

## ORIGINAL RESEARCH PAPER

# Explanation of Urban Development Patterns in Order to Sustainable Development

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**ABSTRACT:** The review of urban growth patterns in recent decades has been suggestive of the sustainability of urban growth and maturation, and important environmental indicators indicate a grave threat to urban systems. In our land, as long as the practice of urban spatial growth and development was organic and determined the urban growth of “intrinsic” and local elements, the metropolitan area was also sufficient for traditional urban uses and there was a rest between the environment and the city, merely since the fundamental for the growth and expansion of cities by the social, economic and political changes led the “exogenous” nature, the practice of many Iranian cities took rapid and uncontrollable trend. The term “urban sprawl” is used today negatively and is used to describe the low density, inefficient development of the city boundaries. Likewise, it examines the positions and experiences related to the sustainability phenomenon, patterns and indices of nationalized and localized sustainability in Iran, which demand to be more localized by more accurate regional zoning and urban subjects, hence that the correct outcomes and strategies to be delineated on them. This research tries to explain the urban areas by using studies and explaining the general precepts of the extent of the distribution or sustainability of existing development.

**Keywords:** urban growth, spatial growth, development patterns, distribution, sustainability


**RUNNING TITLE:** Urban Development Patterns in Sustainable Development

## INTRODUCTION

Whether urban expansion should be banned, accepted or welcomed is an event that has been controversial since the yesteryear. On the unitary hand, there are those who fight with all means and with every means to restrict the development of urban centres. On the other hand, in that respect are people who, while welcoming the city’s growth, are actively preparing cities to draw new immigrants. There are two historical examples, one from London and the other from New York: In 1580, Queen Elizabeth, in a statement, banned any development near or within the city, and imposed laws to restrict any construction to a specific radius around the metropolis. The statement served as an attack to restrict London’s

urban growth. Conversely, in 1811, when the city of New York gave birth only 100,000 inhabitants, three government representatives designed a program to establish and expand streets to ten times the surviving population. (Angel, *et al.*, 2005)

Although many scholars have unanimously held that urban growth is a very significant and controversial matter, there is no consensus amongst researchers, policy makers, and even citizens themselves on whether further development should be stopped or emphasized. This has caused the issue of urban dispersion to become a problem for all the world’s cities in the present era. The Rio Conference, in 1992, issued an Earth Resolution, declaring that existing development patterns, without major changes and in the long term, would not be sustain-

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able, and major changes and altering the current guidance should be accomplished in order to attain sustainable growth. Since energy consumption for transport and consequent environmental pollution in cities are two main issues related to sustainability, the role of cities and urban areas directly and the urban and physical construction of cities indirectly and their contribution to Existing instability has quickly attracted the attention of the scientific and governmental circles, policy makers, urban planners and architects.

### **Sustainable urban development**

Sustainable urban development, which was addressed after sustained development, has not had much life, but it has been able to address some practical, and research tasks (Sarai and Moaiedfar, 2010). Pitter Hal defines sustainable urban development as follows: "A form of modern development that ensures the continuous development of cities and urban communities for future generations." In the definition of a sustainable city, Satterth Waite in his scholarly debate about sustainable city speaks about the necessity for the search of cities and rural areas, where the need for residents to develop to be achieved without imposing unsustainable demands on resources and natural and local or global systems. A sustainable city is an ideal city that can provide shelter for human beings in such a way that it can provide all the needs of the inhabitants.

From a structural point of view, sustainable urban development implies changes in land use and levels of population density in order to meet the city's needs for housing, transportation, leisure and food, so that over time, the city is ecologically, habitable and living, economically durable and socially consistent. In the perspective of social dimension or equality, social equity and social justice, sustainable development is discussed in the field of social ecology and its sub-field of urban ecology, and believes that the main actors in development are human and his society (Ebrahimzade, et al., 2009).

### **Dimensions of sustainable development**

- Economic sustainability, which means the outcome of better allocation and efficient management of resources and the ongoing flow of private and public investment.
- Social sustainability, or the creation of a devel-

opment process whose continuity depends on creating human civilization with a fair distribution of assets and revenues to reduce the gap between the rich and the poor.

- Ecological sustainability, which can be strengthened with the following levers:
- Limiting the use of fuel types and exhaustible fuel sources;
- Cutting down the quantity of waste, pollution and recycling resources;
- Attempting to discover technologies that cause less waste;
- Finding out the laws, device and legal fabric.
- The sustainable spatial development that underlines the following with an aspect to achieving balanced rural-urban formations and better distribution of solid ground for human settlement purposes:
- Reducing over-concentration in centers and satellite parts;
- Preventing the destruction of harmful networks arising from uncontrolled immigration or unnecessary nomad-ism;
- Identifying and exploiting the potential of the environment for centralized industrialization, with new technologies with special emphasis on biomass industries and their function in creating rural employment;
- Creation of a network of natural exclusions for the conservation of biodiversity.
- Cultural continuity, includes the founding Endogenous roots of modernization patterns and Agricultural systems and operations that produce changes in the process of cultural continuity (Ebrahimzade, et al., 2009).

### **Signs of urban sustainability**

Some of the ecological and pathological symptoms of unsustainable areas of the city include the lack of social integration, the destruction of gardens and high-quality agricultural lands, the severe shortage of services, facilities, equipment, high residential density and, consequently, the reduction of infrastructure level led to the unauthorized constructions and slums in areas beyond the city's services range, high population growth rates, high unemployment, false employment, low wages, corruption and delinquency (Ebrahimzadeh, et al., 2009).

## Urban Growth

Growth, the Persian name is derived from Tazi and means abundance of maturation (Azizpour, *et al.*, 2009). Growth is defined by increasing the size or volume of a thing during a particular period. The organic growth process is an increase in size through the formation of new tissues, an increase in volume, length, quantity and number (Esmail Pour, 2011). The development of a city is a kind of planning that uses social, economic, and environmental factors to direct development to desert areas equipped with necessary infrastructure or areas that can be equipped with the necessary facilities (Ghorbani, Nowshad, 2008).

City growth can be defined in terms of a population increase or in terms of an economic development within a metropolitan area (pichler, 2007). Growth in a city system is the following: quantitative increase of the mass or material of the city (population, goods, vehicles, infrastructure, etc.) and controlled energy (Motion, messages, communication currents, etc.) in the urban environment or a part of the city environment (urban subsystems) and finally growth, the continuous increase in products and services and messages in terms of volume in one or more long periods, which is comparable given to its specific characteristics and specifications (Azizpour, *et al.*, 2009).

Wilson *et al.* (2003) introduced urban growth forms into three types, including growth based on the development of inward regions or intermediate growth, Expanding growth or Growth away from the center or pira-shahri growth. Meanwhile, growth in the outskirts of the city is also characterized by three types, including “separate or isolated”, “linear” and “clustered” growth (Meshkini, *et al.*, 2010).

## Urban form

The urban form refers to the spatial location of a metropolitan transport system and other adjacent physical infrastructure, which together bring a spatial arrangement to the city). The shape of a city is very Influencing on and being influenced by the pattern of intra-city trips. Various variables and criteria can affect urban form. Variables such as construction density (as dependent variable) and other variables such as population density, distance to main city center, Distance to regional centers,

access to public transport, Average area of urban block and land price (as independent variables) can affect urban forms and their spatial changes (Azizi *et al.*, 2011).

## Urban development pattern

The urban development pattern or urban development process is the type and extent of development of the urban area and depends on the forms of the previous development. The pattern of physical growth or development or the urban form is defined as the spatial pattern of human activity at a certain point in time and is divided into two main categories of horizontal expansion or urban dispersion and the pattern of a compact city. The shape or pattern of urban growth in different countries is very diverse. But in general, the city’s growth is a dual process of external expansion and rapid physical growth or internal growth and reorganization. Each of these two methods creates an individual body different from each other. Exogenous expansion appears in the form of an increase in the city’s boundaries, or so-called “horizontal extensions”, and internal growth appears as the population’s internalization and the pattern of intensive growth (gharakhlo and Zanganeh Shahraki, 2009).

## Density

Part of the ambiguity about the concept of density is due to its many types, or in other words, due to the various measurements made in this measurement system. In terms of planning and urban design, density can be calculated and determined in relation to the whole city, neighborhood, or a particular residential plan (Azizi, 2009). The most commonly used density concepts in urban planning are, respectively, the scale: population density, total residential density, gross residential density, net residential density and construction density.

Population density: Population per unit area, usually in terms of “people per hectare.”

Total population density: The result of the division of the total population of the city into its built-in surface (all land with different uses) and in terms of “people per hectare”.

Gross residential density: the result of dividing the population of the area by the

level of that area (the area of the city minus open spaces and non-residential uses) and in terms of “people per hectare”.

**Net residential density:** The result of the division of the population (or the number of residential units) into the occupied area of the project. The level includes the level of residential units and dependent spaces (such as children’s playground and guest parking) and half the width of the peripheral streets of the block (up to 6 km). This index measures the density of the population in residential spaces.

**Construction density or floor area ratio:** The ratio between the floor area of the building (sum of all stories) to the area of the plot of land.

## **Decentralization**

The function of centrifugal forces that causes external movements of the built areas, so that in the central-perimeter pattern, the permeation of growth from the center to the periphery and urbanization scape is observed. Another common example is the movement of population and employment from the inner regions of cities and their displacement, either in suburbs or in smaller urban centers. Such moves may be an optional response to the negative external factors of large cities (especially in older regions) and positive external factors that are felt in new locations. The lack of focus from the inner parts of a post-war urban planning goal has been part of overs pill program (Saifuddini, 2009).

## **Compact city**

By definition, it must have a form and scale that is suitable for walking, cycling and public transport, along with a density that encourages social interactions. In practice, this means a density equal to that found in streets with three or four story buildings in in-city areas in most European cities (Mathnavi, 2002). The idea of a compact city was proposed when in order to create a sustainable city, the most effective short-term approach to the energy issue was the creation of artificial environments with greater energy efficiency. One of the definitive solutions to solving the energy crisis is to encourage the idea of a compact city with high density. One of the strongest advocates of the compact city ap-

proach is the Commission of the European Community, which explained it in 1990 by publishing a report entitled “A Green Article on the Urban Environment.” In the report, it is referred to “City as a Source”, which should be given careful attention to its limitations and value in its use (Azizi, 2009).

## **Urban sprawl**

The word sprawl, or dispersion, or, as it is seen in some texts, is a dispersed metropolitan area, the “sprawl”, “broadening”, and “loosening “is used. According to the terminological definition, the dispersion of uncontrolled distribution of development is on pristine land or rural land. Usually it indicates low density, poor land use, early transformation of rural land or forest land into urban utilities, and distribution of development out of cities (Saifuddini, 2009).

But its concept in the literature of urban research is the rapid and dispersed growth, and uneven expansion of metropolitan areas, and even small towns and suburbs in peripheral regions, which in some cases have been drawn up to rural areas or the border of ten cities (Pourmohammadi and Jame Kasra, 2011). It began at the beginning of the twentieth century, after World War II, accelerated in many other cities and has become problematic in most cities in recent decades. The distribution pattern of the 1960s was seriously addressed in urban discourse and was considered as a unique phenomenon for American cities, which due to the abundance of cheap land, the construction of Superfluous roads and over-production of car has occurred in this country. Scattered spheres outside of urban centers along highways and in rural suburbs are termed dispersed urban development and are deprived of the basic criteria of desirability. In sum, it should be acknowledged that what is now criticized as a negative aspect of urban development is mainly not the nature of the city, but rather an uneven and extravagant urban process that is often the result of overcoming the city’s physical development and growth over the development of infrastructure and required services or the priority of scale over performance or quantity over quality (Pourmohammadi and Jame Kasra, 2011).

## **The views and opinions of experts in the definition of urban sprawl**

One of the most important challenges that researchers point out in the context of urban sprawl is the lack of a comprehensive and complete definition of this phenomenon. Urban sprawl spread or urban dispersion is a name for a variety of situations, which can be referred to as residential and non-residential patterns, the process of extending urban areas, the causes of the occurrence of specific land use practices and the results of these practices. Examining

the definitions provided by the experts suggests that some of them focus more on physical dimensions, and they consider the expansion of cities to be scattered, Continuous low density, dispersed, and commercial-linear along the axes of urban access (Ahmadi, *et al.*, 2010), but with address of some environmental implications , some emphasized this aspect of the issue (Table 1).

Urban Growth	Aesthetic	Land Use	Affects	Urban Form and Pattern				Year	Theorizer
				Random Development	Distinguished Development	Linear Development	Low-Density Development		
				*	*			1962	Carlson
				*	*	*	*	1965	Harvey & Clarck
				*	*			1973	Archer
					*			1977	Ottensman
		*		*		*	*	1993	Altshour & Gomez
*								1994	Armer
		*	*	*	*	*	*	1994	Oweing
		*	*	*	*	*	*	1997	Oweing
*								1998	Vitter & Moore
		*	*	*		*	*	1999	Dawns
							*	1999	Pendall
		*						1999	Cieria
	*	*		*	*	*	*	2001	Galaster
			*	*	*	*	*	2002	Skicierz
	*			*				2005	Bourcher & Gally
*								2005	Newman
					*	*		2005	Brogman
							*	2008	Chakerboratti
				*	*		*	2009	Oxford

**Table 1:** categorization of Urban sprawl definition Based on the Opinion of the Source scholars: (Ahmadi, *et al.*, 2010)

Urban sprawl, as a form or format of urban expansion, has opponents and proponents in the field of urban knowledge. sprawl is condemned in terms of aesthetics, efficiency, social justice and environmental justice, and on the contrary, it has been defended in terms of the creation of a variety of choices, equality and economy (Galster, 2001). Pisser (1989) believes that urban sprawl is a part of reality in the present and due to consumer preferences, is inevitable. Gordon and Richardson (1997) argue that sprawl and dispersion is a catalyst for quality of life and social well-being (Ahmadi, et al., 2010). From the summing up of views and ideas of experts in different times, five major approaches to the definition of urban dispersion or sprawl is arisen:

- a) based on the form and format of the body or physic;
- b) the major emphasis on the aesthetic aspect and its outlook;
- c) based on Land use;
- d) attention to the effects and consequences of this phenomenon;
- e) reliance on the physical development of the city (Ahmadi, et al., 2010).

Indeed, the dispersion is a metaphor of an option to the lack of suburbs and the deprivation of city centers, and an explanation of everything and nothing (Galster, 2001)

### Urban sprawl forms

Harvey and Clarke have identified urban sprawl patterns as being three types of dispersion based on

“Continuous low density development”, “linear or strip development” or “development of frog jump”. It can be said that these three types are equal to the same “linear growth”, “cluster growth” and “expansion growth” that were proposed by Wilson and his colleagues. Angel et al. Also referred to three types of urban growth as dispersal, including the “secondary urban center”, “striped development” and “dispersal development” (Meshkini, et al., 2010).

### Characteristics of Urban Sprawl

The characteristics of the dispersion occurring most often in the planning literature are (Table 2):

1. Low density, Diffusion or dispersal development
2. The separation of domicile from employment place
3. Absence of functional open spaces

### Urban sprawl Identification Indicators

Galster (2001) and Wesmere (2005) find urban dispersion as a land use pattern in a Urbanized area, which represents a combination of eight separated criteria (Wassmer, 2005): density (Population), continuity, concentration, clustering, Centeredness, nucleation, mixing of uses, and closeness of distances (Neighborhood) (Table 3).

Features	Uncontrolled, bad-shaped, and low density development
	waste in the use of natural resources and land
	Contamination due to personal car dependency
	Decay of old city centers
	Misplaced and unfair consumption of development and growth costs in different areas
	High tax disparity between different locations
	Striped and scattered commercial development
	Spatial and Ecological Separation
	Developed urban spaces lacking infrastructure

(based on author’s studies)

Table 2: Features of expansion of urban sprawl(Source: Meshkini, et al., 2010)

Centrality	The centrality variable is the measure of the degree of multi-centrality or single-centrality of the municipality of Motherland area within a constant radius of the central business district, and the number of population centers.
Continuity	the Continuity variable is a measure of the density of street networks and is based on the average size of building blocks and the percentage of blocks with an altitude below 500 ft. As the size of the blocks increases, the number of intersections per unit of the region decreases, which is used as an indicator of the street network density.
Density	Combined measurements of population density are performed using official census results and different statistics. By assessing gross densities, the population of a municipality living in high or low densities and proximity to urban centers is taking place.
Land use mixing	Three mixed-use elements are integrated with combined or single measurements by analyzing the main components. These elements include the percentage of employment to the population, the diversity of land use, and accessibility to residential and non-residential uses.
Dispersion index	A combination of urban compaction measurements or dispersion are made through these four urban form factors.

**Table 3:** Definition of some indicators of urban dispersion identification

*Location of urban sprawl*

Physical dispersion or sprawl usually occurs radially around city centers or linearly along highways. Urban areas and around the city areas are expanding with changes in land use, along highways and adjacent cities. Generally, dispersion into a kind of development involves the destruction of agricultural land, open spaces and ecological inhabitants of that space.

*Types of urban sprawl*

The development of frog jumps: It occurs when developers build a dwelling some distance away from existing areas, bypassing empty spaces closer to the city. Under such conditions, people endure long journeys.

Linear or striped development: occurs when a broad business development is created in a linear pattern parallel to the main highway. The striped development is beneficial for jobs that are dependent on high traffic levels.

Low-Density Development: This kind of development is based on relatively large pieces, in which there are only neighboring houses. Critics of low-density development claim that this form encompasses greater spatial spaces and long distances of

commuting (Meshkini, et al., 2010).

**Conclusion**

Ignoring the urbanization processes of Iran over the past years in the process of developing urban development plans, whose physical manifestations around metropolitan areas, such as city expansion along the outskirts of the city, the formation of marginal villages, the formation of disrupted urban areas, the backwardness of accommodations out-of-area, the destruction of the environment and natural resources of the immediate areas of the city are clearly visible (Saiednia, 2004).

Major factors in the expansion of dispersion of cities in Iran
Principles in Iran the lack of Spatial planning
The upward trend of urban population growth in recent decades
Urban land laws in post-revolution of Iran
Urban development projects that by predicting the growth of welfare expectations, raised the per capita urban land use up to the standard of modern cities;
Ignoring the urbanization processes of Iran over the past years in the preparation of urban development plans
land allocation and land preparation policies

Table 4: Reasons and factors of rapid growth and dispersed expansion of Iranian cities

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