space syntax and spatial cognition or why the axial line?', *Environment and Behavior*, 35(1): 30-65.
- 31) Peponis ,J. Zimring, C. & Choi, Y.K. (1990). 'Finding the building in wayfinding', *Environment and Behavior*, 22(5): 555-590.
- 32) Pourdehimi, Sh. (2011). 'Culture and Housing', *Journal of Housing and Rural Environment*, 30(134): 3-18.
- 33) Rapaport. I. (2010). 'Anthropology of Housing'. Trans: Afzaliyan. Kh. Tehran: Herfeh honarmand.
- 34) Raviz, S.R.H. Eteghad, A.N. Guardiola, E.U. & Aira, A.A. (2015). 'Iranian courtyard housing: the role of social and cultural patterns to reach the spatial formation in the light of an accentuated privacy ACE: architecture', *city and environment*, 10(29): 11-31.
- 35) Rismanchian, O. & Bell, S. (2010). 'Applied Knowledge of the Space Deployment Method for understaing the Spatial Configuration of Cities', *Journal of Fine Arts and Architecture*, (45): 49-56.
- 36) Safari, H., Nazidizaji, S., & FakouriMoridani, F. (2018). *Social Logic of Cities and Urban Tourism Accessibility; Space Syntax Analysis of Kuala Lumpur City Centre. Space Ontology International Journal (SOIJ)*, 7(3), 35-46.
- 37) Sang Kyu, J. and Ban, Y. (2011). 'Computational Algorithms To Evaluate Design Solutions Using Space Syntax', *Computer-Aided Design*, 664-676.
- 38) Sartipipour, M. (2012). 'Localism Approach in the Architecture of Iran's Villages', *Journal Space Economy & Rural development*, 2(2): 129-146.
- 39) Sobh, R. & Belk.R.W. (2011). 'Privacy and gendered spaces in Arab Gulf homes', *Home Cultures Journal*, 8(3), 317-340.
- 40) Sungur, C. and Çağdaş, G. (2005). 'Effects Of Housing Morphology On User Satisfaction', *Fourth International Space Syntax Symposium*
- 41) Young, k. Chung, J. Kong, E. Shin, H. & Heo, J. (2015). 'A study on the design methodologies for activating', *Proceedings of the 10th International Space Syntax Symposium*.