

Analysis of Physical Identity via House Typology (Case Study: Sabzevar City)

Yasaman MozafarMoghaddam ^a, Vahid Ahmadi ^{a,*}, Hero Farkisch ^a, Maryam Ostadi ^b

^a Department of Architecture, Mashhad Branch, Islamic Azad University, Mashhad, Iran.

^b Department of Urbanism, Mashhad Branch, Islamic Azad University, Mashhad, Iran.

Received: 24 July 2023.- Accepted: 22 October 2023

Doi:10.22094/SOIJ.2023.1992050.1561

Abstract

The destruction of historic residential buildings of Sabzevar city in recent renovations has increased the need for documenting the housing of Sabzevar. Documenting these buildings requires recognizing indigenous and original patterns that can be interpreted as a "housing types". In this article, typology of Sabzevar city's houses and its analysis in order to explanation continuity of physical identity of Sabzevar city's Houses have been specifically discussed. The main questions of this study are "What are the types of houses in Sabzevar City?" and also "How has the continuity of physical identity been in the housing types of Sabzevar city?" and to answer to these questions, the study uses cases study method combined within analytical-descriptive method. Based on this study, it can be claimed that "typology" and "typological process" are suitable processes for analyzing the "continuity" of physical identity. The results show that there are fifteen types of housing in the city of Sabzevar from the Qajar until now, among which, five types are related to the Qajar, five types are related to the first Pahlavi, two types are related to the second Pahlavi and three types are related to the Islamic Republic. The results of analysis of typology of Sabzevar city's houses indicate that the types of houses in Sabzevar city have characteristics such as distinction, change and plurality due to the passage of time, and the houses of this city has lost its physical identity due to the passage of time.

Keywords: Typology; Physical Identity; House; Sabzevar city.

1. Introduction

In this article, typology of Sabzevar's houses and its typological analysis in order to explanation of continuity of physical identity of Sabzevar city's houses have been specifically discussed. Cities take their identity from their historic continuity. These years, globalization has caused the historic discontinuity so cities faced the physical identity crisis. As the character of each city is strongly dependent on its residential buildings, since houses are the most frequent cells of each city, a house has the biggest impact on the city's shape .

In view of the necessity of identifying and analyzing houses to explain physical identity (i.e., to make distinctions) Rossi has stated in his book that: "the study of the individual dwelling offers one of the best means of studying the city and vice versa. Perhaps nothing so illustrates the structural differences between a Mediterranean city such as Taranto and a northern one such as Zurich as the different aspects. I mean specifically the differences in housing typology". According to Mirmoghtadaee, housing has got morph and changes quickly and easily. Therefore, the investigation and recognition of physical identity for urban housing as the most frequent urban cell is felt inevitable and necessary. Given the current architecture in the country, it can easily be said that not only today's buildings do not give an

identity to the city but they also take away its historic identity from it. According to Mirmoghtadai, unfortunately today, the city and urban housing in the process of its development has lost its distinctive character from another. If this is not addressed, the housing will gradually lose its physical identity in cities, and as a result, cities will lose their physical identity and distinctive character. According to Muratorians, if the housing typology is done well, this means solving the architectural crisis and creating continuity between the past and the present (Memarian, 2010, 210).

Today's cities of ours are suffering from an identity crisis because in these cities, a fundamental change has taken place without any connection with the past, and this rupture has caused the loss of power and the ability to recognize and differentiate (DaneshPour and Shiri, 2015). The architecture of today's Iranian cities has become extremely confused, which not only does not have a trace of culture and architecture, but also does not follow any of the identity patterns of architecture (Bozorgmehr et al. 2023). Traditional houses are one of the significant components of historic urban fabric as the original documents reflecting the characteristics of the communities they belong to (Ozcan, 2021).

The term typology is used to study building types and their typological process. Typology has its roots in biology and is used in the scientific classification of living organisms.

* Corresponding Author Email Address: vahid.ahmadi@mshdiau.ac.ir

The main work in typology is the classification of types based on common criteria. This common criterion can sometimes include the performance of the architectural space and sometimes the features of the form. Typology has been used as a basis for analysis building and cities, as an analytical typology, or as a basis designing buildings as a generative typology.

The process of urban transformations and the introduction of new patterns of housing construction, after the big cities of Iran, can be seen gradually in the middle cities like Sabzevar, and despite the rich historical background, it causes an identity crisis in the way of life, the conflict between the identity of the building and the collective identity and fading the similarity of life and built environment (Motallebi and KafashZadeh, 2021). Sabzevar city, despite its rich historical background, has been affected by the flow of modernization after metropolises. Today, the historical core of Sabzevar city is rapidly disappearing, and consequently the historical houses of this city are in danger of being destroyed, and as a result, the physical identity for the development of housing of this city has also been destroyed. The housing of Sabzevar city has also distanced itself from its physical identity under the influence of modernization. Unfortunately, the historical housing of this city remains unknown and there is not enough study on it. If the housing of Sabzevar is not studied enough, the physical identity of the city will be in serious crisis.

In a study that was conducted under the title “Analysis of the elements of the identity of Sabzevar city with an emphasis on the citizens' point of view”, the results show that the physical elements are the most frequent and have the greatest impact on the identity of the city of Sabzevar

(Hajari et al., 2018). In another study, under the title of “Identifying the dimensions of spatial identity formation in residential neighborhoods based on the experts' point of view”, physical-structural dimensions play the greatest role in the formation of spatial identity of residents in residential neighborhoods (Ebrahimi Mojarad et al., 2022) therefore in this study, the housing of Sabzevar city is analyzed from the physical dimension of identity.

This study has a main purpose and a sub-objective. The main purpose of this study is to identify the typologies of Sabzevar’s houses and this study seeks to answer the questions: “What are the types of houses in Sabzevar City?” and “How has the continuity of physical identity been in the housing types of Sabzevar city?”. To answer the questions, the study uses cases study method combined within analytical-descriptive method.

2. Theoretical Foundations and Framework

2.1. Type and typology

Types as a concept refers to a type, class, or group of objects that share certain characteristics that distinguish them from other people or groups of objects (ZakerHaghighi et al., 2009). Rossi defines the concept of types as something that is continuous and complex, a logical principle that takes precedence over form and constructs it (Rossi, 1984, 52). According to Petruccioli (2007), a type is the organic ensemble of the common characteristics of buildings in a defined culture over specific period of time (Remali et al., 2016). In table 1 the basic definitions and concepts for types has been summarized

Table 1

Summary of basic definitions and concepts for type (Abaee, 2017)

Main Definition	The idea to conceive design without dictating any definite form, as a vague and neutral entity which can be repeated in many forms but let diverse forms exist (Quincy, 1788).		
Author	Notion of type	Procedural aspect	Conceptual explanation
Moneo (Moneo, 1978)	A concept of form which describes group of forms with similar inherent structure.	A tool which opens up the process of change in architecture.	The type can be thought as the frame within which change can be operated.
Vidler (Vidler, 1977)	A body which embedded past and present of urban fabric.	Find fundamental rules of designing spaces and buildings, in the stack of urban experience. By choosing forms (basically their types) from the past, which is disconnected from their temporal period, but still bring their social and political meanings from past to present.	Timeless and value free (neither utopian and nor nostalgic, neither ancient and nor avant-garde).
Colquhoun (Colquhoun, 1969)	A pre-assumption for intuition in any act of design.	It was responding to diverse design problems, by its diversity.	A cell for typological hierarchical repertoire which can bring us at the first step of designing absolute final form.
Argan (Argan, 1963)	Result of reducing many existing forms to a root type.	Refining, deducing and summarizing forms with designed function, use of configuration.	Informal configuration of a form or principle which provide possibility of endless formal diversity.

Therefore, according to the definitions in the table above, it can be admitted that type is a concept that embeds the past and the present and actually links them into itself. It can also be added that the type serves as a tool for the process of change (Figure 1). According to Moneo, the type is considered as the frame in which the process of change takes place.

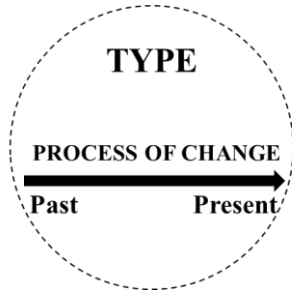


Fig. 1. The notion of “Type”

The main concept of typology as a realm of investigation addresses the conceptual foundation of buildings that can cause classification in types. Demiri (1983) notes that typology is about the formal and spatial characteristics of buildings, which are rooted in culture and history (Remali et al., 2016). Typology is the comparative study of objects in the artificial environment in order to divide them into distinct types, this study can be from the perspective of physical characteristics or other aspects of objects (PourMohamadi et al., 2011).

There are generally four ways of thinking about typology; 18th century rationalism theory, modern ideology, neo-rationalism after 1960 and neo-traditionalism. The first theory in which typology was proposed in architecture was the theory of rationalism. Quatrem De Quancy’s theory of type was the first to be proposed in modern architectural discourses in a systematic and theorized manner. The concept he developed for types was based on three concepts: originality, transformation, and invention. Type theory was proposed in modern ideology based on social

changes that required mass production of buildings for the post-World War era. In this theory, the production of the form was equivalent to the mass production process, the type was standardized and became a prototype (Guney, 2007).

The neo-rationalist theory of type was developed by emphasizing the continuity of form and history as opposed to the rupture produced by the mechanical understanding of typology in the modern period. At the center of this theory is the traditional city, emphasizing the natural process of the growth of cities, and emphasizing the unbreakable chain from the continuity of the form of houses to streets, districts and cities, and on which constitutes a continuous development of typological studies (Moneo, 1978).

Neo-traditionalists seek a new paradigm to guarantee and regulate the public realm through individual building types, and their design methods are rooted in the historical records of the building and in particular revitalize styles and traditions. In this view, buildings are the smallest component of urban growth development. Their correct configuration and their relationship with each other define the "character" of each settlement, so buildings should be designed with reference to their own type, not merely on the basis of their function (Katz, xxii).

In general, the type concept has undergone many changes over the years, from Quatrem De Quancy’s definition of type as the first theory of type, to the neo-traditionalist theory that the type is the source of the historical continuity of cities. Meanwhile, in modern ideology, the concept of building mass production was degraded and the concept of the prototype was reconciled, in the new rationalists' view the concept of continuity in form was introduced and people such as Aldo Rossi, Muratori and Caniggia proposed the typological approach. In the neo-traditionalist view, it was proposed as a new paradigm for the regularization and revival of styles and traditions by neo-traditionalists (Figure 1).

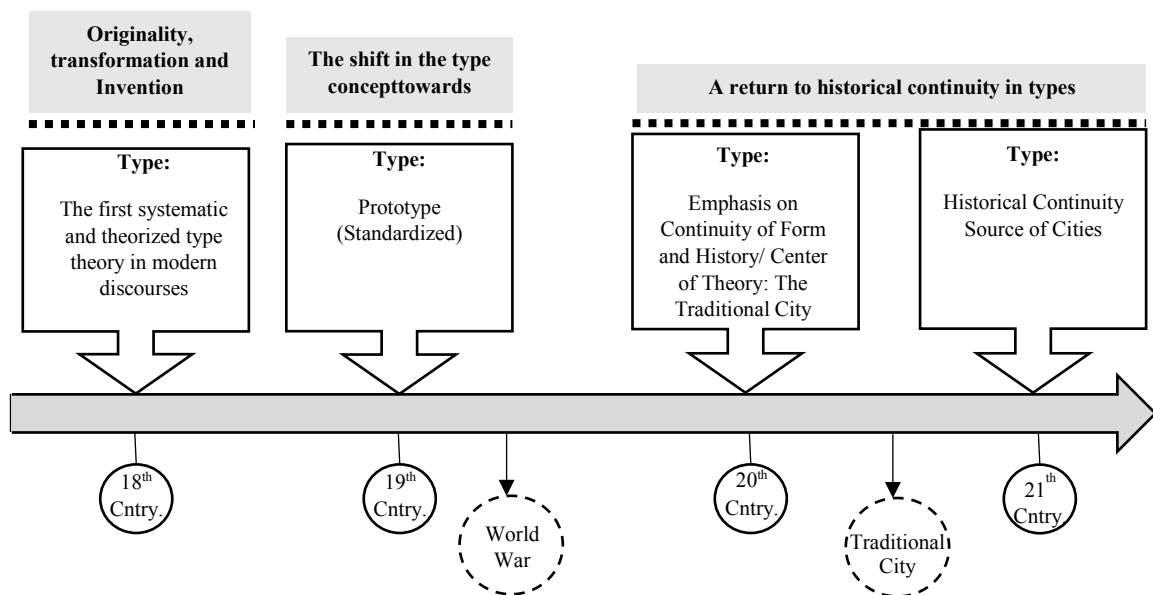


Fig. 2. The process of changing the concept of type throughout history.

In the current study, the concept of type from the perspective of the 18th and 19th centuries is not investigated, because the purpose of this research is “continuity of physical identity”. Therefore, the keyword “continuity” can be searched in the concept of type in two views of neo-rationalists and neo-traditionalists. In these two views, as explained above, the emphasis is on “historical continuity” which is the objective of this research.

Table 2
Similarities and differences between British school and Italian school

	Origin	Unit of analysis	Aspect	Aim of study
British School	German Morphology	Map unit	Current situation with emphasis of alternation procedures	Explanative-descriptive
Italian School	Typology Study	Basic Cell	Current situation with consideration of the past/ Operative history	Prescriptive

Source: (Mirsajadi and Farkisch, 2016) (MirMoghtadaee, 2006) (Levy, 1999) (Bekkering, 2006) (Moudon, 1997)

By comparing these two schools, British and Italian schools, it can be said that both of these two approaches have a nature of historicity embedded in them (Figure 3). The concept of “operative history” suggested by Muratori implies the powerful role of historical dimension in the typological process, which is fundamental framework of the Italian school. Therefore, it can be claimed that typology is a method to achieve historical continuity because the concept of operative history that Muratori said about the typological process forms the fundamental framework of typology.

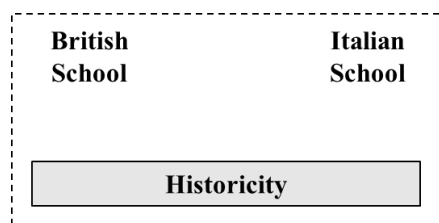


Fig. 3. The nature of historicity embedded in British and Italian school

2.2. Theoretical underpinning on housing typology

Over the past years, articles about typology have been published in different countries such as nine European countries like Spain, Germany, Great Britain, Ireland, Sweden, Poland, and Portugal, two North American countries as the United States and Canada, one Asian country South Korea and one Oceanian country Australia. There was also an article by Kubat on Turkey. There are also so many studies in this field in Iran in the following years. Studies have shown that continuity is negatively affected by typological changes over time (Gokce & Chen, 2018). It has also been found that there is a direct interaction between the process of urban physical changes and urban identity changes (Gur & Heidari, 2020). In the study about defining housing typologies in the capital city of Albania, Tirana, using the proposed hierarchical framework within the dynamics of four political periods: Ottoman, establishment, socialist and post socialist, they reached urban formal housing typologies in Tirana detached houses, apartments, mass housing, social housing, gated communities, informal

The interpretation of type concept and the adopted approach to typology have shaped the classification of types in different ways in the works of researchers. There are three basic typo-morphology schools, named British, Italian and French school. The combination of British and Italian school is utilized in this study. Similarities and differences between the two schools have been shown in Table 2.

detached houses and housing with in/formal additions (Manahasa et al., 2022). In the study of different types of housing of Uzunder, the results show that optimal use of materials ‘construction techniques and climatic considerations occurring in the region over the centuries can be used in contemporary architecture ‘while modern architecture requires environmentally friendly buildings (Karahana and Davardoost, 2020). In the study of housing survey of Kang village in Mashhad, the results show that five different types result from the effect of architectural pattern compatible with environmental climate criteria (BiMakr et al., 2020). In the study of typological analysis of Talas area plans, results show that the houses in the area have a basement and ground floor and upper floor and the functional ground floor and the first floor are dynamically designed (Turgut, 2019).

By comparing and analyzing the studies conducted on housing typology and the presented typology frameworks, it can be stated that no housing typology study has been conducted based on the prioritized typology criteria. And this typology of housing is based on the prioritization of typology criteria at the housing scale for the first time. The theoretical framework of housing typologies relies on classification/categorization housing into types. The typological analysis places emphasizes key specific qualities of the dwellings while identifying their characteristics in order to establish differences that can be utilized for typological classification (Remedi et al. 2016).

2.3. Physical Identity

Identity is one of the pillars of character, and the sense of personality is associated with awareness of differentiation from others. Therefore, it is obvious that identity and personality are in a semantic domain and are necessary and bound by each other. The character includes all the attributes that specify an object, place, event, and so on, distinguishing it from non. It can be argued that there is a close conceptual link between identity and character. Character is considered synonymous with physical identity since it is more concerned with the shape of a city (MirMoghtadaee, 2016, 32).

According to Karl Kropf, morphology is the distinguishing factor of one city from another, and this is the city's identity

city. Therefore, it can be concluded that he considers the concept of physical identity synonymous with character. This concept is an important element for defining architecture and architecture as proof of this and from the perspective of identity, architecture reflects the thoughts of the people of each region, so in different time and place periods, distinctive architecture is created (Torabi & Brahman, 2013, 106).

In this research, physical identity refers to the characteristics that distinguish the body of the city from the non-ones and reveal its similarity with self. These characteristics must be such that the body of the city, while continuous, evolves, eventually leading to the emergence of a whole. MirMoghtadaee in her book introduced the following three criteria as criteria for assessing physical identity:

Table 3
 Criteria for assessing physical identity

Criteria for assessing physical identity	
Similarity/Distinction	Means distinguishing from non-self and similarity.
Continuity/Change	It means connecting with the past and non-interruption-continuity of self-meaning and values while innovating and being creative in light of the conditions of the time, staying self-sustained, but not the same.
Unity/Plurality	It means the union between different, heterogeneous and even contradictory parts, so that together they form a whole.

(MirMoghtadaee, 2016, 24)

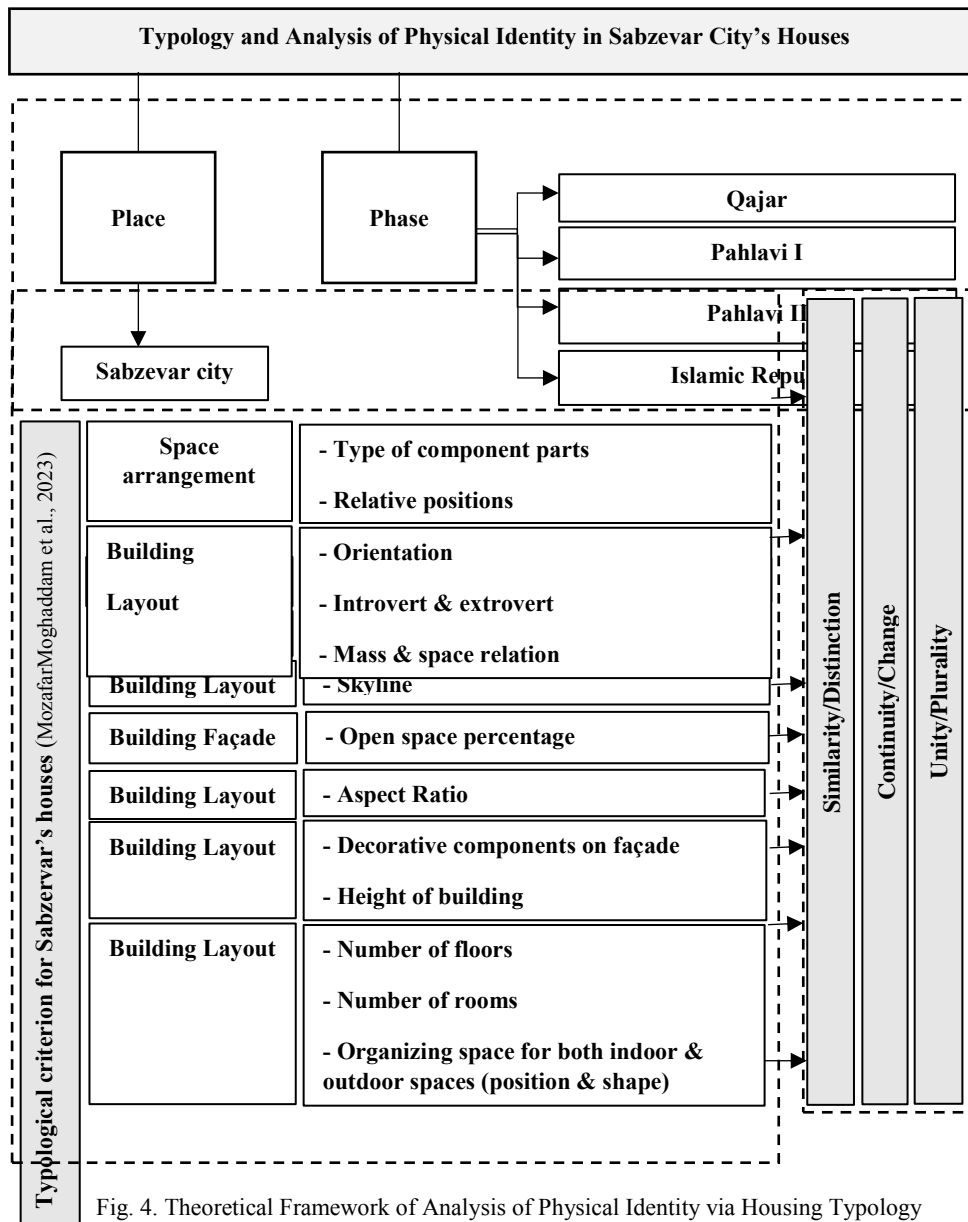


Fig. 4. Theoretical Framework of Analysis of Physical Identity via Housing Typology

As mentioned above, character is a word synonymous with physical identity. So, in order to distinguish one city from another city, the character or physical identity of that city should be studied. Therefore, according to the purpose of this study, which is to analyze the continuity of physical identity in the housing types of Sabzevar city, the three factors for evaluating the continuity of physical identity, as mentioned above, i.e., similarity/distinction, continuity/change, unity/plurality in the types of houses of Sabzevar city are analyzed.

2.4. Theoretical framework

From the theoretical foundation, it can be claimed that “typology” and “typological process” can be utilized as a process to analyze the “continuity” of “physical identity”. When we talk about typology, we also talk about the place. It means that typology finds meaning in the geographical range or the specific region or place. So, typology generally includes the theories that are examined and the typology of housing is specifically investigated. Moreover, typology finds meaning during specific **period, time** or phase. In this study, the theoretical framework has been formed by studying theoretical foundations and also using 15 prioritization criteria derived from previous research by the authors of this paper. These 15 criteria are classified into four categories: space arrangement, building layout, building façade, and outline. Among these categories, space arrangement is placed in the first category, building

layout in the second category, building façade in the third category, and the outline in the fourth category.

In terms of the best criterion of each category, in the category of space arrangement, the best criterion of this category is the number of Iwans, in the category of building layout, the best criterion of this category is orientation and the best criterion of the building façade category is the geometry of the divisions of the building façade, and finally, the best criterion is the outline is the outline

3. Research Method

The research method of this study is combination of case study method and descriptive-analytical method. The case study of this research is the houses of Sabzevar city. Unfortunately, today, the historical fabric and identity-building cores of this city are rapidly being destroyed due to the growth of urbanization, and it is very necessary to recognition the housing types of this city and to analyse the continuity of the physical identity in the housing types of this city.

The main purpose of this research is the typology of Sabzevar’s houses based on the typological criterion out of theoretical framework. Other objective of this research is to analysis the typology of Sabzevar’s houses in order to explanation the continuity of physical identity of its houses. To achieve the main purpose of this research, “case study method” has been used and to achieve other objective of this research, “descriptive-analytical method” has been used. The steps of conducting this research have been shown in figure 5.

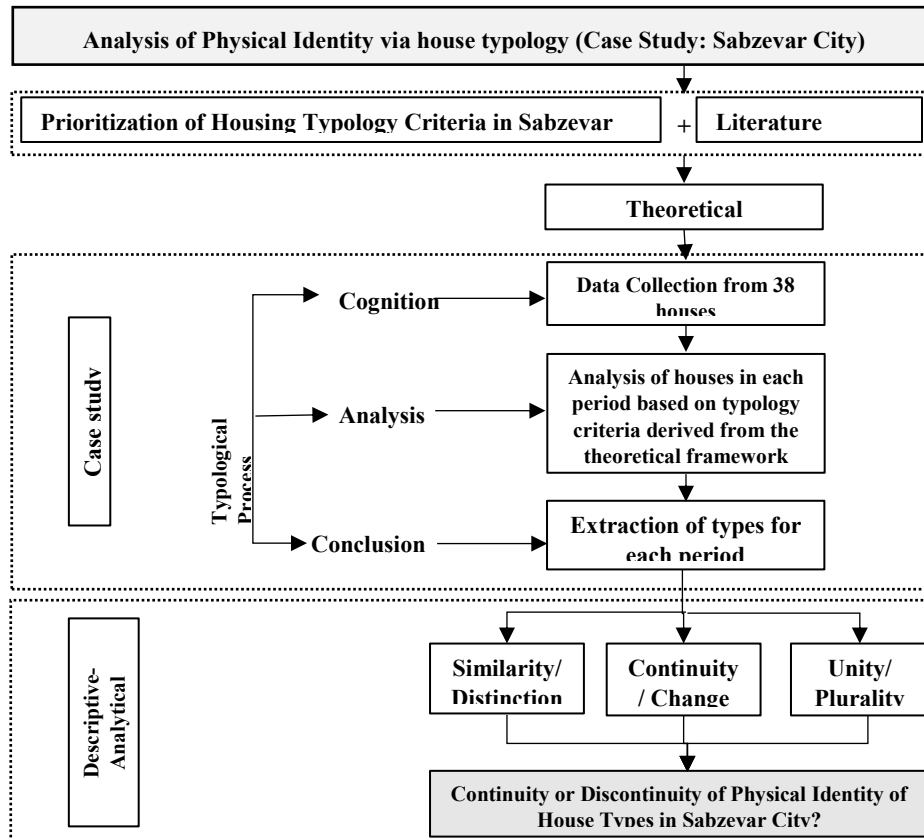
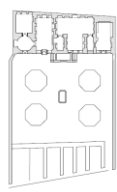

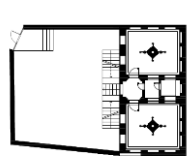

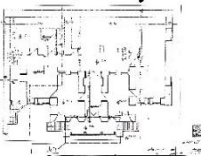

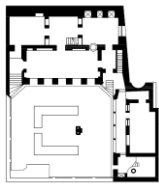

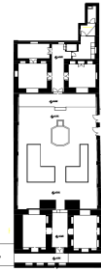
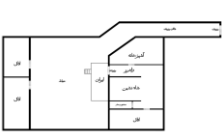
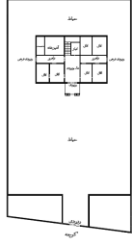



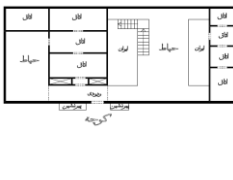
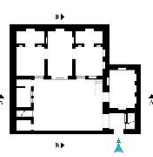




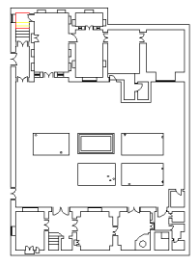
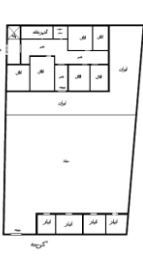




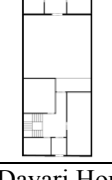
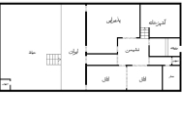







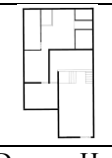
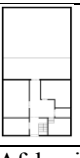

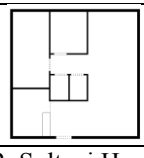
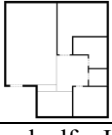
Fig. 5. Steps of Conducting Research

In the case study method, the sampling consideration is such that the sample size is selected purposefully. Among the reasons for the purposeful sampling, it can mention that the destruction of most of the historical houses, the lack of documents of most of the historical houses, the more effective of the selected samples in physical identity and the limitations of the research, including Covid-19, etc. are the reasons. A total of 38 houses were selected as the sample size (Table 4). Conduct data collection, a field study method was used, which includes data collection from the houses of Sabzevar city, which in fact, due to the lack of access to most of the houses and the destruction of most of the Qajar and Pahlavi houses, some of houses' documents were collected from the archive of Hakim Sabzevari University and the information of other houses were collected one by one and implemented on the plans. Data analysis is done in such a way that first the types are analyzed based on a comparative approach, then they are described and finally they are classified.

Research shows that the impact of political system is powerful on socioeconomic and cultural aspects of life, consequently on housing development (Manahasa et al., 2022). Thus, in this research, time period has been divided into four periods: Qajar, Pahlavi I, Pahlavi II, and Islamic Republic. In table 4 the case studies have been introduced through four historic periods. Eight samples of Qajar and eight samples of Pahlavi I and nine samples of Pahlavi II and thirteen samples of Islamic republic have been selected as sample size in this study.

Table 4
 Analyzed houses from Sabzevar city

Qajar				
	1.Aldaghi House*	2.Amiri House*	3.Owlia House*	4.Jafarzadeh House*
				
	5.Hejazi House*	6.Shariatmadar House*	7.Kian House*	8.Vasei House*
Pahlavi 1st era				
	1.Estaji House*	2.Tofighi House	3.Haghiran House	4.HeshmatNia House
				
	5.Badiee House	6.Safakar House	7.Fazel House	8.BlashAbadi House*

Pahlavi 2 nd era					
	1. Shiayan House	2. Sade House	3. Parsi House*	4. Faramarzi House	
					
	5. Malvandi House	6. Adeli House	7. Motevali House	8. Jajarmi House	
					
	9. Davari House				
	Islamic Republi c era				
		1. Mosalmani House	2. Parvandi House	3. HaresAbadi House	4. Afchangi House
					
5. Divandari House		6. Hadadi House	7. Zhian House	8. KianShokuh House	
					
9. Danaee House		10. GolAfshani House	11. SanatPour House	12. Soltani House	
					
13. Farshadfar House					

*Plans have been taken from the archive of Hakim Sabzevari University (Hakim Sabzevari, 1401).

4. Data Analysis, Findings and Discussion









































4.1. Typology of Sabzevar City's Houses

In the following, as shown in Table 5, for example of the Islamic Republic period, 13 selected houses in Sabzevar during the Islamic Republic period have been analyzed

physically. This analysis process has been done through four criteria and their sub-criteria extracted from theoretical framework: Space arrangement, building layout, building façade, and outline.

Table5

Sample of identifying the housing' body of Sabzevar city based on 15 typology criteria (Islamic Republic period)

	Space arrangement		Building layout			Façade	Outline	Building layout	Façade	Building layout	Façade		Building layout		
	Type of components	Relative positions	Orientation	Introvert & extrovert	Mass & space relation	Geometry of façade division	Shape	Open space percentage	Skyline	Aspect ratio	Decorative components	c	No. of Floors	No. of Rooms	Organizing Space Position & Shape
Mosalmāni House	1	1	NS	Extrovert	 1 side			60%		1:2	-	4.20	1	2	Int.-Ext.Rec
Parvandi House	1	1	EW	Extrovert	 1 side			50%		1:2	-	4.20	1	1	Int.Rec Ext.-
Hare sAbadi House	1	1	EW	Extrovert	 1 side			50%		1:1.7	-	4.20	1	4	Int.Rec Ext.-
Afchāngi House	1	1	NS	Extrovert	 1 side			25%		1:1	-	4.20	1	2	Int.Rec Ext.-
Divāndari House	1	1	EW	Extrovert	 1 side			70%		1:2	-	4.20	1	4	Int.Rec Ext.-
Hadadi House	1	1	EW	Extrovert	 1 side			60%		1:1.2	-	6.60	2	3	Int.-Ext.-
Zhiān House	1	1	NS	Extrovert	 1 side			60%		1:1.7	-	4.20	1	3	Int.Rec Ext.-
Kian Shokuh House	1	1	NS	Extrovert	 1 side			50%		1:1.7	-	4.20	1	4	Int.Rec Ext.-
Dānee House	1	1	NS	Extrovert	 1 side			25%		1:1.8	-	4.20	1	2	Int.-Ext.-
Gol Afshāni House	1	1	NS	Extrovert	 1 side			50%		1:1.8	-	4.20	1	2	Int.-Ext.Rec

Sana tPou r Hou se	0	0	NS	Extrov ert	1si de			40%		1:2.5	-	10	3	2	Int.- Ext.-
Solt ani Hou se	0	0	NS	Extrov ert	1si de			40%		1:2.5	-	13	4	2	Int.- Ext.-
Fars hadf ar Hou se	0	0	NS	Extrov ert	1si de			40%		1:2.5	-	13	4	2	Int.- Ext.-

After analyzing the houses of Sabzevar city, in this section, based on physical factors derived from the theoretical framework, we reached a model for categorizing houses, Table 6

here as an example of the Islamic Republic period (Table 6).

Model for categorizing houses based on physical factors (Islamic Republic period sample)

Space arrangement	Relative position	1 Yard 0 Yard	1 st ctg.: 1 Yard-1 Iwan 2 nd ctg.: 0 Yard-0 Iwan	Building layout	Aspect ratio	- 1:1 - Btw. 1:1 & 1:1.5 - Btw. 1:1.5 & 1:2 - 1:2	1 st ctg.: 1:1 (Square) 2 nd ctg.: Btw. 1:1 & 1:1.5 3 rd ctg.: Btw. 1:1.5 & 1:2 4 th ctg.: 1:2	Building layout	Open Space%	- Btw. 25%-40% - Btw. 50%-60%	1 st ctg.: Btw. 25%-40% 2 nd ctg.: Btw. 50%-60%
	Type of component	1 Iwan 0 Iwan				Building layout				Skylines	
Building layout	Mass & space relation	- Mass on one side of the open space - The mass is in an L-shaped shape next to the open space	1 st ctg.: N-S + Extrovert + Mass on one side 2 nd ctg.: N-S + Extrovert + L-Shape Mass 3 rd ctg.: E-W + Extrovert + Mass on one side 4 th ctg.: E-W + Extrovert + L-Shape Mass	Building layout	No. floors	- 1 Floor. - 2 Floors. - 3 Floors. - 4 Floors.	1 st ctg.: 1 Floor. 1-2 Int. Org. Rooms Space: Rectangular / Ext. Org. Space :- 3-4 Int. Org. Rooms Space: Rectangular / Ext. Org. Space :- 2 nd ctg.: 2 Floors. 3-4 Int. Org. Rooms Space: -/ Ext. Org. Space :- 3 rd ctg.: 3,4 Floors. 2 Int. Org. Rooms Space: -/ Ext. Org. Space :-	Building layout	Height	4.20 m 6.60 m 10 m 13 m	1 st ctg.: No Decorative Components in 4.20, 6.60, 10 , 13 m.
	Introvert/ Extrovert	Extrovert				No. rooms				1 st ctg.: 1-2 Rooms 2 nd ctg.: 3-4 Rooms	






Orientation	N-S/ E-W	Organizing space	1 st ctg.: Int. Org. Space: Rectangular/ Ext. Org. Space :- 2 nd ctg.: Int. Org. Space: -/ Ext. Org. Space :-	Outline	- Square - Rectangular	1 st ctg.: Square 2 nd ctg.: Rectangular
-------------	----------	------------------	--	---------	---------------------------	---

After collecting and analyzing the data, the types of each period were obtained (table 7,8,9,10).

Table 7 Shows House Types of Sabzevar city in Qajar period. For instance, the description of type 1 in Qajar period of Sabzevar city is: “Type I is a type within one yard and 1 or 2 Iwans which the building’s orientation is East-West and introverted and the mass and space relation is two sided and aspect ratio is about 1:1.6 which express the golden rectangle and open space percentage is 50%-60%. Number of floors in this type is about two floors and

number of rooms is about 6-8. The height of this type is about 6.60 meters and the internal organizing space is in form of regular octagon and the external organizing space is in form of rectangle. The building façade is designed in form of rectangle and symmetric and the skyline is flat. In the building façade of these types, decorative elements have been used. The outline is in form of rectangle”.

Table 7
House types of Sabzevar city in Qajar period.

	Type I	Type II	Type III	Type IV	Type V
					
Relative positions	1	1	1	2	2
Type of component parts	1 or 2	1	2	4	5
Orientation	E-W	N-S	N-S	N-S	N-S
Introvert & extrovert	Introvert	Extrovert	Introvert	Introvert	Introvert
Mass & space relation	2-Sided	Centered	L Sided	2-Sided	L Sided
Open space percentage	50%-60%	70%-80%	40%-50%	50%-60%	50%-60%
Aspect ratio	1:1.6 Golden Rct.	1:1.4 Iranian Rct.	1:1.2	1:1.50	1:1.4 Iranian Rct.
No. of Floors	2	2	1 & 2	1	2
No. of Rooms	6-8	4-6	4-6	6-8	6-8
Height	6.60	6.60	4.20 & 6.60	4.20	6.60
Organizing Space Position & Shape	Int: Regular octagon Ext: Rectangle	Int: Square Ext: -	Int: Square Ext: Rectangle	Int: Rectangle Ext: Rectangle	Int: Regular octagon Ext: Rectangle
Geometry of façade division	Rectangular & Symmetric	Rectangular & Symmetric	Rectangular & Symmetric	Rectangular & Symmetric	Rectangular & Symmetric
Skyline	Flat	Flat	Flat	Flat	Flat
Decorative components	✓	✓	✓	✓	✓
Outline	Rectangular	Rectangular	Rectangular	Rectangular	Rectangular

The typological findings of the Qajar era in Sabzevar city show that 5 types of houses have remained in Sabzevar city since the Qajar era. Also, the findings show that Single-yard (central courtyard) types are the dominant types left over from this era. Also, the findings indicate that the proportions of the Iranian rectangle and the golden rectangle were also observed in the housing plan of Sabzevar city at that era.

Table 8 Shows house types of Sabzevar city in Pahlavi I period. For instance, the description of type 1 in Pahlavi I period of Sabzevar city is: “Type I is a type within one yard and 2 Iwans which the building’s orientation is North-

South and introverted and the mass and space relation is one and two sided and aspect ratio is about 1:1.8 and 1:2.4 and open space percentage is 40%-60%. Number of floors in this type is about one or two floors and number of rooms is about 2-4, 6-8 and 8-10 rooms. The height of this type is about 4.20 and 6.60 meters and the internal organizing space is in form of rectangle and there is no external organizing space. The building façade is designed in form of rectangle and symmetric and the skyline is flat. In the building façade of these types, decorative elements have been used. The outline is in form of rectangle”.

Table 8
House types of Sabzevar city in Pahlavi I period.

	Type I	Type II	Type III	Type IV	Type V
Relative positions	1	1	1	1	2
Type of component parts	2	2	1	3	2
Orientation	N-S	E-W	N-S	E-W	E-W
Introvert & extrovert	Introvert	Introvert	Extrovert	Introvert	Introvert
Mass & space relation	1 & 2-Sided	2-Sided	Centered	3-Sided	2-Sided
Open space percentage	40%-60%	40%-60%	60%-80%	Lower than 40%	40%-60%
Aspect ratio	1:1.8 & 1:2.4	1:1.5-1:1.7	1:1.5	1:1.2	1:2.2
No. of Floors	1 & 2	1	2	2	2
No. of Rooms	2-4 & 6-8 & 8-10	2-4	8-10	6-8	8-10
Height	4.20 & 6.60	4.20	6.60	6.60	6.60
Organizing Space Position & Shape	Int: Rectangle Ext: -	Int: Rectangle Ext: Rectangle	Int: Rectangle Ext: Trapezius	Int: - Ext: Rectangle	Int: Rectangle Ext: Rectangle
Geometry of façade division	Rectangular & Symmetric	Rectangular & Symmetric	Rectangular & Symmetric	Rectangular & Symmetric	Rectangular & Symmetric
Skyline	Flat	Flat	Flat	Flat	Flat
Decorative components	✓	✓	✓	✓	✓
Outline	Rectangular	Rectangular	Rectangular	Rectangular	Rectangular

The findings of the typology of the first Pahlavi period in Sabzevar city show that 5 types of houses have remained in Sabzevar city since the first Pahlavi period. Also, the findings show that Single-yard (central courtyard) types are the dominant types left over from this era.

Table 9 Shows house types of Sabzevar city in Pahlavi II period. For instance, the description of type 1 in Pahlavi II period of Sabzevar city is: “Type I is a type within one yard and one Iwan which the building’s orientation is North-South and extroverted and the mass and space relation is two sided and aspect ratio is about 1:2.1 and 1:2.4 and 1:1.5

and open space percentage is 40%-45% and 50% and till 70%. Number of floors in this type is about one or two floors and number of rooms is about 2-4, 6-8 and 8-10 and 10-12 rooms. The height of this type is about 4.20 and 6.60 meters and the internal organizing space is in form of rectangle and external organizing space is in form of rectangle. The building façade is designed in form of rectangle and both symmetric and asymmetric and the skyline is both flat and cursive. In the building façade of these types, decorative elements have been used. The outline is in form of rectangle”.

Table 9
House types of Sabzevar city in Pahlavi II period.

	Type I	Type II
Relative positions	1	1
Type of component parts	1	1
Orientation	N-S	N-S
Introvert & extrovert	Extrovert	Extrovert
Mass & space relation	2-Sided	1-Sided
Open space percentage	40%-45% & 50% & Till 70%	40%-45% & 50%

Aspect ratio	1:2.1 & 1:2.4 & 1:1.5	1:2 & 1:2.2 & 1:1.3
No. of Floors	1 & 2	1
No. of Rooms	2-4/4-6/8-10/10-12	2-4 & 4-6
Height	4.20 & 6.60	4.20
Organizing Space Position & Shape	Int: Rectangle Ext: Rectangle	Int: Rectangle Ext: -
Geometry of façade division	Rectangular & Symmetric/Asymmetric	Rectangular & Symmetric
Skyline	Flat/ Cursive	Flat
Decorative components	✓	-
Outline	Rectangular	Rectangular

The findings of the typology of Pahlavi II era in Sabzevar city show that 2 types of houses remained in Sabzevar city from the time of Pahlavi II until now. Also, the findings show that these types were all one-yarded.

Table 10 Shows house types of Sabzevar city in Islamic Republic period. For instance, the description of type 1 in Islamic Republic period of Sabzevar city is: "Type I is a type within one yard and one Iwan which the building's orientation is North-South and extroverted and the mass and space relation is one sided and aspect ratio is about 1:2

and 1:1.5 and open space percentage is 25%-30%. Number of floors in this type is about one floors and number of rooms is about 1-2 and 3-4 rooms. The height of this type is about 4.20 meters and the internal organizing space is in form of rectangle and there is no external organizing space. The building façade is designed in form of rectangle and asymmetric and the skyline is both flat and cursive. In the building façade of these types, decorative elements have not been used. The outline is in form of rectangle".

Table 10
House types of Sabzevar city in Islamic Republic period.

	Type I	Type II	Type III
Relative positions	1	1	0*
Type of component parts	1	1	0*
Orientation	N-S	N-S/E-W	N-S
Introvert & extrovert	Extrovert	Extrovert	Extrovert
Mass & space relation	1-Sided	L-Sided	1-Sided
Open space percentage	25%-30%	25%-30% & 50%-60%	40%
Aspect ratio	1:1.5 & 1:2	1:1 & 1:1.5 & 1:2	1:2.5
No. of Floors	1	1 & 2	3 & 4
No. of Rooms	1-2 & 3-4	1-2 & 3-4	2
Height	4.20	4.20 & 6.60	10 - 13
Organizing Space Position & Shape	Int: Rectangle Ext: -	Int: Rectangle Ext: -	Int: - Ext: -
Geometry of façade division	Rectangular & Asymmetric	Rectangular & Asymmetric	Rectangular & Asymmetric
Skyline	Flat/ Cursive	Cursive	Flat
Decorative components	-	-	-
Outline	Rectangular	Rectangular/ Square	Square

* Zero means that not every apartment unit has one yard and one Iwan.

The typological findings of the Islamic Republic period in Sabzevar city show that there are 3 types of houses in Sabzevar city. Also, the findings indicate that the

emergence of a new type called "residential apartments" has begun in Sabzevar city since this period.

4.2. Analysis of Physical Identity in house types of Sabzevar city

After reaching types in each time period in Sabzevar city, the continuity of physical identity during periods of time based on each typological criteria was analyzed, which is described in table 11. According to table 3, the criterion for

analyzing (assessing) physical identity is: Similarity/ distinction, continuity/ change, unity/ plurality. It should be noted that in Table 11, typology criteria are not based on priority, and each category of criteria with its own sub-criteria is considered outside of the prioritization.

Table 11
Analysis of physical identity in house types of Sabzevar city

Physical identity evaluation criterion	Sabzevar city's house types		Continued	Partly continued	Discontinued
Similarity/ Distinction	Space Arrangement	The process of changing types during the periods of time in Sabzevar city shows that, during the Qajar and first Pahlavi periods, there was a similarity in the number of courtyards and the number of Iwans, but from the period of the Second Pahlavi period and the Islamic Republic, there was a distinction in the number of courtyards and the number of Iwans.			✓
	Building Layout	The process of changing types during the periods of time in Sabzevar city shows that: - In the Qajar and first Pahlavi periods, there was a similarity in the relationship between mass and space, but from the second Pahlavi period and the Islamic Republic, there was a distinction in the relationship between mass and space compared to the previous periods. - In the Qajar and first Pahlavi periods, there was a similarity in the percentage of open space compared to the total land, and this number was 50% to 60%, but as we move towards the period of the Islamic Republic, there is a difference in the percentage of open space. And this percentage is reduced to 40%. - In the periods of Qajar, Pahlavi I and Pahlavi II, there was a similarity in the number of floors, and since the period of the Islamic Republic, there has been a significant increase in the number of floors and a distinction has been made. - In the Qajar period and the first Pahlavi period, there was a similarity in the use of the external organizing space, but in the Qajar period, there was a difference in the use of the internal organizing space because distinct shapes such as square and regular octagon were used in addition to the rectangle. In the period of Pahlavi II and the Islamic Republic, this similarity and distinction has disappeared and these spaces have been removed. - In the Qajar and the first Pahlavi periods, there was a distinction in the orientation of the houses, but in the second Pahlavi period and the Islamic Republic, there was a similarity in the orientation of the houses. - In the Qajar and first Pahlavi periods, there was a similarity in the introversion of the houses, but in the second Pahlavi and Islamic Republic houses, there was a distinction compared to the previous two periods, and these houses became extroverted.			✓
	Building Façade	The process of changing types during the periods of time in Sabzevar city shows that: - In the Qajar and second Pahlavi periods, the geometry of facade divisions was symmetrical and there were similarities, but from the second Pahlavi period and the period of the Islamic Republic, a distinction was made compared to the previous periods. - In the Qajar and first Pahlavi periods, the skyline had similarities, but from the second Pahlavi period and the Islamic Republic, a distinction was made compared to earlier periods. - There is a similarity in the use of decorative elements on the facade of the building in the first Pahlavi and Qajar periods, but from the second Pahlavi period and the Islamic Republic, we see the absence of decorative elements and a distinction has been made.			✓
	Outline	In the Qajar, Pahlavi I and Pahlavi II periods, we see the similarity in outline, but in the Islamic Republic, a distinction has been made.			✓
Continuity/ Change	Space Arrangement	The process of changing types during the periods of time in Sabzevar city shows that during the Qajar and First Pahlavi periods, there was continuity in the number of courtyards and the number of Iwans, but from the second Pahlavi period, the change began and reached the period of the Islamic Republic.			✓
	Building Layout	The process of changing types during the periods of time in Sabzevar city shows that:			✓

		<ul style="list-style-type: none"> - During the Qajar period and the first Pahlavi period, there was continuity in the relationship between mass and space, but from the second Pahlavi period onwards, there was a change in this relationship. - In the Qajar and first Pahlavi periods, there was continuity in the percentage of open space use, and there was a change from the second Pahlavi period, especially in the Islamic Republic. - In Qajar the first and second and Pahlavi periods, there was continuity in the number of floors, but since the period of the Islamic Republic, there has been a significant growth in the number of floors and there has been a transformation. - In the Qajar and first Pahlavi periods, there was continuity in the use of the organizing space inside and outside the house, but gradually from the second Pahlavi period, there was a change in the use of these spaces, until finally, in the period of the Islamic Republic, these spaces have been removed in the houses of Sabzevar city. - In the Qajar and the first Pahlavi periods, there was a change in the orientation of the houses, but from the second Pahlavi period and the Islamic Republic, there was a continuity in the orientation of the houses. - In the Qajar and first Pahlavi periods, there was continuity in the introversion of houses, but from the second Pahlavi period onwards, there was a change and the houses became extroverted. 			
	Building Façade	<ul style="list-style-type: none"> The process of changing types during the periods of time in Sabzevar city shows that: - In the Qajar and first Pahlavi periods, the sky line continued to be flat, and over time, it changed from the second Pahlavi period onwards. - The use of decorative elements continued in the Qajar period and the first Pahlavi and to some extent the second Pahlavi period, but it was changed and removed during the Islamic Republic period. 			✓
	Outline	In all periods, the use of the rectangle shape as the outline shape has been continued, however, in the period of the Islamic Republic, square proportions are also seen.		✓	
Unity/ Plurality	<p>During the Qajar and first Pahlavi periods, there was a plurality in the number of Iwans, but the symmetrical geometry of the facade was its unifying factor. It can be said that in these two periods, there was a diversity in the number of yards and the orientation of the houses, but the relation between mass and space and introversion was their unifying factor. In these two periods, especially in the Qajar period, various geometric shapes have been used in the internal and external organizing space and there was a plurality, but the unifying factor was the shape of the outline of the plan. In these two periods, there has been a diversity in the use of decorative components in the facade of the building, but the unifying factor has been the flat sky line and the geometry of the symmetrical facade divisions. In the second Pahlavi period and the Islamic Republic, there is a plurality of facades in terms of the skyline and the number of floors, and there is no unifying factor. In these two periods, and especially in the period of the Islamic Republic, there is unity in the open space (40% open space-60% mass) and the relation between the mass and open space (one-way) and the extroversion and orientation of the houses (north-south). During the period of the Islamic Republic, there is a plurality in the outline, and there is no unifying factor to it.</p>				✓

Among the global currents, the physical form of a house has been affected by various factors and this transformation has manifested itself in different dimensions (physical, cultural-social and political-economic). The thought of replacing European models for renewal and getting out of traditional obsolescence started huge changes in housing architecture, which was established by regulations by graduates sent abroad and emerging schools of architecture in Iran, which are run in European style and with modern intellectual foundations, in the next stage, the final blow was given to the housing structure (MohajerMilani and EiniFar, 2020).

From the findings of Table 11, it can be concluded that:

- Space arrangement has not continued in the process of typological change.
- Building layout has not continued in the process of typological change.
- Building façade has not continued in the process of typological change.
- Outline has been partially continued in the process of typological change.

5. Conclusion

In order for a city to be distinguished from another city, it must have a distinguishing character. The character of the city is the "physical identity" of that city. It can be claimed that the physical identity of a city is rooted in "continuity" and not "change", because identity is a dynamic concept. Therefore, based on this study, it can be claimed that "typology" and "typological process" are a suitable process for analyzing the "continuity" of physical identity.

In this research, the typological process and the three factors of similarity/distinction, continuity/change and unity/plurality have been used to analyze the continuity of the physical identity of the housing types of Sabzevar city based on 15 criteria extracted from the theoretical framework. This study has been accompanied by severe limitations, including the impossibility of access to the documents of historical houses (due to their destruction) and also the impossibility of access to the houses of the second Pahlavi period. From the findings of this research, it can be concluded that there are a total of 15 types of housing in Sabzevar city from the Qajar period until now,

5 types related to the Qajar period, 5 types related to the first Pahlavi period, 2 types related to the second Pahlavi period and 3 types belongs to the period of the Islamic Republic. The results of this study indicate that the lowest number of types is related to the second Pahlavi period and the highest number of types is related to the Qajar and first Pahlavi period.

The type with one yard and one or two Iwans (Central courtyard with two Iwan and a house with one sided courtyard with one Iwan) was the dominant type in the Qajar and first Pahlavi periods. Also, the results of this study show that the frequency of single-yard and three-Iwan type (Central courtyard with three Iwans) was very low and this type was found only in the first Pahlavi period in Sabzevar city. It may be possible to consider this hypothesis that this type may have existed in the Qajar period as well, but due to the lack of information and the destruction of case studies, it was not included in this research. Also, during the period of the Islamic Republic, we see the emergence of a new type called "apartment". It can be acknowledged that the findings indicate that Sabzevar has lost the continuity of its physical identity during years and analysis of the physical typology of houses in Sabzevar show that tremendous changes have occurred in the physical identity of house types in this city from the second Pahlavi period onwards. The conducted study shows the existence of the following conditions in the housing of Sabzevar city:

- There is no specific pattern for the height of houses during the Islamic Republic period.
- There is no specific pattern for building facades, which includes the geometry of facade divisions and the use of decorative elements in the building facade and skyline, in the Islamic Republic period.
- In the housing plan of the Islamic Republic of Sabzevar city, the internal and external organizing space has been removed, which causes the loss of privacy in housing spaces.

In general, it can be said that the types of houses in Sabzevar city have characteristics such as distinction, change and plurality due to the passage of time, and the houses of this city has lost its physical identity due to the passage of time.

It is important to pay attention to the fact that referring to the past does not only mean intellectual curiosity, but also means trying to take advantage of knowledge that has been neglected. Undoubtedly, the life of a society cannot be completely separated from its past. Therefore, such studies can provide a link between the past, present and continuity for the future. In future researches, the impact of non-physical factors on creating physical changes from the second Pahlavi period onwards in the housing of Sabzevar city can be investigated. The results of this research can be helpful for architects and designers in reaching design solutions for contemporary housing in Sabzevar city.

References

Abae, Mazyar (2017), "Re-reading morphological concepts to face globalization: using typo-morphology

to excavating modern and contemporary forms", 24th ISUF international conference proceeding, 907-914.

Argan, G. C. (1963), On the typology of architecture, *Architectural design*, 33(12), 564-565.

Bekkering, H. C. (2006), "Morphological Analysis of the Contemporary Urban Territory: Is It Still a Relevant Approach?", In F. Hoeven van der, & H. J. Rosemann (Eds.), *Urban Transformations and Sustainability*. Delft: IOS Press.

BiMakr, Farzaneh, Mirzaee, Reza, Madahi, Mahdi and Heidari, Ahmad (2020), "Typology of Contemporary Patterns of Rural Housing and its Relationship with Climate/ Case study:Kang village of Mashhad", *Khorasan Cultural Studies*, vol. 15 (no. 1) 7-30.

Bozorgmehr, A., Nourollahi, M. and Arayesh, M., (2023), "Presenting a Conceptual Model with an Emphasis on Effective Components in the Identity of Urban Facades based on Metacomposition Method", *HoviatShahr*, No. 53, 87-120.

Colquhoun, A. (1969), "Typology and design method", *Perspecta*, 71-74.

DaneshPour, A. and Shiri, E. (2015), "Functional physical elements shaped by the identity of the historical fabric of the Iranian city", *Naghsh Jahan*, No. 1-5, 17-25.

Duygu Turgut, (2019), "An analysis of the plan typology of vernacular Talas houses", *ITU AIZ*, Vol 16 No 1, 117-125.

EbrahimiMojarad, M., Mozaffar, F., Hosseini, B., SedghPour, B., (2022), "Identify the dimensions of the formation of location identity in residential neighborhoods based on the perspective of experts", *Andishe Memari*, No. 11, 1-16.

Farkisch, Hero and Mirsajadi, Seyed Amir (2016), "Assessment of patterns and recognition of effective physical factors in the architecture of historical houses in Neyshabur in order to achieve the design and construction patterns of houses in traditional residential context", *Quarterly Journal of Islamic Architecture Research*, 13th no., 4th year, 72-92.

Gokce, Duygu and Chen, Fei (2018), "A methodological framework for defining typological process: the transformation of residential environment in Ankara", *Turkey, Journal of urban design*.

Guney, Yasemin (2007), "Type and typology in architectural discourse", *BAU FBE Dergisi*, Clit:9, Sayi:1, 3-18.

Gur, Elmira Ayse and Heidari, Nasim (2020), "Challenge of identity in the urban transformation process: the case of Celiktepe", *ITU AIZ*, Vol 16, No.1, 127-144.

Hajari, F., Zanganeh, Y., & Hamidiyan, A. R. (2018). "An analysis on the urban identity element of Sabzevar, with emphasis on the views of citizens". *Iranian Journal of Geographical Researches*, 33(3), 158-174.

Hakim Sabzevari University, Architecture Faculty Archive (Summer 1401).

Karahan Faris, Davardoost, Sanaz (2020), "Evaluation of vernacular architecture of Uzundere District (architectural typology and physical form of building) in relation to ecological sustainable development", *Journal of Asian Architecture and Building Engineering*, 19:5, 490-501.

- Katz, Peter (1994), "The new Urbanism: Towards an architecture of community", McGraw Hill Education.
- Levy, A. (1999), "Urban Morphology and the Problem of the Modern Urban Fabric: Some Questions for Research" *Urban Morphology*, 3, 79-85.
- Manahasa, Edmond, Ozsoy, Ahsen and Manahasa, Odeta (2022), "A hierarchical definitional framework for a heterogeneous context: housing typologies in Tirana, Albania", *Open House International*, Vol. 47, No. 2, 254-281.
- Mirmoghtadaee, Mahta (2016), "Physical Identity of City, case study: Tehran city", Road, Housing and Urban Development Research Center, Tehran, Iran.
- MohajerMilani, Azadeh, EiniFard, Alireza (2020), "Recognition of Tehran's common housing space organization the research case of row apartment buildings up to 6 floors, northern subtype", *Fine Arts*, Vol 24, Issue 1, 45-56.
- Moneo, R. (1978), "On Typology", *Oppositions*.
- Motalebi, Ghassem and KafashZadeh, MohamadReza, (2021), "Challenges of identity of residence in Sabzevar housing", 4th International conference on art and urban design in Tabriz.
- Moudon, Anne Vernez (1997), "Urban Morphology as an Emerging Interdisciplinary Field", *urban morphology*, 1, 3-10.
- MozafarMoghaddam, Yasaman, Ahmadi, Vahid, Farkisch, Hero and Ostadi, Maryam (2023), "Prioritization of Housing Typology Criteria in Sabzevar City", *Creative City Design*, Vol. 6, No. 1, 16-31.
- Ozcan, Seyma, (2021). Correction to: Vernacular Architecture as an Expression of Cities' Identity: Gercüş Houses in Turkey. In: Mohareb, N., Versaci, A., Mahgoub, Y., Maruthaveeran, S., Alberti, F. (eds) *Cities' Vocabularies: The Influences and Formations. Advances in Science, Technology & Innovation*. Springer, Cham.
- PourMohamadi, MohamadReza, SadrMousavi, MirSattar and Jamali, Siroos (2011), "Analysis of Urban Morphology Schools", *Geographic Studies of Arid Regions*, 2nd year, 5th no., 1-16.
- Remali, Adel M., Salama, Ashraf M., Wiedmann, Florian and Hatem, G Ibrahim (2016), "A chronological exploration of the evolution of housing typologies in Gulf cities", *City Territory and Architecture*, 3:14, 1-15.
- Rossi, Aldo (1984), "The Architecture of the City", MIT Press, Massachusetts.
- Torabi, Z., Brahman, S. (2013), "Effective Factors in Shaping the Identity of Architecture", *Middle east journal of scientific research*, vol 15 (1), pp: 25.
- Vidler, A. (1977), "The third typology", *In opposition* 7.
- ZakerJaghghi, Kianoosh, Majedi, Hamid and Habib, Farah (2009), "Compilation of effective indicators on typology of urban fabric", *HoviateShahr Journal*, 5th year, 7th no., 105-112.