

Reasons and Results of Social and Physical Changes in Traditional Mosul Houses Between 2014-2023



Rana Mahfoodh Hamid^{*}, Behiye Isik Aksulu^{*}

Department of Architecture, Faculty of Art, Design and Architecture, Istanbul Okan University, Istanbul 34959, Turkey

Corresponding Author Email: raal-dulaimi@stu.okan.edu.tr

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ABSTRACT

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The research deals with the cultural heritage of the old city of Mosul and the importance of conserving it. It aims to measure the extent of the changes in the social and physical structure due to the war. It comes from a doctoral dissertation on the concept of conservation. The research adopts a descriptive-analytical approach to collecting and analyzing information from the site visit, conducting a field survey represented by personal interviews with families, and conducting a questionnaire prepared for this purpose. In addition to documenting a heritage house, they were elected according to specific conditions and collected data on the physical structure. The research concluded by diagnosing many criteria related to the social structure and measuring the extent of the changes that occurred in it, in addition to discussing the impact of changes in the social structure, extracting their repercussions on the physical structure, and measuring the extent of the changes in the architectural characteristics that occurred in the heritage houses. It was concluded that the change in the social structure due to wars and the lack of awareness of methods of architectural preservation of cultural heritage leads to changes in the physical structure of residential homes, which in turn is reflected in the city's cultural identity.

1. INTRODUCTION

The importance of preserving cultural heritage to protect artistic and scientific institutions and historical monuments has been discussed in many conventions. The Nara Document emphasizes the need to promote the preservation of cultural diversity in the world as a source of intellectual and spiritual wealth for all humankind [1].

Mosul city is known for its religious, social, cultural, and ethnic diversity. Historically, it had a mixed population of Arabs, Kurds, Turkomans, Shabak, Assyrians, Arman, Chaldean (Christians), and Yazidis [2]. It was distinguished by its cultural diversity resulting from its religious, national, and ethnic diversity, which gave it Historical importance, cultural and architectural richness represented by the presence of mosques alongside churches and religious shrines, social characteristics represented by similar customs and traditions that reflected in the City's planning, and their customs, traditions, and relationships in the neighborhood were reflected in the city and its urban character. From 2014 to 2023, the Old City witnessed significant social and architectural changes and massive destruction due to the war, which led to the loss of much of its cultural heritage and social diversity. As a result, the old City lost its centrality and commercial and administrative weight, and the urban areas affected by the conflict turned into commercial and administrative alternative centers. As a result of its historical

importance, international organizations took an interest in it and worked on the necessity of its social and architectural reconstruction to preserve its cultural heritage. The UN-Habitat and UNESCO developed a set of recommendations and directions for reconstructing Mosul's Old City. They said, "While much of this unique architectural heritage has been lost, the historical and cultural soul of the city is still very much present. Therefore, the reconstruction, restoration, and conservation process is imperative to respect the tangible surviving elements and the traditions" [3, 4].

Hence, the research problem was determined: There needs to be a clear vision regarding the architectural and social structure of traditional houses in the City of Mosul and the changes that occurred in it after the war, which could give us guidelines for the methodology of preserving. The research objective focuses on analyzing, diagnosing, and evaluating the change in traditional houses' architectural and social structure to invest it in conserving the rich cultural heritage of the old City of Mosul after the war and studying the mutual relationship between the architectural and social elements in the residential unit. The study provides a general background on the old Mosul in Section 2. In Section 3, the study explains the research problem, aims, and hypothesis. In Section 4, primary social and architectural data are synthesized. Then, Section 5 represents the analysis stage. Section 6 concludes the study with proposed conclusions.

2. BACKGROUND

2.1 History of the old city of Mosul

The Old City of Mosul is the center of the city of Mosul, located in northern Iraq on the western side of the Tigris River. It is one of the Islamic cities and was named Mosul because of its location, as it is considered an access point for many sites. Its history dates back to the time of the Assyrian. Since the founding of Mosul city, it has been inhabited by Arab tribes over successive periods. The old Mosul city was divided into neighborhoods, squares, and shops. The residents of each area have distinct customs and traditions inherited from the tribe to which it is attributed. Every district in the city has a mosque and a market [5]. Mosul is considered one of the most essential Iraqi cities in the social composition of Iraqi society through its historical and civilizational development stages. Its prominent role in the overall movement of Iraq and its civilizational transformation, its distinction with specific social and cultural characteristics that left their mark on the social organization nature of this city, which was an essential reason for the emergence of social patterns, behavioral models, and other values that are embodied in their social and organizational structure (Figure 1).

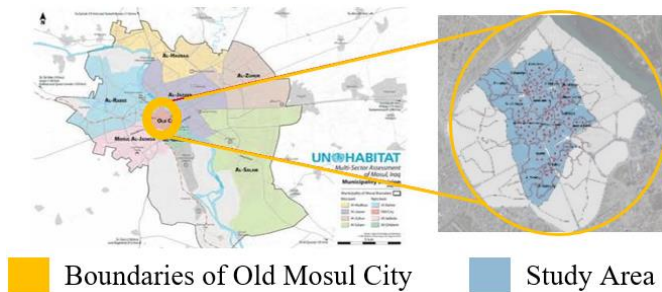


Figure 1. Location of study area in old Mosul city

2.2 Social and architectural fabric of the Old City

The urban fabric in old Mosul city is organic and is the basis of the morphological formation of the town. The traditional Mosul city, like Islamic cities, includes a group of main alleys linking the city's entrances with the site of the Great Mosque and the main markets. Branching from the main alleys are secondary arcades that transfer to other lesser-importance facilities, and a gradation accompanies this gradation in privacy from the general towards the private [6]. With the development of Mosul, most wealthy families moved to live in the new residential areas in the sixties of the last century. So, the adverse effects began in the old city. This displacement did not affect the demographic composition of the Old City for its minority groups until the last events that witnessed large-scale displacement, especially the Christian families, which reflected on the demographic of the area. With the end of the events, some Muslim families who owned homes in the old city returned. Some traditional houses were rehabilitated to suit the nature of the family in several respects, without taking into account the architectural and heritage characteristics of the place; the result was changes in the plan or elements of the facade and even building materials. The city lost part of its social and architectural fabric after the displacement of minorities, the destruction of mosques and churches, and the loss of its distinctive historical landmarks and signs. Much of this fabric along the riverfront was destroyed, and the main

streets lost their clear landmarks and characteristics.

Many architectural studies focused on old Mosul city and its traditional houses, as it constitutes the most significant proportion of traditional towns and the main functional pattern that reflects social and architectural values. Some were analytical studies that analyzed the house from many levels and views. Some for composition [7]. Others studied the plan and focused on the components of traditional houses [8, 9]. Other studies focused on courtyards, which are the most important and prominent in conventional house architecture. [10]. Another analytical study focused on the external facades or the facades overlooking the inner courtyard [11, 12]. While other studies focused on analyzing the architectural elements that traditional houses abound, such as entrances, columns, arches, etc. [13-15]. Other analytical studies dealt with the environmental aspect that has earned them the status of sustainability [16, 17].

On the other hand, other studies dealt with the reconstruction of Mosul after the war, some of which aimed to develop a set of strategies drawn from international experiences that might ensure the preservation of the urban identity of the region [18, 19]. Other studies have linked achieving sustainability in reconstruction projects to the participation of residents [20]. While Saeed et al. [21] dealt with ways to plan the housing aspect and develop potential housing models after the war with the involvement of residents. The studies did not address the assessment of the change in Mosul's social and architectural structure.

3. RESEARCH METHODOLOGY

No applied studies have shown how changes in the social and architectural structure of residential houses affect the City's cultural identity, and no study has determined the extent of the impact of these houses and their users on the value of the place. The research aims to analyze and evaluate traditional houses' social and architectural aspects and determine the changes they witnessed and the extent of their impact on the place.

The main questions in this research are: How can the impact of the social and architectural structure of residential houses be measured on the City's cultural identity, and what happens when changing the characteristics of these structures on heritage values?

The research assumes that the Diversity and Architectural Richness in the Old City of Mosul is due to the Social and Cultural Diversity in the City. The family and the user within the traditional houses have a significant role in determining the place's cultural identity, and any change in the social and architectural aspects will be reflected in the city and its cultural heritage.

The research adopted the descriptive analytical approach, which included finding a theoretical framework around the concept of housing units socially and architecturally and extracting the most important variables related to the social and architectural aspects.

During the Research process, investigation-observation, interview, and documentation studies will be done to find the changes in the social and architectural structure of the traditional housing units. To achieve the research objective, according to the following procedures:

- Evaluate the size of changes in the social structure that occurred in the housing units by determining the criteria of

social structure.

- Evaluate the size of the physical changes and levels of restoration witnessed by the city after coding and valuing each element.

According to the UN-Habitat report, the study sample was selected within the part that recorded moderate to minor damage [4], and witnessed the return of residents to it to ensure the presence of families inside the homes. Specific criteria for selecting the study sample will be explained in more detail.

Two methods were used to study the elected area: field visits, personal interviews, and distributing a questionnaire to residents. These methods allow the researcher to ask questions based on the culture of the interviewer, provide direct

interaction with residents, ensure that the questionnaire is answered accurately, and analyze the information mathematically to ensure the reliability and validity of the results. In addition, the researchers plan surveys of homes and document them with photographs to measure architectural changes. The researcher faced some restrictions in photography due to residents' reservations about photographing their families (especially women) and knowing the nature of social life inside homes. The researcher decided to photograph the houses without the women. However, this did not affect the results, as they were recorded through questions and observations (Figure 2).

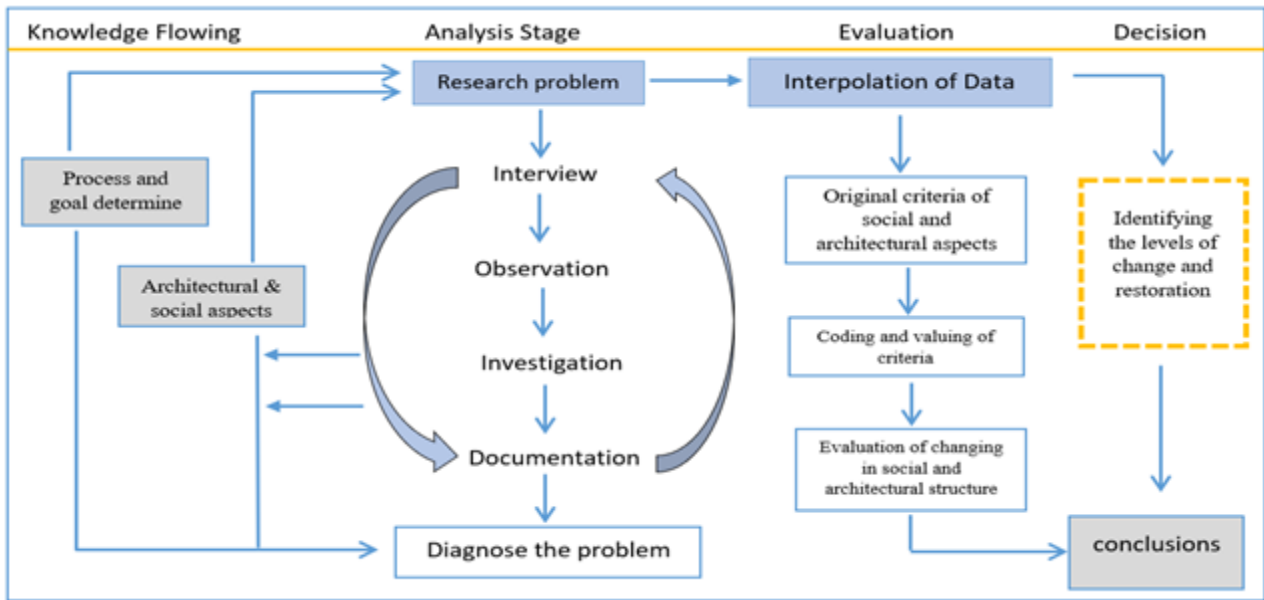


Figure 2. Research methodology

4. SOCIAL AND ARCHITECTURAL STRUCTURE IN THE OLD CITY OF MOSUL

Conserving is not limited to physical heritage aspects but aims to enhance the spatial identity, cultural environment, and social values. The difference between societies is an inevitable necessity that must be preserved because it ultimately leads to the aesthetic reflected in the place's structure and material identity.

Mosul is one of the biggest and most important historical and Islamic cities with a distinctive architectural identity. It is a model of Islamic architecture with joint planning and design features that respond to its residents' environmental, social, and cultural requirements and overlap to form an architectural unit that resists the prevailing climatic conditions in the area and is defined by the wall surrounding the city. The traditional fabric is linked to human needs and is characterized by a local style that gave the city its architectural identity. The origins of its inner courtyard go back to Assyrian architecture [5]. Residential units constituted the highest percentage of land uses in old city, as they were linked to human needs and came in response to the prevailing climatic, social, and cultural conditions. They were diverse in their economy, areas, function, contents, and building materials, which determine the income of the house's owner, with flexibility in planning and adapting to using its spaces during the year or its use by

extended families. And with all the differences, the heritage houses converge on the essential architectural elements of the Arabic Islamic houses. Their most important characteristic is the use of local materials such as marble. Despite the materials' simplicity in construction, they are characterized by precision and high artistry. A brief introduction to these characteristics is offered below:

4.1 Social structure of Mosul families

Many social sciences and humanities specialists have taken care of a family due to its importance and consider it the first and central nucleus from which society is formed. It is considered the oldest human institution. It is closely related to culture because it is the primary carrier of social beliefs and their perpetuation [22].

The Social Sciences Dictionary of Frederick Maatouk classifies the family into three forms (the nuclear family consists of one family linked by one house. The extended family is more than one family linked by kinship and living in one dwelling. The group family is the extended family whose members have a home relationship and joint economic activity [23]. The types of the family have changed in terms of time and the development of society. There are new types, descriptions, and functions of the family that differ in Place and from one group to another. A) The simple (nuclear)

family: It is the traditional family consisting of the father, mother, and children. B) Stem family: a family consisting of the division of the simple family by creating a new family that arises from the marriage of one of the sons. C) A modern single-parent family. D) Combined (mixed) family: This family arises from a single-parent family. E) Grandparents' family: caring for children is costly for the grandparents. F) Family without children [24, 25].





Urbanization and industrialization factors played a practical and direct role in changing the Iraqi family from an extended family to a nuclear family, which led to structural changes in the Iraqi family in addition to a difference in the nature and quality of the family's housing. Education, especially women's



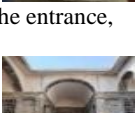






education, and economic developments played a significant role in making marital relations based on relative equality and reducing the father's authority [26]. The Mosul families also changed and became more modern with time, affecting the family's building and functions to be more suitable for the needs of the new era. In contrast, the nineties of the twentieth century witnessed a transitional phase that combined traditional and non-traditional features, led to the creation of similar life patterns within different cultural and economic contexts, such as the family structure and the values related to social upbringing, in addition to the differences in the economic aspects [23]. Through the aforementioned previous studies, the researcher inferred in Table 1.

Table 1. Socialization values between the traditional and modern families

Family Criteria		Traditional Families	Modern Families
Family Interaction	Family types	The simple (nuclear) family	*
		Stem family	*
	Family size	Combined family	*
		Small family	
		Medium family	
		Big family	*
	Numbers of wife	Multi wives in the same residence	*
		Multi wives in separate residences	
	Marital residence	patrilocal residence	*
		Bi-local residence	
Economic function	production unit	*	
	not productive		
	So high		
	medium		
The Economic Aspects	Luxury level	low	*
		So low	*
		Father	
	Number of workers	Mother	
		The parents	
Power of the Family	Parents and sons	*	
	Patriarchy	*	
	Matriarchy		
	Egalitarian		
	good	*	
Socialization Values	Kinship Relations	Middle	
		bad	*
		Patrilineal	*
	Genealogical Relationships	Matrilineal	
Sex prefer	Males	*	
	Without prefer		

Table 2. The Components of the traditional houses in the old city of Mosul

Type of Space	Component	Description	Photo
Closed Spaces	AL- RHAHRA	It is a building below the rooms, with a bit of depth, which descends to it by several steps. It is lined from the inside with Mousilian marble. It is used in summer as a place to sit or sleep due to its coolness. Its windows overlook the courtyard, with Arches of various shapes.	
	The Basement	It is similar to AL-RHAHRA, but it is more profound and more relaxed than it. It is built under the courtyard and the rooms. Its walls and floor are lined with marble; the other part is plastered. It has columns supporting the roof and openings overlooking the yard for lighting and ventilation.	
	Sitting Rooms	The function of the rooms differs between the main rooms (living rooms, guest reception, bedrooms) and service rooms (munition room, treasury, attic), on the ground or first floor. Some rooms open directly to the inner courtyard; others open to the Iwan, or a corridor.	
	The Service Rooms	(MONA room) The locker room opens to the rooms, and its ceiling is low and free of windows, except for some openings (Small holes) that allow the entry of air and light.	

		The Attic Room	is usually above the locker room; it is a foodstuff cupboard. A staircase accesses it from inside the locker.	
		Al-Ashkhim	It is a space between the arches of the Iwan and the room. It is used as a storehouse for materials and grains. It is narrow and enveloping and has two openings, the first on the roof and the second towards the courtyard.	
		The Kitchen	Some families have unique spaces for the kitchen. Usually close to the entrance, with a small upper window that opens into the alley.	
Semi-Enclosed Spaces		The Iwan	The Iwan is an essential element in planning the Mosul house. It is a square or rectangular space surrounded by three walls with a height of 6m, and opened from the side of the courtyard,	
		The Courtyard	The inner courtyard is considered the most critical environmental and social functional element in the traditional house, as movement is distributed through it and is a source of air and light for the rest of the house's spaces. It also provides one of the essential climatic solutions to address the hot environmental conditions by reducing the temperature due to the shadows generated in it. Finally, the courtyard achieves the social aspect because it provides privacy for its residents.	
Open Spaces		The Roof	The traditional houses are full of roof space, It is not limited to being an upper space open to the sky. Still, instead, it is exploited for many activities, especially during the summer for sleeping at night.	
		The Entrance	The entrances of traditional houses are indirect in response to environmental and social conditions, as they are planned through a series of transitional spaces to ensure the most significant degree of privacy, so the courtyard is invisible through the alley; it's called a broken Entrance). The transition takes place from the outer door to a vestibule or corridor called (AL-Mejaz) whose shape and capacity differ from one house to another.	
Transitional Spaces		The Corridor	It is a space confined between the wall of a building and arches based on columns. The corridors are open to the inner courtyard and protect the spaces and the rest of the facilities of the building from direct sunlight and rainwater.	
		The Stairs (Ladder):	A stair is one of the necessary elements in the traditional house. The stairs represent the link between the different levels of the house and are usually distributed in the corners and sides of the house, and some overlap with the enclosures of the house or in the cavities of the walls.	

4.2 Architectural structure of Mosul's houses

Winding streets and courtyard houses constitute the old city's urban fabric, with constructions dating back mainly to the 18th and 19th centuries. The courtyard house is considered the unit of the residential district. The geographical factor has affected the architecture in the Mosul region since its inception, in addition to other factors such as climate, social and cultural nature, creativity, and innovation.

The general planning of the traditional houses in the old city of Mosul, characterized by a high degree of privacy, is oriented towards the interior with one or more courtyards. According to the family's economic level, the rest of the house's spaces are distributed around it, whether from two or more sides, so the windows and doors open to the inner courtyard. It is accessed through a corridor (the metaphor) linked to the outer door, and most houses have one or two floors. The Mosuli House is unique in some of its special features, using local building materials and decorative art, represented in the blue marble pieces and construction methods resulting from climatic conditions, historical developments, religious and social influences, and the effects resulting from the civilizational interaction in the region. It is characterized by their ability to perform optimal functionality and adapt to the available spaces during the hours of the day, which is the most important characteristic of traditional houses [27]. The courtyard is surrounded by the Iwans, to which the rooms, hallways, and stairs to the first floor. in

addition to the basement under the inner courtyard or on one of its sides. Service spaces like the kitchen are always close to the inner courtyard [8].

4.2.1 Components of the traditional houses in the Old City of Mosul

Numerous studies have classified the spaces of the traditional Mousilian house into four main categories: closed, semi-closed, open, and transitional. It can be extracted and give details for each component from Table 2.

5. ANALYZE THE SOCIAL AND ARCHITECTURAL STRUCTURE OF THE SELECTED AREA

A set of social and architectural criteria were extracted for analysis. These criteria reflect the aspects that can be affected by conflicts and wars and thus reflect on the nature of the social and cultural life of the population and the architectural structure and identity of the place, thus achieving the goal of the research in measuring the level of change occurring in the social and architectural structure. The following are discussed in detail.

5.1 Analyze the social structure of the selected area

The area study chosen includes many historical monuments that characterize the old city of Mosul; the Great

Mosque of Al-Nuri is one of these landmarks. The reasons for selecting this area are:

- It is considered among the slightly or not damaged areas [4].

- Possibility and ease of access to the residential neighborhoods selected for the study, as the two main streets in the Old City pass through them (Ninawa Street and Al-Farouq Street).

- Social and Cultural Diversity in these neighborhoods.

Diversity of Building: The study area contains the historical mosques and churches for which the old Mosul is famous, and heritage houses with high historical and architectural value. Figure 3 shows the distribution ratio of selected families in each neighborhood.

5.1.1 Results of social structure in selected areas

Two methods were used to study the socially elected area: personal observations of the neighborhoods through visits and field observations. The second is the study of its residents through a questionnaire and immediate interview to fill out the form prepared for this purpose. The personal interview guarantees to answer the questions. It allows the researcher to ask questions based on the culture of the interviewer, thus

providing direct interaction with the residents and accuracy in analyzing the information. The questionnaire includes (65) questions, distributed within six main axes related to the social, economic, and cultural aspects of the residents, represented by (introducing the family, the relationship with the place of residence, sources of monthly income, housing unit, and property, relations with an urban and social life).

It is informative to say that there is no statistical data on the ethnic, religious, and social composition of the city before the events, except for literary studies that clarify the nature of social life there.

Figure 4 shows the procedure followed in social structure analysis. The following section discusses the six themes of social structure analysis.

(1) The Demographic Structure of the Traditional Family in the study area

The analysis of the demographic composition of the traditional families of the study area showed that they tended to be nuclear families consisting of one family with 54%. Most of these families are from the same social class with 85%, and the average size of the traditional family is around (5_8) with 65%.

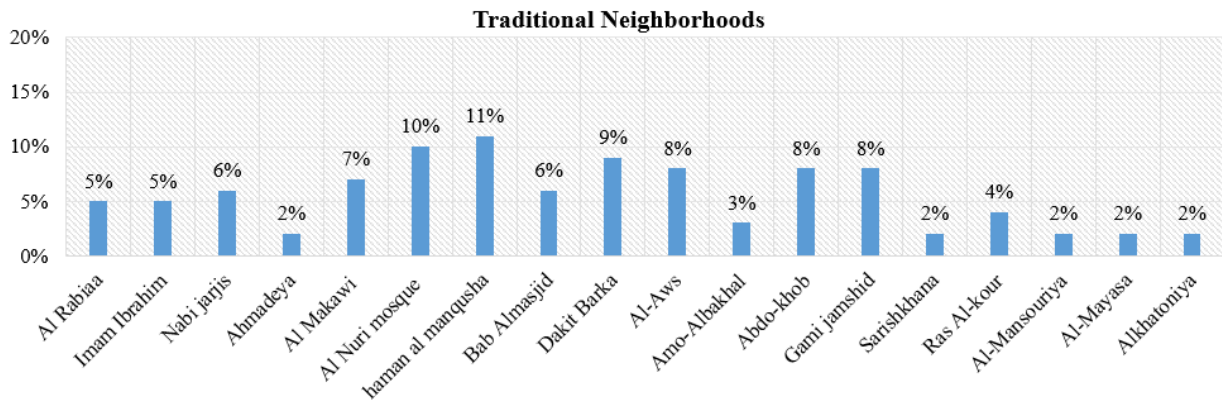


Figure 3. Ratio of selected families in neighborhoods

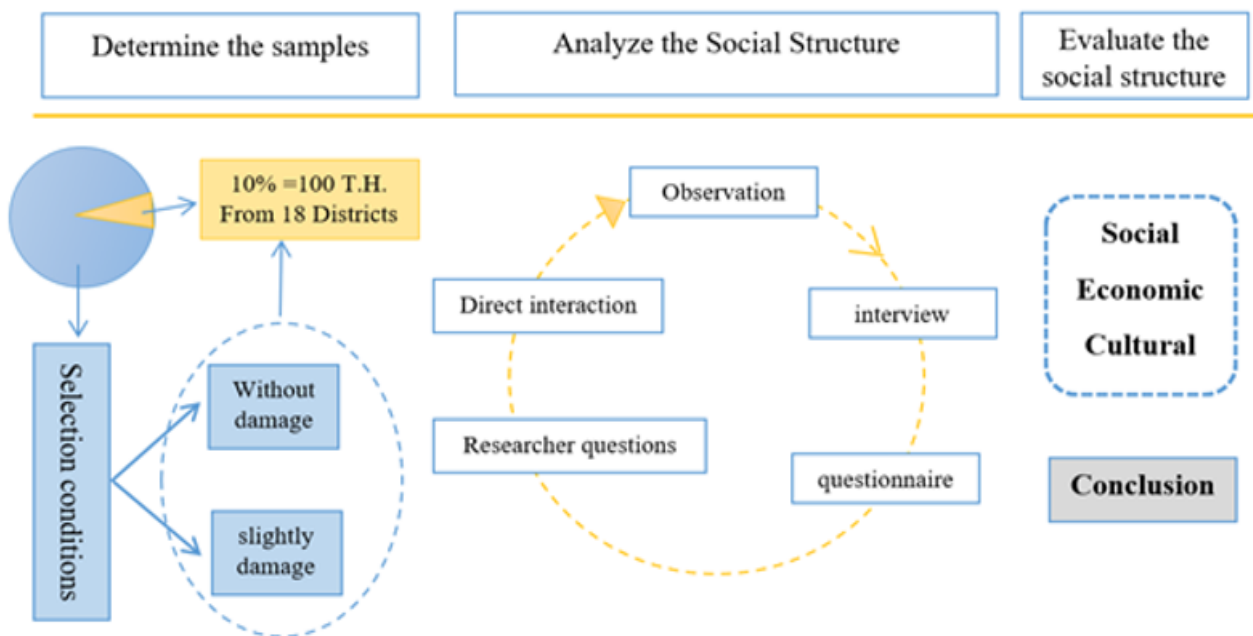


Figure 4. Research method of social structure analysis

The analysis of the head of the family (the father) showed that most of the fathers are residents of Old Mosul 93%, and most had a relatively low level of education. Their work varied between free work with 30% and handicrafts with 20%.

The analysis of the mothers showed that their ages are relatively younger than the fathers. Most of them are also from old Mosul, 90%, and most have a deficient education level; in addition, almost 97% do not have work outside the home.

The results of the children's analysis showed that most families have children with the limits of (1_4), 64%; the results also indicated that all children of both sexes attend school. Figure 5 shows the demographic structure analysis of the traditional family in the study area.

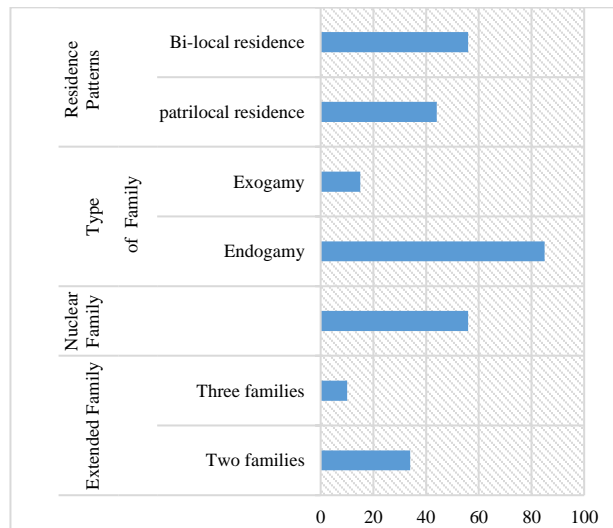
Despite some demographic changes in the old city, the

families and the residents that live in it have belonged to it since their birth, whether they own homes in it or live by rent.

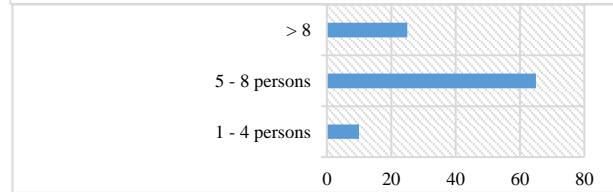
The family in the old city is considered an extended family, and the morphology of the traditional house affected the form of social life inside it. We note that the small size of the houses prompted many families to divide into several nuclear families, and the married son lived in an independent house close to the father's house, preferably within the same location inside the old city.

The family structure in the Old City of Mosul shifted towards the medium-sized nuclear family, which adopts a contemporary lifestyle. On the other hand, families in the Old City still maintain traditional customs related to patriarchal authority; the man is the head of the family and still has absolute power.

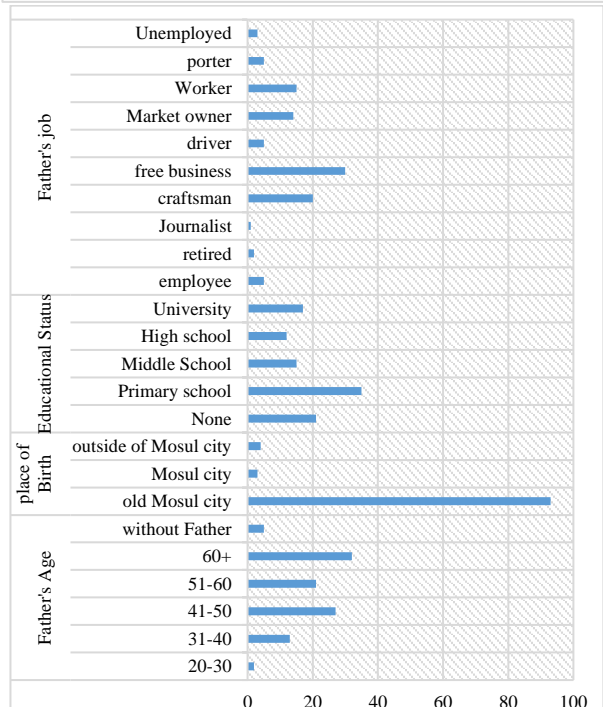
Family Structure



Family Size



Father's Information



Mother's Information

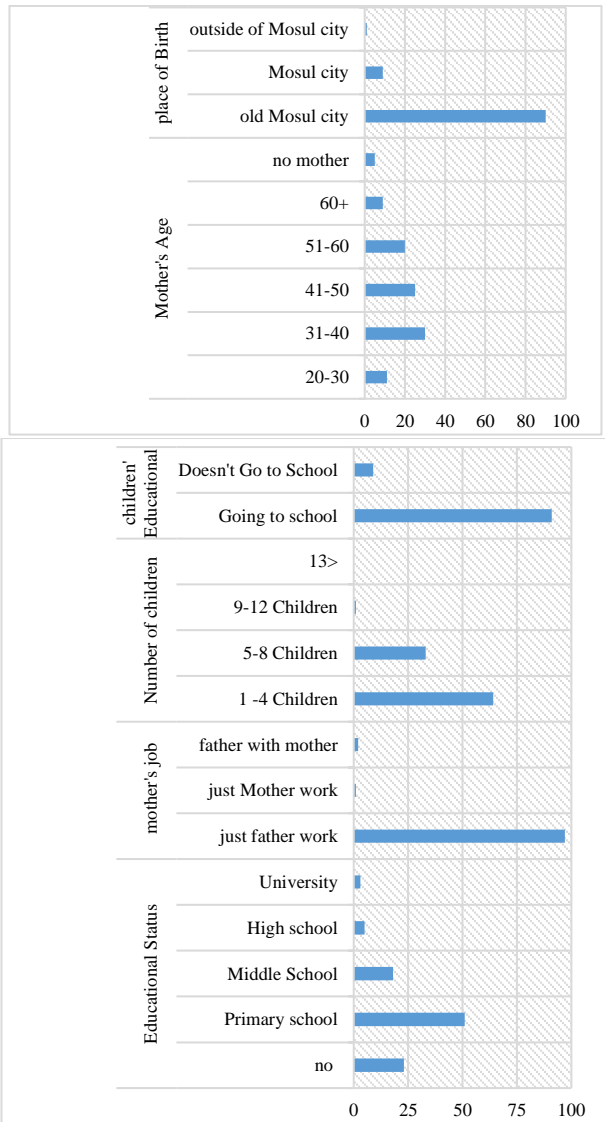


Figure 5. The demographic structure analysis of the traditional family in the study area

(2) The relations with the place of residence/ immigration

The following graph analysis in Figure 6 showed that almost all families belonged to the old Mosul and did not change their places of residence, 98%.

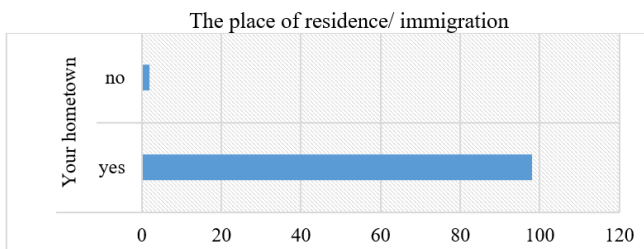


Figure 6. The relations with the place of residence/ immigration

(3) The results of social and cultural life

The graphs analysis in Figure 7 showed that all families' religious structure is Islam 100%. Thus, the nature of the religious structure of the case study has changed after it had a large percentage of Christians before 2014.

The results showed that the national composition of the city was also affected by the security events that the town witnessed; after the diversity of its nationalities distinguished

the city, the most significant proportion came to the Arabs 89%, then the Kurds 11%, compared to what the city was before 2014.

The city's diversity of nationalities affects the languages used in the house or the street. The results have shown that the language used on the road is mostly Arabic 95%, although a percentage of Kurds are inside the city, they are fluent and speak both Arabic and Kurdish and most speak Arabic only on the street.

The analysis showed a decline in social relations between relatives 49%, and visits became primarily limited to special occasions, compared to the ties of neighbors, 98% between excellent and good relations.

The traditional customs of marriage and childbirth have changed as a result of the developments in the region. We note that all births occur in hospitals 100%, not at home, which is different from what it used to be. In addition, the traditional customs of holding wedding parties have changed relatively, most of which take place in event halls 70%. While gatherings for special occasions for death still take place in the neighborhood or the mosque in addition to the homes

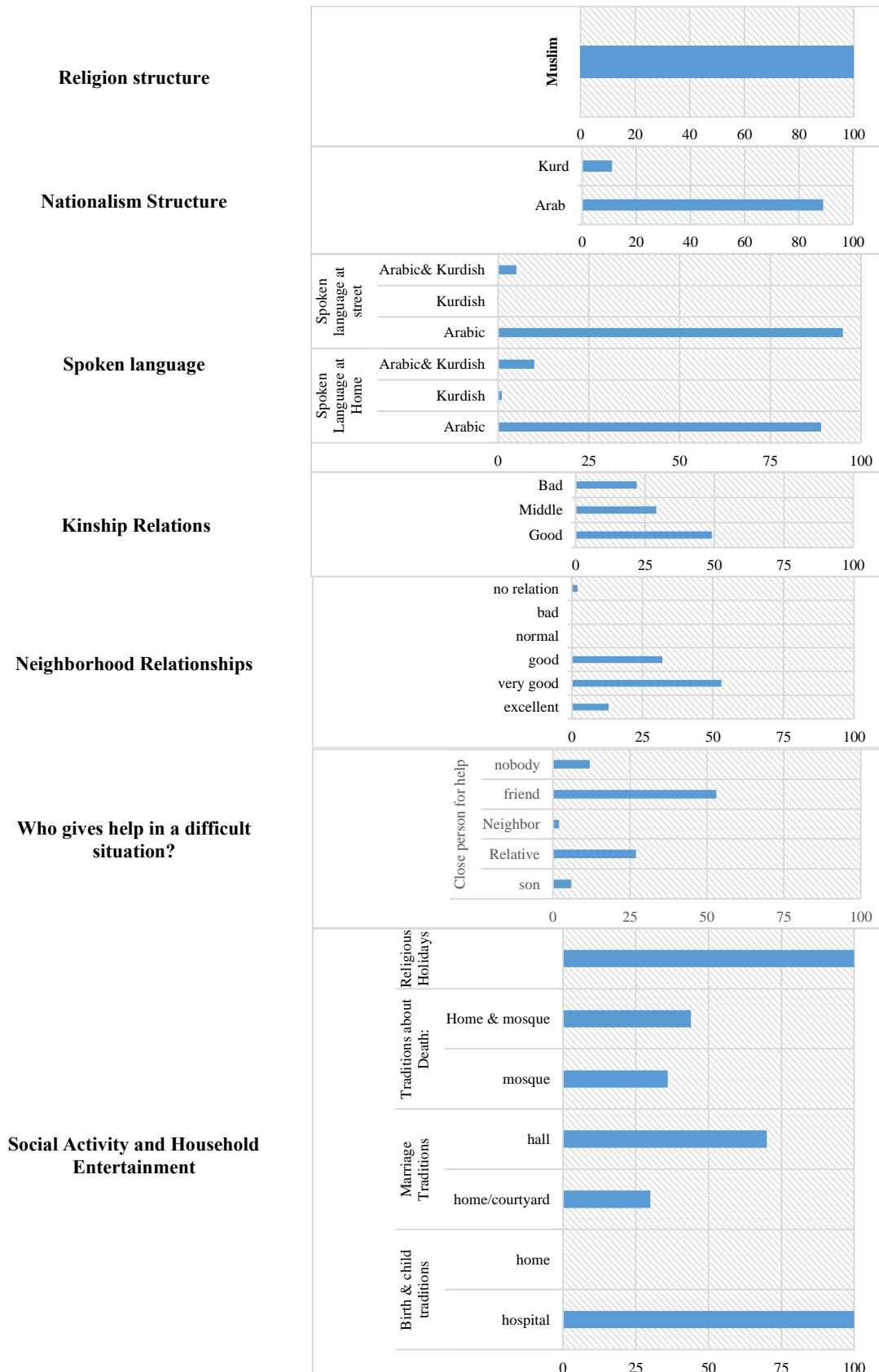
As for religious occasions, traditional families still maintain their traditional customs by celebrating festivals inside the neighborhood and homes and performing rituals

that accompany them.

The adults and old of the Old City have preserved their traditional customs for their social activities by gathering in conventional cafes and cafeterias inside the Old City 61%; the children's activities take place inside the alleys near their homes, and this is customary in the traditional alleys, which are secured for them because cars or strangers do not enter them.

The analysis showed that the family's social and recreational activities often occur through visits to public parks 55%, then relatives 25% or home entertainment 25%.

The analysis showed that 70 % of the people in the study area frequently crossed the river to the other side of Mosul. Figure 7 shows the relationship between social and cultural life.



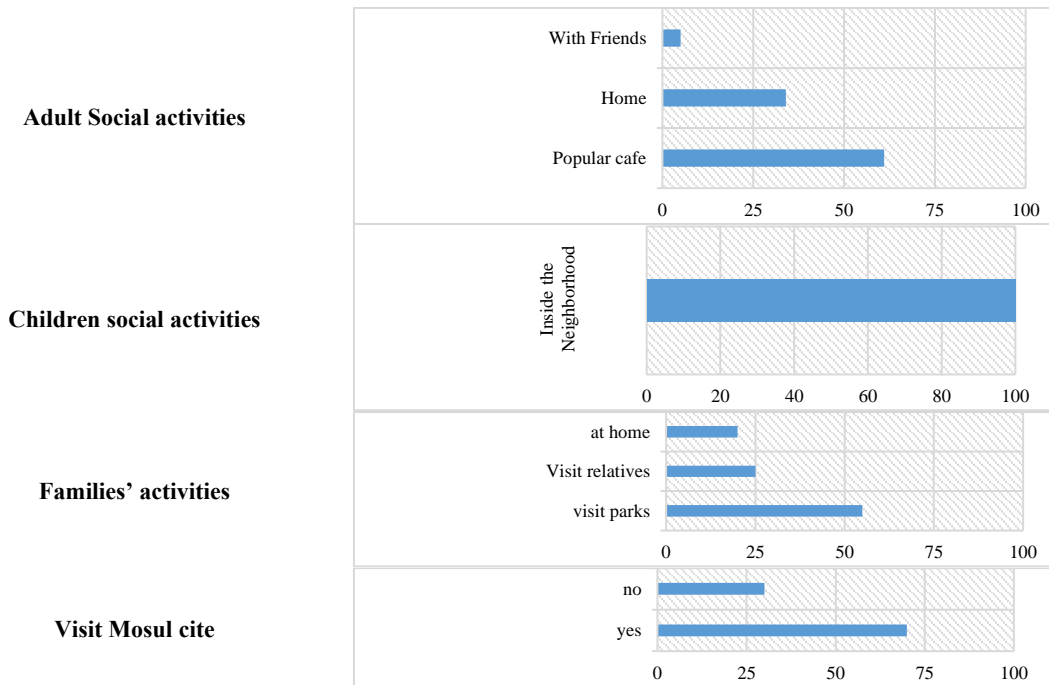


Figure 7. Social and cultural life

(4) Income Analysis

The results showed that the income of most families depends on non-fixed self-employment, mostly in trade with 60%, especially in small businesses and Handicrafts.

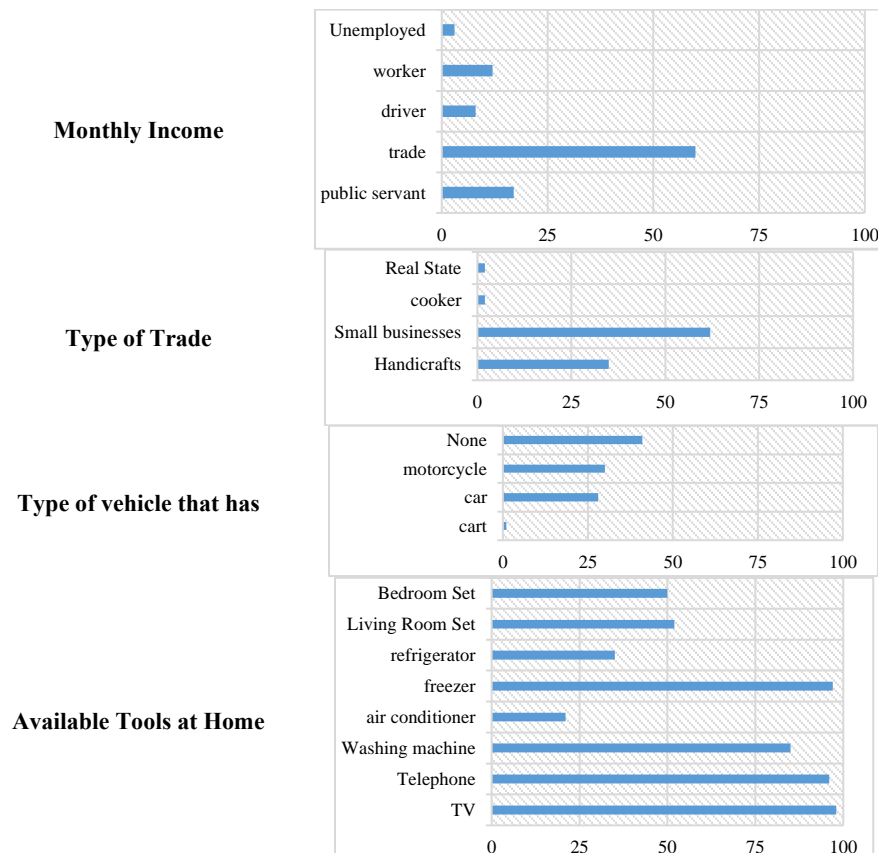
The results showed that few families have cars with 28%, and others have motorcycles with 30%.

The results showed that most of the main tools, especially electrical ones, are available in traditional homes. At the same time, 48% of the families do not have living and sleeping rooms due to the economic level that requires

families to acquire only the necessary tools.

The results showed that the families in the study area retained their traditional habits of making and storing some foods. Still, the handicrafts began to fade and recorded 36% due to the entry of industry and the changing nature of business.

The results showed that only 16% of the families have social security, and 22% have retirement. Figure 8 shows the income analysis.



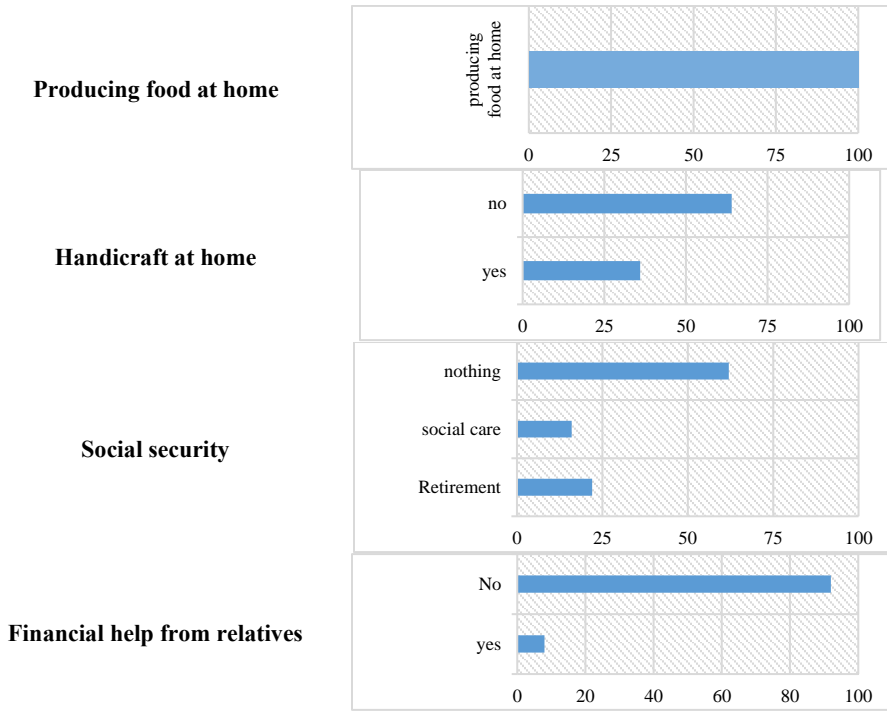


Figure 8. The income analysis

(5) Housing and property status

The analysis showed that 36% of the homes visited were more than 100 years old, 47% were 85-100, 14% were 25-80, and 3% were less than 25 years old.

The analysis showed that 62% of the homes in the case study were in 71-150 m2 areas, and the remaining areas had a relatively small ratio, less than 10%.

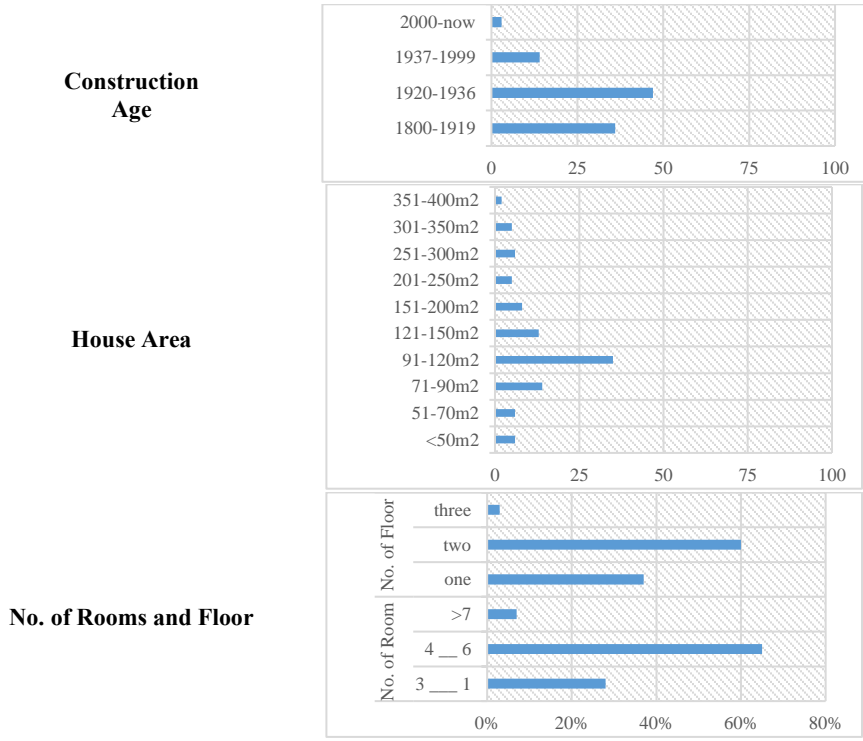
The results showed that 65% of the homes had 4-6 rooms, 28% had three or fewer rooms, 7% had more than seven rooms, 60% had two floors.

The analysis showed that 100% of the homes in the study

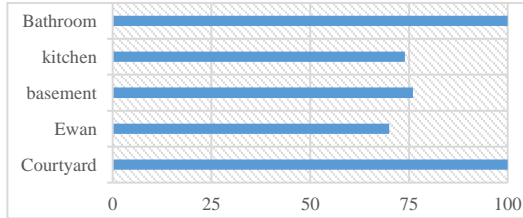
area have water, electricity, and sanitation supplies.

Homeownership analysis showed that 77% owned their homes for various years. The nature of ownership was distributed between purchase, inheritance, and the family home in similar proportions, and it was found that 82% of the population did not own another home.

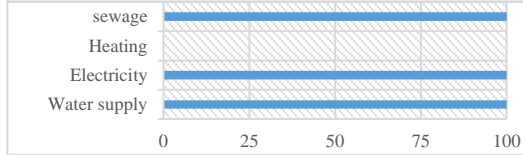
The analysis showed that the rent value for rented houses is relatively low compared to other areas in Mosul. It indicates the general city's low level in several aspects. Figure 9 shows the housing and property status analysis.



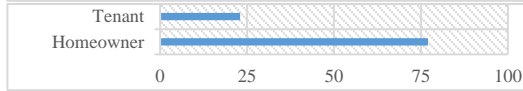
Components of the Housing Unit



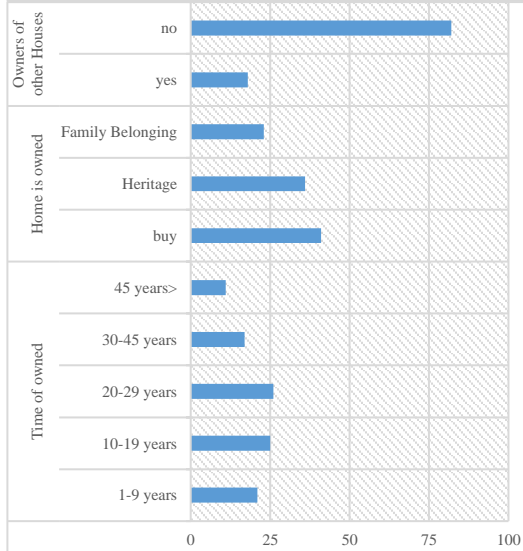
Available Health services



Homeowner



Information about the owners



Information About Tenants

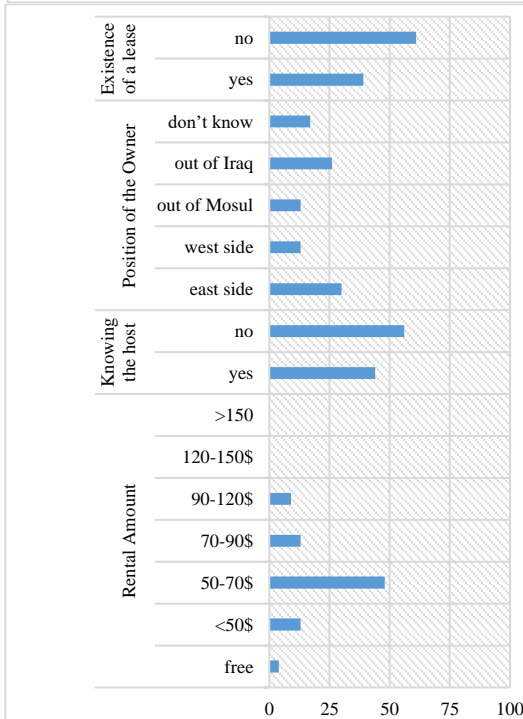


Figure 9. The housing and property status analysis

(6) Relationship with urban life

The analysis showed that the houses result from inheritance 32 %, or because they are close to relatives 37%. and 77% of residents prefer to live in the old city of Mosul.

The analysis showed that 75% of residents need to learn

the meaning of urban conservation, especially older people. We found that 25% of university graduates or street workers understand the importance of urban conservation.

After interviews with residents, they Suffered from the deterioration of their homes and alleys and demanded

rehabilitation.

The results show that 41% of the residents are satisfied with municipal services, 29% are slightly happy. The satisfaction of some residents with municipal services is

because they are simply unaware of the urban preservation and the standard municipal services that cities require. Figure 10 shows the relationship with urban life analysis.

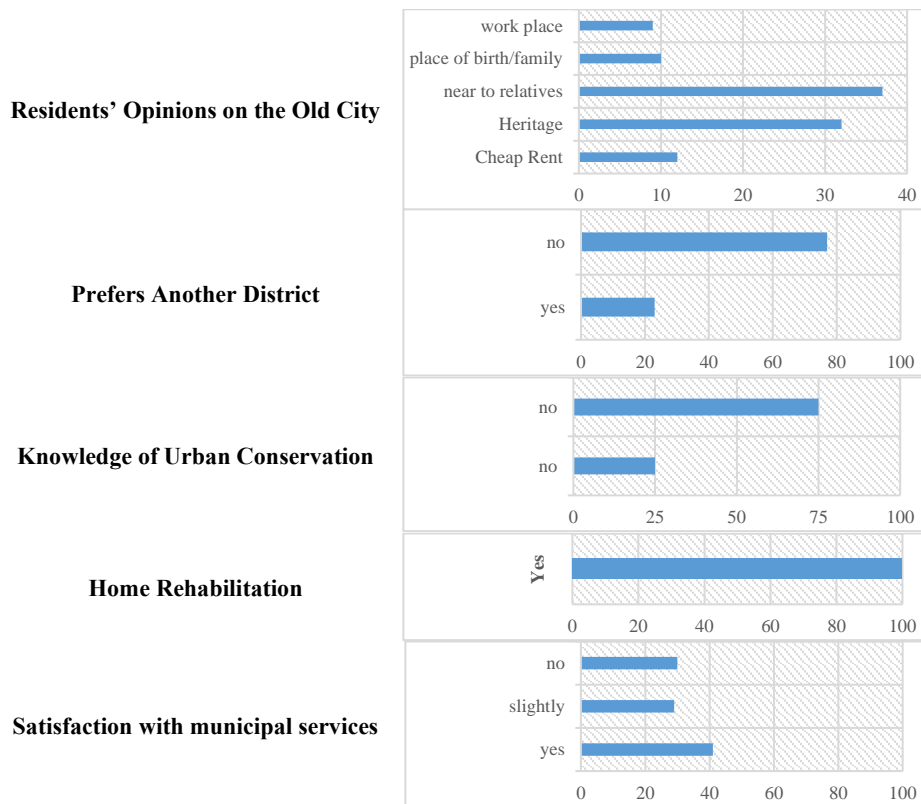


Figure 10. The Relationship with urban life analysis

5.1.2 Results of social analysis

The security events in recent years have affected the social composition of the old city, which was characterized by it since its inception, as it lost religious and national diversity, and Muslim families remained in it; the decline in the number of Christians has influenced a negative on the traditional lifestyle. The city lost the social cohesion, cultural diversity, and religious pluralism for which it was famous.

Knowing the nature of urban culture that characterizes the inhabitants of the old city contributes to facilitating the process of preserving and sustaining cultural heritage. The patterns of social relations and interaction between neighbors are relatively large compared to the relationship with relatives, which has disappeared or become limited.

Despite the increase in the number of low-income families in the region, all of them are original families that have belonged to the old city since their birth, and this is a positive indicator that contributes to conserving the city's social structure. We notice constant customs and traditions and the families' keenness to practice social and religious activities and events.

Cafés are still the first social destination for older people. We notice that they are spread in the central and secondary alleys and are frequented by many residents.

The presence of public schools and making education compulsory positively impacted the level of education within the city, as the entire new generation practices education and most adults go to universities; thus, it contributes to increasing the city's cultural level.

International and local organizations and the media played

a prominent role in raising awareness of the ancient city and its social and architectural heritage through conducting educational workshops and seminars to educate citizens about the need to preserve the cultural and architectural heritage of the town and pass it on to generations.

The rapid movement of local organizations, in cooperation with international organizations, in restoring the old city after the war and preserving and restoring many traditional houses made many residents return to their homes in a positive step to regain safety and the return of social life.

5.2 Analyze and discuss the architectural structure change of the selected area

After identifying the general architectural features of the traditional houses, this part discusses the architectural changes that occurred in the traditional homes in the study area. The planning and design characteristics of the conventional house came from the interaction of climatic and social requirements. The general planning of the traditional house is of a unified and similar system, and the courtyard is considered the most important functional element in conventional homes.

Changes in the social and economic structure led to changes in the physical structure, so some traditional houses were modified to suit the nature of the family in several respects, including changes in the plan or elements of the facade and even building materials.

For example, when Extended Families living in tiny houses with few rooms because of their economic situation,

they added rooms to them or exploited Some semi-open spaces and turned them into closed rooms to meet their needs, in addition to service spaces that are usually lacking in traditional houses, such as the bathroom and the isolated kitchen, in addition to many changes at the level facade.

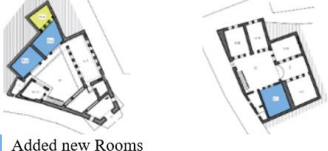
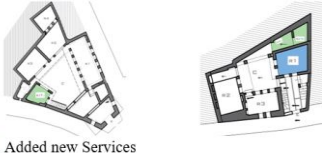
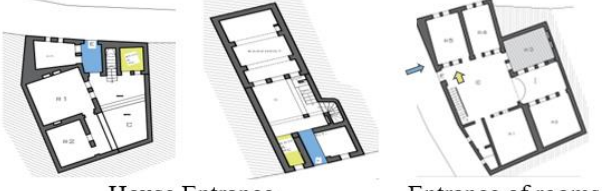
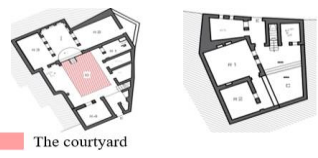

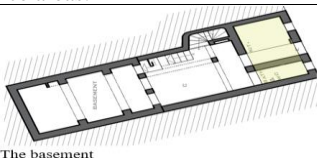

40 samples of the traditional houses in the study area were chosen to be analyzed geometrically and mathematically to discuss the modifications and changes that occurred in their architectural and functional features to achieve the aim of the research and adopted several considerations in selecting the













study sample, namely:

- The building style is traditional, with a courtyard.
- The estimated age of the buildings is at least 60 (years, and approximately the period between (1900-1940).
- Diversity in styles, area, and the number of units.
- Several documented sources of traditional residential houses have been adopted to ensure the validity of the data, including (UNESCO).

Table 3 shows the architectural changes in the physical structure at the plan level and the facade level.

Table 3. The architectural changes in the physical structure at the plan and facade level

Types of Changes		Notes	Plans of Changes
Changing by adding spaces	Adding Room	<ul style="list-style-type: none"> •Utilizing the courtyard or rooftop to add new rooms to suit the needs of the extended families living in the house •Added Rooms on two levels with new technique. 	 <p>Added new Rooms</p>
	Adding kitchen	Building private closed spaces for the kitchen, bathroom, and sanitary facilities on the ground floor, as they were not available in traditional homes when they were first established.	 <p>Added new Services</p>
Changes at the plan level	Changing the location of the entrance	<ul style="list-style-type: none"> •Change the entrance's location and use the old entrance's space to build a bathroom and sanitary facilities and open another door with different characteristics. •Some houses manipulated the location of the rooms' entrances, turning, for example, the room door that opens on the Iwan into a door that opens directly on the courtyard. 	 <p>House Entrance Entrance of rooms</p> <p>Original Entrance New Entrance</p>
	Closing the open spaces	The courtyard	<ul style="list-style-type: none"> •Many families have worked to roof the courtyard with simple materials and convert it from an open space to a closed area. Thus, the courtyard lost its lighting and ventilation functions.  <p>The courtyard</p>
	Closing the semi-open spaces.	Close the Iwan or the Arcades	<p>The need of the extended families in the Old City to increase the number of rooms or expand some of them prompted them to close the Iwan with a wall and a door and convert it into an additional room. Some extended families use the space allocated for the arcade as bedrooms or service areas.</p>  <p>Close the Arcades</p>
Closing the Basement	Some traditional houses closed their basement for several reasons, including losing their functional efficiency and being exposed to significant damage due to the war.	 <p>The basement</p>	
Changes in facade level	Changing of building and finishing materials	<ul style="list-style-type: none"> •The use of modern materials in construction within a traditional alley far from the identity of the place •Changing the nature of traditional houses into buildings with commercial functions on the ground floor and including several apartments on the upper floors. •Changing the nature of finishing materials and the traditional style used in conventional homes, in the external or internal facades. 	

Changing of architectural elements	Windows	Some families added architectural elements that belong to something other than the traditional architecture of the city of Mosul, such as windows and doors, so they put unknown types of windows far from the place and its architectural identity.			
	Doors	Many of the entrances to traditional houses have lost their formal characteristics; after they were surrounded by a frame of Mosul marble filled with various decorations, they became door openings devoid of marble.			
	Columns	Traditional Mosul architecture was characterized by its abundance of ornate marble columns. Residents added columns that did not belong to conventional architecture and lacked art and decoration.			
Changing of colores	In recent years, we have noticed the addition of colors to the walls and windows of the old city with a personal effort that reflects the culture of the residents. In some cases, it was found that Mosul marble was dyed, and its features were hidden, which distorted the city's features and concealed its details after distinguishing by using the natural colors of the buildings				

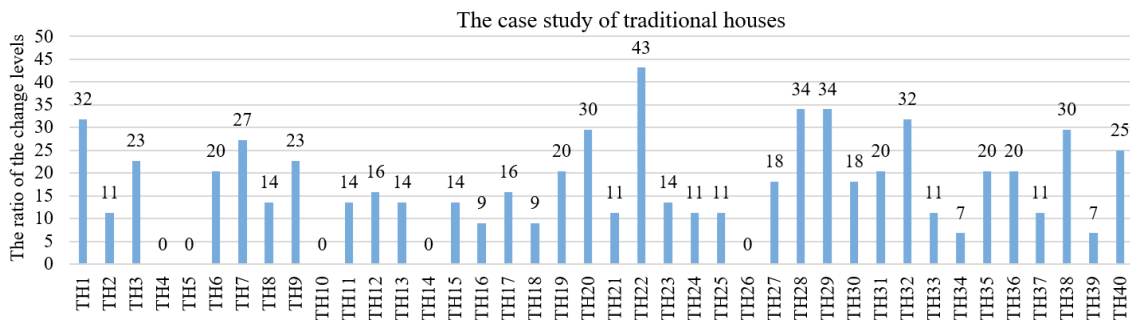


Figure 11. The Ratio of the change levels from the original for the selected traditional houses

5.2.1 Results of architectural analysis

The Results showed that only 5 of the selected houses did not record cases of change at all levels and kept the house as it was with its old features. These houses were (TH4, TH5, TH10, TH14, TH26).

The results showed that only 15 of the selected houses recorded slight changes (7-15%), such as adding a wall, closing the basement, or changing the entrance location while keeping the condition unchanged and keeping the identity of the traditional house. These houses were (TH2, TH8, TH11, TH13, TH15, TH16, TH18, TH21, TH23, TH24, TH25, TH33, TH34, TH37, TH39).

Fifteen houses recorded relatively medium changes (16-30%) because they preserved the house's traditional features, and the changes were represented by adding a concrete column with service spaces or other additions that did not change the traditional identity of the house. These houses were (TH3, TH6, TH7, TH9, TH12, TH17, TH19, TH20, TH27, TH30, TH31, TH35, TH36, TH38, TH40).

Five cases recorded Major changes (31-43%), which included the abolition of a porch and its transformation into

a space, roofing the courtyard with a sandwich panel, adding roofs with modern materials, and adding columns with modern materials such as steel or concrete while preserving the house plan and its traditional walls. These houses were (TH1, TH22, TH28, TH29, TH32). Figure 11 shows the ratio of the change levels from the original for the case study of traditional houses.

6. CONCLUSIONS

The city of Mosul is one of the ancient cities with a profound historical legacy, with a distinctive location that made it a place to attract residents of different nationalities and religions, making it a social and architectural mosaic piece colored with many social and architectural cultural colors, in which social life was reflected in the existing architectural behavior so far. This is why they cannot be separated when studied and analyzed. The diversity and architectural richness reflect cultural and social diversity and pluralism.

From 2014 to 2023, the old Mosul witnessed significant social and architectural changes and massive destruction in the physical structure and infrastructure, which caused it to lose much of its cultural heritage and social diversity. It lost religious and national diversity, and Muslim families only remained in it; the decline in the number of Christians is considered a negative factor affecting the traditional lifestyle and its sustainability. Society lost the linguistic diversity that used to distinguish it, as the dominant language is now Arabic. This change led to the absence of religious and social events related to other religions and their confinement to special occasions for Muslims.

The transformation of the demographic structure and the change of a large portion of extended families into nuclear families contributes to reducing population density, reduces the consumption and deterioration of homes, and maintains their sustainability, especially after the spread of the phenomenon of dividing large houses into small homes inhabited by multi families.

Based on the results, the researcher presented a five-vision that includes preserving the non-physical aspects to rehabilitate the social structure, calling these aspects (Pentagram lens) of the social structure. Figure 12 shows the pentagram lens.

The results enrich scientific research, urban planners, and rehabilitation organizations with the amount of information and outcomes reached by the study to benefit from them in rehabilitating the old city and addressing the problems that were the cause of change in the social and architectural structure. especially after taking responsibility for rehabilitating and rebuilding destroyed traditional houses, training young people in traditional crafts used in construction, and organizing awareness courses and conferences that contribute to spreading the importance of the cultural heritage and social diversity that characterizes the city.



Figure 12. The pentagonal lens of social structure

Changing the uses of some houses, mainly those rich in heritage elements, to cultural and touristic services, such as historical museums and tourist homes, contributes to increasing awareness of cultural heritage and preserving it, and develops the residents' taste, thus keeping the city from deterioration, in addition to its contribution to reducing population density by changing the nature of use, which has been confirmed by Al-Jaberi et al. [28], it has economic returns that are reflected in the place.

7. RECOMMENDATIONS

The researcher recommends to urban planners and cultural heritage professionals the importance of communicating with displaced people of different religions and nationalities and encouraging them to return or to remain in the Old City at specific times after providing services and social security that guarantee their return.

Working on a strategy for the adaptive use of some heritage buildings, replacing them with a cultural and tourism function, to strengthen the population's economy and provide permanent job opportunities for the youth of the old city.

Encourage the preservation and promotion of the traditional way of life.

Rehabilitate one house in each alley and consider it a standard for change that residents will follow in coordination with the municipality.

Spread the culture of domestic tourism among people to learn about the city's heritage and hold educational workshops on the importance of preserving it.

According to the results of change levels witnessed by the traditional houses within the study area, the researcher assumes a preventive preservation strategy for the homes where no change occurred. As for the places with slight and moderate changes, the researcher suggests rehabilitating them and mitigating the factors that affect them to be less change, and the identity value will be high. Some of the major changes caused changes in the features of the house and its cultural identity. Hence, the researcher suggests rehabilitating some of the change points that occurred in these houses that lost their identity, such as reopening the closed courtyard, Iwan, or corridors, providing alternatives and solutions for the materials used in construction and packaging, changing the colors used that are not related to traditional houses, etc. are among the standards that must be taken into account.

Future research may consist of comprehensive studies at the urban level, including urban centers, religious, commercial, and other facilities, in conjunction with traditional alleyways and residential houses, and studying their architectural characteristics and their connection to the population and comparing them to what they were like before the conflict.

It is necessary to involve residents and tourists in future research and consider them part of conservation processes.

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