

Grading Fourteen Zones of Isfahan in Terms of the Impact of Globalization on the Urban Fabric of the City, Using the TOPSIS Model

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Abstract—Undoubtedly one of the most far-reaching and controversial topics considered in the past few decades, has been globalization. Globalization lies in the essence of the modern culture. It is a complex and rapidly expanding network of links and mutual interdependence that is an aspect of modern life; though some argue that this link existed since the beginning of human history. If we consider globalization as a dynamic social process in which the geographical constraints governing the political, economic, social and cultural relationships have been undermined, it might not be possible to simply describe its impact on the urban fabric. But since in this phenomenon the increase in communications of societies (while preserving the main cultural - regional characteristics) with one another and the increase in the possibility of influencing other societies are discussed, the need for more studies will be felt. The main objective of this study is to grade based on some globalization factors on urban fabric applying the TOPSIS model. The research method is descriptive - analytical and survey. For data analysis, the TOPSIS model and SPSS software were used and the results of GIS software with fourteen cities are shown on the map. The results show that the process of being influenced by the globalization of the urban fabric of fourteen zones of Isfahan was not similar and there have been large differences in this respect between city zones; the most affected areas are zones 5, 6 and 9 of the municipality and the least impact has been on the zones 4 and 3 and 2.

Keywords—Grading, Globalization, Urban fabric, 14 zones of Isfahan, TOPSIS model.

1. INTRODUCTION

A. Statement of the Problem

GLOBALIZATION is an issue that is always expanding and developing. This globalization is happening in cities and urban form. World processes make some changes in the city and city functioning and brings opportunities for globalization.

Globalization leaves profound impact on the urban fabric, in particular, since this process has led to the emergence of cities called global cities. The main factor underlying urban change is the increase in cities joining to globalization trends. Thus, reviewing and criticizing changes and the renewal of the

physical structure of cities on a global scale is a pre-requisite for perceiving urban changes all over the world. In fact, the study of the interaction and dynamics of globalization and local forces in certain cities is an important advance in contemporary urban studies.

This study aims to provide a clear analysis of the consequences of globalization in the context of the urban fabric and with the evaluation and analysis of changes that have occurred in their physical context following the realization of this process, make urban planners and managers aware of the issues facing the city now and probably in the future and make them more informed for making better policies and programs.

B. Significance of the Study

The era we live in is the age of globalization with a variety of colorful faces and complex overtones that changes momentarily. Physical changes of the cities considering global developments should be based on detailed research. Thus, there is a need for more research and especially more careful analysis and it requires abundant facilities and scientific research. Globalization is a process that has affected all levels of material and spiritual life in the way that it challenges all aspects of human society. Isfahan metropolitan has not been isolated from this issue and the effects of this phenomenon should be investigated so that it can adopt itself to current conditions in order to reach the level of a world city.

C. Review of Literature

Njoh (2006) in a paper entitled "African cities and regional trade in historical perspective: Implications for contemporary globalization trends, cities" followed three objectives. First, the study tries to identify pre-colonial African towns of regional and international significance and to highlight their role as centers of long distance trade, art and craft. Then, Njoh identifies and discusses the major factors that contributed to weakening the position of these towns in the global socio-economic arena; and third, he suggests steps that can be taken to transform African towns in particular and the continent in general, into active participants in contemporary globalization processes [8].

Yue-man Yeung (2007) in another article entitled "Globalization and the new urban challenge" considers world cities and city centers which have their own specific functions [7].

Padraic Kenna (2008) in an article entitled "Globalization and housing rights" tries to explore the relationship between

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the growing phenomenon of globalization and the field of housing rights [6].

Sassen Saskia (2009) in another attempt entitled "Cities in today's age" investigated the economic role in 20th and 21st centuries in Tokyo and London and the bankrupt of Los Angeles economic in the current century and studied the new economic of cities in national economies and in an increasingly globalized world and shows that these factors are increasingly affected by global factors [5].

Curri and Easterling (2009) in an article entitled "Globalization and population drivers of rural-urban land-use change in Chihuahua" examine the causes of land-use change in Mexico due to processes of globalization [4].

Hong Zhu et al. (2011) in an article entitled "Globalization and the production of city image in Guangzhou's metro station advertisements" discuss how the image of a "globalizing Guangzhou" is produced through the symbolic meanings of the metro station advertisements in Guangzhou. They further found that the globalization process has profoundly shaped the representational meanings of metro station advertisements [3].

Siraro Francesco (2011) in another attempt with the title of "Historic cities and their survival in a globalized world" studies globalization process and investigates the way historic cities deal with this phenomenon to survive [2].

Wei (2012) in another investigative attempt entitled "Restructuring for growth in urban China: Transitional institutions, urban development, and spatial transformation" analyzes Hangzhou's development strategies, including globalization, tourism, industrial development, and urban development, in the context of shifting macro conditions and local responses. The author suggests that urban policies in China are situated in the broad economic restructuring and the gradual, experiential national reform and are therefore transitional [1].

Khademolhosseini et al. (2009) in an article entitled "the change in world consumption patterns and its impact on the compression of space and time (case study of the region 5 in Isfahan" studies change in global consumption patterns and land use change in the 5th region of Isfahan [14].

Karimi (2009) in an article entitled "globalization-localization and Iranian-Islamic architecture: a view toward Jameh Mosque of Isfahan" first looks at the concept of Iranian architecture and then investigates the relationship between globalization and Iranian-Islamic architecture and studies the Iranian-Islamic architecture status- and more specifically Jameh Mosque in Isfahan- in Iranian and Islamic history and culture. Then, relying on such concepts as globalization and cultural identity studies the outcome of interaction of the national and transnational perspective in the territorial of Iranian-Islamic architecture [15].

Zarabi et al. (2010) in another article entitled "Cultural-recreational land use planning of Isfahan urban areas and the role of ICT in regional balancing" study the status of various urban users and investigate shortages in Isfahan urban areas and suggest some solutions for maintaining balance [12].

Ziari, Mohammadpour et al. (2010) in an article entitled "The importance of information and urban communication

infrastructure development in the globalization process of cities" study this process in the growth of services in some parts of the world and their results evaluate this phenomenon in Iran in a poor status [11].

Mohammadi (2010) in an article entitled "The economic functions of global cities" investigates this phenomenon in the growth of services in some parts of the world and in the conclusion evaluates this phenomenon in Iran as poor [10].

Vaysi and Hafeznia (2011) in an article entitled "The effect of globalization on borders (investigating and evaluating border denials votes)" investigate the consequences of information technology development in the concept and functioning of the borders and conclude that geographical borders are not wasted and they change in accordance with the dynamics of human society in terms of the functioning and nature and takes over the new role [9].

D. Research Hypotheses

In recent years, globalization has made profound changes in the fabric of cities.

E. Methodology

Emphasizing systematic perspective, the research method is descriptive - analytical and field study. First, data required in relation to the urban fabric of the fourteen zones were collected separately, then using the TOPSIS model the zones were ranked and the degree of importance of each infrastructure criterion was determined. Then, based on this ranking, the map of the 14 zones was designed in GIS.

It should be noted that the reason for using TOPSIS model was its ability to combine several criteria in decision-making.

F. Zone under Investigation

Based on the municipal zoning, since 2009 the city has been divided into 14 regions. In the segmentation of urban areas, Zayandeh River divides the city into northern and southern halves. The southern half contains three regions of 5, 6 and 13. The other eleven areas are located in the northern half of the city. Chaharbagh artificial axis, creates western and eastern halves [15].

II. DEFINITIONS, CONCEPTS AND THEORETICAL FRAMEWORKS

A. Concept and Components of Globalization

Gottdiener and Budd (2005) have defined globalization as the increasing interdependence of national economies across the world that occur due to the movement of information, capital, services and goods across national borders and in this process the increasing capital mobility make a shift in geographical organization of industrial production and financial market networks [16]. In Anthony Giddens's view, globalization is the interconnectedness of events and social relationships of the distant lands with local texture or local communities; a phenomenon that can be considered as present or absent confluence [17]. Giddens regards globalization as similar to modernity; he considers globalization as a multifaceted phenomenon that can be explained by four highly interrelated dimensions: nation states, world military order,

world economy and international division of labor [18].

B. Anatomy of Urbanism

In the urban design literature, the urban form can be considered synonymous with anatomy of the city. Kevin Lynch in his book entitled "The Image of the City" has defined urban form as the physical manifestation and visibility of the city [28]. In his book entitled "A Theory of Good City form", this concept is further elaborated:

Settlement form, usually referred by the term "physical environment" is normally taken to be the spatial pattern of the large, inert, permanent physical objects in a city: buildings, streets, utilities, hills, rivers, perhaps the trees [29].

C. The Effect of Globalization on the City

Globalization in some ways has affected urbanization, urban hierarchy, the global network of cities, economy and city management. Accumulation of capital and the headquarters of multinational companies, etc. in cities has made some changes in performance and form of cities which demonstrates that "Globalization occurs in cities and cities represents and reflects globalization" [19]. "Globalization determines the city's place in the new hierarchy of cities. Globalization is also linked to convergence among cities in culture and appearance." [20] In addition, as Yang and Hua assert "brought on by globalization, the competition between cities for important nodes in the global economic network has become intense" [21].

D. The Impact of Globalization on the Spatial Organization of City

One of the most important impacts of globalization has been changes made in the spatial organization of urban life due to the new infrastructure templates and communicability. Overall, there have been four major changes in the spatial structure of cities due to the economic forces of globalization:

- 1- Cities have turned their attention to external activities and locations. Economic and political actors have found that new investment and employment opportunities require some information regarding the decisions outside city boundaries [13].
- 2- The dynamicity of the global economy production patterns changes the vertical integration of manufacturers, suppliers, finance and distribution in a market and a place to a horizontal integration with other geographical locations which have the same functions.
- 3- Positions in industry and services are not further determined by the patterns of consumption and local markets, such as commercial centers of the city, rather they depend on the logic that connect strongly distributed actors and functions.
- 4- This condition causes the fragmentation of earlier urban spatial patterns and creates new patterns. Based on these models a new definition of performance, land use types and their access has been proposed; according to which the physical proximity is not considered as the main criterion of decision-making anymore [22].

E. The Impact of Globalization on the Urban Form and Physical Changes

Changes in urban form based on globalization trends can be defined in the following seven dimensions:

- 1- Urbanism: That can mean life experiences, the activity system, dynamics of urban life and the city space. This aspect of urban living may seem palpable. But it is a part the meaning of urban life.
- 2- Urban Image and Identity: The elements that make up a city's identity.
- 3- Spatial Organization and Structure: means the performance radius, divisions and it consists of aggregation combinations, texture patterns which are commonly used to describe the three-dimensional form [29].
- 4- Social Ecology: Includes the distribution of population groups in space, the combination, separation, exclusion and social fabric.
- 5- Public Realm: Includes space and public performance areas, function and spaces distribution and their changes.
- 6- Pace and Scale of Development: Includes size, texture, scale and development proportions and new additions to city development.
- 7- Architecture Vernacular and Contemporary Changes: it defines visual form, urban landscapes, ancient architecture, nature of the architecture and contemporary architecture [19].

These seven dimensions are not static in cities, rather they are dynamic and vibrant and planners seek to discover the rules, and help keep the dynamics and relationships of these factors with one another. But when dealing with the effects of globalization, unknown factors affect the seven structures in the way that identifying and tracking their impacts is difficult and full of surprises. New effects of globalization are inattentive to templates, scale, proportions, laws and local values and affect the space on basis of its own criteria and interest [23].

As it was mentioned, many of the activities of public and private organizations in the cities of the third world are tended toward local and global communication. The outcome of such tendencies has been data transfer of local capabilities to websites and attraction of investors and manufacturers of consumer goods. These interactions not only have attracted the attention of traditional part of the city business, rather they have made major changes in the urban fabric to meet new needs. the outcome of these mutual interactions is occupying commercial spaces in urban centers, large housing projects, physical change, urban sprawl, and urban and industrial development [24]

III. DATA ANALYSIS AND DISCUSSION

A. Grading Globalization Physical Criteria Applying the TOPSIS Method

TOPSIS is the most useful multi-criteria decision- making method in the study of real-world issues that was raised initially by Hwang and Yoon [25]. It is noteworthy that the

classification of fourteen urban areas of Isfahan was performed through cluster analysis as follows. The criteria for classification are shown in Table I. These criteria which are relevant factors of globalization are selected based on the existing statistics of the distribution of fourteen zones in Isfahan municipal which include number of floors, fast food, net cafes, chain stores, branded clothing retailer, statues and symbols, parking, hotels and information technology. In addition, the statistics and data for this table were obtained from the Research Office of Isfahan Municipality which is the most reliable source in this regard.

TABLE I
FACTORS RELATED TO THE GLOBALIZATION OF THE 14 ZONES OF ISFAHAN
(PART 1)

| Urban zones | Number of floors ¹ | Fast food | Net Cafes | Chain Stores | Branded clothing retailers |
|-------------|-------------------------------|-----------|-----------|--------------|----------------------------|
| Zone 1 | 69 | 20 | 5 | 0 | 5 |
| Zone 2 | 13 | 12 | 4 | 0 | 0 |
| Zone 3 | 49 | 19 | 7 | 0 | 0 |
| Zone 4 | 136 | 21 | 5 | 0 | 0 |
| Zone 5 | 57 | 24 | 9 | 4 | 15 |
| Zone 6 | 79 | 22 | 10 | 8 | 20 |
| Zone 7 | 99 | 11 | 4 | 0 | 0 |
| Zone 8 | 136 | 8 | 4 | 0 | 2 |
| Zone 9 | 18 | 8 | 3 | 1 | 0 |
| Zone 10 | 125 | 15 | 7 | 1 | 0 |
| Zone 11 | 2 | 15 | 4 | 0 | 1 |
| Zone 12 | 89 | 15 | 4 | 0 | 0 |
| Zone 13 | 59 | 20 | 3 | 0 | 1 |
| Zone 14 | 28 | 5 | 4 | 0 | 0 |

TABLE II
FACTORS RELATED TO THE GLOBALIZATION OF THE 14 ZONES OF ISFAHAN
(PART 2)

| Urban zones | Statues and Symbols | Parking | Hotels | Information Technology |
|-------------|---------------------|---------|--------|------------------------|
| Zone 1 | 2 | 2 | 3 | .67 |
| Zone 2 | 0 | 0 | 0 | .90 |
| Zone 3 | 0 | 4 | 2 | .70 |
| Zone 4 | 1 | 2 | 0 | .81 |
| Zone 5 | 0 | 3 | 1 | .75 |
| Zone 6 | 0 | 2 | 0 | .74 |
| Zone 7 | 0 | 1 | 0 | .72 |
| Zone 8 | 0 | 0 | 0 | .70 |
| Zone 9 | 0 | 0 | 0 | .73 |
| Zone 10 | 0 | 1 | 0 | .83 |
| Zone 11 | 0 | 0 | 0 | .77 |
| Zone 12 | 0 | 0 | 0 | .72 |
| Zone 13 | 0 | 1 | 0 | .73 |
| Zone 14 | 0 | 0 | 0 | .84 |

Preparing normalized matrix according to (1): [26]

$$n_{ij} = \frac{r_{ij}}{\sqrt{\sum_{i=1}^m r_{ij}^2}} \quad (1)$$

The elements of the given decision matrix are divided by

1 -Our evaluation criteria in this study is buildings with 5 or more than 5 floors

the existing element of column j (per X_j index) and in this way, all columns of the assumed matrix have equal length (of analogous vector) and ultimately their making a comparison between them becomes easy.

TABLE III
NORMALIZED MATRIX OF FACTORS RELATED TO THE GLOBALIZATION OF THE 14 ZONES OF ISFAHAN (PART 1)

| Urban zones | Number of floors | Fast food | Net Cafes | Chain Stores | Branded clothing retailers |
|-------------|------------------|-----------|-----------|--------------|----------------------------|
| Zone 1 | .071 | .092 | .068 | 0 | .113 |
| Zone 2 | .013 | .057 | .054 | 0 | 0 |
| Zone 3 | .051 | .090 | .095 | 0 | 0 |
| Zone 4 | .141 | .1 | .068 | 0 | 0 |
| Zone 5 | .059 | .114 | .123 | .285 | .340 |
| Zone 6 | .082 | .104 | .136 | .571 | .454 |
| Zone 7 | .103 | .052 | .054 | 0 | 0 |
| Zone 8 | .141 | .038 | .054 | 0 | .045 |
| Zone 9 | .018 | .038 | .041 | .071 | 0 |
| Zone 10 | .130 | .071 | .095 | .071 | 0 |
| Zone 11 | .002 | .047 | .054 | 0 | .022 |
| Zone 12 | .092 | .071 | .054 | 0 | 0 |
| Zone 13 | .061 | .095 | .041 | 0 | .022 |
| Zone 14 | .029 | .023 | .054 | 0 | 0 |

TABLE IV
NORMALIZED MATRIX OF FACTORS RELATED TO THE GLOBALIZATION OF THE 14 ZONES OF ISFAHAN (PART 2)

| Urban zones | Statues and Symbols | Parking | Hotels | Information Technology |
|-------------|---------------------|---------|--------|------------------------|
| Zone 1 | .5 | .125 | .5 | .67 |
| Zone 2 | 0 | 0 | 0 | .90 |
| Zone 3 | 0 | .25 | .333 | .70 |
| Zone 4 | .25 | .125 | 0 | .81 |
| Zone 5 | 0 | .187 | .166 | .75 |
| Zone 6 | .25 | .125 | 0 | .74 |
| Zone 7 | 0 | .062 | 0 | .72 |
| Zone 8 | 0 | 0 | 0 | .70 |
| Zone 9 | 0 | 0 | 0 | .73 |
| Zone 10 | 0 | .062 | 0 | .83 |
| Zone 11 | 0 | 0 | 0 | .77 |
| Zone 12 | 0 | 0 | 0 | .72 |
| Zone 13 | 0 | .062 | 0 | .73 |
| Zone 14 | 0 | 0 | 0 | .84 |

Preparing P_{ij} matrix based on (2):

$$P_{ij} = \frac{r_{ij}}{\sum_{i=1}^m r_{ij}} \quad (2)$$

Each value is divided by the existing mean of column j (for positive values for all parameters).

TABLE V
PIJ MATRIX OF FACTORS RELATED TO THE GLOBALIZATION OF THE 14 ZONES OF ISFAHAN (PART 1)

| Urban zones | Number of floors | Fast food | Net Cafes | Chain Stores | Branded clothing retailers |
|-------------|------------------|-----------|-----------|--------------|----------------------------|
| Zone 1 | -0.1877 | -0.2194 | -0.1827 | 0 | -0.2463 |
| Zone 2 | -0.0564 | -0.1632 | -0.1575 | 0 | 0 |
| Zone 3 | -0.1517 | -0.2166 | -0.2235 | 0 | 0 |
| Zone 4 | -0.2760 | -0.2302 | -0.1827 | 0 | 0 |
| Zone 5 | -0.1669 | -0.2474 | -0.2576 | -0.3576 | -0.3665 |
| Zone 6 | -0.2050 | -0.2353 | -0.2713 | -0.3197 | -0.3582 |
| Zone 7 | -0.2341 | -0.1537 | -0.1575 | 0 | 0 |
| Zone 8 | -0.2760 | -0.1242 | -0.1575 | 0 | -0.1395 |
| Zone 9 | -0.0723 | -0.1242 | -0.1309 | -0.1877 | 0 |
| Zone 10 | -0.2652 | -0.1877 | -0.2235 | -0.1877 | 0 |
| Zone 11 | -0.0124 | -0.1436 | -0.1575 | 0 | -0.0839 |
| Zone 12 | -0.2194 | -0.1877 | -0.1575 | 0 | 0 |
| Zone 13 | -0.1705 | -0.2235 | -0.1309 | 0 | -0.0839 |
| Zone 14 | -0.1026 | -0.0867 | -0.1575 | 0 | 0 |

TABLE VI
PIJ MATRIX OF FACTORS RELATED TO THE GLOBALIZATION OF THE 14 ZONES OF ISFAHAN (PART 2)

| Urban zones | Statues and Symbols | Parking | Hotels | Information Technology |
|-------------|---------------------|---------|---------|------------------------|
| Zone 1 | -0.3465 | -0.2598 | -0.3465 | -0.268 |
| Zone 2 | 0 | 0 | 0 | -0.0945 |
| Zone 3 | 0 | -0.3465 | -0.3659 | -0.2492 |
| Zone 4 | -0.3465 | -0.2598 | 0 | -0.1701 |
| Zone 5 | 0 | -0.3134 | -0.2979 | -0.2152 |
| Zone 6 | 0 | -0.2598 | 0 | -0.2227 |
| Zone 7 | 0 | -0.1723 | 0 | -0.2361 |
| Zone 8 | 0 | 0 | 0 | -0.2492 |
| Zone 9 | 0 | 0 | 0 | -0.2292 |
| Zone 10 | 0 | -0.1723 | 0 | -0.1543 |
| Zone 11 | 0 | 0 | 0 | -0.2009 |
| Zone 12 | 0 | 0 | 0 | -0.2361 |
| Zone 13 | 0 | -0.1723 | 0 | -0.2292 |
| Zone 14 | 0 | 0 | 0 | -0.1461 |

B. Calculating Eij, Dj and Wj

Eij is calculated based on (3): [27].

$$E_{ij} = k \sum_{i=1}^m p_{ij} \times Ln \quad (3)$$

$$K = \frac{1}{Ln}$$

Dj is calculated based on (4):

$$D_j = 1 - E_j \quad (4)$$

Wj is calculated based on (5):

$$W_j = \frac{d_j}{Ed_j} \quad (5)$$

TABLE VII
COMPARISON OF EIJ, DJ AND WJ OF FACTORS RELATED TO THE GLOBALIZATION OF THE 14 ZONES OF ISFAHAN (PART 1)

| Urban zones | Number of floors | Fast food | Net Cafes | Chain Stores | Branded clothing retailers |
|-------------|------------------|-----------|-----------|--------------|----------------------------|
| Eij | .9079 | .9636 | .8461 | .3988 | .4843 |
| Dj | .0921 | .0364 | .1539 | .6012 | .5157 |
| Wj | .0307 | .0121 | .0514 | .2008 | .1723 |

TABLE VIII
COMPARISON OF EIJ, DJ AND WJ OF FACTORS RELATED TO THE GLOBALIZATION OF THE 14 ZONES OF ISFAHAN (PART 2)

| Urban zones | Statues and Symbols | Parking | Hotels | Information Technology |
|-------------|---------------------|---------|--------|------------------------|
| Eij | .3938 | .7412 | .3828 | .9885 |
| Dj | .6062 | .2588 | .6172 | .0115 |
| Wj | .2025 | .0864 | .2062 | .0030 |

C. Preparing Weighted Normalized Matrix (D):

Preparing weighted normalized matrix based on (6):

$$D = ND \times WN \times n \quad (6)$$

TABLE IX
PIJ MATRIX OF FACTORS RELATED TO THE GLOBALIZATION OF THE 14 ZONES OF ISFAHAN (PART 1)

| Urban zones | Number of floors | Fast food | Net Cafes | Chain Stores | Branded clothing retailers |
|-------------|------------------|-----------|-----------|--------------|----------------------------|
| Zone 1 | .00666 | .00390 | .0122 | 0 | .03351 |
| Zone 2 | .00121 | .00242 | .0097 | 0 | 0 |
| Zone 3 | .0047 | .00382 | .01707 | 0 | 0 |
| Zone 4 | .01322 | .0042 | .01222 | 0 | 0 |
| Zone 5 | .00553 | .00484 | .0221 | .08858 | .18084 |
| Zone 6 | .00769 | .00441 | .02444 | .17747 | .13465 |
| Zone 7 | .00966 | .00220 | .00970 | 0 | 0 |
| Zone 8 | .01322 | .00161 | .00970 | 0 | .00775 |
| Zone 9 | .00168 | .00161 | .0073 | .02206 | 0 |
| Zone 10 | .01219 | .00301 | .0170 | .02206 | 0 |
| Zone 11 | .00018 | .00199 | .00970 | 0 | .00652 |
| Zone 12 | .00863 | .00301 | .00970 | 0 | 0 |
| Zone 13 | .00572 | .00403 | .0073 | 0 | .00652 |
| Zone 14 | .00272 | .00097 | .00970 | 0 | 0 |

TABLE X
COMPARISON OF EIJ, DJ AND WJ OF FACTORS RELATED TO THE GLOBALIZATION OF THE 14 ZONES OF ISFAHAN (PART 2)

| Urban zones | Statues and Symbols | Parking | Hotels | Information Technology |
|-------------|---------------------|---------|--------|------------------------|
| Zone 1 | .16533 | .02735 | .16542 | .00089 |
| Zone 2 | 0 | 0 | 0 | .00120 |
| Zone 3 | 0 | .05470 | .11017 | .00093 |
| Zone 4 | .08266 | .02735 | 0 | .00108 |
| Zone 5 | 0 | .04092 | .05491 | .00100 |
| Zone 6 | .08266 | .0273 | 0 | .00098 |
| Zone 7 | 0 | .01356 | 0 | .00096 |
| Zone 8 | 0 | 0 | 0 | .00093 |
| Zone 9 | 0 | 0 | 0 | .00097 |
| Zone 10 | 0 | .01356 | 0 | .00110 |
| Zone 11 | 0 | 0 | 0 | .00102 |
| Zone 12 | 0 | 0 | 0 | .00096 |
| Zone 13 | 0 | 0 | 0 | .00097 |
| Zone 14 | 0 | .01356 | 0 | .00112 |

D. Determining Ideal Solution

Determining ideal solution based on (5):

Ideal option

$$A^* = \{(max_i v_{ij} | j \in J'), (min_i v_{ij} | j \in J') | i = 1, 2, 3, \dots, m\} = \{v_1^+, v_2^+, \dots, v_n^+\} \quad (7)$$

Negative ideal option

$$A^- = \{(min_i v_{ij} | j \in J'), (max_i v_{ij} | j \in J') | i = 1, 2, 3, \dots, m\} = \{v_1^-, v_2^-, \dots, v_n^-\} \quad (8)$$

TABLE XI
THE IDEALS OF FACTORS RELATED TO GLOBALIZATION OF 14 ZONES OF ISFAHAN (PART 1)

| Urban zones | Number of floors | Fast food | Net Cafes | Chain Stores | Branded clothing retailers |
|-------------|------------------|-----------|-----------|--------------|----------------------------|
| A+ | .01322 | .00484 | .02444 | .17747 | .13465 |
| A- | .00018 | .00097 | .0073 | .02206 | .00652 |

TABLE XII
THE IDEALS OF FACTORS RELATED TO GLOBALIZATION OF 14 ZONES OF ISFAHAN (PART 2)

| Urban zones | Statues and Symbols | Parking | Hotels | Information Technology |
|-------------|---------------------|---------|--------|------------------------|
| A+ | .16533 | .05470 | .16542 | .0012 |
| A- | .08266 | .01356 | .05491 | .00089 |

E. Calculating the Distance:

The distance between item j and ideals based on Euclidean method is as follows:

The distance with positive ideal is calculated with the following formula:

$$d_j^+ = \left\{ \sum_{i=1}^n (v_{ij} - v_{ij}^+)^2 \right\}^{0.5} : i = 1, 2, 3, \dots, m \quad (9)$$

The distance with negative ideal is calculated with the following formula:

$$d_j^- = \left\{ \sum_{i=1}^n (v_{ij} - v_{ij}^-)^2 \right\}^{0.5} : i = 1, 2, 3, \dots, m \quad (10)$$

TABLE XIII
THE DISTANCE BETWEEN FACTORS RELATED TO GLOBALIZATION OF 14 ZONES OF ISFAHAN

| Urban zones | D+ | D- |
|-------------|----------|----------|
| Zone 1 | 0.044135 | 0.39866 |
| Zone 2 | 0.042656 | 0.36536 |
| Zone 3 | 0.010077 | 0.120926 |
| Zone 4 | 0.010696 | 0.097793 |
| Zone 5 | 0.010558 | 0.096272 |
| Zone 6 | 0.010525 | 0.095958 |
| Zone 7 | 0.010642 | 0.095564 |
| Zone 8 | 0.010474 | 0.094202 |
| Zone 9 | 0.010389 | 0.093421 |
| Zone 10 | 0.010133 | 0.091805 |
| Zone 11 | 0.020527 | 0.090398 |
| Zone 12 | 0.003939 | 0.061969 |
| Zone 13 | 0.012232 | 0.041419 |
| Zone 14 | 0.01057 | 0.031205 |

Relative distance of Ai with ideal and ranking

$$cl_i^+ = \frac{d_i^-}{d_i^+ + d_i^-}; \quad 0 \leq cl_i^+ \leq 1; \quad i = 1, 2, 3, \dots, m \quad (11)$$

TABLE XIV
TOPSIS CALCULATION AND RANKING OF 14 ZONES OF ISFAHAN

| Urban zones | TOPSIS level | Rank of zones |
|-------------|--------------|---------------|
| Zone 1 | 0.090398 | 11 |
| Zone 2 | 0.031205 | 14 |
| Zone 3 | 0.041419 | 13 |
| Zone 4 | 0.061969 | 12 |
| Zone 5 | 0.36536 | 2 |
| Zone 6 | 0.39866 | 1 |
| Zone 7 | 0.094202 | 8 |
| Zone 8 | 0.097793 | 4 |
| Zone 9 | 0.120926 | 3 |
| Zone 10 | 0.091805 | 10 |
| Zone 11 | 0.095958 | 6 |
| Zone 12 | 0.095564 | 7 |
| Zone 13 | 0.096272 | 5 |
| Zone 14 | 0.093421 | 9 |

F. The Ranking of Zones Using the TOPSIS Model:

After modeling and analyzing using 9 variables for 14 Isfahan urban zones, results of TOPSIS model for each of the zones are obtained and provided in Table XIV. Based on the selected variables, zone 6 got the first rank in terms of globalization, followed by zone 5 and zone 9 which got the second and third rank respectively. Then, zone 8 received the fourth rank and zone 13 got the fifth rank. The following ranks were devoted to zone 11 (rank 6), 12 (rank 7), 7 (rank 8), 14 (rank 9), 10 (rank 10), 1 (rank 11), zone 4 (rank 12), zone 3 (rank 13) and ultimately zone 2 got the 14th rank.

IV. CONCLUSION AND SUMMARY

This paper introduces one of the multi-criteria decision-making methods. Multi-criteria decision-making refers to cases in which the criteria are usually different and sometimes contradictory and incompatible. In fact, in the decision-making process we have to select a choice from the available options. Considering the method of the current attempt, Isfahan due to the state of being a sister city with 11 cities, existence of contracts and agreements including scientific research settlement agreement with 40 countries, construction of Summit hall, creating recreation and tourism centers such as Isfahan City Center, International Exhibition of Isfahan, health city and 2-store highway of Imam Khomeini can be regarded as one of the cities which can conform itself to globalization conditions. Thus, it can be said that the first hypothesis is confirmed. In addition, in this study, 9 physical criteria of globalization were examined including number of floors, fast food, net cages, chain stores, branded clothing retailer, statues and symbols, parking, hotels and information technology which based on Table IX that shows the ranking of zones according to a globalization process, demonstrated that globalization has not affected these users to the same extent, and accordingly zone 6 got the first rank and the most affected area followed by regions 5 and 9 which got the second and the third rank and the least impact was for zones 4, 3 and 2 with ranks of 12, 13 and 14.

Thus, we can conclude that the physical elements of the city are not equally influenced by the globalization process.

A. Suggestions and Solutions

Accordingly the following suggestions are proposed to better deal with this phenomenon in the city:

- Strengthening global economic activities in Isfahan, including the main and branch offices of large multinational corporations, international banks
- Changes in system and network of city
- Expansion of infrastructure information technologies in line with the lack of communication links and networks
- Creating adequate infrastructure to deliver services and plan IT in Isfahan
- Adopting urban management to the governance of global cities
- Explaining the policy and long-term planning in the field of IT
- Assimilating the development of communication as a major infrastructure of Isfahan Virtual city
- Creating a clear definition of smart urban units of the municipality
- Explanations of urban transport policies in virtual cities
- Creating the necessary infrastructure to meet the national needs in order to obtain the universal city title for Isfahan
- Providing a safe place for investment and economic activities on a global scale for Isfahan
- Changing the city to adopt it with the minimum requirements of the global economy.
- Creating world-class financial institutions geographic focus in Isfahan metropolitan
- Developing websites, teleports, optical network connections and intelligent buildings
- Increasing international cooperation of the management bodies of Isfahan metropolitan
- Developing and strengthening international services in Isfahan metropolitan
- Understanding the physical components of Isfahan
- Drawing attention to the ecological fabric of the city
- Utilizing changes in urbanization and urban development in global cities over the past twenty years.
- Maintaining positive physical interaction between Isfahan and cities around the world
- Increasing the efficiency of spatial- physical planning due to the lack of direct functional relationship between social – economic issues and the anatomy of the city
- Maintaining integrated urban development rules and regulations regarding the city income considering the optimal distribution of user and urban spatial structure appropriate for the social organization.
- Considering structural stability as a crucial factor in dealing with city burnout to provide sustainable income based on taxation got from citizens.
- Putting comprehensive planning for land use and appropriate environmental planning and designing.

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