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CASE STUDY

Explain the concept of physical-spatial factors affecting the management of urban land values using ANP[1] Method*

Case study: Zaferanieh Neighborhood, Tehran

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ABSTRACT: Urban land is one of the most significant constituents' portfolio of urbanhouseholds in Iran; Land prices also have the greatest impact on real estate prices. In the construction of urban management of Iran, valuation of urban land prices is not a special trustee, and in fact, the offices of the estate consultant, the builders and owners of each one, agreeing to their interests, determine the value of a domain. On the other hand, the value of urban land has a direct relationship with access to the city's physical-spatial facilities. This article is a physical-spatial factors affecting the value of residential land in Zaferanieh neighborhood in Tehran as a case study, identified during the literature review and interviews with experts, investors and residents of the neighborhood, using components derived from The ANP method is prioritized and weighed. The results show that contents of research including visibility into surrounding areas of land, access to facilities and urban activities, the structure of land plots, comfort, image and security of the residents of the environment. The model for estimating the physical-spatial components affecting the value of residential land derived from the research in the case study; can provide an effective tool for determining and controlling the price of urban land, as well as creating a real estate tax map for country-land.

Keywords: Validity Conceptual Model, Spatial-Based Components, Urban Land Value Management, Network Analysis, Zaferanieh neighborhood, Tehran

RUNNING TITLE: Physical-spatial factors affecting the management of urban land values

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1 Analytical network process

INTRODUCTION

Considering the high volume of liquidity required to purchase residential units, decisions in this area are among the important financial decisions of every Iranian household. Accordingly, the greater recognition of investors and consumers of the housing market from the physical and spatial conditions affecting the value of real estate will help to better understand and predict more accurately the decision-making process in this market. (Ross & Giannini, 2017: 17). The aim of this study is to provide a conceptual model for urban management and assistance to housing users, real estate experts and residential sector investors in the city in order to obtain appropriate information on the possibilities of investing in residential land. In this study an attempt has been made to taste unique on the one hand applicants for the purchase of land, to be considered and the designers and builders,

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as suppliers to this market, provide strategic recommendations. Combining the cumulative value of the real estate market is in full property price.

The price of the land that is located on a property is somewhat measurable and varies depending on the type of material, the age and the life of the building, the architecture, the way it is constructed, and the issues of this kind, regardless of the land on which it is located. Whereas the price of the arena is a function of the place where the land is located, it is measured in terms of the facilities that the city provides for all aspects of the physical-spatial dimension and is provided in the real estate market. (Khodaverdi, Moazzezi, Mehr Tehran 1395: 109). Therefore, a building with any kind of structures, materials and architecture, and in every place in a city that is being built, so does not change its price, but in terms of the location of this building, where from The city is built and what facilities are available, the price will vary. Therefore, one of the factors affecting the price of housing, which has a very significant share in its value, is the price of land. In urban management studies, land is always introduced as a commodity with dual characteristics. In addition to having a value, the land also protects investors from the point of view of assets in order to be present in the market (Madani Pour, 1392: 190).

Thus, the prediction of land prices and the factors affecting it for homeowners, investors, tax audits, and other participants in the market for indirect assets are significant. If the monetary value of land yields, the partial derivatives with each of the representatives and effective features are seen, the results show a stable change in the cost of land in terms of characteristics (Abidine Derkush, 1394: 177). Based on the model presented in this study, based on the indirect valuation of satellite-spatial components affecting the value of housing land, and how to access the service and quality of these services in the city. The interaction of the price of residential land with urban and urban facilities makes it clear that reading the land market and its real value directly relates to urban amenities and the types of activities and services around the land; This is in the welfare of the city in the vicinity of the property that affects the price of land for housing. The effects of distance to urban amenities vary from neighborhood to area. For example, there is a relative advantage at the public transport station in southern Tehran. While in northern Tehran, where families often use personal belongings, they may have good benefits. As a result, it cannot compare the value of the components that affect the value of residential land in different city cities.

The area of a municipality of Tehran and Shemiran is one of the most desirable areas in Tehran due to its natural resources and cultural and historical heritage, which has long been the place of deployment of state-government officials and international and diplomatic activities. And other from the neighborhoods of this area, the Zaferanieh neighborhood, considering the high value of residential land in it as a case study, to collect the information needed and interview residents and property consultants to select the physical-spatial components affecting the value of desired land is selected. (Figure 1).

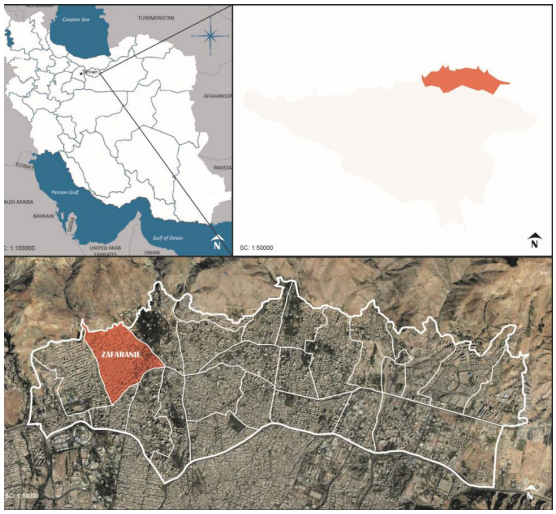

Fig 1: Location of Zaferanieh neighborhood in District 2 of Region 1 of Tehran (Source: GIS Tehran)

Despite the importance of land in the housing sector, its unlimited price increase and the lack of compliance with the laws in this area so far have shown that proper policy has not been taken. Thus, this research attempts to study the modeling of the desirability of residential land in the Zaferanieh neighborhood, located in Region 1 of Tehran as an example, by pulling up the physical-spatial factors affecting supply and demand in the existent estate market using the ANP method. The designed model is, in fact, a kind of support system for urban management that helps applicants and suppliers in the decision-making process in this market.

The process of compilation of the following research can be seen in Fig. 2 below.

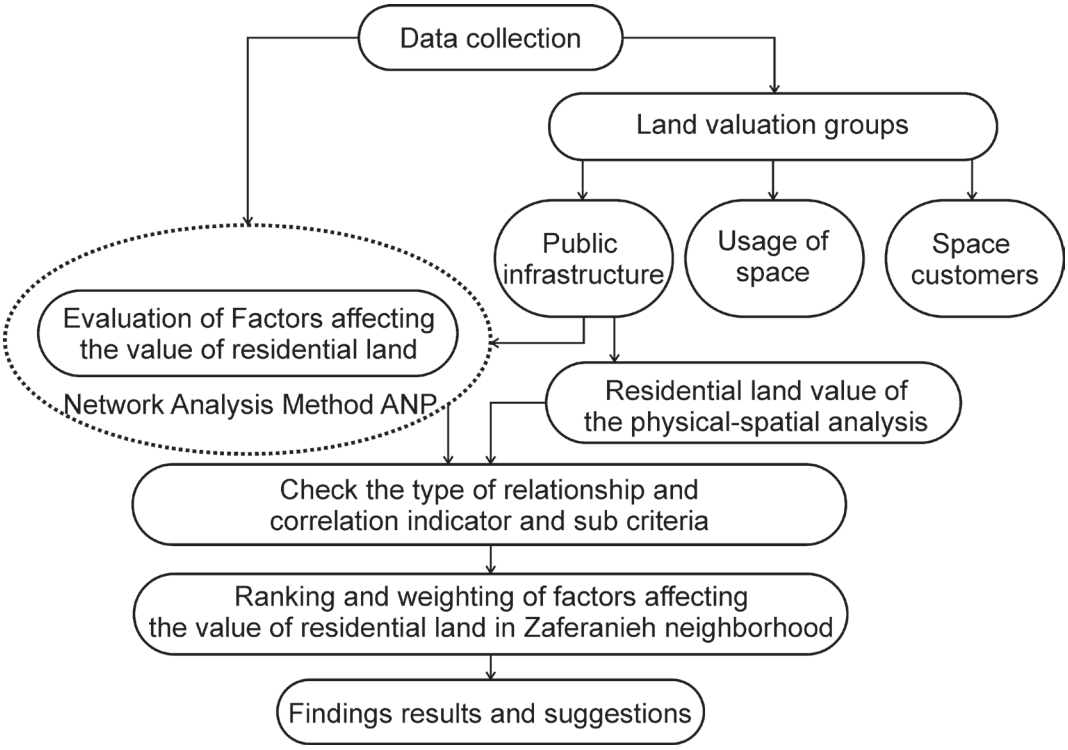

Fig 2: he Process of Compilation of Research (Source: Writers)

MATERIALS AND METHODS

Management of the Value of Urban Land

The right to choose a neighborhood is affected by a variety of conditions that a person or household can choose based on which neighborhood, he chooses for life, and vice versa, the terms of coercion are a set of conditions that forces a person to prefer a spirit in a particular region. The most important characteristic that the selection of a particular neighborhood or having to stay in neighborhoods affects property prices (for the rental or sale). Although the identity of other conditions such as social, cultural, civic and cultural relations, etc. can affect it.

The interpretation of reality-based neighborhood life is one of the roles of the parameters extracted from the mannequin. With the categorization of each urban activity and the extraction of parameters, and with the initial knowledge of the yesteryear and present of the region with a baccalaureate analysis, we can understand the reasons for the difference in numbers or the negative effect of the parametric effects of some urban facilities. Interpretations make it possible to understand and determine the numbers held in diverse scenarios in a qualitative way, and the qualitative status of the current stream of life in the region and a glance of the metropolis as a whole (Khorvardi and Mu'azzai, 1395) is designed to clarify the

subject of a simple spatial database as an object lesson.

Market readings are the key to breaking down the functioning of urban facilities and its impingement on the flow of life in different neighborhoods of the urban center. Reading and analysis features with real estate prices in and get a comparative advantage of each of these scenarios can be adjusted based on observations property prices. Using the information from the city's readings, it can be determined that, in each neighborhood of the city, what people, with what income and needs, they live, using these analyzes and based on the management of the flow of life, organizing and managing the city with rules and rational acts in it. (Khorvardi and Moazzai, 1395)

The research-based model of the real estate economy and access to services and quality of these services in design. The interaction of real estate prices with the city and urban facilities makes it clear that the readings of the real estate market and their actual prices are directly related to the city's facilities and the value of the type of activities; This effect is such that the city's facilities in the vicinity of the property affect the real estate prices and property prices can also affect the way these facilities are located in different parts of the city. This is a natural process of economic formation in the price and facilities of the city.

The function of urban land prices, land features and characteristics of a product consisting of different grades and different values are considered. In this model, the equilibrium price is a function of two groups of characteristics or traits housing. The first group includes the physical characteristics of the land, such as land, land geometry, orientation and so on. The second group includes all features related to location, environment and local neighborhood is residential unit in question is located, such as the quality of the neighborhood and access to educational and health centers, access to shopping centers and the sale of living and private, and distance to employment centers in the city, especially the main center of the city and the existence or non-existent urban settlement housing units to facilities, such as water, electricity, gas, sewerage and so on. (Darkush, 175: 1394)

The impact of urban amenities can be of great help in creating a common understanding between decision makers (urban executives and local government) and the people. These parameters define the needs of the people and the utilization of urban amenities, and for urban managers, applications in urban planning methods will create sustainable revenues and optimize urban management.

Valuation of Land brokers

Property valuation is usually made by the owner of a residential home, by a potential investor (buyer) or by a third group, which is usually a real estate company in our country. Upgrading the value of land is based on the relationships between the three sections. The space customer group, based on the amount of space used, future users of space and consumers, is from the public spaces.

The group of space manufacturers, including the type of materials used, is the skills of the manufacturing sector and the investors in the housing sector. Public infrastructure, which includes services, facilities and urban facilities, which can be considered in the form of spatial components affecting the value of real estate in this research. Figure 2 shows the relationships between brokers in this section.

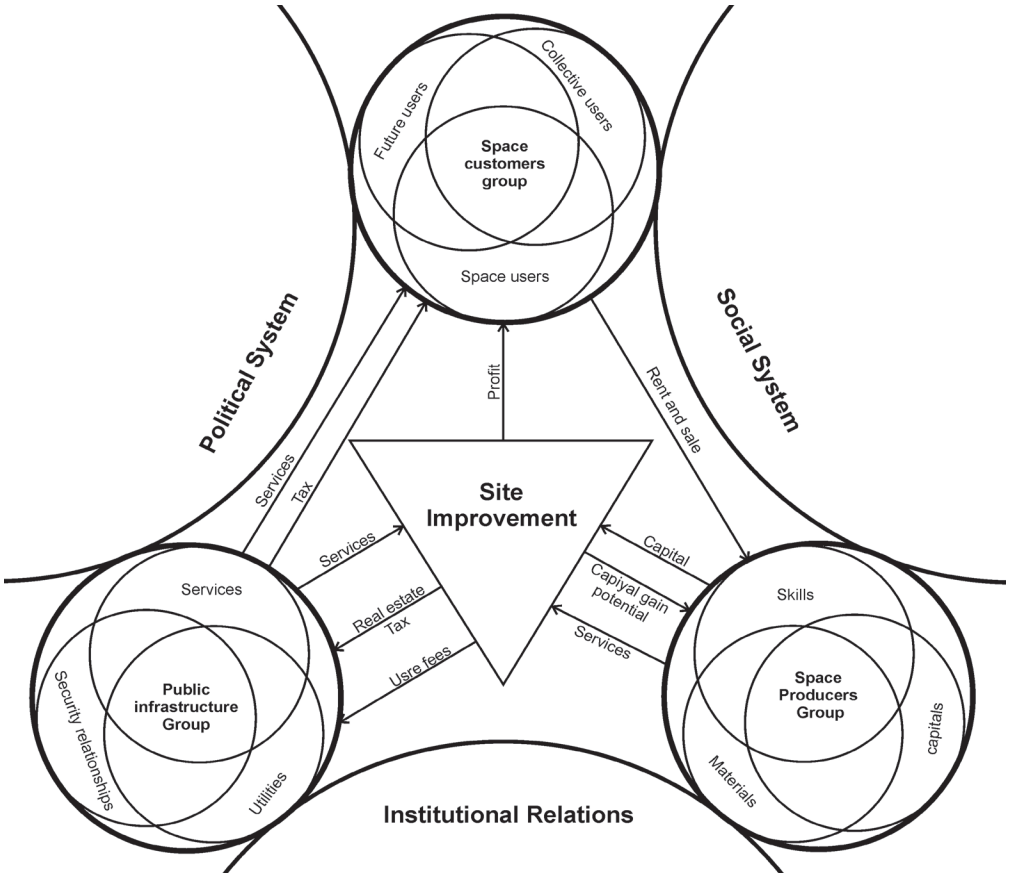

Fig 3: Relations between brokers Real estate (Source: Grasskamp, 1989: 4)

Theorists and their implications

In existing literature, valuation of residential units is based on the compilation, analysis and interpretation of variables affecting the value of a residential unit. However, in order to estimate the real value of each residential unit in the real estate market, it was first necessary to determine and evaluate the physical-spatial components of land value.

Kitchan examines the length of the neighborhood park in Lubbock, Texas, and its impact on housing prices. The results show that there is a positive and significant correlation between housing prices and distance. In the case of existing homes in the neighborhood, housing away from the park, has a higher price. (Rafiian et al., 2010: 109) Anderson, in a study on the value of open space, concludes that it is necessary to jointly evaluate the range of outdoor features.

The explanatory variables, including distance and different sizes for different types of open spaces, including neighborhood parks, special parks (sometimes protect animals and zoos and regional parks), golf courses, cemeteries, lakes and rivers. The result is that the presence of parks and cemeteries negative impact on house prices and proximity to golf courses will have a positive impact on housing prices. (Anderson & West, 2006: 787)

"Rydkr and Henning" with Hedonic price function, examined the impact of air pollution on the price of housing in St. Louis, USA. According to this study, contamination has played a decisive role in housing prices in this area. (Ridker & Hening, 1967: 250)

McDougall examines the impact of goods and services on residential property prices in the Metropolitan Area of Los Angeles. The results show that local police services as well as

education have the most impact on real estate prices. (McDougall, 1976: 440)

Kane and Quillley have used the Hedonic price function to check the price of housing in St. Louis, USA. Some of the most important factors that have the most positive impact on the price are the exterior appearance, the type of design in the windows and the presence of places for walking around the residential unit. (Kain & Quigley, 1970: 540)"Jim and Chen" in the study, examined the effect on housing prices in Hong Kong facilities and utilities using Hedonic model's price. High school, religious places and parking lots are among the most influential services to increase or decrease housing prices in Hong Kong. (Jim, C.Y & Chen, W.Y., 2007: 428)

In another study conducted in Nigeria in 2007, "Blu" key variables affecting the value of residential houses are the location, size of the map (substructure), repair condition, life, water, electricity, telephone, painting, bedroom numbers, toilets / bathrooms, size of the rooms, security, proximity to the workplace, and the availability of parking space. (Bello, 2007: 772)

In the year 1364, Derakhosh and Masoumian conducted a research entitled "The Pattern of Hedonic Prices for Tehran's Urban Housing Demand". In this research, Tehran has been divided into four different income districts and is estimated by statistical sampling of residential units traded in the second half of 1363, called the hedonic price of housing for each district. One of the most important results of the research is the importance of changing the level of subsurface residential units in determining its price, including residential units of the apartment and villa. Another important finding of this research is that the determinants of the price of residential units in Tehran are, firstly, different in terms of residential units (villas or apartments). And secondly, the proportions of different areas of Tehran have different effects. Therefore, if two residential units in the two different locations in Tehran have the same market price, due to the different factors in determining their price, one cannot apply the same policy plans for these two residential units. (In Kowsush, 1389, 178)

Mojtaba Rafiyan et al. (2008) examined the importance of each of the environmental values in urban spaces in terms of inhabitants. In this research, seven values including environmental pollution, accessibility, security, social status, neighborhood facilities and residential facilities were introduced into the model. The results showed that the air pollution value variable has the highest social value from the resident's perspective for choosing a residential unit and paying more for improving the environmental values affecting it and other value variables are in equal terms. (Rafiyan *et al.*, 2009: 19)

Theorist	Concepts mentioned affecting the value of land
Kitchan	There is a positive correlation between housing prices and distance to green spaces
Anderson	Variables affecting the value of land, including distance and different sizes for different types of open spaces, including neighborhood parks, special parks, golf courses, cemeteries, lakes and rivers
Rederk and Hinging	The determinant role of pollution on housing prices
Mac dugal	The Impact of Local Police Services and Education of Residents
Kane and Quillley	Exterior view, type of design in the windows and the presence of places for walking around the residential unit
Jim and chen	High schools, religious places and parking lots, including the most influential services in raising or reducing housing prices in Hong Kong

Blu	Security, proximity to work, parking, welfare facilities
Rafiyan	.Factors affecting the value of pollution, access, security, social facilities
Passionate	Effect of dwellings (villas and apartments) and the distance of the users of urban land

Table 1: mentioned concepts affecting the value of land by theorists briefly show.

Research method

The present study is descriptive in terms of purposefulness of the study. The statistical population of the study consisted of real estate agents, market experts, investors and residential users. To answer the research questions, firstly, with the help of indirect data collection, studies related to research issues and factors affecting the assessment of residential land were extracted from reputable scientific sources. This method should be based on statistical data and views of experts and vaulters in order to find the appropriate measure of importance and how the various factors interact with each other and ultimately the decision-making process in this area. Using the results of the literature review and interviews with experts, the two components of subjective and objective factors, according to Table 2, was questioned. In this section, a sample of 40 students from Ph.D. in Urbanism, University of Science and Research, 10 experts in housing and 10 residents in Zaferanieh neighborhood were selected. The number of samples examined in this study was 60 and the adequacy of the sample was the repetition of responses.

Then, using a closed response questionnaire, the experts were asked to do so by comparing the pair of identified factors[1] to determine the superiority of the two factors to one another and to score. Also, due to the fact that some factors are of a qualitative nature and that their proper clustering is necessary to narrow and accurately define them, a precise information about these factors was provided to the respondents in the questionnaire. In addition, in order to reduce the calculation error, all questionnaires were completed with the presence of the researcher and the necessary explanations were provided to the respondents.

By collecting distributed questionnaires, applicants were divided into four groups of investors and builders (with a frequency of 25%), real estate consultants (25%), residents of the Zaferaniyeh neighborhood of Tehran (25%), as well as faculty members and Ph.D. students of Tehran University of Science and Research (25%). The results show an acceptable level of discrepancy of less than 1.0.

Then, using MCDM Multi-criteria decision analysis process is a method that ANP network, dual comparison of weighted factors were calculated[2].

Also, in order to assess the reliability of items, in a sample of 10, the final questionnaire was completed in a preliminary and experimental way and its reliability coefficient was evaluated through the method of determining the Cronbach's alpha coefficient. Since the alpha value is higher than 8. Indicator of high reliability of measurements or points, according to alpha coefficient of 85 /. This quest for validity is most desirable, indicating the coherence and internal stability of the measurements, so they are used to measure the

1 Questionnaire questions consisted of a range from 1 to 9 of Thomas A. The number 1 indicates the importance of equalities of two factors and the number 9 indicates the high importance of one factor relative to the other factor.

2 The network analysis method considers complex communication between and among decision elements through the replacement of a hierarchical structure with a network structure. This method, while preserving all the capabilities of its previous version of AHP, including simplicity, flexibility, the use of quantitative and qualitative criteria simultaneously, the ability to check the compatibility of judgments, the possibility of the final ranking of factors, can affect its serious constraints, including Not taking into account the interdependencies between decision elements and the assumption that the relationship between decision elements is hierarchical and one-sided, and has provided a suitable framework for analyzing urban issues. (Zander, 2010: 79)

variable. After extracting factors affecting the value of residential land in the ANP analysis process, six criteria and 21 determinants were identified to achieve the study objectives. For this purpose, the following, by organizing internal and external factors in Super Decision software, the appraisers of residential land were evaluated by experts and experts.

Regarding the independence of the considered criteria as one of the important presuppositions in using the network analysis method, using the questionnaire of the pair comparison of the factors and the calculation of the average opinions, the average weight of each of the factors was calculated. Below and in the form of Chart 3, we can see the reciprocal relations between each of the components, criteria and sub-criteria affecting the value of housing.

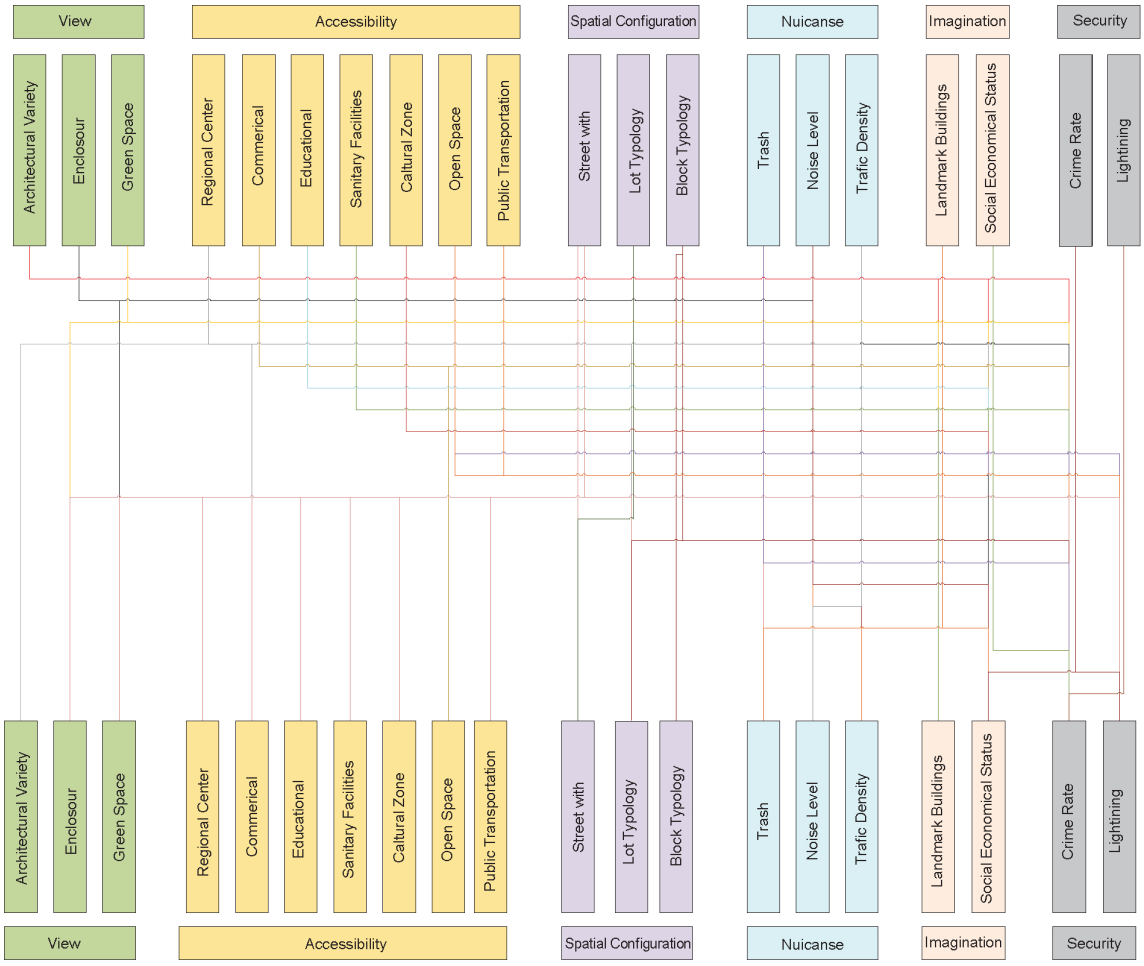

Chart 1: Network Model of Criteria and Sub-Dimensions Affecting Housing Value

RESULTS AND DISCUSSION

By reviewing the subject literature and interviewing experts and experts, two main external and internal criteria were identified below a set of factors related to each one. Outside criteria due to their unpredictability and difficulty in measuring are known as model error and include macroeconomic status, urban laws, types of sanctions, immigration rates, loan rates, taxes, etc., that are determined at macro level determinant general levels of urban land value. Of the internal factors, two objective and subjective components were identified in the domains of six physical-spatial dimensions and 21 indicators of the factors affecting the desirability of a residential land.

After reviewing the subject literature and

reviewing the views of stakeholders and beneficiaries, effective physical-space components were divided into two main groups of objective and subjective components. The first group or objective component includes:

- Visibility to various points around the ground, including variables: architectural diversity of buildings around the ground; enclosure of surrounding walls; natural landscapes and green spaces around the ground ‘s surface.
- Access to urban amenities and activities, including distance to religious, commercial, educational, therapeutic applications; distance to unclean transportation stations and distance to open and green spaces.
- The structure of the parts, including variables of the width of the tangent; the geometry of the parts; the extent of tissue permeability and the range block types.
- Environmental comfort that involves how municipal waste is collected and pollution types and traffic congestion.
- The second group is mental components, which include:
- A mental image that includes the presence of historic and valuable monuments and the level of socioeconomic dignity of the inhabitants.
- Security that includes the crime rate and ambient light level at night.

		View			Accessibility							Spatial configuration				Nuisance			Imagination		Security	
Dimensions	Indicator	Architectural variety	Enclosure	Green space	Religious centers	Commercial	Educational	Cultural zone	Sanitary facilities	Public transportation	Open space	Street width	Lot typology	Permeability	Block typology	Trash	Noise level	Traffic density	Landmark building	Socio economic status	Crime rate	Lighting
View	Architectural variety		4	3												5		-3	-2	-6	-5	3
	Enclosure			-3		-3	5	-3	7	3	-5	-4	-7	-2	-3	2	-4	-5	-5	-7	-3	5
	Green space				8	6	9	3	9	6	1	-2		2	4	6	2	-3	-2	-4	-3	7
Accessibility	Religious centers					-6	6	-8	1	-3	-9		-8	-3	-5	-3	-3	-3	-2	-8	4	-3
	Commercial						5	-2	3	3	-4		-4	2	-3	6	2	-5	1	-6	-4	5
	Educational							-6	-2	-3	-9			-3	-5	-3	-3	-6	-5	-7	-3	-2
	Cultural zone								6	4	-3		-2	3	-3	4	1	-3	-3	-2	-2	3
	Sanitary facilities									-3	-5		8	3	-3	1	-4	-5	-7	-8	-4	3
	Public transportation										-6		-6	-2	-3	-3	-4	-5	-7	-8	-7	-6
	Open space												7	3	-2	8	3	-3	1	-3	-3	3
Spatial configuration	Street width												-4	3	1	5	6	1			2	4
	Lot typology													4	1	7		-2			-2	6
	Permeability														1	-3		-4			-5	2
	Block typology															3		-5			-2	7
Nuisance	Trash																-4	-6	-7	-5	3	1
	Noise level																	-5	-6	-5	-3	5
	Traffic density																		2	-2	1	7
Imagination	Landmark building																			-2	4	6
	Socio economic status																				3	8
Security	Crime rate																					4
	Lighting																					

Table 2: Binary comparison of sub-criteria with respect to their interdependence with control of “increasing the value of residential land in Zaferanieh neighborhood”

According to Table 3, the total objective component includes 23% of the utility and subjective component of 67% of the suitability of residential property applicants. By calculating the scores of each of the indices related to the main research criteria, the average

Component	Dimensions	Normalized weight dimensions	Indicators	Normalized Weight Standard
objective	view	0.2490	architectural variety	0.2216
			Enclosure	0.0087
			green space	0.0187
	accessibility	0.0051	religious centers	0.0003
			commercial	0.0008
			educational	0.0002
			cultural zone	0.0002
			sanitary facilities	0.0003
			public transportation	0.0004
			open space	0.0020
	spatial con-figuration	0.0114	street width	0.0062
			lot geometry	0.0019
			permeability	0.0026
			block typology	0.0012
	nuisance	0.0651	trash	0.0049
			noise level	0.0316
			traffic density	0.0286

Tab 3: Calculation of Utility Index of Variables to Evaluate Residential Land in Zaferanieh neighborhood, Tehran

The results of the research showed that the cluster of the mental component measures 67% of the weight of that unit. Among the inner factors of this cluster, the mental image criterion alone accounts for 44% of the total weight of the indicators. The security component also ranked second with about 23%. So, homebuilders, with standards and tastes of customers in these two areas can expect more than half of them meet at this level. The two factors of perceived visibility and environmental comfort, with objective components, are also 23% of the total weight of desirability. Accordingly, visibility, environmental comfort, structure of parts and access to urban facilities are in the following ranks, respectively, with weights of 0.249, 0.065, 0.11 and 0.055 respectively.

CONCLUSION

In the situation where many choices and factors are involved in the process of choosing a residential unit, the human mind is incapable of paying attention to the vast and varied information and processing it. In these circumstances, it is not possible to evaluate all factors in the decision-making process for determining the value of housing, which makes the best decision not made. Therefore, the set of factors needs to be limited to a certain number. Accordingly, the present study focuses on the aspects of the mindset of the housing market customers to identify the spatial components affecting the valuation of a residential property and the ranking of these factors from their point of view. The results of the study showed that, despite the large number of tricky and specialized factors, identifying the important qualitative and quantitative factors and extracting their relative importance in order to prioritize the desirability of the applicants and suppliers is possible. Therefore, the ANP model using the proposed method can be used as a decision support system in response to these complexities.

The model consists of the distance from the property being taken up to each of the urban amenities that the range of facilities is considered in the neighborhood as a whole. The conceptual model of the scope domain survey specifies the exact number of observations needed by each neighborhood. In a complete model, the planner should consider all the facilities and activities, which means having complete spatial database in the area of the city in question.

But in the summarized model, the planner can enter the most important activities and facilities of the neighborhood into numerical calculations, which is an error for the model, which can be calculated and presented. The calculation of the distance between each facility and the sample is done in a table and written in a table. Calculation of these distances requires the analysis of the shortest route as well as the complete urban road network information. The proposed model can help to improve the process of buying a home and obtaining the right result. Accordingly, the advantages of the proposed model are as follows:

- Controlling land prices by urban management

One of the components of construction in cities that affects the price of housing and housing in each neighborhood of the city and causes the difference between neighborhoods; the price of land.

Regardless of how urban land ownership, land prices balance analysis using the parameters affecting prices (the effect of municipal facilities) is possible. These parameters provide urban management tools for determining and controlling land prices so as to balance land prices by utilizing its powers through building urban facilities and controlling business and activity. Urban land price balances, along with analytical intervention, thus lead to a sustainable urban balance, turning the land out of stock and turning into urban living space, which is a tool for sustainable urban development.

- Providing property tax map

Other management applications are models and tools for guiding development as well as urban equilibrium. Real estate tax maps can have different characteristics due to different approaches to urban management and local government in the city administration, so that it can be characterized in certain intervals based on the monitoring of the city's activities and readings. And a time-consuming version.

Sustainable urban development is based on the assumption of taking tolls from citizens and managing the city of city managers based on these costs. The more complicated the matter is, the less disturbing the flow of urban life. Acquiring real tolls in the city can and should be done with the benefit of urban activities and facilities. Obtaining complications proportional to the size and type of structure and its use, regardless of the type and manner of enjoyment of urban activities and especially the localities (cultural, economic, social, etc.) disrupted the flow of life in the city, caused the gap between the neighborhoods and causing the urban balance to collapse some neighborhoods will be exhausted.

Hence, using the amount of urban amenities on the price of land and the interpretation of the role and contribution of each of these facilities in the course of life, real estate value can be estimated based on their utilization of the city and urban amenities. Using the results of the model, even the price of land not subject to trading can be estimated also based on the value determined for the neighborhood. With the price of the estimated and observable property, it is easy to use a cartographic system or geographic information system to map the value of the neighborhood property in a color classification of the calculated price range.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interests regarding the publication of this manuscript.

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