ITU A|Z • Vol 15 No 3 • November 2018 • 109-121

Important factors in residential complex architecture in Tabriz

Shiva VELAYATI[1], Mohammad Reza POURMOHAMMADI[2], Rasoul GHORBANI[3]
[1] sh.velayati@tabrizu.ac.ir • Department of Urban Planning, Faculty of Planning and Environmental Sciences, University of Tabriz, Tabriz, Iran
[2] pourmohamadi@tabrizu.ac.ir • Department of Urban Planning, Faculty of Planning and Environmental Sciences, University of Tabriz, Tabriz, Iran
[3]ghorbani.rasoul@gmail.com • Department of Urban Planning, Faculty of Planning and Environmental Sciences, University of Tabriz, Tabriz, Iran

Received: March 2018 • Final Acceptance: September 2018

Abstract

The architectural aspects of residential complexes are of the important and effective variables in urban structure. The formation of these dimensions reflects some social, economic, political and environmental conditions. To neglect the affecting factors in housing architecture dimensions causes problems and uncertainty in urban planning. This paper intends to evaluate the impact of different economic, social, political, and urban, climate, geological, cultural and religious considerations and their sub-criteria on the architecture of residential complexes in Tabriz, a city in Iran. The architects, urban planners and designers were asked to specify the importance of each of these factors in the formation of architectural dimensions of residential complexes. Using an Analytic Hierarchy Process method (AHP), the role of specified factors in the design of residential complexes in Tabriz was discussed and then these factors were ranked based on their impact. The results showed that economic, political and social factors were more effective than the urban, climatic, geological, cultural and religious considerations on the architecture of residential complexes. According to results, profitability has the highest importance and cultural and religious considerations have the lowest weight.

Keywords

Climatic factors, Cultural and religious considerations, Economic and Political factors, Social factors, Residential Complexes architecture.

doi: 10.5505/itujfa.2018.45822

1. Introduction

A house is a building that functions as a home, ranging from individual houses to the complex, fixed structures of wood, brick, concrete or other materials containing plumbing, ventilation and electrical systems. Iran Census Center defines a house as a space or a place for one single family or many families to live in and a living structure which has one or many entrance gates (Iran Census Center, 1996). The urban houses can be divided into two categories of single dwelling units and apartment houses. The apartment houses themselves are divided to low or eight-story buildings and the high-rise towers (De Chiara & Callender, 1990: 656). The modern residential complexes can be traced to the postindustrial revolution era. The technological advances in hardware, changes in the culture and in the lifestyle and the interaction between humans and the influx of people into the large industrial cities required the construction of affordable dwellings for the labor and low-income groups in the cities (Arts & Architecture Journal 2012: 94-99).

The residential apartment complexes are specified through some architectural features such as plan, façade, congestion, the construction material, the location, the form, and the space orientation of the buildings. To recognize the determining factors of these dimensions is highly significant and can be very helpful to pave the way for the proper urban development. Thus, the recognition of the determining factors of these dimensions is considered as a priority in the urban planning.

A review of the existing literature in the field implies that the housing architecture is influenced by the economic, social, political, climatic, civil engineering, geological, cultural and religious factors. No inclusive studies are carried out in the field of determining factors in the housing architecture in Iran, although the significance of the housing architecture in the social, civil, economic and environmental aspects of the problem are already determined. This paper intends to review the existing literature and to determine the influential factors in the architecture of the residential building complexes so that they may be applicable to the rise of some appropriate residential complexes in Tabriz. To do this, a Delphi method is used to collect and distill the anonymous judgments of experts and the Analytic Hierarchy Process method (AHP) is used to analyze the data.

A review of literature, the methodology and the experimental results of the research will be put forward, to be followed by the conclusion.

2. Review of literature

The studies concerning the influential factors in the form of the houses are by no means new. Medga (1968), for instance, identifies the proportion of the social class to the form of the housing architecture. Medga has suggested that the upper social class people tend to privacy and seclusion and the idea is revealed in their lives through having private courtyards and a self-confidence in design and interior decoration of their houses (cited in Kibet 1992). Rappaport (1969) showed that the social organizations, the belief structures, the ideas and the psychological needs were all determining factors in the form of the houses. Kukreja (1978) had an emphasis on the impact of the physical environment, the climate and weather on the design and construction of the houses.

Kimati, et al. (1976) studied and concluded with the development of the houses in accordance with the physical and social-cultural factors in Kilimanjaro, Tanzania. Kimati and his colleagues realized that the construction of the traditional houses in Chegga [a small town] was inspired by the beliefs, traditions and moral codes of the people. They identified three stages during the construction process: the pre-tradition, the tradition and ultra-tradition eras. The developments were determined by the political, economic and social changes occurred during the transition period. As time had passed, the families had grown larger and the economic status had been dramatically improved. The undertakings of the dealers and the preachers, active on the shoreline, were another influential factor in the development of the houses. The researchers had also been effective

in the development of the houses. The beliefs of the people had been changed from compatibility to the traditions to an incompatible view towards the traditions. The change in the beliefs had imposed a change in the progress of the houses. In fact, there had been a compromise between the pragmatic needs and the use of the space. However, there were samples of the traditional elements in many modern houses. These elements were dominant in the bedrooms, sitting rooms and the kitchens. In some cases, the traditional houses were used as the kitchen, the shop or as a place to keep the animals in. Similar researches were carried out by Boalt (1992) on the 4 districts in Tanzania and by Hanson (1973) in the eastern part of Ethiopia.

In a theoretical work, Hunter and Anderson (1977) attempted to define the basis of variability of the houses and their form and shapes. Using the two previous studies done by Robbins (1966) and Whiting & Ayres (1968), Hunter and Anderson tried to interpret the correlation between the shape of the house and the cultural topographies of the people. According to Robbins (1966), the circular shape of the house was related to the small families who used a provisional pattern of a living. They were not acquainted with farming and agriculture. The square houses, on the other hand, were related with the large families who lived permanently at a place and whose lives were dependent on agriculture (Robbins, 1966: 290).

Dully (1979) believed that the houses were constructed according to the needs of people and with the skills of human beings and with the human scale. The type of the family, nuclear families and large families, is related to the shape, space and architectural composition of the house. Dully emphasized that, in a technical response to the cultural and environmental principles, the houses changed and the change affected the nature of the family. The shape and form of the architecture are dependent on the climate, the local building materials and technical and economic conditions. The paper significantly considered the religious and social components which were symbolically offered in the design and decoration of the houses.

Katende (1983) presented that the demographic, social and economic variables were related to the building of the houses. He revealed that the renting system and land ownership were among the major factors which prevented people from building permanent houses. The people were not inclined to make their houses on the lands which were uncertain whether they would be able to live on and pass to their heirs after their death.

Studying the traditional architecture in Keiyo-markwet, Kiprono (1989) apprehended that the most important factors, effective on the form of the buildings, were the social aspect (the spiritual forces and the organization of the family, for instance) and the physical considerations ((climate and topography). Nevertheless, it was proven that the impact of the physical environment on the form and shape of the houses was not as significant as it used to be. This is due to the fact that two different unique communities with different architectural characteristics may simultaneously emerge in a homogeneous space.

A review of the literature and the history of architecture both suggest that some economic, social, political and cultural factors are effective in the architecture of the houses (Kibet (1992). Nevertheless, it would seem that there are other variables such as the climate, geographical and geological factors and the principles of urban design (such as discipline, security, immunity, comfort and environment) are also the variables that should be considered in the architecture of the residential buildings (Ghadiali, 1959). These factors are to be discussed below.

2.1. Climate considerations in architecture

Climate Considerations in Building and Urban Design offers real-life solutions to climatological site planning and design issues, helping to make the buildings compatible with the climate conditions, contributes to save energy and to maintain the local identity of the architecture. To identify the space potentials and to understand the limitations are

crucial in climatological site planning. Building climatology plays a decisive role in the studies concerning the impact of climate on the buildings and the human living spaces. The experiments of using local architecture throughout the world and also in Iran confirm the creation of the regional form considerations in the architecture. The body in the city is a function of the climate in the city (Bahrini, 2011). The rise of the modern architecture and the recurrent use of the ventilation subordinated the significance of the climate in the urban planning. In fact, the urban design and residential buildings were influenced by the imported material, and the architecture lost its traditional regional identity. The same architectural patterns were used in various regions worldwide, with divergent climatic conditions (Pirmohammadi & Rafiei, 2015). However, the decrease in the non-renewable natural resources of energy, the increase of the pollution in the cities and the damages on the environment caused by the fossil fuels all turned the focus to the climate and building climatology once more in the twentieth century (Daneshpour, et al., 2009).

The natural renewable resources to reduce the consumption of energy in building have become the main task in the architectural design circle. The architecture compatible to the climate considerations addresses the following objectives:

- To decrease the energy loss in the building
- To decline the impact of the wind on the energy loss in the buildings
- To use the solar energy to warn the buildings
- To protect the building against the heat of the sun
- To use the pending weather during the day
- To use good condition of the weather in the outside
- To create the wind gust through the corridors
- To use the humidity
- To protect the building against the rain
- To decline the effect of the dusty winds on the building
- To prevent the noise pollution (Shams & Khodakarami, 2010: 4).

The role of various climatological factors on civil operations and building construction is of high importance. Being aware of meteorological parameters of construction site including the amount and type of rainfall, temperature, humidity, direction and wind speed, detrimental environmental phenomena including heavy showers, heavy winds, local changeability, glacial times, heavy snow, etc. is essential before designing a building. The major climatic variables effective in the architecture are explained below:

2.1.1. The temperature

Temperature may be regarded as the major climatic factor in the architecture. To construct a building in the tropical weather or in a place with moderate temperature and in the cold weather is differently carried out. The freezing weather requires a special method of building. Insulation against cold and heat is a priority in the areas with cold and warm climate correspondently; however, insulation may not be a priority in an area with a moderate climate.

2.1.2. The soil temperature

The soil temperature and the changes in the climate during an annual period are important factors in urban planning. The surface of the earth is mostly affected by the climate changes. As the depth of the soil grows deeper, the changes in the temperature decline. Thus, an awareness of the temperature in the depth of the earth can be useful in laying the pipes for water supply and gas flow. It is axiomatic the depth of the canals in the cold weather is less than that in a freezing weather.

2.1.3. The sun

The extent to which the heat of the sun is received on the earth is dependent on three factors: the latitude (φ), the quantity of the clouds and the time when the sun shines. The sun gives the earth and the people on it light and it is also a valuable source of heat energy. The sun can be considered the 'life giver' of all living things on Earth; however, its extreme heat may cause a sudden increase in bodily temperature. Hence, people have always sought ways to har-

ness the sun's power and yet at the same time reduce the detrimental effects of it. The architects should be quite aware of the sun's effect on building design to come up with designs of buildings to control the sun's energy.

2.1.4. Relative humidity (RH)

The ratio of water vapor in the air to the maximum amount of water vapor the air can hold at a particular temperature is expressed as relative humidity (RH). Air usually contains water vapor, the amount depending primarily on the temperature of the air. Warm air can hold more moisture than cold air, so as the air temperature falls, the maximum amount of water the air can hold also falls. As air temperature increases, its capacity to hold moisture also increases so if air temperature rises and its moisture content remains the same, the RH decreases. Humidity affects both thermal comfort and indoor air quality.

2.1.5. Wind direction & speed

Wind direction is a way from which it is blowing. Knowing about the wind direction of each region, bearing the most frequency from that direction (prevailing wind), is an important factor in setting the direction of building construction aerodynamically so that in the state of heavy winds, light buildings wouldn't be hit. Wind speed is also important because in the case of high speed winds, there is the possibility for the detachment and physical damage to different parts of building especially light ones. Knowing about the mean of wind speed at the project site and seasonal and annual distribution of wind speed are important factors for strengthening against wind power. The more the mean of wind speed in the region, the more powerful the building must be. In projects where there are several choices in terms of region, it is a good idea to pick up the one in which wind speed is lower than other regions.

2.1.6. Rainfall

The amount of rainfall is one of the most determining factors that shall be considered in building design, especially ceiling design. In rain areas, the ceiling of buildings must be designed as gable roof so that water erosion is reduced, due damages are minimized and there would be no water left on the roof. Otherwise, adverse effects of rain and its penetration into buildings would rise. Knowing about the rate of rainfall, especially for designing structures is necessary. Moreover, in order to design surface water disposal system across cities when it rains, knowing about the maximum urban flood relevant to return period sounds like essential (Branch & Saghez, 2013).

2.2. Urban design considerations in architecture

A city is regarded as a source of progress and the status of the civil management in the process of the urban progress and in the improvement of the urban residential buildings is of a high importance (Shi'ae, 2003). The main objectives of the civil managers are to establish a discipline, to protect the environment, urban beautification, distribution of convenient urban living conditions and meeting citizens' needs to live in a secure and immune place. Disciplinary architecture refers to an organized idea which collects all the features of an architectural design together to meet an objective. Discipline is the life-giving force to architecture. Discipline in architecture leads to the best quality of living in a building (Khaki, 2012: 77-78). Rudolf Arnheim recognizes "discipline" as a pillar to architecture and architecture itself as the art of disciplines (2009: 155). Arnheim identifies the durable architecture as the compatibility of all the features integrity to meet the needs of the users (2009: 254).

Security and safety is a human-environmental factor which can play a significant role in the satisfaction of the people living in the building. The security is so important for the building that one may look for the reason of misbehaviors all within the residential buildings. Oscar Newman (2008) argues that when common spaces associated with high-rise housing (such as community rooms and outdoor grounds) lack clear owners or are open to too many users, residents cannot assert responsibility for their safety and maintenance, and these places are left vulnerable to

crime and vandalism. Newman advocates recreating a sense of ownership in these spaces by dividing and "assigning them to individuals and small groups to use and control as their own private areas." Once residents reestablish control of their environment, "the criminal is isolated because his turf is removed," writes Newman. Jalalian, et al. (2016) considers the residential space as a major factor to reinforce safety. For them, space features such as the green space, enough light, the setting of the building g blocks, the appearance of the complex, the entrance gates, and the number of the residents are all determining factors in creating a safe place in a residential complex.

A considerable devotion to immunity of the building and its façade will contribute to the immunity in site architecture. The immunity constitutes a prerequisite to achieving security and feeling of safety, in the lives of the people from risks and disasters. The rise of the high buildings in the cities has given rise to the high risk of danger. Architects and urban developers have to take into consideration immunity and safety of the buildings through the sufficient spaces to allow the authorities remove the danger factor in case one arises.

The attractive uniform aesthetic appearance of buildings should also be taken into consideration. Finding the right balance between the artistic-creative design of buildings and the technical and economic implementation is essential. A beautiful architectural space meets the needs of the people who want to live, learn, work or relax in these buildings. Nowadays, the Iranian cities are a blending of designs, colors and forms which produce no aesthetic effect on the minds of the beholders. The nasty tangle of the buildings in an area in Iran creates a cauldron of misshapes which is the result of the decline of aesthetic values in the cultural context of Iran in the contemporary era.

A review of the aesthetic criteria during the pre-modern and modern eras can frankly suggest the impact of an attitude toward nature and environment on the aesthetic standards prevalent among the people. In the pre-modern aesthetic norms, a sense of beauty was presented in a fundamental completeness in arts. The perception of a pre-modern man from the nature was a symmetrical outlook and the compatibility of the observation with the outer world. It affected man's mentality so that the classical ideals of symmetry, clarity and legibility became the norms of aesthetics. Andrea Palladio (1508-1580) believed that whatever existed in the nature was symmetrical and the structure of human body was also symmetrical. He concluded that symmetry was the perfection and was to be followed in arts and architecture. Symmetry was a rule in the traditional Iranian architecture. The remains of the architectural works in Iran all suggest that the principles of symmetry, clarity and spontaneity were observed by the architects in the buildings. In modern epistemology, began with Rene Descartes, the assumption of the priority of mind over matter was established. This led to the aesthetic standards to become all subjective and taste, mood and perception were put in the core of the aesthetic problems. The "pattern" as a known truth to be followed by the practitioners declined to a commonplace status both in epistemology and aestheticism. Modern aesthetics, thus, put the subjectivity as a criterion in creating an artistic work and the perception of it. Therefore, it is possible to define the modern aesthetic standards through the concepts of ambiguity, uncertainty and asymmetrical forms (Mahmoodi, 2017).

It is a now a truism in Iran that the quality and the quantity of the interior parts of the house are very significant for the people. They believe that the social sustainability is reinforced by an increase in the comfort inside the house. In other words, the sustainability of the residential building complexes is dependent on the degree of comfort inside the houses. Comfort is influenced by the variables such as the size and the quality of the main spaces (living room, hall & bedroom), the size and the quality of the service-offering parts (kitchen, bathroom & toilet), the flexibility of the interior design, lightening of outer spaces, the area of the plan, the building materials used in the interior and exterior parts of the house, the quality of interior design, public

and private spacing of the house (Iranmanesh, et. al., 2015: 351).

Accessibility is another significant variable in the design of comfort in a city. The residential complexes have some major quality and quantity effects on the urban spaces and transportation systems within a city (Varesi et al, 2015:7). They decide and formulate a high rate of the *tour de city* transportation. Due to the large population living in the residential complexes, the accessible transportation system around the residential complexes is usually influenced by the heavy traffic. Thus, if the planning and location of the residential complexes are coordinated with the transportation officers, some part of the traffic problems are eliminated and a proper use of the transportation system will be carried out (hadipoor & Pooribrahim, 2011: 136). Overall, one of the desirable features in the planning of the residential complexes in the urban space is to locate them at the places which are accessible to the city center and transportation system active within the urban space (Azizi & Malekmohhamadnejad, 2007, 32).

An overview of the cities around the world, it is possible to identify that many environmental problems could have been avoided through better ideas at the planning phases. The living problems in the modern era such as overpopulation, construction expansion, urbanization, and industrial boom and expansion all contribute to the corrosion of the natural environment. . Examples of industrial developments and the ruining repercussion on the environment are the commonplaces of the social discourses nowadays. These phenomena have brought forth concepts such *Sustainable architecture, Passive design, Green building* and *thermal mass* are terms that are getting thrown around at the moment by ill-informed practices. A green architecture, for instance, attempts to decrease to the lowest degree the damages done for the environment Green Architecture and Green Design define an understanding of environment and contains some universal consent. It may have many of these characteristics: Ventilation systems designed for efficient heating and cooling, Energy-efficient lighting and appliances, water-saving plumbing fixtures, landscapes planned to maximize passive solar energy, Minimal harm to the natural habitat, alternate power sources such as solar power or wind power, non-synthetic, non-toxic materials, locally-obtained woods and stone, responsibly-harvested woods, adaptive reuse of older buildings, use of recycled architectural salvage and efficient use of space. While most green buildings do not have all of these features, the highest goal of green architecture is to be fully sustainable (McGraw-Hill construction &US Green Building council, 2006).

2.3. Geological considerations

Land is the resource and favorable substance factor for the city construction; at the same time, land has many geological disasters. Some parts of the land are low-quality and it is a restriction to urban construction and development. The geological factors which should be taken into consideration in the urban planning are the soil composition, soil mechanics and their responses to the pressure, land slide and land subsidence. Soil mechanics, for instance, be considered in order to avoid the damages to the building in natural disasters such as the earthquakes and floods (Childs, 2010).

2.4. Cultural/religious considerations

House became a shelter for man early in his evolutionary stage. In his book *House Form & Culture* (1969), Amos Rappaport believes:

> "The house is an institution, not just a structure, created for a complex set of purposes. Because building a house is a cultural phenomenon, its form and organization are greatly influenced by the cultural milieu to which it belongs. Very early in recorded time the house became more than shelter for primitive man, and almost from the beginning "function" was much more than a physical or utilitarian concept. Religious ceremonial has almost always preceded and accompanied its foundation, erection, and occupation. If provision of shelter is the passive function of the house, then its positive purpose is the creation of an environment best suited to the way of life of a people-in other words, a social unit of space" (p. 47).

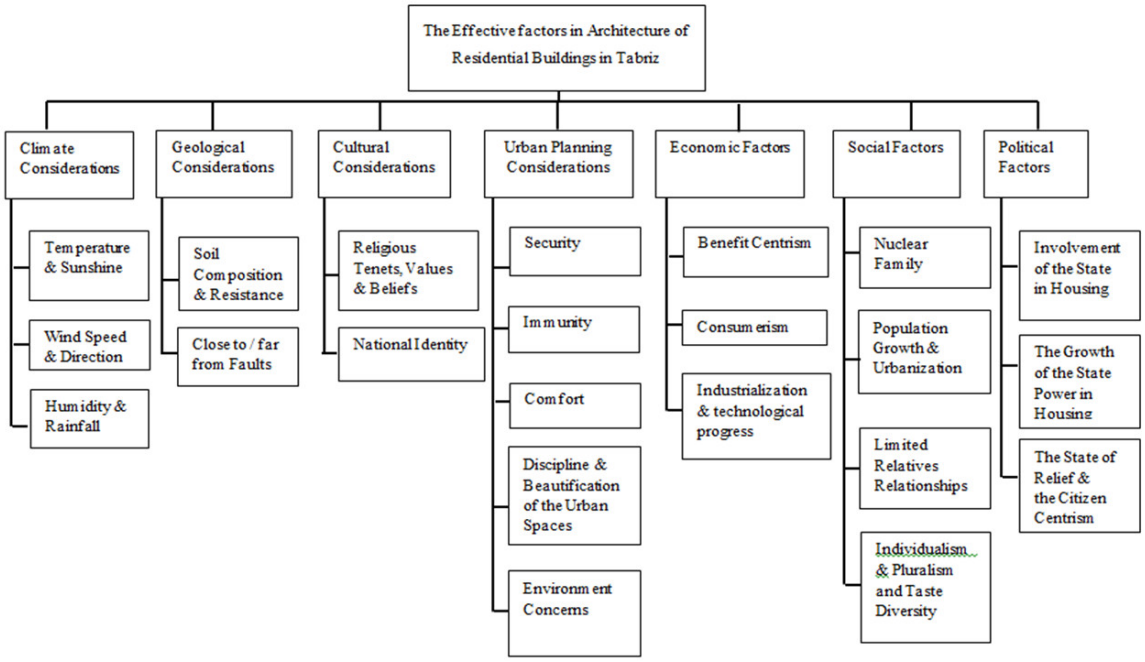

Figure 1. *Research model (Source: Originally designed by the researchers).*

In the architecture of the Iranian traditional houses, issues such as Islamic confidentiality (*mahrami-yat)*, introversion, the sacredness of the entrance gates, and the use of the mosaics decorated with Qoranic verses were all signs of religious beliefs (Noghrehcar, 2008). The traditional Iranian architecture attempted to preserve the holiness of the family and the Islamic confidentiality. This was also observed in the settlement constructions. The houses were built in such a way that the interior parts were not seen from outside by the neighbors and the passing people. Nowadays house has declined to the status of a shelter which provides a desirable living place for the people to develop financially and spiritually (Jalalian et al, 2016).

3. Methodology

In terms of the objective, this research is a practical one; while the nature of the research is descriptive with a post-event processing approach. The required data was collected from the experts in the architecture and urban planning. The experts were asked to identify the significance of the indices related to each of the economic, political, social, climate, geological, urban planning considerations, and cultural/ religious aspects in formulating the architecture of the residential complexes in Tabriz. A hierarchal analysis (AHP) was used to obtain the ranking of the indices' function and the identified aspects in relation to the formation of the architecture of the residential complexes in Tabriz. The effective indices on the architecture were provided through the library work as well as through a study of related literature.

The Analytic Hierarchy Process (AHP), introduced by Thomas Saaty (1980), is an effective tool for dealing with complex decision making, and may aid the decision maker to set priorities and make the best decision. By reducing complex decisions to a series of pairwise comparisons, and then synthesizing the results, the AHP helps to capture both subjective and objective aspects of a decision. In addition, the AHP incorporates a useful technique for checking the consistency of the decision maker's evaluations, thus reducing the bias in the decision making process. The AHP is a very flexible and powerful tool because the scores, and therefore the final ranking, are obtained on the basis of the pairwise relative evaluations of both the criteria and the options provided by the user. The computations made by the AHP are always guided by the decision maker's experience, and the AHP can thus be considered as a tool that is able to translate the evaluations (both qual-

Table 1. *Distribution of responders based on study major, degree & job experience.*

Job Experience (Year)			Academic Degrees			Study Major				Participants
Over 10	6-10	1-5	Ph.D.	M.S.	B.S.	Geography	Urban Planning	Architecture	Civil Engineering	
64	18	16	42	43	13	10	11	65	12	98

Source: Findings of the Research

Table 2. *The weight of effective criteria in residential complexes architecture, Tabriz.*

No	Criterion	Weight
1	Economic Aspect	0.374833
2	Social Aspect	0.247167
3	Political Aspect	0.174333
4	Climate Consideration	0.059167
5	Urban Planning Consideration	0.053667
6	Geological Consideration	0.048833
7	Cultural/Religious Consideration	0.041833

Source: Findings of the Research

itative and quantitative) made by the decision maker into a multicriteria ranking. In addition, the AHP is simple because there is no need of building a complex expert system with the decision maker's knowledge embedded in it. The AHP can be implemented in five simple consecutive steps:

- modeling
- priority judging (pairwise comparisons)
- computing the vector of criteria weights
- mixing relative weights
- compatibility in assessments (Mehrgan, 2004: 170)

The hierarchy ranking pattern in this study is displayed in Table (1). The significant variables effective in the architecture of the residential complexes in Tabriz are as follows:

The social factors: the growth of the population, the expansion of urbanization, individualism, pluralism and tastes divergence, limited relative relationships (a reduction in the tribal communication), nuclear family (family composed only of parents and their children).

The political factors: Involvement of the State in Housing (Constructing Building Complexes by the State-run Companies; e.g. Maskan-e-Mehr), The Growth of the State Power in Housing (An increase in the power of the state to control and lead the House Construction Industry), The State of Relief & the Citizen Centrism (An increase in the focus of the State on the social relief).

The economic factors: Benefit Centrism (An inclination in the community to gain more profits), Consumerism (a competition in the community for more consummation), and industrialization.

Cultural/religious considerations: The religious beliefs and values, the national identity and the Iranian traditions.

Urban planning considerations: Security, immunity, comfort and environment

Climate factors: Temperature, humidity, wind direction and speed, geographical location

Geological considerations: Composition of the soil, mechanics of the soil and its responses to the pressures imposed against it, landslide and land subsidence.

4. Findings

Using the AHP and creating a hierarchy, an online questionnaire and was distributed among 98 experts active in constructing buildings (architects, urban planners & civil engineers) as outlined in Table (1). They were asked to identify the rate of the criteria and sub-criteria (depicted in Figure 1) relatively and write to what extent the norms were observed in constructing the Residential Complexes in Tabriz.

It seemed that AHP was an appropriate model because AHP is designed to address the limited number of experts with high degree of experience. In different studies, different number of participants are observed and no definite rule governs the number (Kil, et. al., 2016). The participants, according to Table (1) had all job experiences of over 10 years and this was a prestigious aspect of the research population.

The questionnaires being collected, first the role of each criterion at the first level of hierarchy was compared as in the architecture of the residential complexes. As it is shown in Table (2), the economical aspect enjoys having the highest priority; the social and political aspects being the next in the hierarchy of priority. Climate Consideration, Urban Planning Considerations, Geological Consideration and Cultural/Religious Consideration respectively stand at the other steps of hierarchy. The Ta-

ble shows that the economical aspect to have the first significant status in the Residential Complexes Architecture in Tabriz. The other aspects, Cultural/Religious Consideration in particular, are subordinated to the economic aspects.

To synthesize the results, the pairwise comparisons were done between the sub-criterions and the ranking results of the sub-criterions were implemented in Table (3). In the first part, the weight of the first three indices chosen in economic factors was computed. The results of the ranking process showed that benefit seeking gained the prior status among the economic factors; consumerism stood the second and industrialization attained the least importance in the hierarchy of the determining factors.

In the second part, the weights of the four indices identified as the social factors were compared. The growth of the population and the expansion of the urbanization gained the highest rank. However, individualism, pluralism and tastes divergence was placed in the second rank. The third position was taken by the Nuclear family and relative relationships. As for the political factors, the increase of the State of Relief & national regulations received the highest rank, to be followed by the Relief State & Citizen Centrism; and involvement of the state in the house construction policies gained the lowest rank. The climate considerations comprised of temperature, humidity and sunshine. These factors stood in the hierarchy of importance as the temperature, sunshine, humidity and wind direction and speed correspondently. The urban planning considerations study was resulted to the security, immunity, comfort, discipline and beauty, and finally environment as standing in the ranking hierarchy of significance. In the geological considerations, the composition of the soil attained the highest rank as compared to being Close to/ far from the faults. The table suggested that the significance of the religious beliefs and values was two times more significant than the national identity.

The obtained weights in Table (2) and Table (3) were computed and the scores were used to put the results in a hierarchal ranking. The result of the final ranking is presented in Table (4). The results in Table (4) suggest that the benefit seeking factor has the heaviest weight and stands at top of 22 items identified as the determining factors for the house construction industry. The growth of the population (from social factors) stands the second and an increase in the State Power and State involvement in the Housing industry (from political factors) stands the third. The other items are ranked as depicted in the table below. Strange to say that the beautification of the city and environmental considerations are ranked at the lowest part of the factors.

Table 3. *Weight of the criteria for each effective factor in residential complexes architecture as compared to the sub-criteria in the same group.*

Criterion	Sub-criterion	Weight
Economic Aspect	Benefit Seeking	0.696
	Consumerism	0.154
	Industrialization & Technological Progress	0.149
Incompatibility Rate		**0.011**
Social Aspect	Population Growth & Urbanization	0.386
	Individualism, Pluralism & Taste Diversity	0.214
	Nuclear Family	0.212
	Limited Relative Relationship	0.187
Incompatibility Rate		**0.025**
Political Aspect	The Growth of the State Power in Housing	0.362
	The State of Relief & the Citizen Centrism	0.320
	Involvement of the State in Housing	0.317
Incompatibility Rate		**0.025**
Climate Aspect	Temperature	0.436
	Humidity & Rainfall	0.295
	Wind Direction & Speed	0.269
Incompatibility Rate		**0.002**
Urban Planning Aspect	Security	0.312
	Immunity	0.281
	Comfort	0.241
	Discipline & Beauty in City	0.085
	Environment	0.082
Incompatibility Rate		0.04
Geological Aspect	Soil Composition & Resistance	0.816
	Close to / Far from Faults	0.184
Incompatibility Rate		**0**
Cultural / Religious Aspect	Religious Beliefs & Values	0.658
	National Identity	0.342

Source: Findings of the Research

5. Conclusion

As urbanization developed in the large cities in Iran, the mass production of the buildings and the construction of the residential complexes were determined as the short-term and long-term policies to address the needs of the ever-growing population in metropolitan cities, including Tabriz. Among the effective factors on the construction of houses (being economic, social, political, climatological, geological

Table 4. *Weights & final ranking of the effective factors in architecture of residential complexes in Tabriz.*

Rank	Criteria	Weight
1	Benefit seeking factor	0.260882
2	Population Growth & Urbanization	0.095406
3	Increase in State Power & State involvement in Housing industry	0.063109
4	Consumerism	0.057724
5	Industrialization & Technological Progress	0.05585
6	State of Relief & Citizen Centralism	0.055264
7	State involvement in House Industry	0.055264
8	Individualism, Pluralism & Tastes Divergence	0.052894
9	Nuclear Family	0.052399
10	Composition & Resistance of Soil	0.048283
11	Limited Relative Relationships	0.04622
12	Religious Beliefs & Values	0.027524
13	Temperature	0.02129
14	Security	0.016745
15	Immunity	0.015081
16	Humidity & Rainfall	0.014405
17	National Identity	0.014306
18	Wind Direction & Speed	0.013135
19	Comfort	0.012934
20	Close to/ far from Faults	0.010887
21	Discipline & Beautification of City	0.004562
22	Environment	0.004401

Source: Findings of the Research

factors and urban planning principles and cultural/religious considerations), the research showed that the dominant economic, social and political conditions in Iran are the most significant factor in the policies concerning the construction of the residential complexes. This suggests that the economic and political attitude towards the house construction industry is a determining factor. The degree of the importance is so high that the responses to the space and construction requirements of the community are determined through politics and economics, while the architectural factors such as climate, culture, urban planning considerations are all subordinated to the politics and economy. It is clear that as far as the politics and economy dominate all the other factors, the houses will be regarded as the consummation goods and will lack the desirable quality. Moreover, as far as the architectural factors such as geological, climate, religious, cultural, and urban planning considerations are undermined, there will be fatal problem in urban planning and urban management. The complications may be represented in the traffic problems, the deterioration of the communication systems, security, immunity, and beauty of the city. Moreover, an increase in the energy waste and damages to the environment and the loss of the identity will be the result of a negligence of the architectural principles. The findings of this paper can be used to lay new strategies for the urban planning, urban design and appropriate patterns for the house construction.

References

Arnheim, R. (2009). *The dynamics of architectural form*. Univ of California Press.

Art and Architecture Journal (2012). The Formation of Residential Complexes in Iran and the World. (27), 94-99 (In Persian).

Azizi, M., and Malek Mohammadnejad, S. (2007). Comparative Study of Two Patterns of Residential Complexes (Conventional and high-rise), Fine Arts journal, (32), 27-38 (In Persian).

Bahreini, S.H. (2011). *Modernization, post modernization and then urbanization*. Tehran University (In Persian).

Boalt, C. (1992*). Village housing in Tanzania: a pilot study of four villages in transition*. University of Lund, School of Architecture, Department of Building Functions Analysis.

Branch, S., & Saghez, I. (2013). The role of climate factors on designing and constructing buildings (from urbanization architecture approach). *Bull. Env. Pharmacol. Life Sci,* 3(1), 197-200.

De Chiara, J., & Callender, J. H. (Eds.). (1990). *Time-saver standards for building types*. New York: McGraw-Hill.

Childs, E. M. (2010). *Geology, culture, and the built environment: An interpretive center for the Berkeley Pit.* University of Maryland, College Park.

Daneshpoor, S., A., H., Mahdavinia, M., & Ghiaie M., M. (2009). The Position of the Knowledge of Environmental Psychology in Tall Buildings with Sustainable *Architecture*. City Identity, 5, 29-38 (In Persian).

Duly, C., & Duly, C. (1979). *The houses of mankind* (No. 728.18). Thames and Hudson.

Ghadiali, J.H. (1959). Effect of Cli-

mate on Architectural Expression. *In Seminar on Architecture*, Edited by Achyut P. Kanvinde. New Delhi: Lalit Kala Akademi.

Hadipoor, M., & Pooribrahim, Sh., (2011). Locating residential land use in urban transportation planning by the application of gis and mathematical emission modeling of air pollution. *Journal of Environmental Studies*, (59). 135-148 (In Persian).

Hunter-Anderson, R. L. (1977). A theoretical approach to the study of house form. For theory building in archaeology. Edited by Lewis Binford, pp. 287-315. New York: Academic Press.

Iran Statistics Center, Population and Housing Census (1996) (In Persian).

Iranmanesh, E., NosratPoor, D; Mirshak Dagian, M., Hadi, M (2005). Provide local housing design patterns with emphasis on design elements climatology case: Kerman. *Quarterly Journal of Urban Management*, (38), 347-370 (In Persian).

Jalalian, S., Habib, F., & Zakerhaqiqi, K., (2016). Compilation of a conceptual model of environmental factors affecting the security of residential complexes. *Science and Technology of the Environment,* 4, 345-360 (In Persian).

Katende, J. (1983). Housing conditions and some of their related socio-economic and demographic aspects: A case study of Bushenyi district-Uganda, Doctoral dissertation.

Khaki Qasr, A., (2012). The development of the subject of order in architecture as one of the manifestations of quality. *Urban and local Architecture*, (2), 63-80 (In Persian).

Kibet, A. (1992). The influence of socio-cultural and economic factors on architectural changes of houseforms in mosop, nandi district. Doctoral dissertation, *Institute of African Studies, University of Nairobi.*

Kil, S. H., Lee, D. K., Kim, J. H., Li, M. H., & Newman, G. (2016). Utilizing the analytic hierarchy process to establish weighted values for evaluating the stability of slope revegetation based on hydroseeding applications in South Korea. *Sustainability*, 8(1), 58.

Kimati, V., A. Helland and Z. Poonja. (1976), Housing Development in Killimanjaro, *Working Report No 6, National Housing and Building Research Unit*. Darussalam.

Kiprono, M. (1989). An explanatory of analysis traditional built form versus social life: Case study in Keiyo and Marakwet of Kenya, B. Arch Dessertation, Dpartment of Architecture, university of Nirobi.

Kukreja, C. P. (1978). *Tropical architecture*. Tata McGraw-Hill.

Madge, J. (1968). Housing: social aspects. *International Encyclopedia of the Social Sciences*, 6, 516-517.

Mahmoodi, M., (2017). Criteria of aesthetics and abnormal urban imagery. Citizenship Culture (In Persian).

McGraw-Hill Construction, & US Green Building Council. (2006). *Green building Smartmarket report*. McGraw Hill Construction in conjunction with US Green Building Council.

Mehrgan, M. R., (2004). *Advanced Operational Research*. University Press. Publications and Printing Publishing (In Persian).

Newman, O. (2008). *Defensible Space; Crime Prevention through Urban Design*. (In Persian)

Noghrehcar, A. H., (2008). *An Introduction to Islamic Identity in Architecture and Urban Development*. Tehran: Ministry of Housing and Urban Development. First Edition (In Persian).

Pirmohammadi, M., & Rafiei, V., (2015). The impact of climatic factors on building design and the way to sustainable design. *National Conference on Civil and Architectural Approaches to Sustainable Development* (In Persian).

Rappaport, A, (2012). *Humanities of Housing*. Translated by Khosrow Afzalian, Tehran, Artists press (In Persian).

Rappaport, A. (1969). House Form and Culture (Foundations of Cultural Geography Series). Pre New Jersey: Prentice-Hall.

Robbins, M. C. (1966). House types and settlement patterns: an application of ethnology to archaeological interpretation. *Minnesota Archaeologist*, 28(1), 3-26.

Shams, M., & Khodakarami M. (2010). The study of traditional architecture compatible with the cold climate. *Geographic Quarterly, Environment Journal* (4). 10-19 (In Persian).

Shi'ae, I., (2003). The Need for Ur-

ban Management in Iran. Geography and Developmen , 1, 37-62 (In Persian).

Varesi, H., Shiran, Gh., & Azizi Hasanvand, H. (2015). Locating Bus Stations with ANP Model and Fuzzy Logic in GIS (Case Study: Khorramabad City). *Urban Research and Development Journal*, (23). 55-76 (In Persian).

Whiting, J. W., & Ayres, B. (1968). Inferences from the shape of dwellings. *Settlement Archaeology*, 117-133.