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Changes in population settlement pattern in urban system of Tehran province (1966 to 2006)

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Rapid suburbanization in urban system of Tehran province has been driven by the government's policies in past decades, transport system development and land price differences between metropolises and Periphery area. Cities in Periphery area grew rapidly during 1966 to 1986 as families moved there in anticipation of jobs. The non-appearance of jobs resulted in poor social services, gridlocked freeways and long travel distances to metropolises for job. The aim of this paper was to investigate how population settlement pattern in urban system of Tehran province USTP have been changed during 1966 to 2006. Methods adopted for this purpose were Mehta index, entropy coefficient and urban development model. Furthermore, for more analysis paper was supported by some theories such as system theory, primate city theory, basic economy theory, suburbanization theories, etc. Secondary data used in this paper were collected from governmental organizations (statistical data and map). Results show that growth of big cities in number and in population is the most considerable change which has been happened in urban system of Tehran province (USTP). What make it critical is their short distance from Tehran and Karaj. The paper argues that although distribution both in urban population and in urban points occurred during 1966 to 2006. But it is very important that where the destination of population flows. Because of their short distance, big cities exert double pressure on infrastructures of metropolises and agricultural lands in periphery area. The paper recommends seeking new structures for management in USTP because roots of change pressure extend beyond individual city.

Key words: Settlement pattern, primate city, population distribution, growth of big cities, urban system of Tehran Province.

INTRODUCTION

Change in pattern of population settlement in urban system refers to organization of urban population and urban areas in space and its change over time or an abstract or generalized description of distribution of phenomena in geographic space (Garcia-López, 2101). Studies on change of population settlement patterns can be categorized in three categories: 1) a description of changes in spatial pattern of settlement within the urban system, 2) explanation of factors driving change process and 3) assessment of change impacts on economic, social, political, administrative and environmental aspects.

A general rule which should be accepted in analysis of population distribution in urban system is that differences in process of social, economical and ecological among cites, strongly depend on size of their population.

Recognizing basic importance of the topic and its application in urban and regional planning, this paper attempts to express how spatial pattern of settlement have been changed in USTP.

To examine changes in urban system, related theories may be divided in two main parts: 1) behavioral theories such as primate city theory attempts to explain existing pattern of settlements in a region, 2) and normative

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theories such as central place theory and rank–size rule seek to define ideal system of settlements, essentially underpinned by "efficiency" principle (Ramachanran, 1989). Utilizing the following theories and models, the paper takes a behavioral approach to examine changes in settlement pattern in USTP.

System theory

Harvey, in the "explanation in geography", defines the system as:

a) A set of elements identified with some variable attribute of subjects.
b) A set of relationships between the attributes of objects.
c) A set of relationships between those attributes of objects and the environment (Harvey, 1969) which is applicable in urban system.

Systems have a specific behaviour which by way of flows, stimuli and responses, inputs and outputs changes in duration of time. We can examine both the internal behaviour of system and its transactions with environment (Harvey, 1969). Elements in the given system are changed as its environment changes, and eventually the whole system is altered. Thus, a system such as urban system is dynamic and ranges from full imbalance to perfect balance, but does not reach them. Among methods which can be used to measure behaviour of urban system are primacy and entropy indices which show changes in urban system over time.

Rank-size rule is an excellent example of organized system which completed by Zipf and based on principle of least effort. This principle holds that human, industry and economical establishment, all other things being equal, will tend to behaviour in such a way as to minimize the energy they utilize to achieve a given task. The result is that there will be a multitude of small centres and the decrease in the number of large centres as the size of centre increases (Kaplan et al., 2004). As mentioned such order is rarely found in reality. In contrast, in disorganized system, providing various wants and needs involves travelling in long distance.

How urban system changes is greatly dependent on volume of inputs and outputs. In the other hand, the formation and growth of cities is due to accumulation flows from villages to the city. In agriculture-dependent economy, population flows and capital accumulation from village to city occurs sluggishly and allows few big cities to rise in urban system. Gradually, basis of economic is shifted from agriculture to secondary or tertiary activities by factors such as mechanized agriculture, global division of labour and national economic policies, etc., fostering the rural-urban migration and growing big cities. Unlike the first sector activities that cause distribution, the secondary and tertiary sector activities allow to focus

capital and population.

Primate city theory

At first, urban primacy term was introduced by Jefferson in 1939 (Shakoei, 2005) which focuses on accumulation process and their effects on cities. Polarizing economic opportunities and urban infrastructures leads to persistent drain of skills and capital from surroundings. Primate city proclaims forces which unify people in a country, culturally, politically, economically and so (Ramachanran, 1989).

It could be suggested four reasons why primacy may exist in developing countries: 1) it is associated with colonialism and arises because empires tend to be controlled through key cities, 2) as the major outlets for the products generated in dependent export economies, 3) primacy may be created from within by the collapse or decline of the rural economy and 4) finally, primacy may be a social consequence of the transition of an economy from subsistence to capitalist production. Such a change typically transforms class and labor relationships and in particular, leads to a reduction in the amount of labour that is required in agriculture (Clark, 2003).

Some think that primate cities are engines of economical growth (Youg-Hyun et al, 2010) and believe that population dispersion among cities is suboptimal, at least during some stages of urbanization (Hadar et al., 2004). On the other hand, some considers primate city as the barrier of economic growth. Excessive population concentration makes increasing negative effects such as increased congestion, inefficient use of national space, pressure on environmental resources and inappropriate use of other urban areas. The gravity of primate city diverts rapid growth and development to a single city (Yong-Hyun et al., 2010).

Basic economy theory

The goal of this paper is not to investigate basic economy theory in urban system, but the theory helps appropriately the understanding of the flows of population and capital flows in urban system.

At its most simple level, urban economy may be viewed as two interdependent sectors, the basic and the non-basic. Former produces goods and services that are sold outside the city and provide finance to enable basic requirements to be imported into the city. The latter consists of all those activities that provide goods and services for the city itself. If the basic sector expands, workers in that sector will spend more on city services, so the non-basic sector will grow as well (Clark, 2003). In this theory, the growth of city results from circular and cumulative process.

Several important theoretical and practical implications

follow from these findings. First is that the larger the city, the less it is dependent upon basic activities, and hence the less links with surrounding suppliers and markets, for its viability. Beyond a certain size, growth is self-generated and is a product of the non-basic sector. The second consideration, which relates to the size of the urban multiplier, is that larger urban centers have the capacity to grow more rapidly, a small increase in the basic sector leads to proportionately large increases in the non-basic sector. Conversely, this means that large cities are somewhat more vulnerable to collapse if the basic sector suddenly contracts. These mechanisms and relationships emphasize the close dependence of small cities on the volume of surplus product that exists locally. They provide theoretical support for the views of those who believe that the generation of surpluses was a key factor in urban genesis (Clark, 2003).

Suburbanization theories

The system grows exponentially at first but as the land limit is reached, new enterprises fail to be built (Batty, 1967). Urban growth as a transition from rural landscape to fast irregular and unplanned spread of large cities (Kotlyakov, 2007; Thapa et al., 2010), is achieved when central cities export the growth factors to their around. With the formation of the capitalist and labor class, conditions were provided to immigrate from central cities to which offered new roles to suburbs. Gradually, speculators turned surrounding farmland to urban land. Later, technological innovations foster lower-income class migration to suburbs. At the present time, most large cities around the world are undergoing a process of

population suburbanization and employment decentralization (Garcia-López, 2010).

Generally, two hypotheses are cited to account for the interdependencies between cities and suburbs: a) Flight from blight hypothesis suggests that suburbs growth is the result of social and fiscal problems such as high taxes, congestion, high crime rates, concentrated poverty (Leichenko, 2001), lack of cultural and consumption amenities (Garcia-López, 2010) and racial tensions in central cities, b) The second hypothesis "natural evolution" indicates that suburban growth is a function of demand for land by firms and higher-income households fostered by innovations in transportation technology (Leichchenko, 2001).

In investigating new space for settlement, residential land area, residential population, work trips, service trips, population and employment ratio, total land area and cost of trip (Batty,1976) are important factors that should be considered.

Ramachanran (1989) explain transformation of suburbs in five stages:

1) The rural stage.
2) The stage of agricultural land use change.

3) The stage of occupational change.
4) The stage of urban land use change.
5) Urban village stage.

MATERIALS AND METHODS

Study area

Because of existing big cities and particularly capital, USTP (Figure 1) includes conspicuous and diverse factors influencing the flow of capital, goods and people which gives it exceptional situation in national growth process.

19% of population, 25.4% total urban population and 5.3% total rural population is settled in USTP. 91.3% of its population is urbanized. Urban population of province has reached from 4947367 million in 1976 to 12,260,431 million in 2006. 30% of industries, 26% of large factories, 40% of consumption market, 40% of food industries, 40% of the country's cooperatives, 44% of floriculture industry, 31% of meat production are located in this province. Having 584 large firms in economical, agriculture and services activities, USTP contains a third of the country's total economic power (http://amar.sci.org.ir). Only two cities from 53 urban settlements have more than 1 million populations in USTP in 2006. It is interesting that there is not any city with 500 thousands to 1 million populations in USTP. In addition, 10 cities exist with 100 to 500 thousands population and rest of the cities is less than 100 thousands, but role of these cities in distribution of population and attraction of new immigrants has a considerable importance.

Several methods are used to examine changes in settlement patterns and population dynamics in USTP.

Classification of cities

Classifying cities is first step to study settlement pattern change in urban system. Today, statistical methods have provided some ways for classifying cities, but also are not perfect. In this paper, classification criterion is population amount of cities. A graphical method is used in this way. Chart breakpoints were considered to divide cities into five classes, based on the 2006 population data (Statistical Centre of Iran, 2006) (Table 2).

Mehta index

In this paper, we use three models including Mehta index, entropy coefficient and urban system development model. The first computes concentrating changes and the second and the third calculate deconcentrating process in USTP from 1966 to 2006.

There are different methods to compute primacy index such as urban primacy index, Two-city index, Ginsberg index and Four-City index or Mehta index. In this paper we used Mehta index which is defined as:

$$\text{Mehta index} = \frac{P_1}{P_1 + P_2 + P_3 + P_4} \qquad (1)$$

Where, P_1 is population of the primate city, P_2, P_3 and P_4 are population of the second, the third and the fourth big city in USTP, respectively. Examining rank-size rule and four-city index, Richardson suggested ranges to determine primate city score
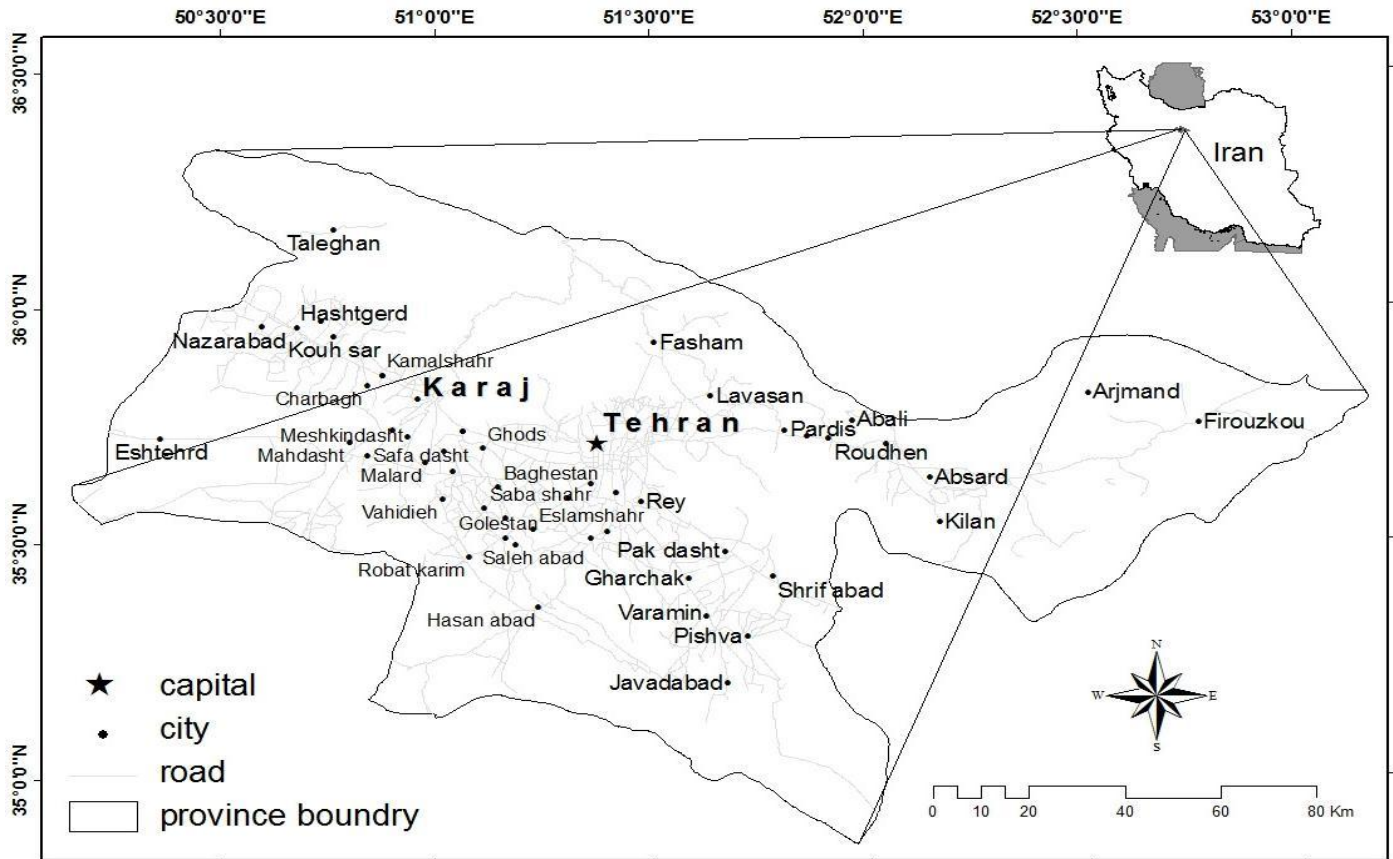
Figure 1. Position of Tehran province in Iran (2006).

Table 1. Richardson's ranges to determine primate city score.

The least primacy	Desirable primacy	High primacy	Extra primacy
0.41 and less than	0.41 to 0.54	0.54 to 0.65	0.65 to 1

(Table 1) (Zabardast, 2006).

Entropy coefficient

Entropy coefficient ranges from 0 to 1. If the entropy trends towards 0, indicates more concentration or imbalance state in the distribution pattern of settlements. Higher entropy coefficient shows more dispersed pattern of urban population (Hekmatnia et al., 2006). Note that in real world, there are not some evidence being exactly 0 or 1, but urban systems lay between ranges.

After classifying cities, the coefficient of entropy was calculated in two dimensions: 1) in terms of population 2) and in terms of number of urban points. Entropy coefficient is defined as (Hekmatnia et al., 2006; Wheeler et al., 1986):

$$E = -\sum_{i=1}^{n} P_i \cdot L_n P_i \qquad (2)$$

$$P_i = \frac{\text{population of or number of urban points in Class}_i}{\text{total urban population or total number of urban points}} \qquad (3)$$

Where, E is entropy coefficient and L_n is natural logarithm of P_i. Figures 5 and 6 are computed in terms of Equation 2 and figure 7 is calculated in terms of Equation 3. Date used in this paper to compute all tables and figures, exception Figure 2 and Table 6, are collected by Statistical Centre of Iran in years 1966,1976,1986,1996 and 2006.

Urban system development model

Different models have been proposed on settlement patterns transformation corresponding to economic developments (Zabardast et al., 2009). One of these models is proposed by Berg et al. (Clark, 2003) under title urban development model. For Berg et al. cities evolve in a defined sequence of stages based upon population changes in urban regions as a whole and upon shifts of population within urban regions (Table 3). In the 'stages of development' model, changes of urban form are related to shifts in

Table 2. Classification of cities according to population.

Class	Population (persons)	City (1966)	City (2006)
Urban - Rural village	900 to 10000	Nasirabad-Golestan- Mahdasht-Chardange-Eslamshahr-Gharchak-Pishva-Boomehen-Pardis- Hasanabad-Baghershahr-Ferdosie- Sabashahr-Robatkarim- Salehabad-Nasimshahr-Absard-Sharifabad-Kahrizak-Kousar-Fasham-Kilan Nazarabad-Charbagh- Baghestan-Vahidie-Malard-Javadabad-Taleghan- Eshtehard-Ghods–Abali- Shahryar-Arjmand- Meshkindasht-Shaheshahr- Firouzkou-Garmdare-Kamalshahr-Pakdasht- Mahamdshahr.	Absard-Sharifabad-Kahrizak-Kousar-Fasham-Kilan-Charbagh-Javadabad-Taleghan-Abali-Arjmand-Shaheshahr.
Small city	10000 to 20000	Roodhen-Varamin-Newhashtgerd-Hashtgerd- Lavasan.	Ferdosie-Hasanabad-Roodhen-Sabashahr-Eshtehard-Mahdasht-Firouzkou-Newhashtgerd-Lavasan-Garmdare.
Mid city	21000 to100000	Andisheh- Damavand.	Nazarabad-Kamalshahr-Mahamdshahr-Andisheh-Robatkarim-Salehabad-Baghershahr-Baghestan-Hashtgerd-Meshkindasht-Mahdasht-Boomehen-Chardange-Pishva-Damavand-Pardis-Vahidie- Nasirabad.
Big city	101000 to 500000	Karaj.	Eslamshahr-Golestan-Ghods–Malard- Varamin-Nasimshahr-Shahryar-Gharchak- pakdasht.
Metropolis	1000000 and above	Tehran.	Tehran- Karaj

Table 3. Stages of daily urban system development (Clark, 2003).

Stage of development	Classification	Population change characteristics			
		Core	Ring	DUS	
Urbanization	Absolute concentration	++ [1]	_ [2]	+ [3]	Total growth (concentration)
	Relative concentration	++	+	+++ [4]	
Exurbanization	Relative deconcentration	+	++	+++	
	Absolute deconcentration	_	++	+	
Counter urbanization	Absolute deconcentration	_	_ _	+	Total decline (deconcentration)
	Relative deconcentration	_ _	_	_ _ _	
Reurbanization	Relative concentration	_	_ _	_ _ _	
	Absolute concentration	+	_ _	_ _	

the distribution of population within and around the city. For this purpose, it is useful to divide urban landscape into a number of areas according to their population, employment and commuting characteristics. At the centre of urban region is a core area of population which comprises a central business district. Beyond the core is an extensive commuting ring from which it draws many of its daily workers. The ring encompasses an area of towns and villages in a predominantly rural setting.

Core and ring are tightly bound in a relationship of interdependency by morning and evening commuting flows between two areas. Beyond daily urban system is a sparsely populated rural area. Urban development model is based upon variations in the direction and rate of population change between core and ring. Shifts are absolute when core is growing while ring is declining or inverse. Alternatively, Shift is relative when each area has the same direction of change but the rate of change is different (Clark, 2003).

In order to study cities in term of urban development model, first, daily urban system must be determined. Daily urban system means a set of cites having daily flows of population among themselves. To determine daily urban system in USTP, commuter bus system criterion was used and data was collected through field survey
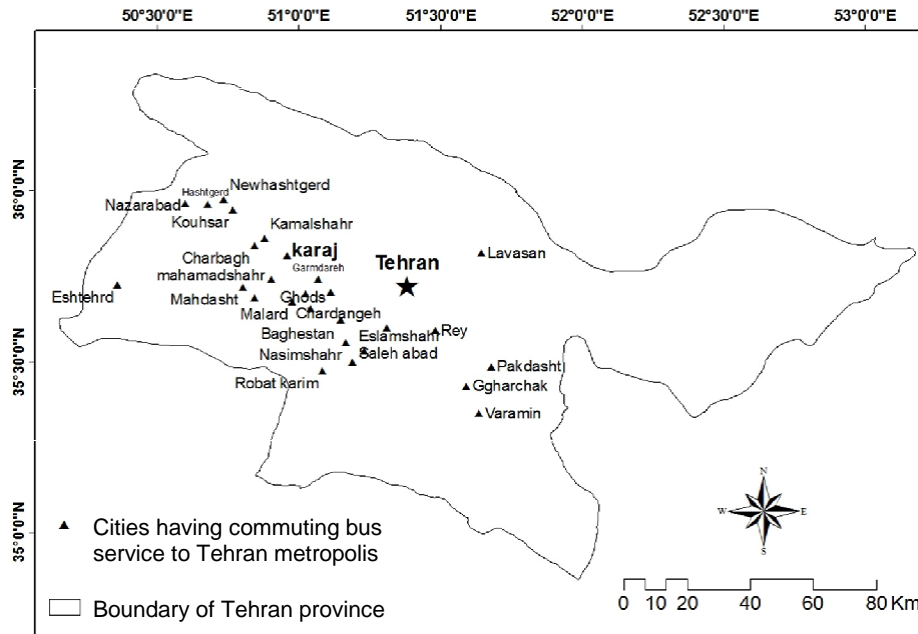
Figure 2. Commuter bus transportation system in USTP (2006).

(Figure 2). To use this factor, there are several advantages:

1) Since all of bus systems among cities is run by a private organization, it may be said that due to many commuters between central city and suburbs and also, high density of urban population in suburb (Souche, 2010) in suburbs, the management of bus systems has economic efficiency for private sector.

2) Bus system works from morning to night corresponding to cycle of daily living. Even people can travel for leisure and recreation in urban system, too.

3) A reduction in average user cost of public transportation encourages using public transportation (Srinivasan, 2005; Liya et al., 2008; Souche, 2010).

4) The most essential attribute of a network is connectivity of a network (Lee et al., 2001). Bus system links surrounding cities to Tehran metropolis, directly. If a person who travels from origin to his destination is been forced to use several nodes, his/her demands reduces.

5) By considering low economical status of people who have few transportation choices, bus services are more appropriate means than minibuses and taxis. Cost and time are two main factors in travel demand (Srinivasan et al., 2005). The population of cities which have commuter bus system is as a basis to compute Table 6.

FINDINGS

Changes in primacy index

Population concentration in Tehran is influenced initially by political policies. Relying on oil revenues, declaring "Open Door" policy in 1957, acting "Land Reform" in 1962 and simultaneously establishing assembly industries mainly in Tehran province, in fact government provided conditions for people transition from rural to urban settlements and particularly in Tehran metropolis (Habibi,

2005; Nazarian, 2005) and therefore to form pattern of urban primacy.

By considering demographic data(statistical Centre of Iran, 1996; statistical Centre of Iran, 1976; statistical Centre of Iran, 1986; statistical Centre of Iran, 1996 and statistical Centre of Iran, 2006), we see that despite of declining growth population rate in Tehran metropolis (Table 5), families' increase demand for services, private sector demand for financial, business and managerial services, governmental ministries and headquarters of the major governmental agencies have intensified labour market especially in Tehran which take in a large number of people both in low-skilled and in high-skilled jobs as well as in informal economy.

However, rent factor (for house, business and industrial activity), plays an important role in future dynamics. Because of high rents and costs in Tehran, poor people who live in this city and those come from other provinces to Tehran province, prefer to live in suburbs, but to work in this city. So belt of big cities around Tehran, capital of Iran, is growing, now (Figure 3 and 4). Furthermore, Suburban residents contribute to the city's tax base, directly by their spending and indirectly because their workplaces add to the property-tax base of the city (Pacione, 2005).

Besides the aforementioned factors, it should be noted that Albourz chains in the north, unfavourable climate conditions in the south affected by topography, wind direction and especially location of industries are geographical factors limiting growth of Tehran (Rahnemaie, 2000). Tehran is crowded and the land is quite expensive.

Although population growth of Karaj is very high (Table 5),

Table 4. Changes in primacy index in USTP, (date source: Statistical Centre of Iran, 1996, 1976, 1986, 1996 and 2006).

Year	1966	1976	1986	1996	2006
Richardson range			Extra primacy		
Mehta index	0.96	0.94	0.91	0.83	0.79

Table 5. The growth rate of population of Tehran and Karaj metropolis (1966 to 2006).

Year	1956 to 1966	1966 to 1976	1976 to 1986	1986 to 1996
Tehran	5.70	5.23	2.92	1.12
Karaj	11.75	12.04	7.15	13.09

Table 6. Population change in daily urban system of Tehran province (1966 to 2006).

	Year	Tehran city pop	Suburb pop	Daily urban system pop	Stage of development	Classification type	Total trend
				Population change characteristics			
Population growth rate (%)	1966 to1986	4.07+	11.78++	4.59+++	Suburbanization	Relative decentralization	Total growth (concentration)
Population growth rate (%)	1986 to 2006	1.42+	7.25++	2.66+++	Suburbanization	Relative decentralization	Total growth (concentration)

but lack of cities with half a million persons in USTP have led to remain extraordinary primate city state in USTP (Table 4). Increasing population in cities around Tehran, as a result of immigrations from Tehran metropolis and particularly from other parts of country will be an influential factor in decreasing primacy.

Settled immigrants in big cities have short spatial distance to the metropolis stimulate their rapid growth.

This causes noticeable commuting between metropolis and them. Also public and private cooperation, by considering least effort principle, are relocating in big cities. Due to the short spatial distance and public transportation development in the surroundings, this makes double pressure on infrastructures of Tehran metropolis and landscape change in peripheral area.

Changes in distribution of urban population and urban points

As previously discussed, it was found that in recent years both population growth of Tehran (Table 5) and primate city index have declined due to government migration controls (Dhehaqani, 2005). Moreover, the city is crowded and the land is quite expensive, then by increasing Land availability (in terms of both the affordability and amount of undeveloped land) with distance from densely populated metropolis (Portnov et

al., 1999), immediate hinterland has experienced high concentration of population. In 1966, we cannot see sizable urban point while in 2006 a large number of cities had emerged around Tehran and Karaj (Figures 3 and 4). Regional imbalance in job opportunities and facilities is specific character for Iran (Hosseinzadeh, 2006) which makes polarized regions in the country. A number of factors contributed to hinterland's high concentration of population and activities. Locally available skilled labour, research and development facilities, nearness to considerable consumption market (40% of country's consumption market), etc., has centralized a large amount of industries and factories in only 1.2% of Iran's total land area.

So, although population growth has declined in Tehran because of economic advantages of scale (for example, cheap land resources in periphery area, congestion on roadways, increased land and service costs in central city) (Portnov et al., 1999; Pacione, 2005), this does not mean to reduce migration into USTP. 24.56% (2,983,889 persons) of country's total migration during 1996 to 2006 has entered in Tehran province which 11.83% (353,232 persons) of them were caused for obtaining job (www.amar.sci.org.ir).

According law migrations, introduced by Ravenstein (1834 to 1913), most migration is over a short distance and long-range migrants usually move to large urban areas (Fellmann, 1996) which perhaps can be explained
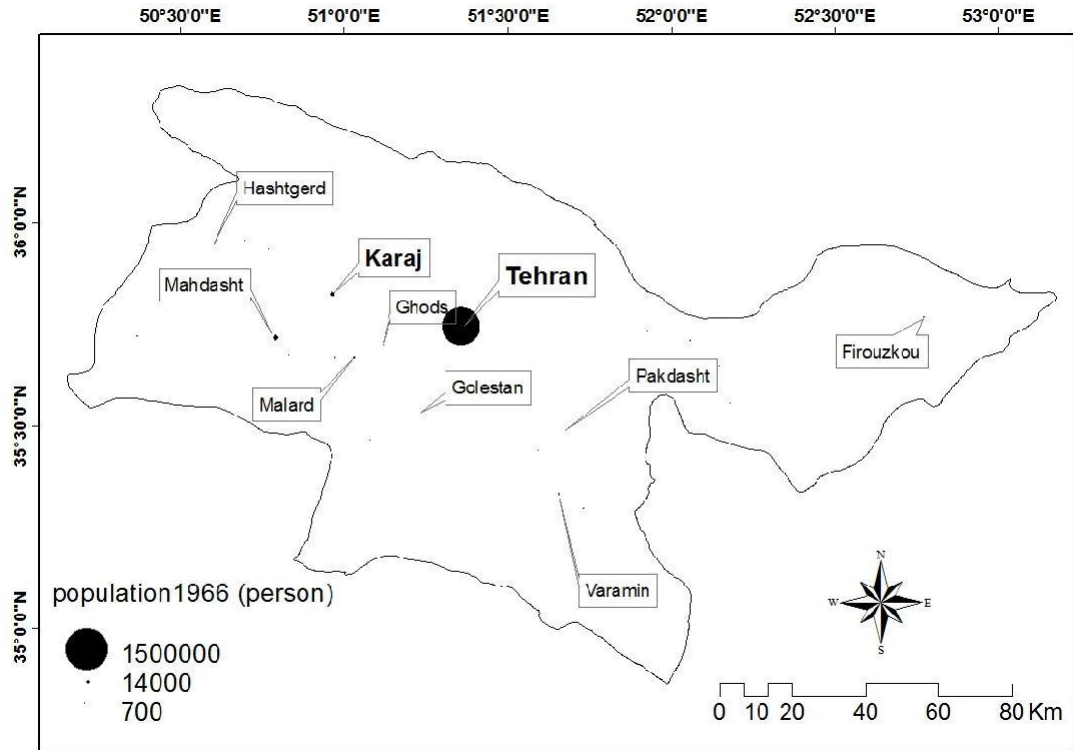
Figure 3. Spatial distribution of cities in terms of population in USTP (1996).
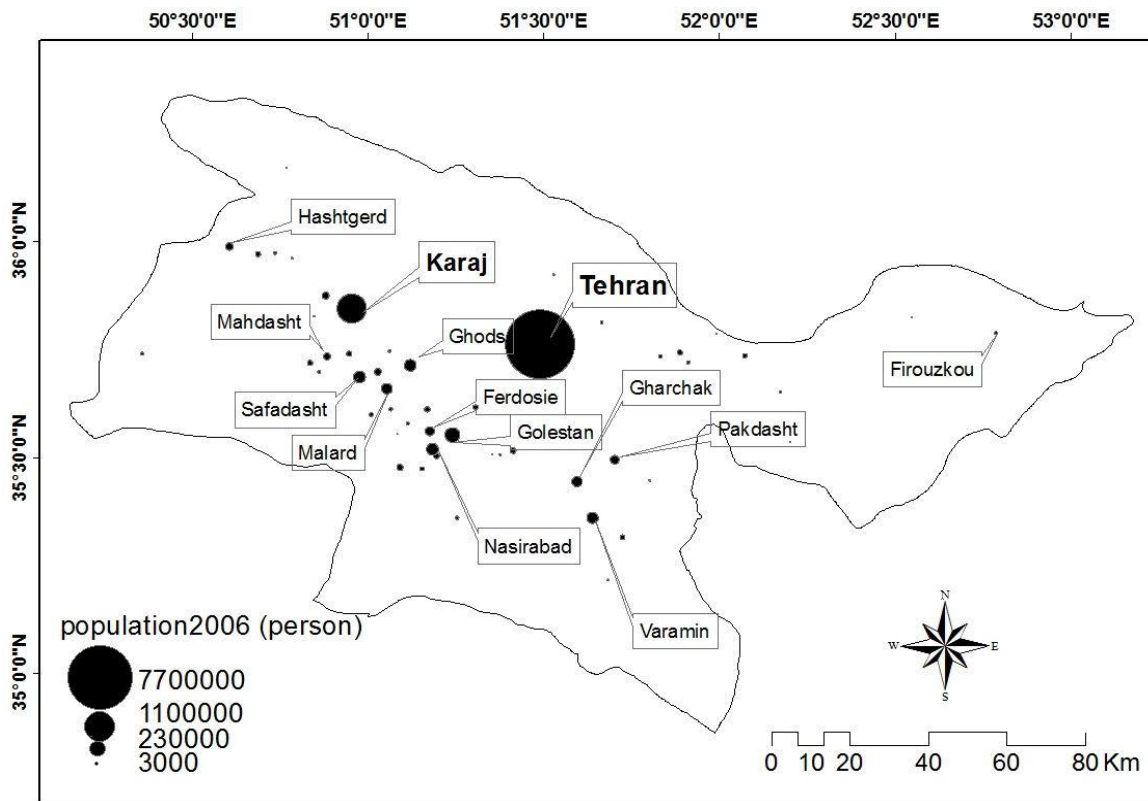

Figure 4. Spatial distribution of cities in terms of population in USTP (2006).
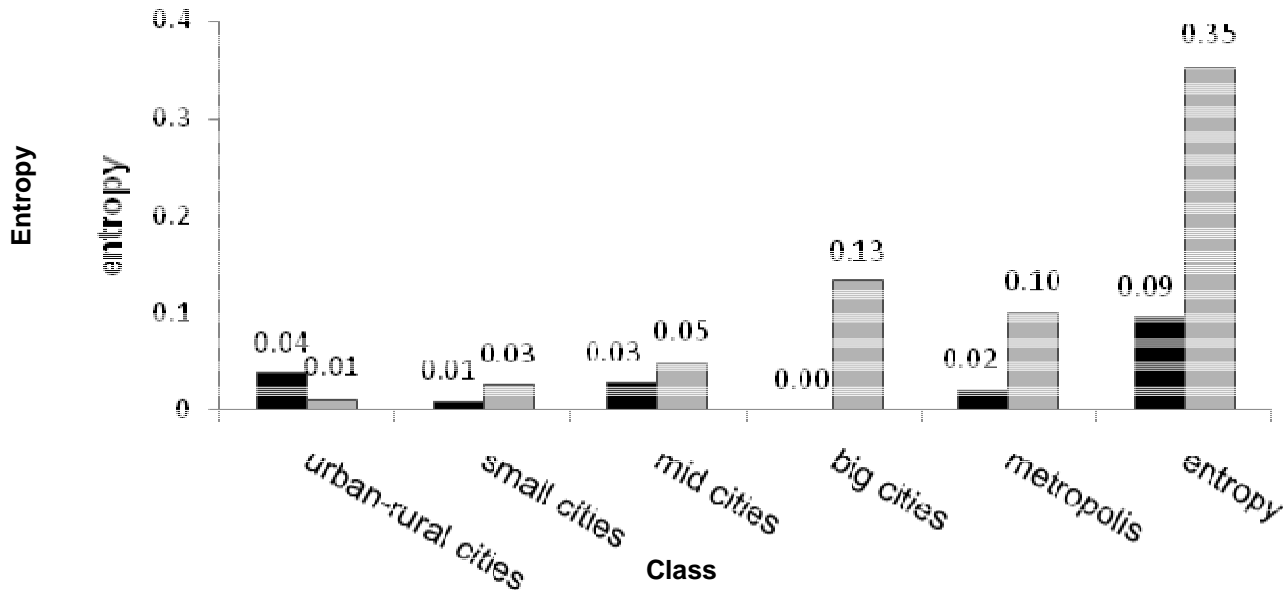
Figure 5. Entropy changes of the number of urban point in USTP (1966 to 2006).
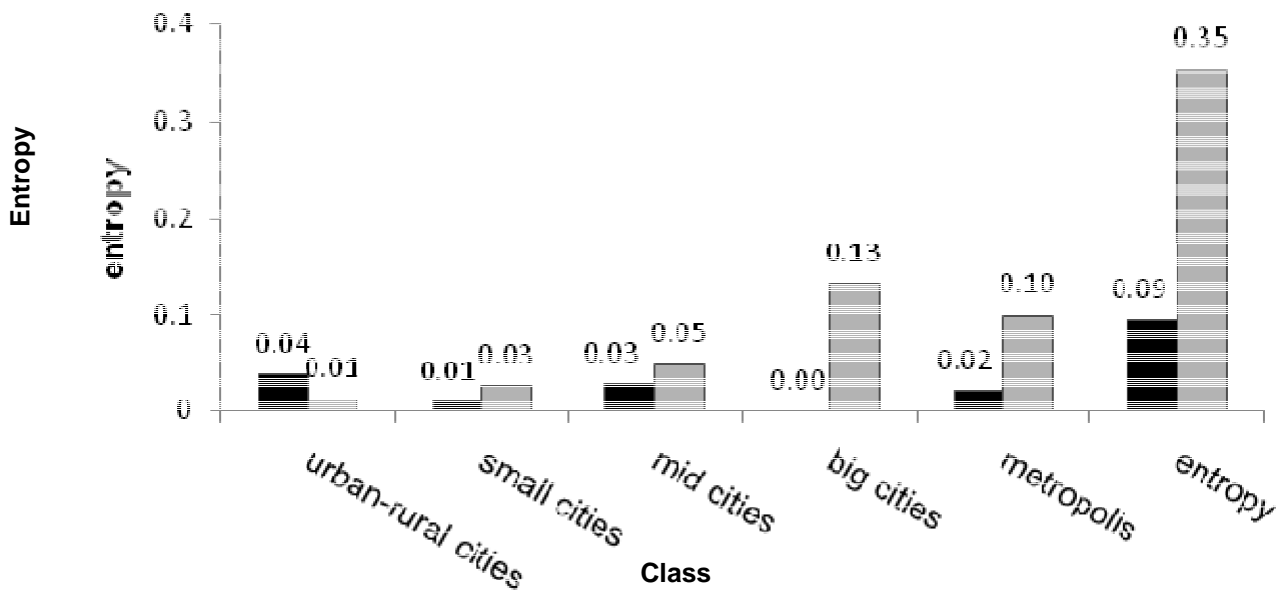

Figure 6. Entropy changes of population in USTP (1966 to 2006).

in terms of least effort principle.

Two aspects of these laws are important in USTP. The first is that people emigrate from Tehran to periphery area at short distance, and the second is that a people coming from country's other parts selects big cities to live. Since home-ownership is a social and economic value in Iran, availability of land is a critical factor determines ability of the poor to construct and consolidate their own settlements (Pacione, 2005). So,

during 1966 to 2006, big city class, both in numbers and in population had significant growth (Figure 5 and 6). Figure 5 shows entropy of the number of urban point had considerably moved toward more equilibrium pattern (from 0.13 to 0.64). That is, we can see cities with different size in USTP. The figure also exhibits the variable share of different classes in entropy changes during 1966 to 2006.

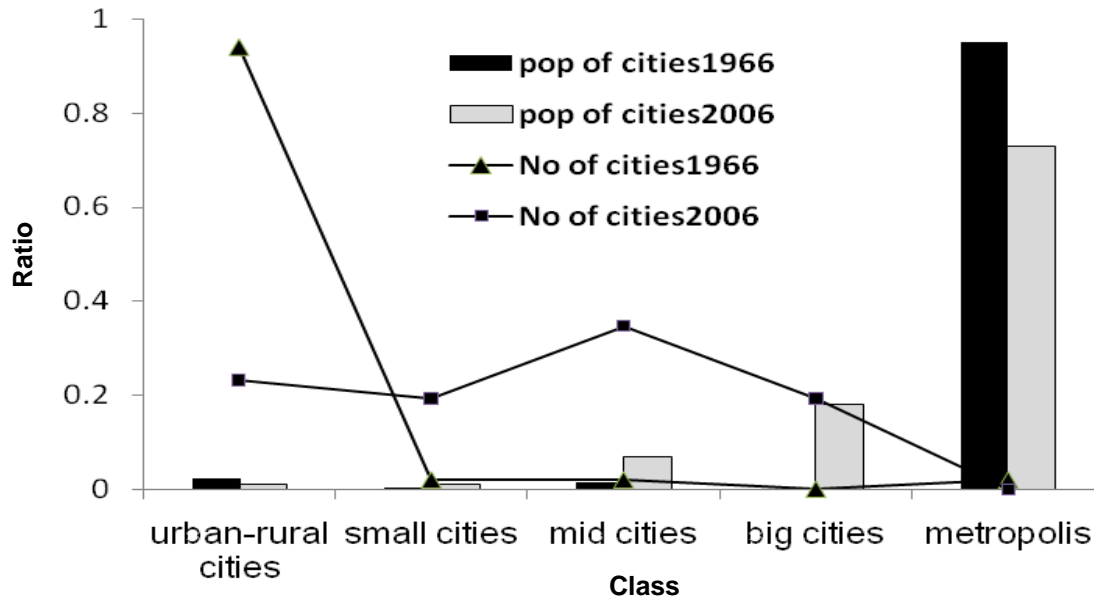Figure 6 shows changes in entropy of population in

Figure 7. Changes in population and number ratio of cities in USTP (1966 to 2006).

1966 to 2006 period (from 0.09 to 0.35). Either Figure 5 or 6 presents important share of big city class in entropy changes.

Growth of big cities in developing countries led to shape informal settlement phenomenon (Akhoundi et al., 2007). By considering sustainable development concepts, we cannot claim that population distribution have produced better pattern, but has produced different pattern. Because the most number of big and mid cities has scattered in a short distance from Tehran and Karaj (Figure 4). It can be estimated high pressure on metropolises' infrastructures, intense land use change from agricultural to urban (Ningal et al., 2008) and stressfully social environment in peripheral area.

Migration is mostly due to economic causes and occurs in steps (Fellmann, 1996). Moreover, level of infrastructure development (transport network, engineering utilities) generally diminishes with distance from the major urban centres of a country (Portnov et al., 1999). Large towns, grow more by migration than by natural increase. After forty years, many of urban-rural villages such as: Eslamshahr, Golestan, Ghods, Malard, and Varamin had altered to big cities. Many of present urban-rural villages have located in the east of USTP (Figure 1) which topographical condition does not allow industrial and residential development there. In other word, desired cities for population are not urban-rural cities in USTP (Figure 6). But thank for financial support of government, proportional frequency of their number is more than proportional frequency of their population (Equation 3) (Figure 7).

Increasing demand for lacking of leisure space and within big cities and metropolis attract population to small

cities and urban-rural villages. Particularly in North and East of Tehran province there are diverse attractions which have been exploited by strongly expanding second homes. In the watershed of Latian Dam, there are more than ten thousand second homes including 50% of total housing (Rezvani et al., 2006). Besides benefits such as increasing per capita income and job creation, polluting water, reducing villages' permanent population, increasing temporary population and changing agricultural land to second house (Rezvani et al., 2006) are the most important negative consequences of tourism development in this cities.

Coordination among different zones, particularly between urban and agricultural land use is often a contentious issue in urban fringes where competitive interests concerning land uses are found. Spontaneous and disordered developments in such zones have severe impacts on agricultural and residential landscapes. As a consequence, land fragmentation has occurred and valuable open spaces have been converted to residential and commercial uses while the preservation of open spaces has been an important policy in many regions (Saizen et al., 2006; Millward, 2006). This necessitates consolidated management of cities in USTP.

Changes in urban development process

Suburbanization of the residential population of cities is essentially a twentieth-century process closely associated with development of transport technology. Suburbs may be defined as the outer areas of a city which are linked to city by their lying within the commuter

zone of an urban area. 'Suburbs' usually refers to the predominantly residential landscapes built up around urban core as a city has expanded outwards (Hall, 2001; Kotlyakov, 2007).

In developed countries, it is mainly better-off who move to suburbs, but in developing world, it is generally poor who are forced to locate to cheap lands on periphery area. Few cities have significant amounts of undeveloped land within their boundaries on which to accommodate the growing urban poor population, or to relocate space-extensive land uses, thereby freeing up sites closer to the centre for the urban poor (Devas, 2005). Local decentralization is very different from dormitory style suburbanization of the early post-war period, now involving the veritable 'urbanization of suburbs' and some withdrawal of 'urban' facilities from traditional cities through a form of 'deurbanization' process (Paddison, 2001).

Urban system of Tehran province, based on urban development model and "commuter bus system" criterion, can be placed in suburbanization stage (Table 6), that is, population growth rate in the cities around Tehran (Figure 2) is wholly more than that in Tehran metropolis. It can be said that USTP has been passed urbanization stage (Table 3) and started decentralization process.

Cities within daily urban system of Tehran province grew rapidly during 1966 to 1986 as families moved there in anticipation of jobs. The non-appearance of expected jobs led to poor social services, gridlocked freeways and four-hour daily commuting journeys.

Density population promotes public transportation expansion in those cities. Since location appears to be important in travel behaviour, especially for low-income residents who have few transportation choices (Srinivasan, 2005), public transportation attract people more and more. It appears that location affect all aspects of travel behaviour: time, cost, frequency and mode choice for a trip (Srinivasan, 2005).

Then, a belt of poverty has shaped around the metropolises which make difficulty for achieving a sustainable development not only for cities in this belt but also for metropolises. Large cities grow more by migration than by natural (Fellmann, 1996). Population growth rate of Tehran metropolis significantly has reduced in this period (1966 to 2006) signify decreasing immigrants share in its growth. As a result, main growth is occuring in big cities.

In rapidly growth and deconcentrated metropolitan regions, traffic congestion is so bad that it is fast approaching gridlock. This issue is an environmental problem of urbanized areas which is highly interrelated and is often a consequence of dense development (Paddison, 2001). It is not unusual for people a three or four-hour daily commuting journeys between Mohammadshahr or Varamin and metropolises by private car or public transportation such as bus. These issues such as congestion, pollution, concentration of poverty

around and in the Tehran and Karaj metropolis, provision of municipal services to developing areas, emergence of sprawl, etc., necessitate seeking new structures and functions for government and governing in Tehran metropolitan area.

Because metropolitan area experiences growth or change pressures that extend beyond individual political boundaries (Hamilton, 2000). In general, greater the similarity between people and places with a region-socially, fiscally, politically, and developmentally- the more apt these people and places are to pursue and forge regional alliances. History, politics, economics, resources, and legal factors may reinforce or weaken tendencies toward regionalism (Foster, 1997). And these elements should be tested in Tehran metropolitan area.

DISCUSSION AND CONCLUSIONS

Population flows which has mutual interrelationship with political, economical, social and environmental process, act as a power in urban system. Relying on oil revenues, declaring "Open Doors" policy in 1957, acting "Land Reform" rule in 1962 and simultaneously concentrating investment in the primate city, government provided conditions for transition subsistence economy to capitalist production. Metropolises such as: Tehran are the most attractive cities, because of their job opportunities as the most important factor for immigrants. But high rent and service cost act as push factors. Then, gradually, population and economic institutions move to periphery area and prepare growth condition there.

In view of the least effort principle, migration laws, cheap land in periphery area, travel demand variables such as time, cost and mode choice in USTP, not only people have emigrated from Tehran to periphery at short distance but also migrant coming from the country's other parts selected big cities to live, then large population flows to big cites. Examining entropy changes of the number of urban points over the period 1966 to 2006 shows that settlements present exhibit more scattered pattern in 2006, but according to spatial-equilibrium theory, the number of higher-order centres would be less than that of lower-order centres, whereas USTP is to reverse the theory. A number of big cities with short distance from each other and from metropolises have appeared over this period. Thus, although entropy of the population and the number of urban points show considerably dispersed pattern of settlement during 1966 to 2006, what remains critical is rising a significant number of big and mid cities at short distance from Tehran metropolis which has led to increasing commuting between Tehran and them. Thus, belt of big and poor cities in the form of informal settlements around Tehran and Karaj is growing, now. In this process, metropolises, accompanied by big cities, grow and produce a common problem for all cities in USTP which necessitate

integrated management in USTP. It is worthy to say that, today, markets are emerging in large urban areas in the international, national or regional scale which increases inefficiency of small town and perhaps enhances growth of big cities in the future.

An important issue that should be solved in a regional development is the process for making link between national, regional and local levels. Beside regional integrated management, an emphasis on local management and civil society is essential, if we accept concentrated planning and market system are not exclusive and single useful approach for local and regional development.

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