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# Spatial-geographical analysis of urbanization in Iran

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The development of urbanization and urbanism in Iran has created a wide socioeconomic gap in urban areas. Rapid population growth along with the lack of socioeconomic growth programs and urban development strategies have deteriorated unemployment, inflation, housing price, traffic congestion, and marginalization in cities, particularly in metropolises of Iran. This paper, using a descriptive-analytic research method and a meta-analysis technique, addresses the urbanization and urbanism changes in Iran. Using GIS technique and CV formula, the spatial distribution of urbanization and its rapid growth in Iran are depicted. The research data was derived from a systematic review of documents and techniques over 40 years. The results of the study demonstrated that Iranian cities have undergone an unsustainable growth trend and urbanization has overtaken urbanism. Over the past 4 decades, cities have been struggling with rapid growth and development. In this regard, development-oriented governments can play a significant role in tackling growth and urbanization problems. These problems are especially evident in the socio-economic, urban planning and urban ecology. The rapid growth of urbanization (74% in 2016) has resulted in the emergence of metropolitan areas in an unstable process. Also, in metropolitan areas of Iran, environmental and ecological threats, rural-urban migration and marginalization have posed serious national-regional and local challenges. The structural-functional reforms in Iran, along with skeletal-spatial and socio-economic changes in cities, have given rise to a new social class (low-income people), which is characterized with non-formal businesses and informal settlements in the outskirts of cities, especially metropolitan areas. This has prompted unsustainability in main indicators of urban development such as security, building density, environmental threats, and centralization, among other things. This analysis is based on indicators such as density and centralization, informal settlement, and urban security.

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## Introduction

In developing and less-developed countries, the rate of urbanization has generated an unbalanced trend. As such, strategies of growth and development, with the centralization of metropolis and capitals, have paved the way for structural–functional changes. This trend has provoked imbalance and inequality in urban and urbanization systems, resulting in economic polarization and dependence, polarization of capital, class division, along with population movements, especially rural–urban migrations (Pilehvar and Pourahmad, 2004). Some experts believe that an important factor that sheds further light on cities in developing and developed countries is understanding the role and the status of government in urban development and growth (Shokuie, 1995). It is because development in such countries, instead of agriculture, relies upon urban activities, which are accompanied by class conflicts and disparity, and exacerbate urban poverty (Haerian Ardakani, 2007). Therefore, in such countries, urban change ensues exogenous factors, and cities, owing to their centralization, are embodiment of imbalanced urbanization and urbanism on the one hand and encourage dependence and consumer-oriented urbanization on the other (Shokuie, 1995). This has resulted in the dominance of metropolises over their fringes and caused an imbalance in the process of sustainable development in recent decades. The importance of urbanization and urbanism has captured the attention of urban practitioners and scholars from both material and spiritual aspects. These scholars have attempted to unravel the rules of urban life and to find solutions for problems and issues facing cities (Piran, 1991). Urbanization and urbanism are socio-cultural phenomena arising from a connection between socio-economic and cultural-political systems in every country. Urbanization is considered to be a settlement pattern and system of governance, and governments play major roles in the variations of this phenomenon. In this paper, urbanization is seen as a process related to urban population growth (caused by rural–urban migration), physical environment, and the growing number of cities. Urbanism is a behavioral urban phenomenon that is qualitative in nature. In the present study, urbanism refers to behaviors, values, and traditions held by the urban population.

In Iran, urbanization and urbanism play a key role in the creation of spaces and formation of geographical regions such that the emergence and growth of rural and urban areas could be considered as corollaries of these two phenomena (Shokuie, 2006). In centralized countries (e.g., Iran), the role of government is vital to attain the goals of the urban system and also structural and functional changes. Hence, government plays a pivotal role in the structure and function of cities, which has contributed to centralization and growth of urbanization and urbanism (Pilehvar et al., 2011). This study aims to explore the process of urbanism, with an emphasis on urbanization in Iran. It adopts a descriptive–analytical methodology and data collection is performed through the analysis of documents and statistical sources. Using GIS Technique, the spatial distribution of urbanization and its rapid growth in Iran are depicted and the divergence between urbanization and urbanism is deduced.

## Methodologies

This is a descriptive research that uses the meta-analysis technique. Meta-analysis is the process of integrating the results of several studies to draw certain conclusions or to plan new studies. Meta-analysis is adopting statistical techniques in a systematic way to integrate the results of multiple studies. Data were obtained from the analysis of documents and GIS technique in a systematic review (from 1957 to 2017). The coefficient of variation (CV)

formula was also used to present meta-analytic topics. The design-related issues include protocols development, objectives, literature review, publication bias, measures of study outcomes, and quality of data.

**Study area.** Iran is a country in the southwest Asia, with prominent geographical and geological features as shown below (see Fig. 1).

Iran is a middle-income developing country with a significant industrial base, a relatively solid scientific and technological infrastructure and desirable human development (Pilehvar, 2019).

In recent decades, the growth and development of urbanization and urbanism in Iran have been affected by several important indicators, which could be classified into six categories:

1. *Political:* Iran's political developments such as 1979 Revolution have been effective in structural and functional changes in cities. Given that the government in Iran is centralist, this approach has played an important role in concentrating population and activities in large cities, which has posed challenges in large cities. From a political point of view, public participation in Iran's urban management is a new phenomenon. In 1998, the first election of the Islamic Council of Cities represented an important step in policy-making and management of the urban system, and these councils played a major role in the promoting urban development in Iran.
2. *Social and cultural:* Urban development is directly related to social and cultural development of Iran. Along with the social and cultural development associated with modernism and postmodernism, it gained prominence in urban planning and architecture of Iran. However, it was incompatible with the values of the Iranian-Islamic community. Population density in metropolises, the rise of a new generation of urban specialists, the change of lifestyle from rural to urban patterns after the 1970s, marginalization, consumerism, etc., have been primary manifestations of social and cultural indicators of urban growth and development in Iran.
3. *Economic:* Urban economy is crucial for urban development. The support of Iran's oil-based economy from the urban economy has considerably influenced the growth and development of urbanization. As such, foreign investment, GDP surge, increase in per capita income of citizens, inflation, the growth of urban poverty, etc., could be examined in relation to this index.
4. *Physical:* One sign of urban development in Iran is the physical growth of cities. The transformation of rural areas into cities, the construction of 28 new cities, the unbalanced urban growth, high-rise, vertical urban planning, etc., explain the trend of changes in the physical index.
5. *Technological:* In recent decades, the development of information and communication technology has played a crucial role in urban development management. In Iran, information production, processing, and distribution have been main barriers to urban development planning and management. In the last two decades, the implementation of the national e-government plan and the establishment of smart cities have highlighted the role of this indicator in the urbanization and urban development system.
6. *Environmental:* Balanced urban growth and development is one of the key principles of sustainable urban development. The proper locations, and urban development policies, among other things, are key factors in urban sustainability or instability. In Iran, the urban population growth and ineffective urban system have mounted environmental challenges such as pollution (water, soil, and air), forest



**Fig. 1 The geographical position of Iran and its provinces.** Figure shows the location of Iran in Southwest Asia. Most of Iranian provinces are concentrated in the western and northwestern regions. The urban population is also more concentrated in these provinces. Iran, one of the leading countries in Southwest Asia with a population of 83 million, has 31 provinces and shares border with 15 countries. Due to its geopolitical and geostrategic position, Iran is of geopolitical importance in the Middle East. The 2019 population density in Iran was 51 people per  $\text{mm}^2$  (132 people per  $\text{mi}^2$ ), calculated based on a total land area of 1,628,550  $\text{mm}^2$  (628,786 sq. miles) (see <https://www.worldometers.info/world-population/iran-population/>).

degradation in northern Iran, and per capita reduction of urban green space. However, with the implementation of the EGO system, important steps have been taken for investment in recycling municipal waste and increasing the per capita green space.

### Theoretical framework

**Urbanization.** Urbanization describes the surge in the population of urban spaces compared to rural spaces (Deepika, 2020). It is also a geographical phenomenon. Urbanization is a process through which changes in the social structure of human settlements are caused by population density, concentration, and growth. Structurally, urbanization is characterized with the transformations of socio-economic structures and demographic functions, which alter the structure of urban spaces. Generally speaking, urbanization has two main features:

The flow of migrants from rural areas to cities in search of employment and non-agricultural jobs and activities, which leads to higher levels of density and land use change.

The transformation of people's lifestyles along with changes in values and attitudes, which promotes new types of behavior (Shokuie, 1995).

**Urbanism.** Urbanism is an urban movement linked to socio-cultural development and growth (Varma, 2017). Urbanism describes citizen's interest in the city, which is driven by social

awareness and a sense of belonging to the city. In its broad sense, urbanism is the study of cultural, political, economic, social, and geographical aspects of cities (Deepika, 2020). To Louis Wirth (1938) and Theodorson and Theodorson (1969), it is a lifestyle (Agalgatti, 2008; Theodorson and Theodorson, 1969; Wirth, 1938), and in major cities and metropolises, this lifestyle has been associated with rationalization, individualism, loss of identity, and alienation (Fischer, 1982; Simmel, 1971). The urbanism theory is influenced by three approaches:

1. Determinism or the ecological approach in which population density, monetary economy, communication, etc., differentiate urban and rural spaces in term of living conditions, creating a specific lifestyle called urbanism.
2. The sub-culture approach, which has influenced the social life of cities (Sharepour, 2011) and reinforced various social groups with different sub-cultures (Sedigh Sarvestani, 2013).
3. The integrated approach, which influences urbanization through emotive connections with demographic features such as age, sex, occupation, and education (Bemianian, 2012).

Urbanism is a bi-directional link that extends from villages to cities and vice versa and provokes changes in behavioral patterns and values (Anderson, 1959). Urbanism is the final phase and the outcome of urbanization (Rahmani Firoozjah et al., 2013). Therefore, a country might have a high rate of urbanization, but a low level of urbanism. Urbanism is another basic concept

**Table 1 Population and urbanization per cent in developed and less developed regions (1950-2050).**

Total and urban population	Percentage					
	1950	1970	1990	2018	2030	2050
Development group						
More developed regions (Total population)	32.1	27.3	21.1	16.5	15.1	13.3
Less developed regions	67.9	72.7	78.5	83.5	84.9	86.7
More developed regions (Urban population)	59.4	49.8	36.2	23.6	20.3	16.8
Less developed regions	40.6	50.2	63.8	76.4	79.7	83.2

Source: UN (2018). World population prospects: the 2018 revision and world urbanization prospects.

associated with the urban culture (Gottdiener et al., 2015) and citizenship culture, which arises from socio-cultural relations and communications (CNU, 2020). Urbanism is usually characterized with some changes in values, traditions, ethical norms, and the collective behavior of citizens (Jalalipour and Abdolahpour, 2012). Features of urbanism include contradictions of norms, cultural changes, social movement, and individualism. In the past decades, these features have been affected by globalization, modern urban spaces, ethnicity, etc. (Hooper, 2009).

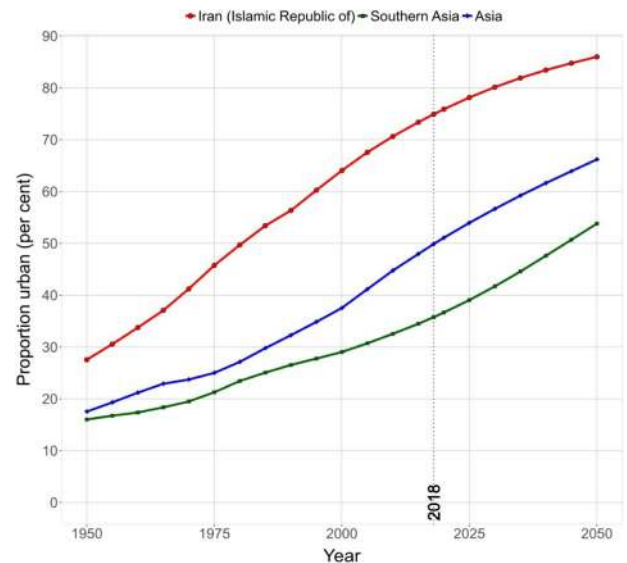
**Population and urbanization in the world.** The analysis of population changes and urbanization trends show four types of change:

1. The urbanization of villages, i.e. the process of transforming villages into cities, will continue along with a surge in urban population.
2. The concentration of rural population in the suburbs of major cities will aggravate in less-developed and developing countries.
3. Globalization of cities, i.e. the transformation of cities into metropolises with national and international functions (Shabirchima, 2004).
4. The global urbanization, which is marked by the alteration of settlement models from rural to urban (Pilehvar, 2019).

As shown in Table 1, these changes describe the process of urbanization in the world and changes of life patterns from non-urban to urban styles.

In 2018, the less-developed regions accounted for 76% of the world's urban population and 83.5% of the total world population. As the developing world is becoming increasingly urbanized, the difference between these two figures declines. By 2050, with 5.6 billion urban population, the less developed regions are projected to accommodate 83% of the world's urban population and 87% of the total world population (UN, 2018) (Table 1).

**Urbanization in Southwest Asia.** Contemporary urbanization in both less-developed and developing countries of southwest Asia has been the outcome of globalization, modernization, and transition from agricultural societies to industrial and super-industrial societies. Notwithstanding the bifurcation of their socio-economic systems, the process of urbanization in these countries has followed a uniform direction, but retained its specific regional form, with the redistribution of population in these countries favoring urban societies at the cost of the abandonment of villages. The urbanization pattern in both groups of countries has followed a logarithmic curve. The processes of urbanization and urbanism in both groups are accompanied by creativity and innovation, providing a fertile ground for geographical concentration of capital, population, activities, and exchange of information. Urban population growth in south Asia and Iran is shown in Fig. 2. The prospect of urban population growth in Iran



**Fig. 2 Process of urbanization in southern Asia, Asia and Iran in 1950-2050.** Urban population growth in south Asia and Iran's shown in figure. The prospect of urban population growth in Iran indicates that this trend will increase up to 85% by 2050. This is a considerable growth, which exhibits a prevailing gap with other Asian or south Asian countries. The share of urban population in these areas compared to their subregions. Figures are expressed as a percentage of the total population, 1950-2050. Source: United Nations (2018). Department of Economic and Social Affairs, Population Division, and World Urbanization Prospects: The 2018 Revision.

indicates that this trend will increase up to 85% by 2050. This is a considerable growth, which exhibits a prevailing gap with other Asian or south Asian countries (UN, 2018) (see Fig. 2).

**Urbanization and urbanism trends in Iran.** In recent decades, urbanization and urbanism trends in Iran have manifested a clear disparity between the quality and the quantity of urbanization and urbanism. Political and socio-economic changes ushered in by modernism (establishment of new factories, railways, creation of oil industry, land reforms, industrialism, etc.), which began in Iran in 1922, boomed urbanization and changed the face of cities. The rate of natural population growth doubled and the pace of urban population growth was accelerated compared to natural and rural population growth. To shed further light on this issue, the historical periods of urbanization and urbanism in Iran can be described as follows:

*The first period: pre-1922 era.* In this period, the Iranian economy was dependent and fundamental cultural, economic, and social changes were introduced (Nazarian, 2010). Subsequently, the traditional socio-economic system and its components including cities, lost their dynamism, spurring recession in urbanization



and urbanism (Solimyani, 1994). This era was coincided with the industrial growth and industrialism in western countries. As a producer of raw materials (agricultural products, oil, etc.), Iran is part of the global markets; however, this has had a slight effect on the pace of urbanization and urbanism in Iran, causing limited transformations in terms of urban, spatial and physical constructs. In this period, urbanization and urbanism remained fairly stable and urbanization was <50 percent.

*The second period: from 1922 to the 1979 Revolution.* From early 1920s, oil revenues played a pivotal role in geopolitics of Iran and assisted the trend of modernism. Transitioning from workshops to factories, the growth of bureaucracy, emphasis on military power, etc., are all indicative of authoritarianism and major structural changes in the political, social, and economic systems of Iran in this period (Habibi, 1977).

Therefore, more than ever, cities were considered as main centers for accumulation of capital, concentration of activities, and innovations, and for several decades, centralization policies of the government were integral to the creation of metropolis and their unseemly growth.

Therefore, political, economic, and social changes along with the development of government policies, which were based on urbanization and urbanism, overshadowed other phenomenon (Saidi Rezvani, 1993). These effects, transmitted through industrialization-induced migrations, turned Tehran into the major city of Iran and contributed to the emergence of a raft of other new cities (Amir-Ahmadi, 2008). Therefore, urbanization gained prominence and the law for establishing municipalities was ratified in 1931. A focus on modern urbanization and urban development triggered formal and physical changes in cities and the enactment of the law for developing sidewalks and streets in 1934. This legislation was the onset of modern urban planning, a milestone for the transformation of urbanization and foundation of urbanism in Iran (Pilehvar, 2007). In this period, the formulation of growth and development plans along with the strategic plan of industrialization in 1960s ushered in two major waves of change in Iran: physical transformation of urban centers and mass rural–urban migrations.

During the first wave, the introduction of new symbols of western culture such as hotels, theaters, cinemas, banks, etc., together with the advent of a new device called automobile, transformed the structure, and the function of cities. In the second wave, massive torrent of migrants from villages to cities, who were in the hope of finding better job opportunities and reaping the fruits of industrialism, along with deployment of industries in the fringes of major cities triggered major changes in urbanization and urbanism processes?

*The third period: post 1979 Revolution.* The 1979 Iranian Revolution was an urban event triggered by the congregation and participation of social groups, especially the emerging middle class (Movsaghi, 2007). With their political wisdom, religious beliefs, independence, Islamism, and republicanism, they strived to change the ruling government. In the wake of the Islamic revolution, the model of political, social, cultural, and economic development underwent massive changes, so that government played a more prominent role in regional-urban plans for growth and development (Haji Hashemi, 2012).

The concentration and reinforcement of migration waves increased fertility rates and altered consumption pattern of the society, with the achievements of the Revolution highlighting the lure of cities. The widespread and unbridled rush of migrants to cities coupled with the elevated rate of natural population growth, due to policies that supported population growth, led to the formulation of comprehensive plans called

“Development and Construction” in 1980s. In this period, a new government agenda was planning and constructing 28 new cities to accommodate the population surplus of major cities, which began in 1990s. This plan had a substantial role in the growth of urbanization in Iran.

**Population and urbanization in Iran.** The role of government in protecting, expediting, and intensifying urbanization and urbanism processes in Iran was influenced by recent changes, especially the 1979 Revolution. Accordingly, in the post-Revolution era, governments, albeit with discernible fluctuations, have continuously attempted to reinforce and promote urbanization and urbanism by adopting city-centric and city-based policies (Rahnamai, 2009). In this period, governments, whether knowingly or unknowingly, have focused on reinforcing urbanization rather than urbanism. This is provoked by factors such as the growth of semi-capitalism and the automation of the national economy along with government’s expansionary policies (Kamrava, 1995). From this perspective, the government has failed to play a systematic and influential role in the urbanization of Iran. The rapid transformation of villages into cities along with growing rural–urban migrations, which reached 25% in 2000s in Tehran (as the capital of Iran), engendered a raft of environmental (adverse consequences of fossil fuel consumption, endangered coastal cities, water supply to cities), humanitarian and social (security threats, social clashes, especially in the fringes of metropolises, inadequate health services, etc.) issues that threatened urbanization. In this process, the urban population and urbanization pace were escalated but scant attention was paid to the urban culture or urbanism.

Over the past decades, urbanization policies in Iran have been driven by the importance of urbanization in the process of national growth and development at the cost of overlooking the huge potentials of rural areas. Hence, the government, as a major driver of structural and functional changes in Iranian cities, has played a pivotal role in this process. According to the Human Development Report released by the United Nations, the urban population of Iran was 64.20% in 2000, rising to 75.94% in 2019 and is expected to rise to 85.82% in 2050 when the rural population will reach its nadir (UN, 2018). The percentage of urban and rural population in Iran from 1950 to 2050 is depicted in Fig. 3.

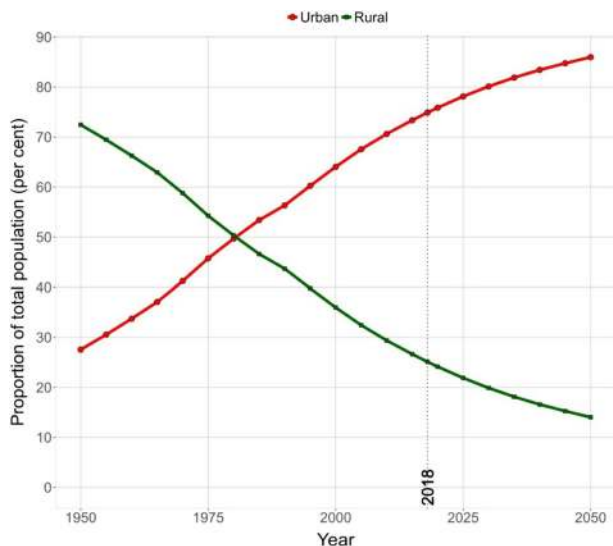
Failure to implement new population-control policies coupled with the eruption of Iran–Iraq war led to a surge in the average rate of annual population growth in the 1980s, which was estimated at 3.9% according to of 1986 Census. Since 1990s, the introduction of birth control strategies decreased the average rate of annual population growth to 1.5% from 1996 to 2006. This declining trend continued to the last national Census in 2016, when the average rate of annual population growth was reported to be 1.3% (Statistical Center of Iran, 2018). According to the results of the 1986 Census, the population growth rate of 3.9% in this year marked a historical milestone in Iran. According to urban statistics in Iran, which is based on the national census, there were 271 cities in Iran in 1966 and this figure rose to 1245 in 2016. As shown in Table 2, over a 40-year period, the urban population spiked from 53.3% in 1986 to 74% in 2016 (Table 2).

**Changes in the urbanization growth rate.** The population growth and urbanization of Iran rates have taken an upturn in recent decades. The analysis of urban population growth shows that urbanization has nearly doubled and the urban population has witnessed a 6-fold increase. In fact, in the wake of the 1979 Revolution, Iranian governments have developed a tendency for

**Table 2** Number of cities, urbanization percent and urbanization rate in Iran (1966–2016).

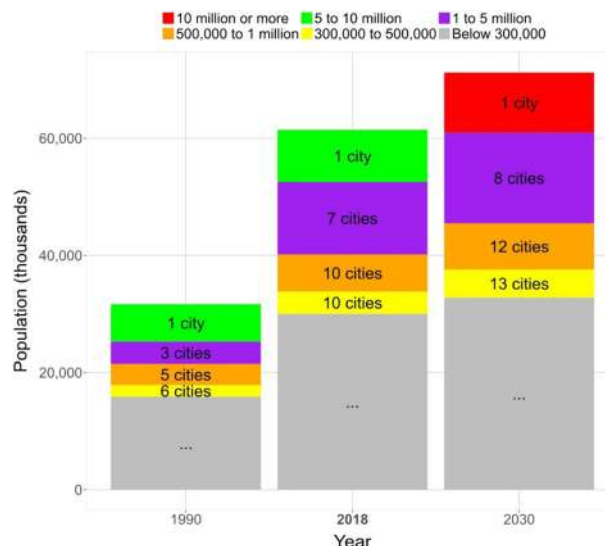
Year	Total population (million)	Percentage of annual growth of population	Urban population (million)	Urbanization per cent	Rate of urban population	Number of cities
1966	25	3.1	9	37.9	4.9	271
1976	33	2.7	15	47	5	373
1986	49	3.9	26	54.3	5.4	496
1996	60	1.5	38	61.3	3.1	612
2006	69	1.6	48	69.6	2.7	1016
2016	79	1.3	59	74	1.3	1245

Source: Statistical Center of Iran (2020). National censuses in 1966–1976–1986–1996–2006–2016.



**Fig. 3** Percentage of Iran's urban and rural population in 1950–2050.

According to the Human Development Report released by the United Nations, the urban population of Iran was 64.20% in 2000, rising to 75.94% in 2019 and is expected to rise to 85.82% in 2050 when the rural population will reach its nadir. The percentage of urban and rural populations in Iran from 1950 to 2050 is depicted in the figure. Since the 1980s; the urban pattern has replaced the rural pattern in Iran. For the first time, the urbanization percent reached 51% in the 1986 official Census and this trend has continued to date. Source: United Nations (2018). Department of Economic and Social Affairs, Population Division, and World Urbanization Prospects: The 2018 Revision.



**Fig. 4** Classification of Iran's urban population by 2030.

As shown in figure, Iran had a city with a population of 10 million in 2018 (Tehran). It is projected that by 2030, the number of cities with up to 5 million populations will increase. Therefore, Iranian cities manifest a rising trend in terms of population and urbanization. Classification of urban population in terms of the size of urban settlement and the number of cities in 1990, 2018, and 2030. The gray area denotes residual areas, which include all urban settlements with <300,000 populations. Source: United Nations (2018). Department of Economic and Social Affairs, Population Division, and World Urbanization Prospects: The 2018 Revision.

both urbanism and city-centrism. Emergence and expansion of major cities as well as the change of rural lifestyle into urban one together with a 35% surge in the urban population over 5 decades are all evidence of this transformation in Iran.

The analysis of urbanization growth rate in Iran shows that settlement patterns have altered from rural to urban in 1980s, giving rise to a new urbanization and urbanism trend (Pilehvar, 2019). In addition to different mortality and birth rates of rural and urban areas and rural–urban migrations, some other major factors including the establishment of 28 new cities have also contributed to the transformation of villages into cities. These factors increased urbanization rate in Iran, especially in 1990s and 2000s. Figure 4 shows the population of Iranian cities by 2030. As shown in Fig. 4, Iran had a city with a population of 10 million in 2018 (Tehran). It is projected that by 2030, the number of cities with up to 5 million populations will increase. Therefore, Iranian cities manifest a rising trend in terms of population and urbanization (UN, 2018) (see Fig. 4).

**Geographical distribution of the urban population.** Since early 1920s, the urbanizing trend and urban change in Iran indicate centralization in major cities such as Tehran, Mashhad, and Tabriz. Despite the decentralization policies, which were implemented by the government in 2000s, centralization and urbanization in Iranian provinces are still on rise.

The percentages of population living in urban areas of Iran in 2000s and 2010s, based on the national censuses, are shown in Table 3.

Comparing the percentage of urban population in 2006 and 2016 Censuses shows provinces that are home to Iranian metropolises (such as Tehran, Isfahan, Qom, Alborz, Khuzestan, Khorasan Razavi, Fars, Gilan, East Azerbaijan) have a higher urbanization rate. In addition, provinces that are located in desert regions (such as Qom, Yazd, and Semnan), due to their specific environmental features and lack of growth opportunities (mainly water shortage) have a low level of urbanization. On the other hand, in provinces where villages have great potentials to grow, such as Mazandaran (44.2%) and Gilan (46.8%), the urbanization rate is lower.

**Table 3 Urbanization coefficient of Iranian provinces in 2006 and 2016.**

Province	2006	2016	Mean ( $\mu$ )	Standard Deviation ( $\sigma$ )	Coefficient of Variation (CV)	Urbanization Changes (%)
Markazi	68.98	76.93	72.955	3.975	0.054	7.95
Gilan	53.88	63.34	58.610	4.730	0.081	9.46
Mazandaran	53.18	57.78	55.480	2.300	0.041	4.6
East Azerbaijan	66.6	71.68	69.140	2.540	0.037	5.08
West Azerbaijan	60.03	65.42	62.725	2.695	0.043	5.39
Kermanshah	66.79	75.22	71.005	4.215	0.059	8.43
Khuzestan	67.22	75.45	71.335	4.115	0.058	8.23
Fars	61.17	70.12	65.645	4.475	0.068	8.95
Kerman	58.53	58.73	58.630	0.100	0.002	0.2
Razavi Khorasan	68.15	73.06	70.605	2.455	0.035	4.91
Isfahan	83.32	88.02	85.670	2.350	0.027	4.7
Sistan and Baluchistan	49.60	48.49	49.045	0.555	0.011	-1.11
Kurdistan	59.43	70.76	65.095	5.665	0.087	11.33
Hamadan	57.58	63.12	60.350	2.770	0.046	5.54
Charmahal and Bakhtiari	51.56	64.09	57.825	6.265	0.108	12.53
Lorestan	59.43	64.46	61.945	2.515	0.041	5.03
Ilam	60.69	68.13	64.410	3.720	0.058	7.44
Kohgiluyeh and Boyer Ahmad	47.64	55.74	51.690	4.050	0.078	8.1
Boushehr	65.15	71.85	68.500	3.350	0.049	6.7
Zanzan	57.99	67.25	62.620	4.630	0.074	9.26
Semnan	74.70	79.80	77.250	2.550	0.033	5.1
Yazd	79.71	85.32	82.515	2.805	0.034	5.61
Hormozgan	47.11	54.71	50.910	3.800	0.075	7.6
Tehran	91.34	93.85	92.595	1.255	0.014	2.51
Ardabil	58.27	68.17	63.220	4.950	0.078	9.9
Qom	93.92	95.18	94.550	0.630	0.007	1.26
Ghazvin	68.05	74.75	71.400	3.350	0.047	6.7
Golestan	49.17	53.28	51.225	2.055	0.040	4.11
North Khorasan	48.36	56.12	52.240	3.880	0.074	7.76
South Khorasan	51.03	59.02	55.025	3.995	0.073	7.99
Alborz	88.07	92.64	90.355	2.285	0.025	4.57
Total	68.46	74.00	71.230	2.770	0.039	5.54

Source: Statistical Center of Iran (2018). National censuses in 2006 and 2016.

Moreover, in provinces that host nomads, the urbanization rate is low. Tehran has the highest rate of urban population followed by Khorasan Razavi. The lowest level of urban population belongs to Kohgiluyeh and Boyer-Ahmad province, followed by South Khorasan, Ilam, and North Khorasan, respectively.

Table 3 shows huge gaps between Iranian provinces in terms of urbanization and the urban population in 2000s, which is due to economic and social differences in Iranian provinces including the levels of economic, social, and cultural development as well as sustenance diversity. The data from 2006 Census manifests the unbalanced distribution of urbanization in Iran. As can be seen, Hormozgan (47.11%), Kohgiluyeh and Boyer-Ahmad (47.68%), and North Khorasan (48.36%) have the lowest while Qom (93.92%), Tehran (91.34%), and Isfahan (83.32%) have the highest levels of urbanization, respectively. Figure 5 shows the geographical distribution of urbanization in Iranian provinces based on 2006 Census (see Fig. 5).

According to 2006 Census, Sistan and Baluchestan (48.49%), Hormozgan (54.71%), and Golestan (53.28) have the lowest rates of urbanization while Qom (95.18%), Tehran (93.85%) and Alborz (92.64) have the highest rate of urbanization. In Fig. 6, the geographical distribution of urbanization in Iranian provinces based on 2016 Census is depicted (see Fig. 6).

Overall, it can be asserted that increased urbanization in Iran is triggered by factors such as rural-urban migration, which is rooted by industrial development, settlement and concentration of the nomads in new cities, and transformation of some rural areas into cities, especially villages in the vicinity of major cities. For the analysis of changes in the trend of urbanization in Iran,

based on data presented in Table 3, coefficient of variation (CV) formula. Expressing the dispersion of data around the mean, this coefficient was obtained by dividing the standard deviation ( $\sigma$ ) by mean ( $\mu$ ) and then multiply it by 100.

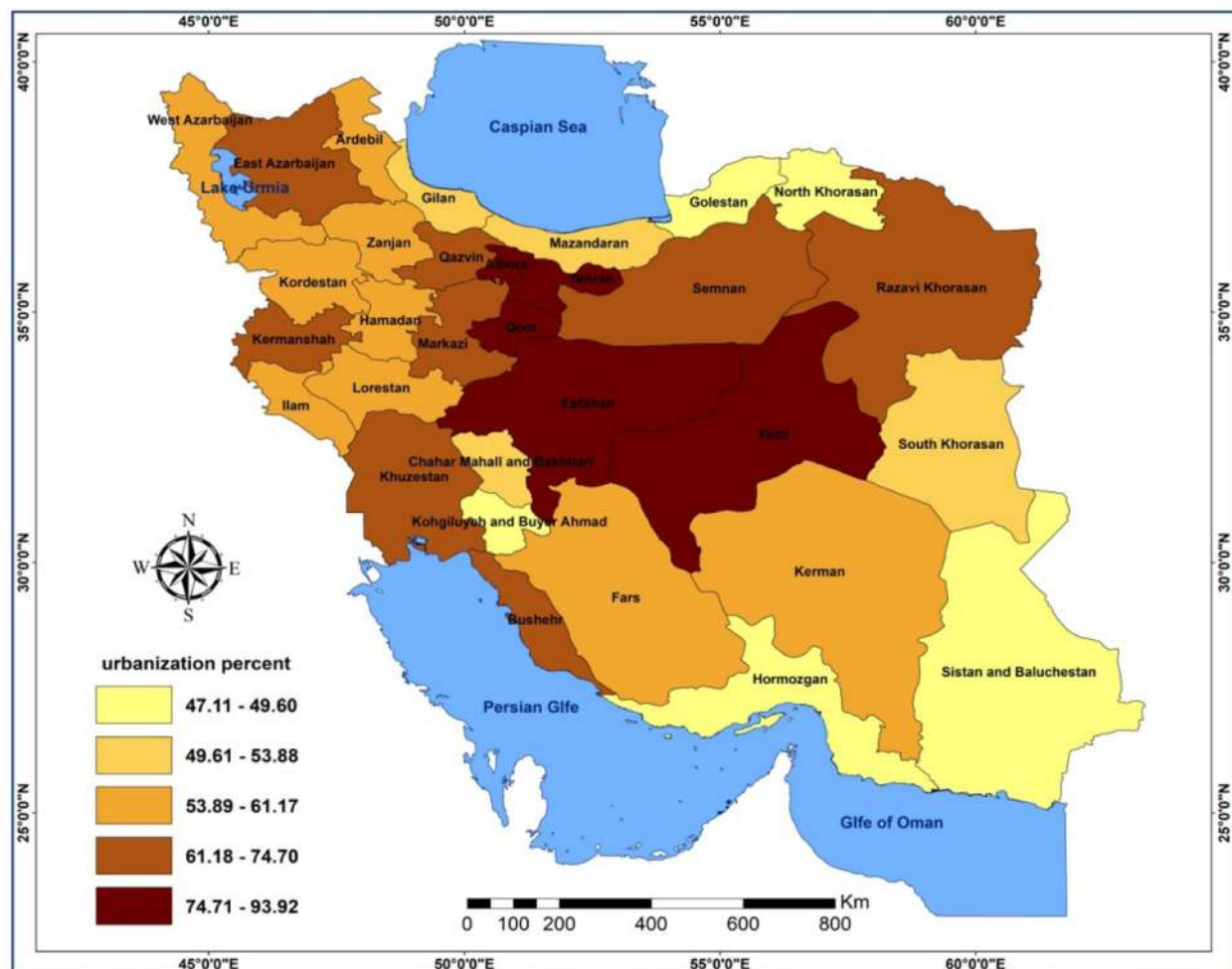
This coefficient is shown by Formula 1.

$$CV = \frac{\sigma}{\mu} \times 100 \tag{1}$$

Therefore, this index indicates a change relative to the raw percentage index. Formula 2 shows the coefficient of urban variation in Iran from 2006 to 2016. This coefficient is calculated by dividing the standard deviation of the sample (S) by the mean ( $\bar{X}$ ), as shown in Formula 2.

$$CV = \frac{S}{\bar{X}} \tag{2}$$

For example, in Kermanshah and Khuzestan provinces, the percentage of urban change is higher than that of North Khorasan because their average urbanization is higher. However, they have a lower CV than North Khorasan. For the analysis of urban CV in Iran, provinces can be classified into three groups: The first group comprises the provinces of Chaharmahal and Bakhtiari, Kurdistan, Gilan, Kohgiluyeh and Boyer-Ahmad, Ardabil, Hormozgan, Zanzan, North Khorasan, South Khorasan and Fars, which have the highest CV. These provinces have undergone structural changes during this period with the lifestyle of the people witnessing a change from a traditional rural pattern to an urban one. As a result of the government’s support policies for the urban system, the development of urban centers, and expansion of industrial facilities,



**Fig. 5 Geographical distribution of urbanization in Iran (2006).** Figure shows the largest urban population of Iran in 2006 in the central provinces of Yazd, Isfahan, and Tehran. The lowest share belongs to the southeastern part of Iran, including the provinces of Kerman, Sistan, and Baluchestan and South Khorasan (Sources: Research findings).

this province has witnessed a greater rural–urban migration. In the second group, Kermanshah, Khuzestan, Ilam, Markazi, Hamedan, Qazvin, West Azerbaijan, Bushehr, Lorestan, Mazandaran, and Golestan provinces have a moderate CV. This suggests that industrialization in these provinces has lasted in recent decades. In some provinces belonging to this group, including the northern provinces of Iran, people still reside in villages and earn a living in rural areas. The third group consists of industrial provinces such as East Azerbaijan, Khorasan Razavi, Yazd, Semnan, Isfahan, Alborz, Tehran, Qom and Kerman, which has the lowest CV. In these industrial provinces, which have reached a degree of stability, balanced urbanization process is evident. Sistan and Baluchestan province in the southeast is an exception. In this province, due to severe deprivation, unemployment, and limited official activities in cities and villages, the lowest CV belonged to urban population growth and migration tendency.

The changes of urbanization in Iranian provinces over the study period (2006–2016) are shown in Fig. 7. As depicted in Figs. 5–7, urbanization has taken an upturn so that in some provinces such as Fars, Gilan, Ardabil, Zanjan, Kurdistan, and Chaharmahal and Bakhtiari, it has increased from 8.44 to 12.53 (see Fig. 7).

## Discussion

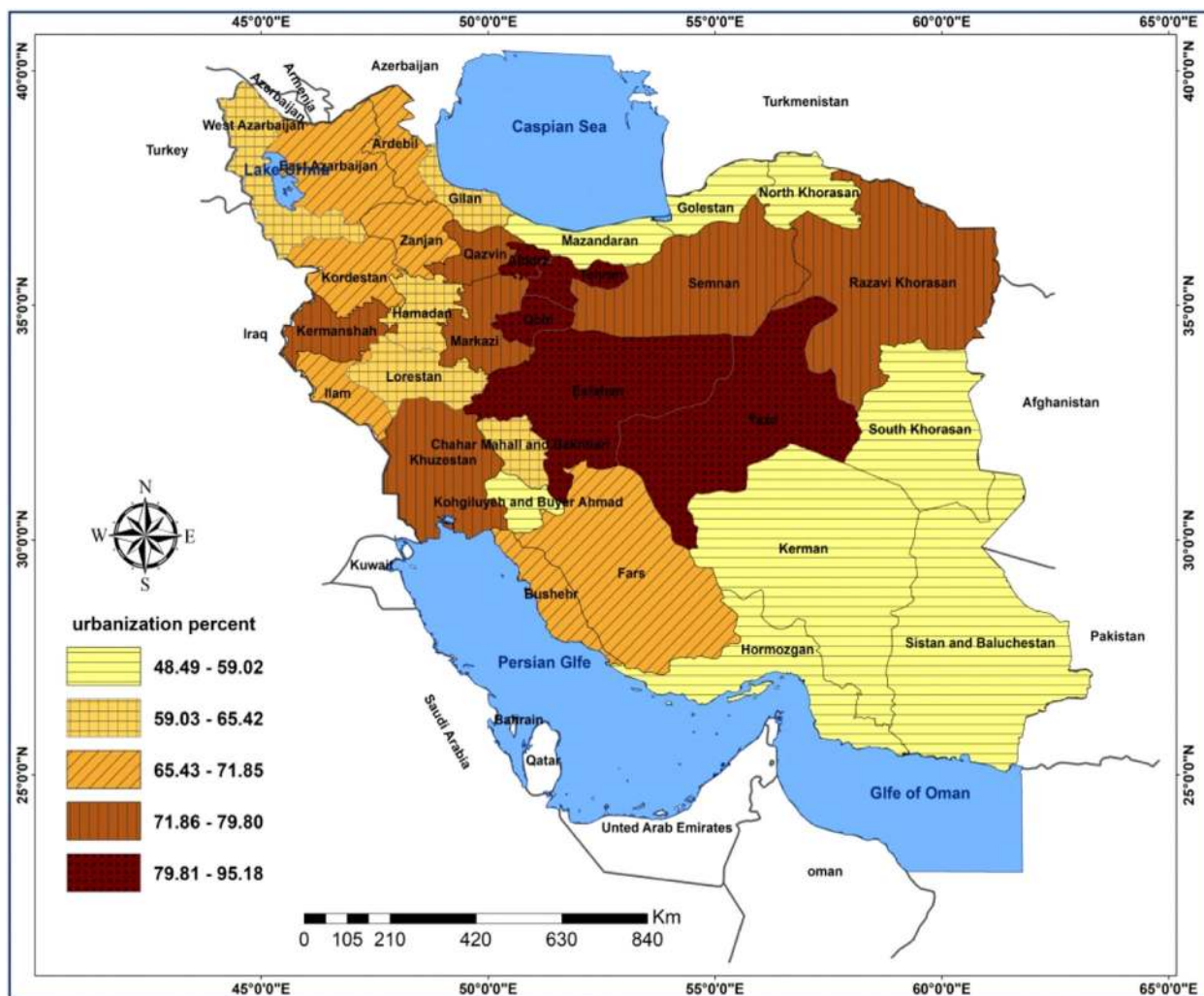
In the 1960s, the modernism approach with the strategy of harmonized industrialization and land reform boosted the flow of rural–urban migration. Since the 1970s, the Iranian government

has fortified the urban economic cycle using oil revenues and capital flows (Rahnamai, 2009). The government, influenced by its urbanism approach, has changed the rural–urban mechanism, which reinforced the dependence of rural system on the urban system (Meshkini and Rahimi, 2014). Also, in this decade, the Arab–Israeli war and the Arab-imposed sanctions on Western countries led to a surge in oil export of Iran. Therefore, the substitution of oil exports increased oil revenues and foreign investment in Iran. In this process, the urban planning system and the construction industry thrived in cities and metropolises. However, in the 1980s, the Iran–Iraq war (which lasted for 8 years) impeded the growth of war-stricken cities. Since the 1990s, the urban population growth along with the construction of 28 new cities, targeted urbanization, government-backed urban planning and growth of oil revenues disclosed problems of urbanization.

In recent decades, population growth and urbanization (see Table 2) have altered the structure and function of cities. Changes in urban structure and function have also mounted challenges such as marginalization, housing shortages, inadequate urban services, informal economic growth, bridging social capital, rising urban poverty, identity crisis and unsustainable urban development, especially in Iranian metropolises. The indices of urban growth and development in Iran are influenced by five factors.

1. Rural–urban migration.
2. Concentration of nomads in the fringe of cities.





**Fig. 6 Geographical distribution of urbanization in Iran (2016).** According to 2006 Census, Sistan and Baluchestan (48.49%), Hormozgan (54.71%), and Golestan (53.28) have the lowest rates of urbanization while Qom (95.18%), Tehran (93.85%), and Alborz (92.64) have the highest rate of urbanization. In the figure, the geographical distribution of urbanization in Iranian provinces based on 2016 Census is depicted. Figure shows that the percentage of urbanization in Iran has changed. Accordingly, it has increased in all provinces compared to 10 years ago (Sources: Research findings).

3. Conversion of rural to urban centers.
4. Merging of rural areas surrounding large cities in the metropolitan system (Saie, 2013).
5. Implementation of the national project for the construction of 28 new cities in the vicinity of the metropolises.

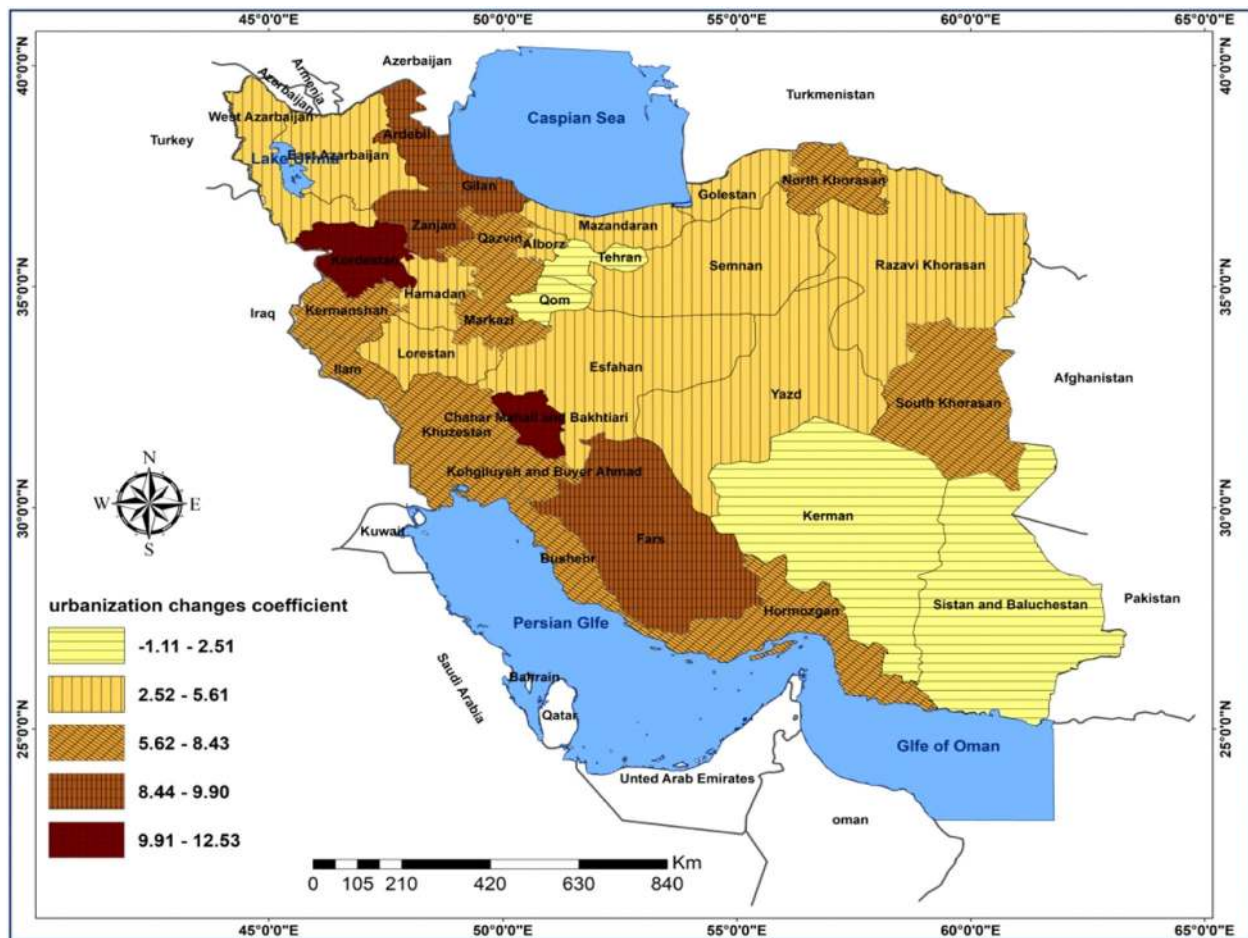
Also, the growth of urbanization and urbanism in Iran has been influenced by three schools of thought: modernism, post-modernism, and globalization.

For the analysis of data and meta-analytical discussions in this research, we have used the data obtained from 2006 and 2016 official Censuses, the data belonging to six development programs in the pre-Revolution and six in the post-Revolution era as well as UN statistical reports and results of recent studies. According to the data above, the urbanization changes in Iran have been on rise over the past 50 years. The planning system was established in Iran in the 1950s. By 2020, three types of planning have been implemented at three national, regional, and local (urban-rural) levels.

1. Development plans (including plans and projects) in the pre-1979 Revolution era.
2. Comprehensive national programs (traditional form) in the post-1979 Revolution era.

3. Structural plans (according to the principles of sustainable development).

The trend of national development and urbanization system in Iran demonstrates the lack of national and indigenous growth as well as a development model compatible with the Iranian-Islamic values, which has posed majors challenges to social, cultural, political, physical, and environmental indicators in the process of national growth and regional and local development (Salimi and Maknoon, 2018). Therefore, the introverted approach and the decentralization of metropolises can provide an effective strategy for the sustainability of national development and urban system in Iran. These trends of urban development in Iran have given rise to a plethora of positive and negative outcomes. On the positive side, it has improved socio-economic welfare, job opportunities, freedom of action, and lifestyle. On the other hand, it has engendered a plethora of socio-cultural problems, undermined social solidarity, weakened mutual understanding, increased alienation, and heightened the isolation of people from rural origins (Rahnama et al., 2012). These have mounted structural and functional challenges to the viability of sustainable urban development, leading to poor social solidarity, proliferation of urban harms, growing distrust,



**Fig. 7 Rate of urbanization changes in Iran's provinces (2006–2016).** As depicted in figure, urbanization has taken an upturn so that in some provinces such as Fars, Gilan, Ardabil, Zanjan, Kurdistan and Chaharmahal and Bakhtiari, it has increased from 8.44 to 12.53. Figure shows the highest CV in western Iran. The western regions have more natural and human resources than the eastern areas. In the eastern part of Iran, desert and low water areas have had a bearing on migration. (Source: Research findings).

and suppression of social ethics. For instance, urbanism in Tehran has debilitated social links among citizens in the past decade, (Mousavi and Pak khesal, 2012). In addition, a new study shows that urbanism in Tehran has undermined the sense of belonging to place (Mosavi and Safari, 2017). This manifests the spread of identity crisis, confusion, and rootlessness among citizens. In this study, statistical data and the trend of urban population growth revealed that urbanization has outpaced urbanism. Thus, the share of rural population, who lived in the fringes of major cities and metropolises due to rural–urban migration but still retained their rural culture, was estimated at 21 percent in 2002 (Pilehvar and Pourahmad, 2004). As a result of this population growth, one-third of the urban population lives in the marginal areas of major cities such as Tehran, Mashhad, Karaj, and Tabriz. These areas struggle with escalating problems such as poor housing quality, poor quality of urban services, urban poverty, lower social participation, and identity loss, among other things, such that the development process of Iranian metropolis seems to be unsustainable.

## Conclusions

After the 1960s, the urban development problems escalated with the industrialization strategy due to the oil-based economy, deterioration of rural economy, rapid population growth, and government investment in large cities. Hence, this era saw a

proliferation of social (marginalization, class gap, etc.), economic (e.g., inflation, unemployment, urban poverty) cultural (alienation, despair, etc.) physical (e.g., informal housing, housing shortages), environmental (e.g., pollution) and managerial (e.g., decreased citizen participation) problems in the urban system of Iran. Urbanization and urbanism approaches in Iran, due to the rapid pace of urbanization, have been struggling with issues such as inefficient transportation, shortage of open urban spaces, low-quality architecture, reduced quality of urban life, specifically in metropolis, housing shortages and unequal job opportunities (Rahnama et al., 2012). Official statistics manifests the explosion of urban population and the repaid growth of cities in recent decades. Therefore, the population and urbanization rates have retained their increasing trends. The data analysis exhibits the rapid growth of urbanization in recent decades, suggesting the doubling of urbanization and a 6-fold surge in the urban population over the past 50 years. The analysis of urbanization trend shows that urban centralization and urbanization growth will continue in the future. The study of Iranian population in general and the urban population in particular reveals that the average rate of urban population growth in 1966–2016 was 3.1%, with the highest rate of urban population growth belonging to the 1977–1978 period, when the average rate of urban population growth was more than 5%. During these years, the average population growth rate of the country was high and the urban population growth was chiefly driven by rural–urban migration along with the natural population

growth. After 1986, as the average population growth rate in the country fell, the rate of urban population growth shrank to 2.7% between 1996 and 2006. According to the last general Census in 2016, this rate stood at 1.3%, which indicates a significant declining trend; however, United Nation's forecasts suggest that the trend of urbanization in Iran will continue to rise by 2050. The surge in urban population of Iran can be attributed to three possible factors: natural growth, rural–urban migrations, the transformation of rural areas into cities, as well as the merging of city outskirts into urban areas. However, since 1996–2006, the establishment of 28 new cities in the vicinity of major cities was also a driver of growth in urbanization and urbanism in Iran. In recent decades, the urban population has taken an upturn and the absence of a coherent urban planning system to deal with urbanism is felt. Regarding the geographical distribution of the urbanization in Iran, there are significant differences between Iranian provinces so that the growing trend of urbanization is particularly noticeable in central provinces of Iran. As depicted in Fig. 7, the coefficient for variation in urbanization is higher in western and northwestern provinces of Iran. Natural elements, concentration of industries and government's policies to support less-developed areas in western and northwestern Iran are the main drivers of this growth. The aforementioned considerations have played a major role in the concentration of urban services, the greater lure of the city, and rural–urban migrations along with the growth of urbanization and urbanism in these regions of Iran. Given that Iran is not an industrial country but possesses vast agricultural potentials, the outlook of urbanization and urbanism growth by 2050 manifests the dominance of urban life. Informed by this assumption, to guide the national economy away from agriculture in the direction of industry and services, ICT, IT and other socio-cultural changes are required. This can be both a threat and opportunity. Lack of a systematic plan to exploit the potentials of the urban population or promote the urban culture can pose threats. Also, aiding the urban society to play both regional and global roles in the age of communication and information will present ample opportunities.

Therefore, at the macrolevel, social, economic, and cultural empowerment of the urban system and at the microlevel, reduced marginalization, informal employment, and urban poverty with modernization, innovation, and technology can offer effective and practical strategies. From this perspective, the system of urbanization and urbanism could be balanced to ensure sustainable urban development.

### Data availability

The datasets used during the current study are available from the corresponding author on reasonable request.

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The author declares no competing interests.

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