

# 'Investigating and explaining the justice-oriented model in smartening new urban development with a mathematical approach and McGranahan method: A case study on the Abdul Azim Shrine Privacy'

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## Abstract

Today, metropolises have been exposed to process of urban stagnation and decline that was led to creation of inefficient and worn-out spaces in the city. In order to resolve these problems, several approaches have been expressed from perspective of theorists where the urban recreation is placed on top of them. One may refer to smartening of smart cities as the foremost attitudes relating to regeneration in which revaluation of human pure life is assumed as the foremost preferences in this concept. The grounded theory has been utilized in this study in order to identify parameters of smartening of new cities based on justice-oriented indicators. Similarly, the methodology is of descriptive-analytical type. The new urban development and properties and definition of smart city were initially extracted by attribution to the existing references and they were concluded by analytical technique. Then the related principles were formulated for the theories and at the end these principles were compared and parameters were obtained using analytical-comparative method. Primarily, using mathematical analysis, normalization and standardization methods and parameters were arranged by means of McGranahan method and weighting in descending order to identify which of principles and parameters might play significant role in research result. The findings of this study suggest that justice principle (weight= 0.272) has devoted the highest weight in realization of smartening of smart cities based on justice-oriented urban development.

*Keywords:* Smartening, Recreation, New urban development, Justice, Mcgranahan method

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## 1. Introduction

Nowadays, one of the challenges for the present, especially in metropolises, is the process of urban stagnation and decline that was led to creating inefficient and worn-out spaces in the city. These processes, which have been widely affected by social, economic, political and administrative forces, caused encountering basic problems in performance of urban textures where this has led to removing social and economic life in them and were followed with high density populated public arenas of city and also absence of the needed infrastructures and public economic insolvency and so forth. In order to resolve these problems and issues, several approaches have been expressed from perspectives of different theorists out of them one can refer to urban recreation that only considered only formative and physical dimensions, but also all social, economic, cultural and administrative dimensions. Since early 21st century, improvement of sustainable development approach and achievement of stable locations are assumed as these attitudinal transformations and originated from them. However, generally regardless of such problems what is considered by this approach, these attitudes need to be integrated and essential management thereby to achieve their objectives. This important issue has been suggested in these countries to the extent that on some occasions, urban recreation approach has entered macro policies of urban development to restore city texture and space. As mentioned, this process and procedural approach may not exclusively consider physical dimensions of space, but also target all dimensions and elements and this may lead to this point that the living space of inhabitants and citizens would be restored and reconstructed and specific function would be predicted in them. Among these approaches, one of the foremost and latest classifications is new urbanism principles and fundamentals that address human values. Regardless of tools made and handled by human at the modern age of leading city developments, importance of human and also revaluation into human pure life are assumed as the foremost priorities in this concept. Based on American Charter of New Urbanism, it can be implied new urbanism aims to create an appropriate environment at human scale that may meet urban and developmental modern changes and advancements in line with goals of sustainable development. This significant subject should be done proportional to human's basic needs so that by identifying these concepts it can meet comprehensively and inclusively human's requirements.

Based on this introduction, we deal with trace of justice concept in smartening principles in smart cities so that thereby we can identify the overlooked principles and link justice principles to it after review of weight and significance coefficients of principles and elements and take administrative strategies for the current and future cities.

## 2. Research theoretical bases and literature

### 2.1. *Research literature:*

Many studies have been so far conducted on new urbanism in Iran and the world, but most of these investigations were devoted to definition of concepts and criteria of this school. It is referred to some of these studies in the following. Danesh et al. (2008) translated book of 'Charter of new urbanism' written by Arendt Randall. Giving an image of world developments and the forecast designs and schemes within several years and also emerging of new urbanism patterns and their application in case studies, this book is a rich collection and valuable book. In a paper titled 'The proposed new urbanism principles in planning for urban localities', Asgharzadeh Yazdi (2010) has briefly introduced new urbanism and the offered principles for planning of urban localities while looking for the answers to these questions that what principles of new urbanism could be applicable

to planning and design of urban localities and how these principles could be utilized for planning and design of urban localities. In a paper under title of 'New urbanism: A new approach in urban design and planning', rather than introducing new urbanism, Mann et al. (2010) have concluded that nature and formation conditions of new urbanism movement to use it in process of urban planning and design have served as a new movement in the course of achieving organized urbanism goals and it might be led to emerging of sustainable spaces. In a paper titled 'Urban restoration: A commentary on principles and rules of local urbanism', Habibi et al. (2011) have used two new urbanism movements and urban constructional cores and they came to the result that there were few distinctions and numerous proximity among this school and contemporary urbanism theories and they assumed these differences originated from asynchrony of aforesaid trends. In a paper titled 'Analysis of locality approaches toward design of new urban developments by focusing on new urbanism', Hashemnejad et al. (2011) considered ignorance to bases and concepts seen in architecture and urban design in our country today as the reason for non-smartening of cities and therefore they argued that returning to and dealing with the space in which everyday life of inhabitants would be continued should be based on the past time by focusing on stability of cities and observance of environmental issues.

Hashemzadeh and Malekian conducted studies to measure rate of adjustment of new urbanism principles to the physical and influential factors on form and content of Iranian cities (2011: 43-49). Katifi and Safari Chabok reviewed the locality concept in Iranian Islamic cities based on new urbanism principles and concluded that these principles and rules were consistent with both new urbanism trend and Isfahan school and there were few differences and numerous similarities between them (2013: 58-66) and Habibi et al. Dealt with localization of new urbanism criteria within framework of Isfahan school and they came to the result that there were few differences and many similarities among this school and theory of new urbanism (2011: 3-12) that could be referred.

## *2.2. Theoretical basics*

### *2.2.1. New urbanism*

What called today under titles of new urbanism, moder urbanism and new urban design etc. Results from problem solving by contemporary American urban designers to overcome dispersive growth and dissemination of American cities at the end of 1980s. New urbanism is a reaction to urban dispersion and acts as an efficient way to cope with automobile-dependent communities where any trip is done by automobile. Approximately at early days of twentieth century up to 1980s, all human's solutions were proposed to define city development pattern based on presence and emerging of automobile and this principle was devoted to all of urban development modern and postmodern scenes. Some problems and issues emerged due to ignoring human's presence in city during last decades at 20th century and made experts and thinkers in the field of urban design to find a solution for revival of declining soul of cities. To respond to these issues, since 1980s a modern attitude formed for new urbanism based on reconstruction of human-centered cities. This concept was created under this title and with the existing theoretical framework for the first time in US. (Randall et al. 2008)

### *2.2.2. New urbanism principles*

These principles are shown with accurate definitions in Table 1.

Table 1: New urbanism principles

New urbanism principles	Definition
Pedestrian-oriented	Paying attention to pedestrian motion and pedestrian trend of passages is one of the foremost suggested new urban principles to plan in the existing textures. It is argued in new urbanism that streets and squares should be safe and attractive for walking and they should be designed in such a way that to provide comfort for inhabitants and to prepare them for walking. Thus, it emphasizes that daily and weekly servicing applications are employed for inhabitants to walk for 10min (Asgharzadeh Yazdi, 2010: 52-54).
Connection and continuity	The penetration and accessibility to a texture and observance of a clear hierarchy of accessible spaces are deemed very important. It is believed in new urbanism that the passages continuous network and also definition of hierarchy for streets and alleys and high quality walking network may reduce traffic and facilitate walking and increase and encourage public interest for walking (Blasingame Cuister, 2007:2).
Creation of various housing types in texture	It is believed in new urbanism that the presence of a wide range of different types, sizes and prices for housing units in a human community may not only cause anyone to be able to select the best choice with respect to his/her interest and income level, but also it can contribute to positive interaction between various classes of people at any age and from any ethnicity and with any income level. This principle creates diversity and variation in the texture appearance and helps liveliness and pleasure of local communities and rescues them from monotony risk that causes depression for inhabitants (Asgharzadeh Yazdi, 2010: 52-54).
Rising density in texture	It is argued in new urbanism that rise of density may approach housings and shops and services closer together and reduce distances and avoid from horizontal expansion in city. This principle causes using the maximum utilization from the lands inside texture within the existing urban textures and and lead to more compressed social space where walking is facilitated and sources and services are utilized more efficiently and effectively and finally it creates comfortable, pleasant and suitable living place for the citizens (Asgharzadeh Yazdi, 2010: 52-54).
Conservation and improvement of traditional structures	The new urbanism is highly focused on conservation of the formed structures, existence of public places at center and high quality public domain designed as urban art, establishment of uses and densities within walking distance for 10min, transversal planning so that build the highest densities at city center and gradually lower densities toward the edges and preservation of different edges. Thus, upon intervention in the existing textures, it tries initially to identify these structures in texture and then try to improve them by means of various efforts (including improvement of open spaces (outdoors) and public places and conservation of different edges etc.). (Asgharzadeh Yazdi, 2010: 52-54)

Conservation and improvement of open, public and green spaces	Public spaces generally include those spaces in which the people interacted socially with each other. These spaces in localities include green spaces, squares, roundabouts, and centers of localities where green spaces are assumed as the major types of these spaces. The working basis in this study is the suitable distance (5min) between these spaces from the houses for suitable access to these spaces for locality inhabitants, especially green spaces (Blasingame Cuister, 2007:2). Among them, urban green space includes some features that may convert them into suitable spaces for enhancement of quality of life for urban human. (Maedzadeh & Farrokhian, 2020)
Improvement of public transport	The new urbanism is especially focused on improvement and equipment of public transportation system and it is believed that establishment of a continuous network from public transportation lines that may connect large and small-size cities and localities can help reducing transport problems and causes energy conservation and improvement of air quality and encourages inhabitants for walking, cycle-running and using bus for transport. (Asgharzadeh Yazdi, 2010: 52-54)
Application of design tools to increase safety in urban textures	The new urbanism is mainly focused on using urban design tools to increase safety in urban textures and it is believed that favorable urban design may contribute to further safety in urban textures. Based on their viewpoint, in reorganization of a texture, buildings and streets should be designed in such a way thereby the inhabitants to be able personally to provide the necessary safety and security (Asgharzadeh Yazdi, 2010: 52-54).

Source: Findings from other researchers

### 2.2.3. New urbanism principles and parameters

These principles along with parameters are indicated in Table 2.

Principles	Parameters	Source
Pedestrian-oriented	Accessibility to various uses and applications by walking in less than 10min	(Steuteville, 2004), ( Duany & Plater-Zyberk ,2004)
	Traffic soothing	(Edward et al. 2010), (Steuteville, 2004), ( Duany & Plater-Zyberk ,2004)
	Suitable lighting and safety of walks and pedestrians	(Brian,Ohm,2001), ( Aurbach, 2005 )

	Tree- planting at the margin of walks	(Steuteville, 2004), ( Duany & Plater-Zyberk ,2004 )
	Presence of population attractive applications along walks	(Steuteville, 2004), ( Duany & Plater-Zyberk ,2004 )
Connection and continuity	Observance of access network hierarchy	(Duany & Plater-Zyberk , 2004)
	Paying attention to size of blocks and avoiding from creation of deadend and relief road	(Brian,Ohm,2001), (Aurbach, 2005), (Asgharzadeh Yazdi, 2010: 61)
	Continuity of pedestrian connection network	(Duany & Plater-Zyberk ,2004)
Creation of combined uses	Rate of combination of uses through localities	(Steuteville, 2004), ( Duany & Plater-Zyberk ,2004)
	Variety of uses in stories	(Brian,Ohm,2001), (Aurbach, 2005), (Asgharzadeh Yazdi, 2010: 61)
	Observance of adaptation principle in adjacency of uses	(Steuteville, 2004), (Brian,Ohm,2001), (Aurbach, 2005)
	Establishment of active uses in public space at night	(Brian,Ohm,2001), (Aurbach, 2005), (Asgharzadeh Yazdi, 2010: 61)
Creation of various housing types	Variety in size of surface area of plots	(Steuteville, 2004), (Duany & Plater-Zyberk ,2004)
	Variation in housing type (villa, in row, flat)	(Steuteville, 2004), ( Duany & Plater-Zyberk ,2004)
	Variation in housing price	(Steuteville, 2004), ( Duany & Plater-Zyberk ,2004)
Rising density in texture	Proximity of buildings of servicing centers and shop centers, other shops to housing areas	(Duany & Plater-Zyberk ,2004)
	Gradation of plots	(Steuteville, 2004), (Brian,Ohm,2001), (Aurbach, 2005)
	Optimal constructional density	
Using inhabitants' involvement	Autonomy by local inhabitants	(Brian,Ohm,2001), (Aurbach, 2005) (Asgharzadeh Yazdi, 2010: 61)
	Using comments from inhabitants in all stages of project preparation and execution processes	(Rahim Rahnama, Roshani & Afshari, 2013)



Conservation and improvement of open, public and green spaces	Observance of green space standard per capita	(Brian,Ohm,2001), (Aurbach, 2005) (Asgharzadeh Yazdi, 2010: 61)
	Suitable quality of green space (observance of partition limit, suitable gradient, suitable furniture and equipment)	(Brian,Ohm,2001), (Aurbach, 2005) (Asgharzadeh Yazdi, 2010: 61)
	Creating public and gathering spaces in localities	(Brian,Ohm,2001), (Aurbach, 2005) (Asgharzadeh Yazdi, 2010: 61)
Using design tool to increase safety and security in urban textures	Sense of place	(Brian,Ohm,2001), (Aurbach, 2005) (Asgharzadeh Yazdi, 2010: 61)

Source: Findings from other researchers

#### 2.2.4. The concepts relating to smart city

- Definition of smart city:

The smart city has been defined as an advanced and intensive high-tech city that links people to urban information and elements using modern technology to create a sustainable and greener city with innovative and competitive commerce and high quality life (Balici et al. 2012). Smart city means using smartly all existing sources and technologies in coordination to develop sustainable and habitable and integrated urban centers (Barrionuevo et al. 2012). A city will be assumed as smart when all investment processes are done in social and human capitals with improvement of traditional (transport) and modern (Information and Communication Technologies ICT) communication infrastructures, economic growth and sustainable energy, and high quality of life along with rational administration of resources by participatory governance (Caragliu et al. 2011). Smart cities are the outcome of creative and knowledge-based strategies that aim to enhance competitive, supportive, ecological, and socioeconomic performances of cities. Such smart cities are based on a heralding composition of skilled manpower (human capitals), high-tech communication facilities (infrastructural capitals), open and serious communications (social capitals) and risky and creative business activities (entrepreneurial capitals) (Kourtit Nijkampm 2012).

#### 2.2.5. The concepts relating to smart city

The main streams may lead cities toward smart approaches.

- **Effects of cities on environment** (Environmental concerns)

Cities are the engines for economic growth and 80% of Gross National Product (GDP) of world are devoted to cities (Habitat, 2015), but despite 2% occupation of total world lands and they consume about 75% of total energy in the world (Ferraro, 2013). About 70% of dissipation of greenhouse gases originate from cities (Collhadi et al. 2013) that may play essential role in climatic changes. Environmental problems and requisite for developing more sustainable cities are assumed as the focal axis for many projects in smart city (Batagan, 2011) so that smart cities in Europe have been mainly focused on problems relating to energy and stability. The smart cities are looking forward to environmental problems and employing technology to increase stability and better management of natural resources may be assumed as one of the main cores of smart city (Chourabi et al. 2012).

- **Economic crises** (Economic incentive)

The main motive for moving cities toward smartness lies in their tendency to economic development

Cities not only did not compete with their neighbors in state and or at national level, but they competed with their other counterparts at the other side of the world for different generations (current and future) due to world and internet supply and demand networks. (Harrison Donnelly, 2012)

Economic crises and requisite for production of more wealth was the most distinct incentive for development of smart cities. At present, world economy is integrated at world level and more service-oriented and cities are pivotal in this trend.

- **Demographic changes**

The fourth enormous trend that may lead capabilities of cities to destruction is related to demographic variations. It is predicted for 10 subsequent years throughout the world the old generation older than age 65 to be increased twice a time and this means that many infrastructures need to be adapted to major changes in healthcare sector and care for the old people.

- **Information and Communication Technology (ICT) advancements**

Toffler implies that the given developments in ICT will create Third Wave in evolution of cities (Castles, 2001). Communication systems connect citizens, enterprises and organization together similar to a single nervous system. Citizens will receive services by the aid of technology and connection to internet without time and place limits. Regardless of investment in broadband infrastructure, the information flow will stop between various sectors of a city and among cities.

### 2.2.6. Justice-oriented urbanism

Paying attention to the patterns and elements, which can lead to more just city, is not a new subject. In all intellectual schools, either leftist or rightist, planners and policymakers assume their own as champions to administer justice in the society. Today, paying attention to city and justice-oriented urbanism has been developed in theoretical texts of urban planning to the extent that based on viewpoint of some of thinkers, ‘Justice-oriented city’ is considered as a suitable alternative for sustainable development pattern at current century. Since twenty first century, subject of justice has been mentioned as a very equivocal topic among thinkers of main stream in planning field (Fainsten, 2003, 2009, 2010; Campbell, 2006; Sandercock, 2003).

The comparison of new urbanism smartening parameters are shown with justice parameters in Table 3.

New urbanism parameters	Parameters of smart cities	Parameters in justice-oriented cities	Result
Pedestrian-oriented	Smart motion		Given comparison between parameters, one could adjust urban justice principles to new urbanism parameters
Connection and continuity	Smart motion		
Combined use	Smart motion	Variation- equality	
Various housing types		Equality	
Rising density in texture	Smart environemnt		



Conservation and improvement of traditional structure	Smart environment		of smart city and construct human-oriented and ideal cities based on human justices.
Use of inhabitants' involvement	Smart people-smart governance	Democracy	
Conservation and improvement of open public and green spaces	Smart environment	Variation	
Improvement of public transport	Smart motion	Equality	
Use of design tools to increase safety in urban textures			

### 3. Research conceptual model:

The research conceptual model has been shown in Diagram-1 based on work execution processes.

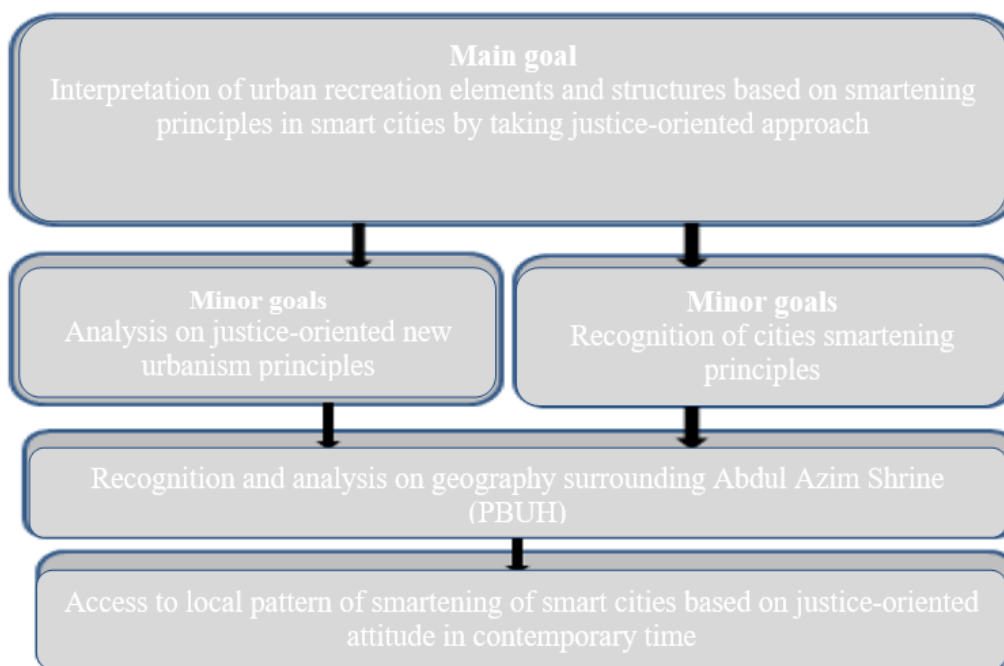


Figure 1: Research conceptual model; Source: Research Findings

#### 4. Studied limit

##### 4.1. Introducing local field- Case study



Figure 2: Studied local field

In Diagram 2, the studied limit is shown with area of 237hectare locating in Regions No 2, 1 and 5 where the Region No 5 includes the most area. This area is restricted from the north to Zakaria Razi St and Qom St, of west to Qom St, of south to Salman Farsi St and from the east to Karimi Shirzai Blvd.

##### 4.2. Demographic and social generalities

Based on results of People and Housing Public Census (2016) the population of studied area was 42'380. Out of this population, 10'000 lived in Estakhr Locality, 500 in Sartakht, 7'800 in Vali Abad Locality, 13'000 in Hashem Abad and Nafar Abad and 5941 at the south area of Aghdasiyeh Locality and two zones situated at northwest and southeast of this area (Amin Abad and Firooz Abad).The results of People and Housing Public Census (2016) indicate that 21.9% of population in demographic centers situated in strategic field were under age 15, 72.5% of them were at ages 15-61 and 5.96% of them were older than 6 years (Statistics Center of Iran, 2016).

Diagram 3 is the age pyramid of population that shows age structure of population separately based on age and gender. Male population distribution is placed at right side of this diagram for age groups (five-years) and the female population distribution is located at left side. As age population pyramid for studied limit indicates, the above-said population moves from the middle groups toward higher age groups where the role of age group (30-44) and 65year is more considerable. Based on diagram it can be inferred that the studied population is located at demographic dividend and the highest rate of this population is at age of activity. This condition can be the dominant demographic status in this area for 15-20 years in the future. 201

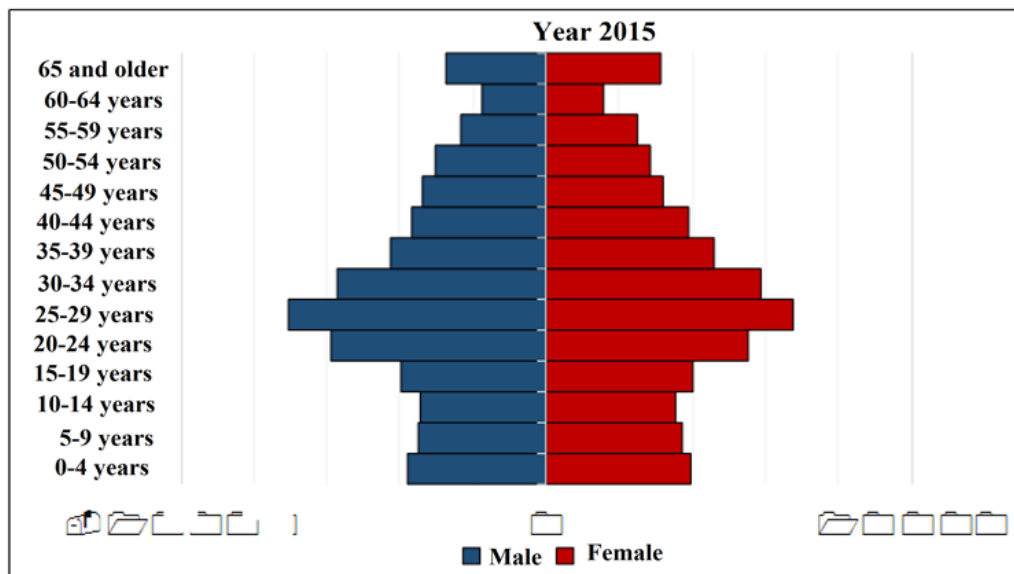


Figure 3: Age and gender pyramid in strategic field (Tehran city, Region No 20). Source: Statistics Center of Iran, 2016.

## 5. Analysis of results of review of smartening principles and parameters of smart cities based on justice-oriented urbanism

### 5.1. Determination weight and significance coefficient of smartening principles and parameters of smart cities based on justice-oriented urbanism

#### 5.1.1. Formation of decision matrix

Formation of decision matrix is the first step in this technique. Decision matrix is a matrix to evaluate number of choices based on a few criteria. Namely, it is matrix in which any choice has been scored according to number of criteria. Decision matrix is shown with X and each of its array by  $x_{ij}$ .

$$X = \begin{bmatrix} x_{11} & x_{12} \dots & x_{1n} \\ x_{21} & x_{22} \dots & x_{2n} \\ \vdots & \vdots & \vdots \\ x_{m1} & x_{m2} \dots & x_{mn} \end{bmatrix}$$

$$R_{ij} = X_{ij} / (\sum_{i=1}^m 1/2) \quad I_i = \{1, \dots, m\}, J_j = \{1, \dots, n\}$$

#### 5.1.2. Formation of normal decision matrix

Normalization or descaling is the second step in solving all multiple criteria technique based on decision matrix. It is better in Multiple Criterion Decision Making (MCDM) techniques to use term of descaling. Normalization is done in TOPSIS technique by means of vector method.

$$\sum_{j=1}^n W; \quad W = \{w_1, \dots, w_n\}, V_{11} = W_1 R_{11}, W_2 R_{12}, \dots \quad V_{mn} = W_n R_{mn}$$

#### 5.1.3. The output is displayed as the following normal matrix at this step:

$$N = \begin{bmatrix} n_{11} & n_{12} \dots & n_{1n} \\ n_{21} & n_{22} \dots & n_{2n} \\ \vdots & \vdots & \vdots \\ n_{m1} & n_{m2} \dots & n_{mn} \end{bmatrix}$$

#### 5.1.4. Formation of weighted normal decision matrix

At third step in training of TOPSIS method, the given normal decision matrix should be weighted. To this end, weight of any criterion is multiplied to all arrays under the same criterion. Wight of criteria should be specified in advance.

$$V = \begin{bmatrix} v_{11} & v_{12} \dots & v_{1n} \\ v_{21} & v_{22} \dots & v_{2n} \\ \vdots & \vdots & \vdots \\ v_{m1} & v_{m2} \dots & v_{mn} \end{bmatrix}$$

#### 5.1.5. Computation of positive and negative ideals

The next step is calculation of positive ideal point (PIS) and negative ideal point (NIS). A poitive ideal point (A+) with a negative ideal point will be computed for any parameter at this step. Positive ideal is the greatest value for the criteria that have positive load. Negative ideal is the smallest value for the criteria that have positive load. Positive ideal is the smallest value for the criteria that have negative load. Negative ideal is the greatest value for the criteria that have negative load.

$$A^+ = \{(MaxV_{ij}; j \in J); (MinV_{ij-}; j- \in J-); i = \{1, 2, 3, \dots, m\}\}$$

$$A^- = \{(MinV_{ij}; j \in J); (MaxV_{ij-}; j- \in J-); i = \{1, 2, 3, \dots, m\}\}$$

#### 5.1.6. Distance of parameters from positive and negative ideal points and calculation of ideal solution

At this step, the relative proximity of any choice to ideal solution is calculated. The Euclidean distance of any choice from positive and negative ideals will be computed by the following formula. Calculation of ideal solution is the next step. At this stage, rate of relative proximity of any choice to ideal solution is calculated. We employ the following formula for this purpose:

$$d_i^+ = \sqrt{\sum_{j=1}^n (V_{ij} - V_j^+)^2}$$

$$d_i^- = \sqrt{\sum_{j=1}^n (V_{ij} - V_j^-)^2}$$

$$CL_i^* = \frac{d_i^-}{d_i^- + d_i^+}$$

CL-value is placed among zro and one. The closer to this value, the solution will be closer to ideal response and the better solution will result.

#### 5.1.7. Calculation of relative proximity to ideal solution:

$$C_i^+ = S_{i-} / (S_{i+} - S_{i-})$$

#### 5.2. Steps in weighting and normalization techniques:

There are many techniques for data normalization here two methods are mentioned:

5.2.1. Standard normal method:

Data standardization helps them so that their significance does not depend in their measurement unit. As a result, standardized data are used for some cases e.g. data-mining and multiple data analysis.

Z-Score is used as standard score to convert data from normal distribution to normal standard. Their conversion into standard score can be also useful even though distributed data are pseudo-normal. The following formula shows the relationship among standard score and actual value:

$$Z_i = \frac{X_i - \mu}{\sigma}$$

It should be noted that  $Z_i$  denotes standard score for data  $X_i$  in formula at above and  $\sigma$  is standard deviation for data.  $Z_i$  values have mean 0 and variance 1 by doing so where they have been shown in Diagram-4.

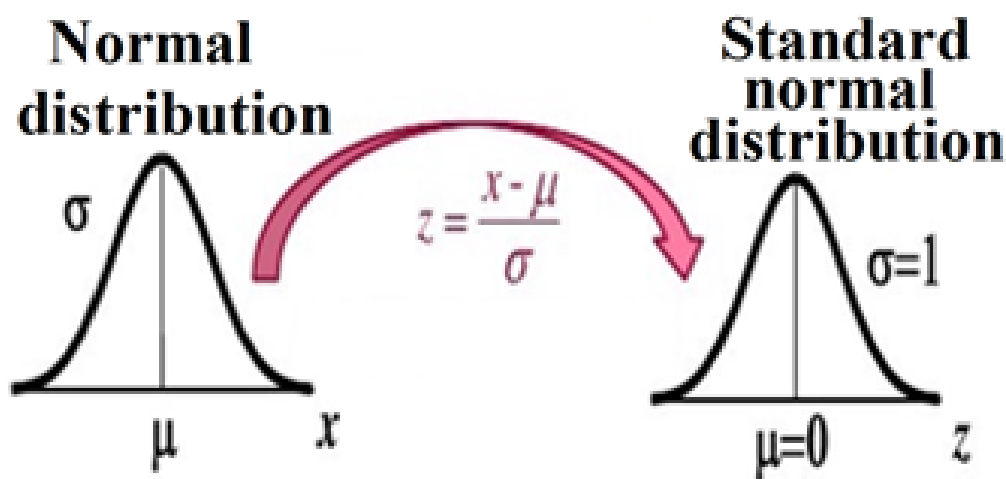


Figure 4: Normal distribution and standard normal

5.2.2. λ method:

We build matrix  $A$ .  
 We specify matrix  $(A - \lambda I)$ .  
 We will compute determinant  $(A - \lambda I)$  and set it zero and calculate  $\lambda$ -values. The greatest  $\lambda$ -value is called  $\lambda_{max}$  so we put it in this formula  $(A - \lambda_{max} I)W = 0$  and calculate  $W$ -values by this formula:  $(A - \lambda_{max} I)W = 0$

$$\begin{aligned} a_{11}W_1 + a_{12}W_2 + \dots + a_{1n}W_n &= \lambda.W_1 \\ a_{21}W_1 + a_{22}W_2 + \dots + a_{2n}W_n &= \lambda.W_2 \\ &\vdots \\ a_{n1}W_1 + a_{n2}W_2 + \dots + a_{nn}W_n &= \lambda.W_n \\ W_i &= \frac{1}{\lambda} \sum_{j=1}^n a_{ij}W_j \quad i = 1, 2, \dots, n \end{aligned}$$

The above-said system can be written as follows:

$$A \times W = \lambda.W$$

Generally, as several parameters are employed for evaluation of a concept in the given studied platform no one could claim that all parameters have the same value and significance. Thus, the suitable weights should be designated for controlling difference between parameters. Therefore, in order to compare the comparison between them after extraction of parameters, since each of parameters may have different measurement unit thus difference should be resolved among them in terms of scale and parameters become standardized and normalized so that to select suitable weights for any parameter at next step. McGranahan method has been utilized in this study where weights should express the given importance rate for each parameter among the group of used parameters and significance of any parameter is also based on the given significance coefficient. It is assumed that weights should also denote importance according to correlation coefficient for any parameter versus other parameters. Based on this technique, different weights are obtained for the parameters used by correlation coefficient matrix. The higher correlation rate is obtained for any parameter versus other parameters, the greater weight is dedicated to that parameter and if correlation coefficient is lower the lesser weight is devoted to it.

At the next step after computation of correlation coefficient matrix for any parameter, the mean absolute value is calculated for correlation coefficient thereby to compute correlation coefficient as mean weight for any parameter. Finally, weight was calculated for any parameter. In order to make decision about the studied platform it should be required for determining weight by means of McGranahan to arrange them in descending order thereby to specify which of parameters has significant role in studied goal that is visible in Table 4.

Table 2: Weights of smartening principles and parameters of smart cities based on justice-oriented urbanism.

<b>New urbanism principles</b>	<b>Weight of principles</b>	<b>Parameter</b>		<b>Normalized weight</b>
Spatial continuity	0.155	X1	Spatial link between main elements of system	0.0268
		X2	To have centers and their placement at the intersection of several minor or major routes	0.0569
		X3	Main role of main routes and their role in linking between urban localities and zones	0.0279
		X4	Walking ability	0.0434
Spatial unity and diversity	0.157	X5	Spatial conflict to space width and narrowness, their openness and closeness, change of scale	0.0344

Source: Research findings



		X6	Step by step growth of texture	0.0489
		X7	Isolated texture and at the same time including localities	0.0362
		X8	Spatial orientation based on axis arrangement, concentration and hierarchy etc.	0.0372
Higherarchy	0.175	X9	Access hierarchy and reduced access from local distributor to access to residential units local distributor to access to residential units	0.0394
		X10	Observance of privacy for residential buildings	0.0330
		X11	Placement of public use beside main skeleton and edges and location of residential use within middle layers of texture	0.0409
		X12	Observance of privacy with hierarchy of spaces from public to private spaces	0.0304
		X13	Observance of privacy by using some elements e.g. roofed routes and arches etc.	0.0313
Emphasis on social relations	0.115	X14	Presence of spaces in which social relation and public contacts take place together	0.0355
		X15	Potential for community members to use equally public spaces and commercial and religious facilities	0.0469
		X16	Land multiple-use method (shops on ground floors and residential units at upstairs)	0.0329
Importance for locality concept	0.126	X17	To have centers and their placement at the intersection of two or more major routes	0.0396
		X18	Rational distance of locality center from all points of locality	0.0535
		X19	Locality center including mosque, mall, small square, Takyeh (mourning center) and other elements at locality scale such as bathroom, water store and cafe shop etc. And presence of redezvous at localities	0.0331

Justice	0.272	X20	Method of distribution of city elements and their relationship together e.g. composition of mosque, market and plaza at their front	0.0482
		X21	Variety of market areas	0.0427
		X22	Placement of small-, medium- and large-size houses beside each other	0.0419
		X23	Various housing	0.0561
		X24	Various use	0.0435
		X25	Stability of building structure	0.0392
Total	1	-	-	1

included parameters after determining weights of smartening parameters of smart cities. Accordingly, sum of the normalized weight of existing parameters for each of principles will be calculated as the final weight for any principle. As it also visible in table, it can be found that justice-oriented principle has devoted the greatest weight (0.272) in realizing interpretation of smartening model of smart cities based on justice-oriented urbanism. At the next step, principle of hierarchy possesses second position (0.175). The principle of spatial unity and diversity as well as principle of spatial continuity also are ranked with weights of 0.157 and 0.155 at subsequent preferences, respectively. Diagram 5 has been drawn to display weight and significance coefficient for smartening principles and parameters of smart cities based on justice:

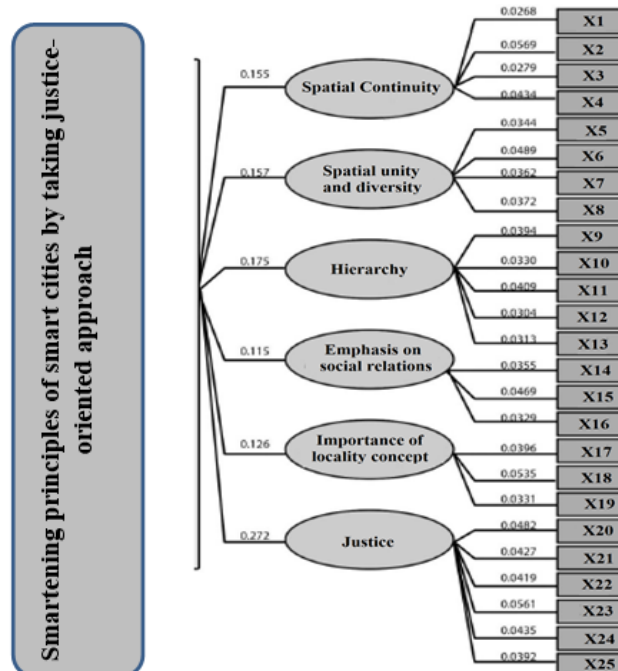


Figure 5: Weights of smartening principles and parameters of smart cities based on justice-oriented urbanism. Source: Research findings

## 6. Findings and results

The grounded theory was utilized to recognize justice trace in smartening principles and parameters of smart cities. Then, it was interviewed openly with experts so that according to the results of interview to specify which of smartening principles and parameters of smart cities has been founded on justice-oriented urbanism. For this purpose, semi-structured interviewing method was employed for data collection thereby it was asked from the experts to express their comments about smartening parameters of smart cities and determine which of these parameters might be founded on justice. In other words, in which one of these parameters justice trace and justice-oriented urbanism could be found. The results are given in a model based on grounded theory this model specifies that if smartening approach toward smart cities are used according to justice-oriented urbanism within an inefficient texture, which of these principles and parameters should be considered to realize this goal.

Whereas this study mainly aims to interpret urban recreation management elements and structure based on smartening justice-oriented principles of smart cities within a conceptual framework. It necessitates for implying some solutions and strategies about administrative requirements concerning each of principles that possessed the highest weight thereby to approach to the research goal, as urban recreation based on justice-oriented urbanism principles on studied platform around Abdul Azim Shrine (PBUH) and facilitate it by observance of these cases. Accordingly, it is required initially for clarifying the inclusion limits of this subject and taking strategies based on it.

### 6.1. Conclusion:

Overall, smartening of new cities can be executed in light of justice-oriented urbanism in 2 fields. The first is concerned with the existing cities and latter concerning future cities. Several strategies have been taken regarding the current cities in which it was emphasized on studied field and the surroundings of Abdul Azim Shrine (PBUH) have been considered for this purpose and some solutions have been presented in line with reaction of this area based on aforesaid approach. However the strategies were free of certain location concerning the future cities and by emphasis on concept of smart city (smart people, smart economy, smart motion, smart governance, smart life and smart environment) as executive lever of justice-oriented city, it has been tried to propose some solutions. Thus, the given strategies are as follows:

- To merge Information and Communication Technology (ICT) with city public services
- Suitable collection and disposal of solid wastes, ease of recycling and recoverable energy management
- Emphasis on protection and security of citizens via lighting and filming smart systems etc.
- Strategic planning for all income sources including tax payment and governmental budget etc.
- Emphasis on personnel's involvement
- Improvement of collective intelligence by physical, IT, social and business infrastructures
- The meaning of using smartly and harmonically from the existing sources and technologies
- Social infrastructures proportional to population requirements
- Efficient public transportation network

Alternately, it is inferred from necessity of urban recreation in order to enhance satisfaction sense in citizens with the living in that city based on new urbanism approaches to realize smart cities by taking our human-centered attitude to conclude that:

1- Today, entering into new urbanism of smart city is required for improving level of quality and quantity of worn-out and inefficient urban textures. 2- In addition to 10-clause charter of new

urbanism, it should be pay attention to justice-oriented concepts in urban planning in taking new-urbanism policies. 3- Implentation of justice-driven policies

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