

Tehran City's Typing in Terms of Social Indicators of Housing

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Abstract

Housing is something more than just a physical shelter and contains all the public services facilities for the human life. Therefore, housing location environment in one hand and characteristics of resisting human on the other hand, affects the developing and formation of housing. Affective items on proposal of housing as a several dimension good vary and are so different. The heading study approaches to find majority type of housing in Tehran by scrutinizing affective items on proposal of housing in this city in terms of affective population indexes on the way of housing between 2010-2011, and this way it would be able to shed light on proposal of housing in Tehran. Researching method is kind of Analytical overview and applied survey studying. For analyzing the data the mixture of basics of numerical taxonomy methods and fuzzy logic (kind of several variable ranking method) in the environment of Arc GIS software is used. Also correlation analysis in SPSS software environment is used to acknowledge the relationship between variables and determine weights of items. All in all 6 main indexes are studied. Results show the possibility of house typing in Tehran, as accurate as statistical areas in 2011. Also the correlation between population density variables and the household, number of rooms in each residential unit on 99% of confidence level is approved. So with the knowledge of the way population indexes affect the choice of housing location, operational approaches to provide optimal pattern of settlement in Tehran could be presented.

Keywords: *housing, Construction typing, urban areas, Tehran*

1.0 Introduction

Urbanization has been having a fast a growth during the last century and caused major changes in different aspects of human life such as economy, education, public health and housing (Tanaka et al, 1996: 879). Housing has so long been an important issue of humans' life and for most of households is considered as the most important and expensive asset. To the majority of households housing also is the most terminating factor of life quality. Housing is favorable in most of advanced countries and some of market-based economies (Khoury,1996: 19). In our country, urbanization development in the last decades caused the urban housing crisis (Habibi and Ahari, 2004: 8) and has affected most aspects of human life as it includes the majority of each household's income (Farhangi, 1995: 371). On the other hand every phenomena in every moment is an analysis and an ongoing combination of countless variables which have a regular, ongoing and versatile correlation. So while studying every phenomena something important is the relation and affection on its different aspects (Maleki, 2003:61). So in housing systems all the social, economic and cultural affairs like hygiene, nutrition, education, job, family life, cooperation, security and social stability should be considered in a same time. This understanding of housing implies that it's not possible to study the policy of housing, separated from other wards as residential policies can't be produced separately from socio-economic and environmental systems (Khoshfar, 1995: 375).

Housing indexes might be the most important and key-roles in urban planning (Azizi, 1996: 112). Studying the social indexes of housing is considered as a way to know the housing's property by which a part of affective parameters in housing can be recognized and facilitate every appropriate plan and decision (Arjmand nia, 1975:54) the importance of social housing indexes

functions has one so far that housing planners are using it for the development and maintaining the accuracy of housing planning (Khoshfar, 1995:376 & 125). Current passage, with aim of Tehran's housing typing, tries to recognize the most species types of Tehran's urban housing in terms of social housing indexes which in this research contain the population density, household point of population, education level, job types, the number of rooms in every residential unit and the amount of households in each residential unit. So this way it could provide the necessities of an appropriate housing planning in Tehran.

2.0 Literature Review

2.1 The role of social indexes in housing development plan

As said in the introduction, housing indexes are the most important and key-tools in housing planning by which the affective parameters in housing could be recognized and facilitate the planning and decisions in that area. Among housing indexes, social indexes are considered as the most appropriate tool to measure the progress and achievement of general goals as within the use of these indexes all the levels from local to national could be analyzed (khoshfar, 1995: 376). Also with the use of them and with referring to inhabitants it could be found about the affection of housing plans and their satisfaction of different aspects of housing issue.

About the function of social indexes of housing it should be said that these indexes should not be considered as a successor for other different indexes but in an appropriate situation they should be developed in a way to be in relation with other needed indexes like economic indexes of national income, government budget, inhabitants sources, the plan's cost and most of other items which are needed for making decision like geographical, skeletal and climate indexes. (Mokhber, 1984:134). Social indexes of housing is an important tool to measure the human-housing (physical environment) relation. In fact human has two type of relation with his residential environment. (Arjmandnia, 1975: 54) quantity relation, which means quantity and numeral relation of human in regard to economic with housing sizes and the inhabitants in it, in this case only quantity relation of human with housing is measured. Second relation, is the quality relation which human has with physical environment or residential one of his, this index is the identifier of the qualitative aspects of human with housing. Housing quality in terms of affection it has on health, security and appropriate living situation, has a direct relationship with the financial and people's income and has a direct affection on people's welfare.

2.2 The importance of social indexes of housing

The current situation of housing in every city is a result of an evolution. All the buildings and residential units of a city are not build in a same time, but they are result of the construction in last several decades (Tofigh, 1991:90) therefore for achieving the housing situation in every city it is necessary to study the different evolutionary periods of it. So the indexes are needed that show the housing situation and its changes in each period. Studying the housing indexes is considered as a tool and way to know the property of housing by which the affective parameters in housing can be recognized and facilitate every planning and decisions about housing (Maleki, 2003: 60). Developing a comprehensive program in housing needs an identification and analyzing on different aspects and parts of housing. Housing indexes are like main foundation of a comprehensive program and necessary tool to express the different social aspects, economic, cultural, environmental and skeletal of housing have special places in house planning. Housing indexes study the current situation of housing not only as a descriptive tool to express it, but it's also considered as a handy tool for measuring the criterions during the housing evolution. These indexes help the big policy makers of housing ward to get a clear picture of housing situation in the past, present and future and adopt appropriate policies and strategies in the future. Among housing indexes, social indexes are the most appropriate measuring tool for progress and achieving general goals in housing that by using these indexes all the individual and collective

levels could be analyzed. Housing indexes in Iran have been under the influence of internal factors and external factors. External affective factors on housing, like population factors, economic and social, provide the necessities for boom and bust of housing and housing plans have less been affective on general situation of housing and the improvement of its indexes. Internal factors of housing, which are mostly under the influence of how housing and planning process are, also shape housing situation in special aspects.

3.0 Methodology

Current research, in terms of nature and method, is generally a quantitate research of descriptive analysis kind. The use of competitive analysis method among areas according to the amount of indexes, also in terms of substantive is done. In order to analyses in combined approach, functional analysis method (using the theoretical of numerical taxonomic method) and fuzzy logic (spectral mapping of indexes in areas), complicated analysis method (clustered analysis of areas) and finally correlation analysis method (using the spearman and Pierson coefficient and slight (denotative) correlation analysis method) are used in terms of proving the relation between indexes. All in all 6 main socio-demographic indexes are studied in the 22 districts of the Tehran. Needed data are gathered from libraries procedures and using statistics and referring to statistic organizations in Tehran.

3.1 Methodology of homogenous clusters' creation

Creation of homogenous clusters is done in two levels. On first level numeral Taxonomy catechism and physical logic are used. Statistical concepts are used for determining the maximum interdisciplinary similarity and maximum interdisciplinary difference. Levels are then scaled and analyzed in the form of raster data. With the goal of explaining the relationship between indicators and their ability to determine the homogenous clusters in the second level of studies, correlation analysis is used in the partial correlation form.

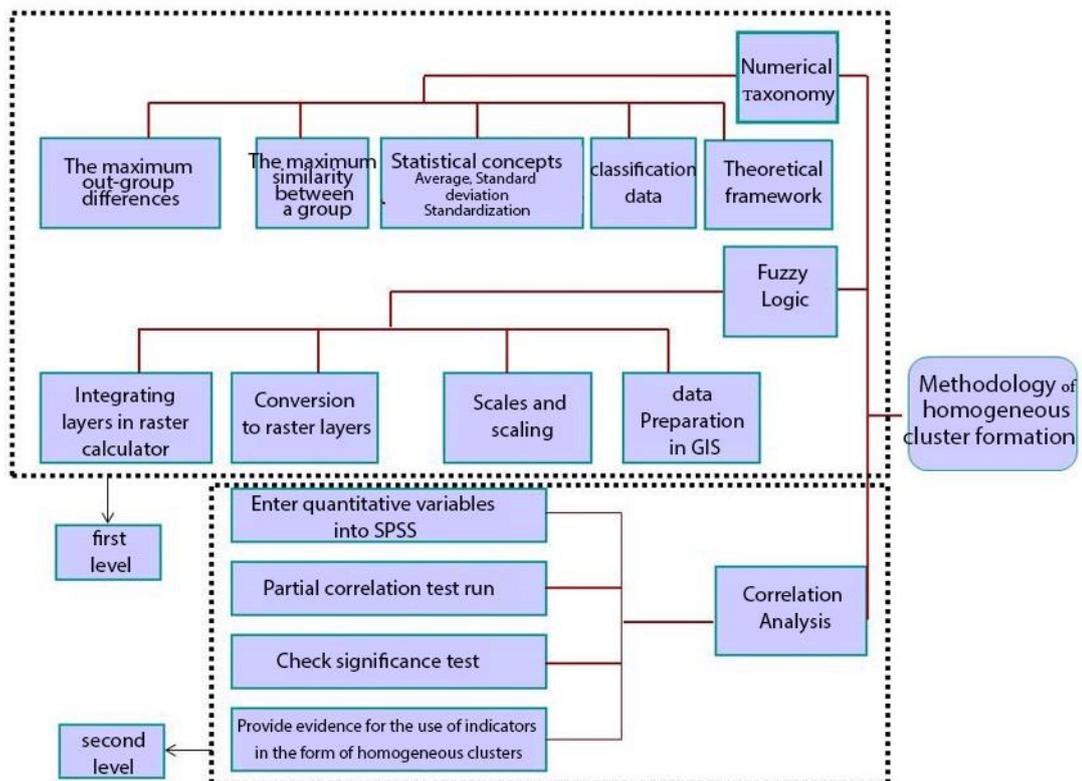


Figure 1: Methodology of research (research findings, 2017)

3.2 Study area

Geographic area of the current researches is limited to the area covered by Tehran's city hall. Time period of the study includes a one year period. Since in the time of research, most updated information gathered about housing has been from Iran's statics center of 1390, studies are done in this period of time. Therefore, population data of 22 areas of Tehran city collected by general population and housing census in 1390 is used separating statistical areas.

4.0 Research history

One of continues challenges of wasteful urbanization in developing countries is providing an appropriate and affordable housing. One million or third of the world's urban population (residents in these countries) are living in an unstandardized housings. Because in such countries urbanization has overtaking the financial and managerial capacity. Specific features of these non-standard settlements are lack of drinking water, improper disposal of waste, lack of access to services and major infrastructures and lack of proper lighting and cooling and heating system (UN-Habitat, 2005). Also, it is estimated that 40% of housing in big developing cities are non-standard (World Bank, 2008). Meshkini and partners (2010) have got to this conclusion, in an article about the inequality housing issue, which housing situation in low income groups from 1996 up to now has been getting worse and this lack of proper housing has been covering from income deciles 1 & 2& 3 to 4 & 5 deciles.

Regarding to the check of housing indicators in Iran and world lots of widespread researches have been done about which Muhammad Mehdi Azizi's researches could be implied which have scrutinize the place of housing indicators and vary of them in Iran and different countries in the world. In this regard, Rafiei and Chagni have studied "the international indicators of housing" and Habibi and Ahari have studied "the dimensions of housing in Iran". In 1999 Zebardast, in settelment magazine, studied the "housing and urban indicators". Muhammad Mehdi Azizi (2005) has studied the evolution of population, social and cultural indicators of housing and in this regard, Saremi and Ebrahimpour (2012) have been analyzing the quantity, quality and economic indicators of housing.

Several studies are done in regard to social housing indexes, for example: studying the housing and unequal accessibility to sources (Gholizadeh, 1999) housing's social dimensions (Mokhber, 1984), house planning (Dalalpour Mohammadi, 2000) geographic analysis of Tehran's housing policies and it consequences (Sajjadian, 2001). All in all, demand of housing has two dimensions; quantitative and qualitative, quantitative dimension of housing demand includes the knowledge of phenomena and affairs which have to do with the lack of shelter and accessibility to it that is related to bad or non-housing. In fact in qualitative dimension, the skeletal aspect is more in attention (Shea'e, 2005: 63). A review of housing situation in different societies shows that almost no country claims the solution of housing problems in it. Some countries' issues are quantitative that is caused by lack of housing, population growth, immigration and economic bottlenecks and mostly includes developing countries (Azizi, 2005:25). Rahimi and Nazarian (2008) studied the affective items on housing management and urban creating of it and according to their research's results, the rebuilding plan of city or house providing for low income groups of the city should be placed at the top of the building policies and developing plans. Ziari and partners studied the housing changes in managing the city and prediction of needed housing until 2023 in an article. The results of the researches showed that during the 1976-1996 the situation of quantitative indexes of housing had been improving and in compare with urban areas of the state, they had a better condition, but in a lower level with urban areas of the country. Gharakhlou and Khalil Abad studied the housing situation in historical tissue of Yazd in 2006. The results showed that in new tissue and rich settlements of Yazd like Safaeie, Jomhoury Blv and ... houses are built with beautiful architecture and strong materials, but in historical and worn-out tissues of the city, mediocre or weak materials and facilities are used. Ebrahimzadeh and Moraveji (2008) studied the analysis of cooperative roles of housing in developing Shirvan city. The results of his research showed that there's a relation between the cooperative function of housing and changing the land

and gardens in Shirvan city's area, in other words, cooperative of housing in Shirvan city caused the devastation of lands and gardens which had irreparable effects in urban environment. Maleki and Sheikhi (2009) studied the role of social housing indexes on countries' state level by using the compound index method of human development. Lotfi et al (2009) studied the quantitative and qualitative indexes of housing and prediction of them for future in Esfarayen city. The result of his researches showed that to provide enough space for households' settling it's possible to fill these demands by increasing the compression of destructive units and rebuilding them during a period which are economically, socially and culturally appropriate for city's status. In 2011 Maleki studied the condition of quantitative and qualitative indexes of housing in Ahvaz, in an article. The cooperation and studying of social indexes of housing in Ahvaz during 1966-2006 showed that most of these indexes have had an improving process. In 2012 Yarmuhammadi and partners studied comparative social indexes of housing in new neighborhoods (Kouye Moalem) and old ones (Sarban Mahaleh) in Bojnord city. What they found in their researches showed that the housing condition in Kouye Moalem is better than Sarban neighborhood.

Table 1- Research history

Number	Researcher	Indicator
1	AZIZI (2005)	Density indicator, Housing ownership, accessing to services and quality indicators, infrastructure and land average, building density and number of floors, number of residential units, housing durability and ages
2	SAREMI & EBRAHIMPOOR (2012)	Household per dwelling density, persons per dwelling density, the average number of rooms per dwelling, ownership of residential units, residential units enjoyment of facilities, infrastructure and residential area (square meters), the share of the rent and housing costs in total household expenditure
3	GHADERI (2004)	Rental housing demand estimation, real housing demand estimation permanent income estimation, Hedonic function of rental housing prices estimation
4	ZIARI, GHARAKHLOO, JANBABANEJAD (2013)	family size, housing inventory, household density of residential units, average room per residential units, density of persons per dwelling Room for every households, household density in the room, density of persons per room, comparing the growth of family housing and housing development, home ownership (ownership of housing units), the durable housing, units ages, bad housing, homelessness
5	AZIZI (2004)	Job creation in housing section, the need for housing and the lack of it, the annual growth rate of households, number of households and household size, household density in housing units, room per residential units, density of persons per room, density of persons per dwelling unit, dwelling ownership
6	PARHIZ, SAMSAM, KARIMIAN, ZIARI ET AL. (2012)	Households per housing units, people per room, residential per capita basis, household size, room per housing units, sub-standard housing units
7	MALEKI (2011)	Household density in housing units, the density of people per room, the density of persons per dwelling, room density in housing units, housing units per household, housing density, social indicators related to

		quality of housing, average level of infrastructure in housing units
8	MALEKI & SHEIKHI (2009)	Housing quality index (facilities)
9	NOURI (2014)	Household density in housing units, the density of people per room, the density of persons per dwelling Room, density in housing units, average residential units on the age of the building, residential units in terms of durability of building materials, home ownership
10	BASTAMINIA ET AL. (2014)	The density of persons per dwelling, household density in housing units, room density in housing units, the density of people in the room, the mean area under the building housing units
11	YARMUHAMMADI & ASHOURI (2012)	Household density in housing units, the density of persons per dwelling, the dwelling infrastructure, accessing to services, durability of housing units
12	SADRI FARD, JALALABADI & MOSTOFIAN (2014)	Household density in housing units, the density of persons per dwelling, household density per room, infrastructure, ownership, age and durability, accessing to facilities and utilities, security
13	HOSSEINI & NOURI (2013)	The density of persons per dwelling, household density in housing units, room density in housing units, people per room Housing shortage
14	MOEINIFAR & GROUSI (2015)	Affordable housing, providing services for people with disabilities and the elderly, encouraging social cohesion, diversity and social mix, preserving cultural and historical characteristics
15	AHADNEJAD, ALIMORADI & ALIOGHLI (2014)	The density of persons per dwelling, household density in housing units, room density in housing units, density of persons per room, infrastructure, housing durability, having Services

According to the studies done on research history and housing's social indexes and by the aid of accessibility to information, in this research eventually there are six indexes considered as evaluation indexes. These indexes are : compression of resident population, family aspect index of resident population, family index in a residential unit, majority of occupational groups index of resident population, education level index of resident population, earning groups index of resident population and room number index in each residential unit.

5.0 Results and Discussions

5.1 Index scrutiny and analysis

Table 2 - Accuration and preparation of social indicators for analysis process

Indicator name		Evaluation basin	Indicator kind	Quantification possibility
Indicators suggest social demographic characteristics	Density of Residential population	gross population density	Quantitative	-
	Family size of Residential population	Number of people who are in one family	Quantitative	-
	The number of households in residential units	The number of households in one residential unit	Quantitative	-
	Occupational major groups of population	According to the international Occupational classification in ten groups	Qualitative	There is
	Educational level of population	Educational level in terms of grades separation	Qualitative	There is
	Income groups of residential population	Income level of residential population	Quantitative	-
	Room per dwelling	Number of rooms in each dwelling	Quantitative	-

According to the table above, overall indexes analyzed, literacy and major occupational groups of indexes are qualitative indexes category which are able to quantitate the data. Also because of inaccessibility of income groups of index in gathered data, this index is removed from process able information. Indexes are measured based on general population and housing census in 1390 of central statistics of Iran.

• The number of population and gross population density in areas of Tehran

Gross population density of the population is the total land area under investigation. Most of the population of Tehran are living in zones 2, 4, 5 and 15. Distribution of population in Tehran can be seen in the figure. Also because of inaccessibility to other income groups' index in receiving data, this index is removed from the process able data. Indexes are measured based on the data gathered from Iran's static center's general census of population and housing in 2011's. The number of resident population and impure density of population in areas of Tehran city Impure density of population is same as resident population in the whole field covered by the research. Majority of Tehran's population are resident in district 2,4 , 5 and 15. According to the picture, you can see how the population is distributed in Tehran city.

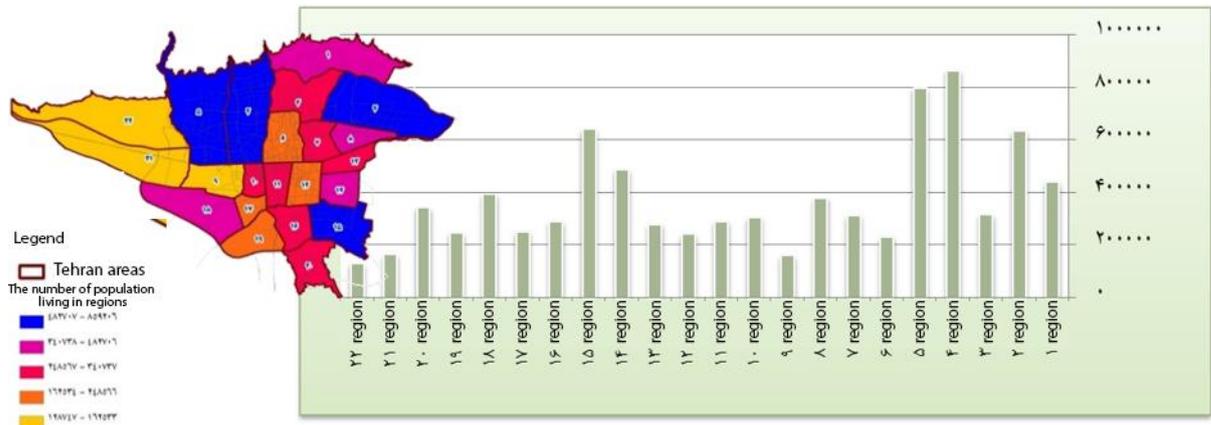


Figure 2: The distribution of the population in areas of Tehran
 Source: (research findings, 2017)

Information of impure density of population shows its maximum as 376 persons/hectare belonged to district 10 and the minimum of 21 persons/hectare for district 22. According to this issue the average of impure density on areas is 145 persons/hectare according to which average impure density of half of areas is lower than this and the other half more than it. Impure density of population on areas is showed in chart below.

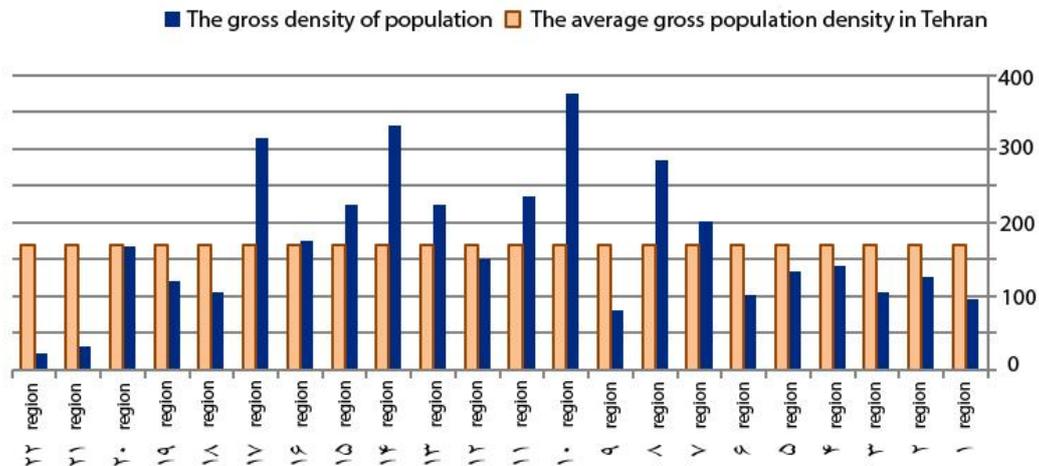


Figure 3: Comparing the gross density (persons per hectare) population living in areas of Tehran
 Source: (research findings, 2017)

• The family size of population in Tehran

The following map shows the number of family members as one of the important demographic factors that affect residency in Tehran. Household size in regions 4, 16 and 21 is equal to average household size in Tehran. The least amount of family size can be seen in the middle areas of Tehran. Regions 18,

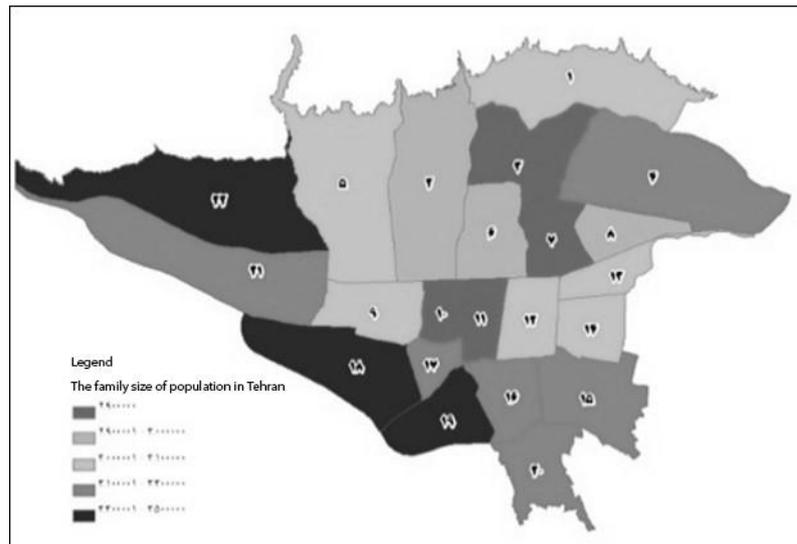


Figure 4: Comparing regions in terms of the number of family households
Source: (research findings, 2017)

• **The number of households in residential units**

According to the 2011 Population and Housing harvest, the distribution of households in housing units by area are shown in the map below. Through this composite indicator of how living and population distribution of the above maps can be concluded the following:

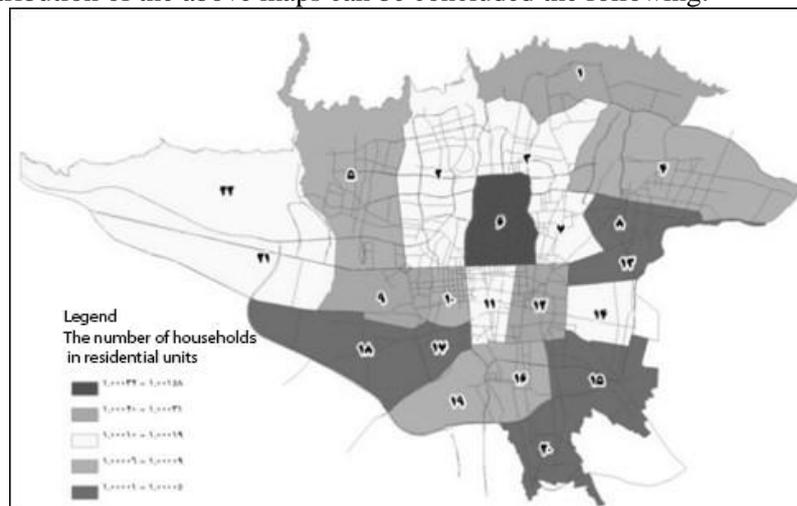


Figure 5: Comparing regions, the number of households in housing units
Source: (research findings, 2017)

Regions 8, 13, 15, 17, 18 and 20 have had the lowest number of households in the residential segment.

• **Educational level of population**

Education has been raised as a determining indicator of the social and cultural differences of the population in order to study population trends applicant of residence. Due to the fact that the index is a qualitative indicator which shows in evaluating and comparing statistical properties of the areas, that in Region 1, the central areas of the northern half of Tehran (Regions 6, 2 and 3), Region 7 and 4 western parts and the eastern part of the region 5 population predominate other population groups with higher education levels. Meanwhile, secondary and pre-university

education level are the most frequent among the population in the southern half of Tehran (southern axis of Damavand, Enghelab and Azadi), Region 8, eastern parts of zone 4 and western parts of regions 5 and 22. Also in the areas among the regions 12, 15, 16, and in the southern parts of 18 & 19 regions, population with primary education and adult literacy classes predominate over the other groups.

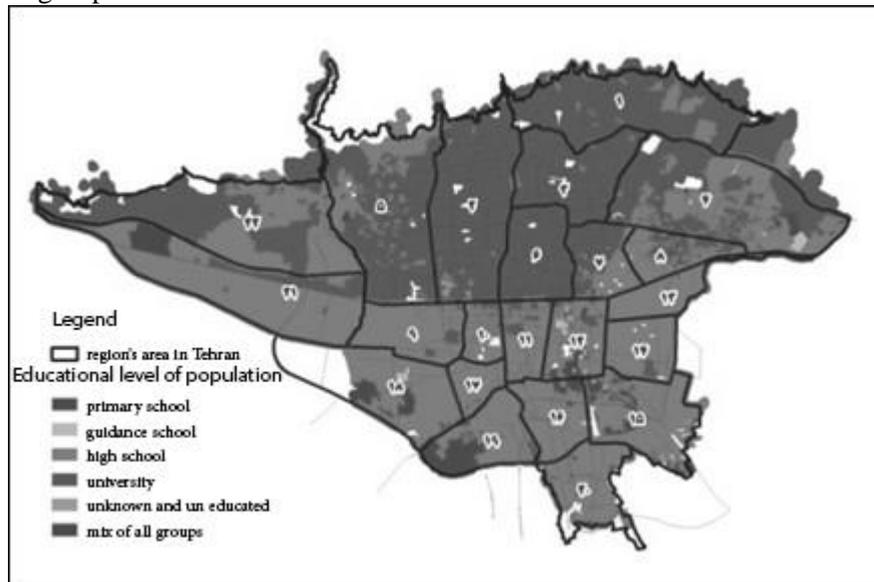


Figure 6: Comparison of areas, population education
 Source: (research findings, 2017)

• Occupational major groups of population

To determine the socio demographic characteristics indices of living population that determine the trends in house choosing and residential type, the major occupational groups which is the outcome of the frameworks, occupation, education level and income, as an elected indicator is considered. The following map indicates the distribution of statistical areas in terms of major job groups overcoming. This map is also well with the map before, and shows significant correlation between education level and major occupational groups.

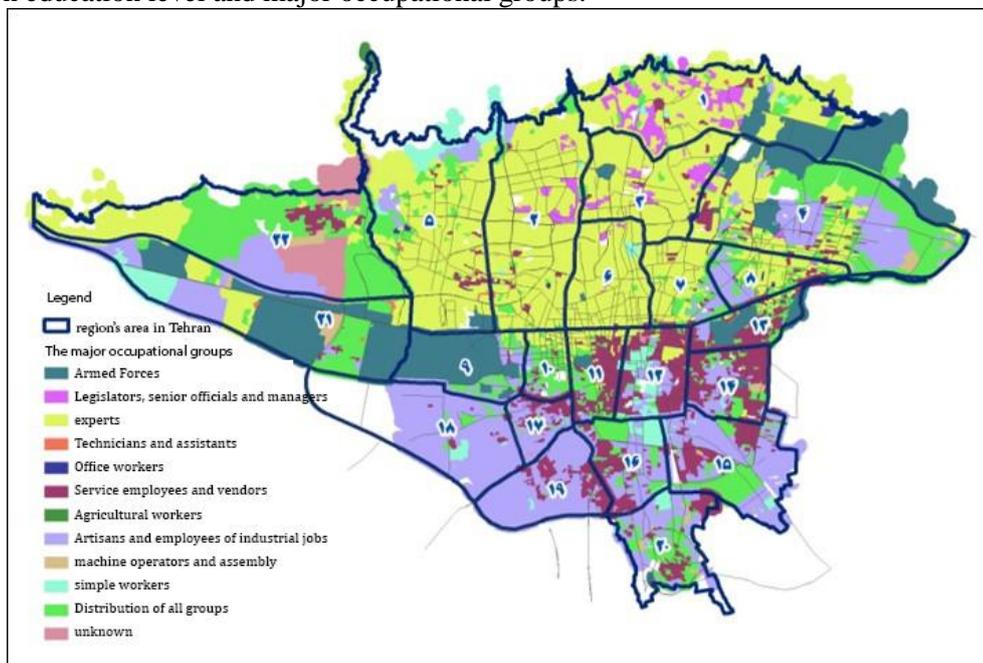


Figure 7: Comparing regions in terms of employment population groups
 Source: (research findings, 2017)

• Room per dwelling

Room per residential units is an indicator that on the one hand indicates Physical characteristics of housing, and in another hand, its data along with population indices are gathered to assess the minimum quality residence, by the Statistical Centre of Iran. In the present study due to lack of the index's information in issued construction permits, the index is being compared between different regions of Tehran, based on General Census of Population and Housing 1390 provided by the Statistical Center of Iran. The following diagram shows the average number of rooms per dwelling in each region of Tehran compared to the average of that. According to the graph this can be achieved that the average number of rooms per dwelling is higher than the average in the areas 1, 2, 3, 4, 5, 6, 21 and 22. This index is about to the average in the areas 8, 9 and 11, and in other regions it is lower than the average in Tehran.

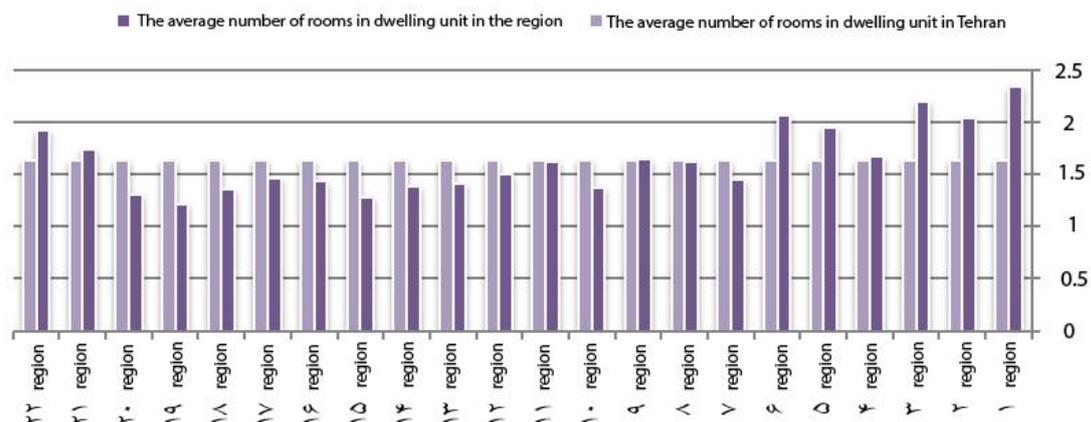


Figure 8: Number of rooms in the house in Tehran

Source: (research findings, 2017)

5.1 The combination of indicators and identifying homogeneous clusters

Numerical taxonomy is a method which is used to classify objects and events. There is maximum Likelihood between the elements of objects or events that are placed in the same group, as well as this group as a whole has the maximum difference with the elements of other groups. So, the goal in numerical taxonomy is to measure the assimilation variety of topics based on their distance to one another, which means that each one is placed in taxonomic space and their distances are calculated. Consequently, with regard to the above, we have tried to obtain the essential theoretical foundation for classifying data into homogenous groups (maximum similarity between the group and the maximum difference out of the group), using the theoretical foundation of numerical taxonomy and statistical terms mean, standard deviation and standardized values. In the following, fuzzy logic (Normalized continuous spectrum in the range of 0 to 1) is used in order to show the variables in the urban area of Tehran. Therefore, standardized data have been constructed, using the software GIS, in the urban area of Tehran, based on the obtained values of variables. In this way, the total of 6010 statistical areas located in Tehran have been studied in order to identify the groups which have almost identical characteristics of the studied population. These areas were the basin of the living population information. Since the statistical areas are, in fact, space containers which cover the different parts of the residing population in Tehran, it is possible to identify the location of the similar areas in Tehran, using mentioned applications. Thus, the statistical areas in the GIS software were categorized and classified than the maximum and minimum of each group. Overall, seven main clusters (homogeneous) by social demographic indicators in Tehran can be seen in the map below.

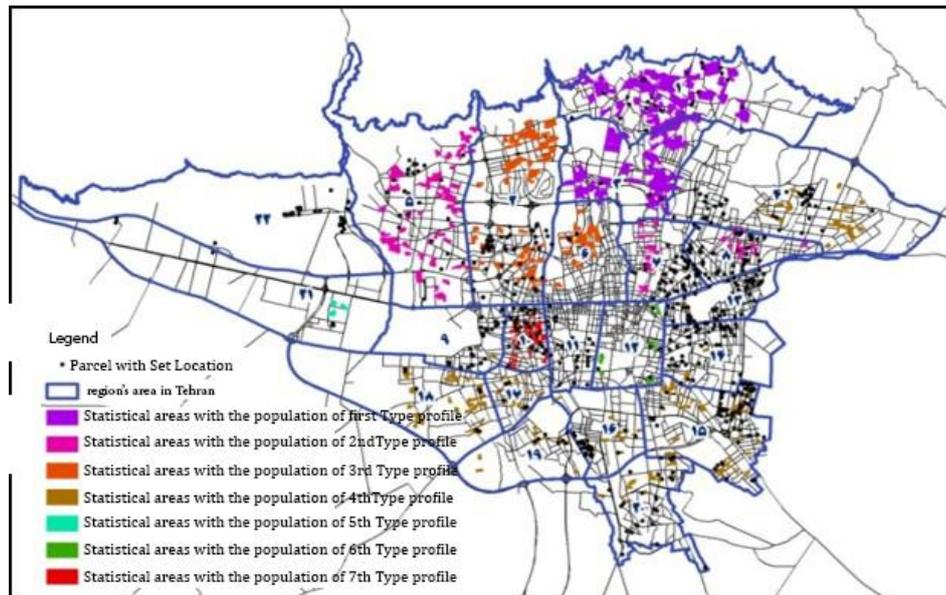


Figure 9: The combination of demographic indicators and identify homogeneous clusters
Source: (research findings, 2017)

Table 3 - Demographic types identified

Number of types	The gross density of population (Ha)		Family size		Households per dwelling		Average of rooms per dwellings		Dominant educational level	Dominant job groups
	max	min	max	min	max	min	max	min		
Type 1	173/017	64/796	/149 3	/534 2	/001 1	1	3.14 6	2.1 6	Unknown	Experts
Type 2	281/237	/017 173	/149 3	/534 2	/001 1	1	2.16	1.6 8		Experts
Type 3	281/237	/017 173	/149 3	/534 2	/001 1	1	3.14 6	2.1 6		Experts
Type 4	479/678	/457 389	/764 3	/149 3	/001 1	1	1.68	1.2 0		
Type 5	479/678	/457 389	/149 3	/534 2	/001 1	1	1.68	1.2 0		
Type 6	389/457	/237 281	/149 3	/534 2	/001 1	1	1.68	1.2 0		
Type 7	maximum	/678 479	/149 3	/534 2	/001 1	1	1.68	1.2 0		

Source: research findings, 2017

It's obvious in the above chart and reviewing the 7 types, that the prevailing residential situation in all of the types of households in housing units is equal to one. As well as the family size in all types is between 2.5 -3.1. Only the family size of the type 4 is 3.1 -3.7 which is higher than the average of Tehran. But a significant relationship between occupational groups, the number of rooms in residential units and a gross density of population living in areas can be seen by reviewing the above table columns, which confirms the accuracy of typing for housing.

The distribution of statistical areas groups (types of population) with the highest frequency in the population is given in the table below.

Table 4 - Introduction of distribution groups statistical areas (types of population) with the highest frequency in the population.

Zone	Groups statistical areas (types of populations) have the highest frequency in Tehran							The most crowded population types in the zones
	p.t.1 1	p.t. 2	p.t. 3	p.t. 4	p.t. 5	p.t. 6	p.t. 7	
1	91846	6142	33569	0	0	0	0	p.t. 1
2	53201	57828	85252	0	0	0	0	p.t. 3
3	78004	16674	57986	0	0	0	0	p.t. 1
4	18680	23811	11241	40693	0	0	0	p.t. 4
5	8825	82937	14757	0	0	0	0	p.t. 2
6	18583	21069	30335	0	0	0	0	p.t. 3
7	7831	13835	4125	0	0	0	0	p.t. 2
8	1087	16027	0	1314	0	0	0	p.t. 2
9	0	0	0	2780	0	0	0	p.t. 4
10	0	0	0	0	48607	0	0	p.t. 5
11	0	1204	0	0	0	0	0	p.t. 2
12	0	0	0	0	0	12267	0	p.t. 6
13	0	0	0	1738	0	0	0	p.t. 4
14	0	0	0	5443	0	0	0	p.t. 4
15	0	0	0	47803	0	0	0	p.t. 4
16	0	0	0	18502	0	0	0	p.t. 4
17	0	0	0	19361	0	0	0	p.t. 4
18	0	0	0	54204	0	0	0	p.t. 4
19	0	0	0	14803	0	0	0	p.t. 4
20	0	0	0	25382	0	0	0	p.t. 4
21	0	0	0	0	0	0	9638	p.t. 7
22	0	1218	0	0	0	0	0	p.t. 2

Source: research findings, 2017

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1	91846	6142	33569	0	0	0	0	p.t. 1
2	53201	57828	85252	0	0	0	0	p.t. 3
3	78004	16674	57986	0	0	0	0	p.t. 1
4	18680	23811	11241	40693	0	0	0	p.t. 4
5	8825	82937	14757	0	0	0	0	p.t. 2
6	18583	21069	30335	0	0	0	0	p.t. 3
7	7831	13835	4125	0	0	0	0	p.t. 2
8	1087	16027	0	1314	0	0	0	p.t. 2
9	0	0	0	2780	0	0	0	p.t. 4
10	0	0	0	0	48607	0	0	p.t. 5
11	0	1204	0	0	0	0	0	p.t. 2
12	0	0	0	0	0	12267	0	p.t. 6
13	0	0	0	1738	0	0	0	p.t. 4
14	0	0	0	5443	0	0	0	p.t. 4
15	0	0	0	47803	0	0	0	p.t. 4
16	0	0	0	18502	0	0	0	p.t. 4
17	0	0	0	19361	0	0	0	p.t. 4
18	0	0	0	54204	0	0	0	p.t. 4
19	0	0	0	14803	0	0	0	p.t. 4
20	0	0	0	25382	0	0	0	p.t. 4
21	0	0	0	0	0	0	9638	p.t. 7
22	0	1218	0	0	0	0	0	p.t. 2

Source: research findings, 2017

In this table, the predominant type of population in each constituency is also visible. As seen in the table, zones 1 to 8 includes several types of population, but other parts include a certain type.

Correlation analysis between indicators

In this part of the research, the way of relationship between different variables which is determined for clustering of residence in Tehran, is studied. This process usually works by calculating the correlations' coefficient. Correlation's coefficient is an index which shows the relationship level between indicators. For analyzing the correlation, it is necessary to convert data to quantitative form, because correlation analysis is a mathematical-statistical analysis. But qualitative data which are passed won't have the ability of correlation analysis, unless they are given weight rankly by a fixed procedure. While calculating the correlation, the effect of other indicators is not removed and they may also have impact on the relationship of two indicators. But partial correlation is correlation between two indicators with removal of other indicators' effect. In these researches, three main quantitative indicators include impure density of population, family and number of rooms in each residential unit are entered to partial correlation analysis. It should be mentioned that occupational group indicator is removed from the research because of ranking and family indicator inaccessibility caused by same situation in the whole sample. Indicator of this research's result is shown in table below.

Table 6 - partial correlation analysis variables

Correlations			Gross population density	Family size	Room per dwelling
Control variables					
binary effects	Gross population density	L correlation level	1.000	.627	.411
		Significance level - Bilateral test 99%	.	.000	.000
		L correlation level	.627	1.000	.665
	Family size	Significance level - Bilateral test 99%	.000	.	.000
		L correlation level	.411	.665	1.000
	Room per dwelling	Significance level - Bilateral test 99%	.000	.000	.
Room per dwelling		L correlation level	1.000	.519	-
	Significance level - Bilateral test 99%	.	.000	-	
	L correlation level	.519	1.000	-	
Family size	Significance level - Bilateral test 99%	.000	.	-	

Source: research findings, 2017

The analysis output shows that the Correlation between the first two variable (gross density of population and family size), is equivalent to 0.627 regardless of the effect of a third variable (number of rooms per dwelling), and is significant at an error level of 5 percent (with 99 percent confidence). The correlation between the two variables gross density of population and family size would be equal to 0.519, considering the effect of a third variable (number of rooms per dwelling) which is significant at 1% error level (level 99%). So the strong relationship and proven possibility is formed here of which good use of indicator in homogeneous clusters. Also, according to quantitation of the variable of education, which is the qualitative variables in this part of the study, considering these variables correlation analysis has been re-run. The results of the correlation analysis showed an inverse relationship between the variable gross population density and level of education (with 0.317- Spearman correlation coefficient). So the educational level would be reduced by increasing the variable gross population density. As a result, we can ensure that changes in the variables is consistent and will have the necessary performance in forming the homogeneous groups, given that there is a correlation between variables. In other words, heterogeneous variables are not used in the formation of groups, but the uniform change of the variables created homogeneous groups. So the settlement patterns in our sample can be shown more certainly.

6.0 Conclusions

Considering that the aim of the present study was to determine the dominant type of residential building in terms of population indicators, as the conclusion of areas' properties, It's possible to diagnose the similar properties of the resident population in some areas, based on the demographic characteristics affecting how to reside and according to the measurement based on quantitative indicators of "gross population density", "family size" "number of rooms per dwelling unit" and "the number of households per unit "and qualitative indicators include" education "and" occupational resident population groups". These similarities have been introduced in the following way:

1. Regions 1, 2, 3 and 5 have similarities in terms of quantitative and qualitative indicators. These regions include 27 percent of Tehran's population.
2. The 11, 12, 13 and 16 regions are similar in terms of indexes group. 13% of the population of Tehran is concentrated in these areas.
3. Regions 15 and 20 as adjacent areas are similar in terms of mentioned indices.
4. The areas of 18 and 19 region including 8 percent of Tehran population have similarities.
5. 15 and 20 regions including 12 percent of Tehran population have similarities.

In addition, seven main clusters of population-social can be introduced in Tehran, through the maximum homogeneity of population characteristics. So that the urban development planners can meet the needs of the residents in each district using the dominant type of each district and involve it in their decision-making process. For instance, residents are more likely to have more room in their housing units in the areas where the dominant type is 1-3. Or in areas where main types is 5, 4 and 7, gross residential density is higher than the average of Tehran, so there should be appropriate planning of services needed by residents.

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