



The Analysis of Neighborhoods' Sustainability with Imperative Factors (Case Study: Regions in Mashhad Metropolitan Area)

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Abstract

Currently, sustainability has become a significant issue in urban revisions due to the consequences of unequal urban development. In order to increase the sustainability in a city, the criteria of sustainable development should be considered for neighborhoods as the main module of a city. Neighborhoods' sustainable development includes various dimensions which are required for recognizing and defining the indicators and their priorities. Consciousness about operative factors of residential neighborhoods and their priorities, provides a foundation for sustainable development of a city. The objective of this paper is to identify and analyze the major factors in the field of residential neighborhoods' sustainability. In order to achieve this aim, two districts were taken as case studies: one with historical background and organic urban fabric (Sarab area) and the other one with modern society and gridline urban fabric (Sajjad area) that have different physical, economic, and social contexts. Their overall conditions have a significant role in the resolution of sustainability criteria. The research method of this paper is descriptive-analytical; information was collected using 310 questionnaires filled by individuals who are the residents of the neighborhoods. The calculation process (factor analysis) was carried out for five main features consisting of economic, social, environmental, physical, and managerial.

Keyword: *City Neighborhood, Urban Sustainability, Sustainable Development, Sustainable Neighborhood, Mashhad Metropolis.*

1.Introduction

Various aspects of human life have been affected by rapid development of urbanization in recent decades. Today, cities are the main actors causing instability in the world. In fact, urban sustainability is related to the world sustainability. Accordingly, the role of cities and their impact on the sustainability criteria has attracted the attention of many scientists. The topic of sustainability in urban studies attracts an ever increasing attraction and become the center of attention for specialists. For several reasons, the significance of sustainability arises in the planning system of developing countries. However, if those communities do not pay enough attention to the criteria and indicators of sustainable urban development, it will be hard to figure out their progress [1]. In fact, any change in the functions, structure or form of a community has a direct correlation with overall metabolism of a city [2]. Achieving sustainable cities requires developing sustainable communities as they are the smallest units and organs of the city life [3]. It is obvious that achieving a desirable physical space depends on the deep understanding of communication networks, quality of services for populations, quality of life, education service, health, economy, cultural issues and so on [4].

What should be noted is that the sustainability does not necessarily reflect the urban sustainable development. The concept of sustainability is presented here as a situation or favorable condition, or set of conditions that have been perpetuated. However, in terms of sustainable urban development, it is a way to achieve sustainability in a long term plan. On the other hand, as science of planning moves forward, the sustainable development is placed in the center of attention to bottom-up urban planning and design. Currently, the main goal of city development in most countries is the impoverishment of urban units called residential neighborhoods to achieve sustainability efficiently. Suitable human scale and qualities of space are two important features of "community". Firstly, from the social perspective, there are more opportunities for choices on the scale of a local community, Secondly, it is further provided for cultural identity preservation and emotional-psychological needs recognition from cultural viewpoint. Thirdly, the dominant role of monetary affairs in a local community is less highlighted, and moral values and cooperative relations are the concerned objectives from an economic point of view. Finally, the nature and green-land are pivotal requirements from environmental standpoint. For these reasons, we can say that the "society" of an urban "community" is an ideal platform for sustainable development, since the ecological relationships between

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social conventions and moral obligations of citizens can improve the dynamic harmony along with the environmental capacities to use resources efficiently while considering future generations [5]. According to Collingsworth, since people live in the form of "local" not regional, they interpret regional policy in relation to local impacts. Regional planning is in conflict with the local tendency. It is necessary to emphasize on important factors in local scale planning and design [1]. In this regard, urban community is defined as a part of the city's urban area that has functional borders and spatial identity with a complex of small scale activities. An urban community is often composed of more than a single neighborhood. In Iran, community is a place of residence and employment for 700-1250 households (about 3500-6250 persons) with walking routes around a primary school. Regarding this definition, community's key elements have played a crucial role in its shaping. These elements make up the community structure in two levels including index elements (such as primary schools and mosques) and distributive elements (such as daily and weekly commercial centers, community parks, sporting venues and health units). This research can help recognizing the significant factors in both historic and new urban fabrics affecting the neighborhood's sustainability.

a. Necessity and Importance

Community self-management is the ability of small local communities to exploit natural and human resources. So all community members could experience welfare, health, high-quality life, secure economic condition, and the positive integrity of the environment and human activities in advancement of sustainable urban development [6]. Sustainable development is the condition that all residents of a neighborhood benefit from equal rights and opportunities plus responsibility for the actions and decisions that affect their environment [7]. Communities in neighborhoods can solve numerous challenges and obstacles to initiate inner-development. It is the duty of development experts and practitioners to inform and support efforts that are most likely to help communities seize the opportunities and avoid or minimize the disadvantages [8]. In Iran, the process of neighborhoods' establishment over a long period of time seems to be related to the social needs of residents, but modern changes in various fields (economic, social, and physical environment) have altered neighborhoods in general and particular which has a considerable negative impact on the sustainability [9]. The history of sporadic city growth and evolution of metropolitan's areas in the city of Mashhad shows that different communities have been formed in different ways. Some of them have rural and historical roots that became larger in development process. "Sarab" neighborhood is one of the very historic while under-developed districts. Furthermore, according to states and information, "Sajjad" neighborhood is considered as a

one of new affluent neighborhoods. These different conditions can affect the sustainability indicators in these two neighborhoods which is scrutinized in this paper.

b. Objectives

In this research, a comparative study of sustainability and recognition of important criteria has been carried out between Sarab and Sajjad districts in Mashhad city. These parts of city have distinct physical, economic and social complexity, the conditions that can impact on the sustainability indicators of these two neighborhoods. Accordingly, the comparative study of these factors in both neighborhoods has been performed. So the main question of this paper is that, "what are the main factors of sustainability determination for Sarab and Sajjad neighborhoods in city of Mashhad?"

2. Literature Review

Allen and Gibson has researched the perceptions of governments and residents about satisfaction with community life regarding 22 public activities. Both groups expressed significantly different ideas, but they were in agreement on the importance of satisfaction with community life. Therefore, the question of resemblance of perceptions between governments and residents must be addressed from a specific level of reference. On a general scale, government and residents had consistent perceptions of community life; however, on a specific task or project level, their views had differed considerably. Also, it is found that a satisfaction importance analysis is a viable mechanism to prioritize community issues that cannot be accomplished by viewing importance or satisfaction ratings independently [10]. Cascante and Brennan (2012), through defining and conceptualizing community development in the twenty-first century, have finally stated that policy-makers, practitioners and academics should perceive what community development is from not only a conceptual and overarching standpoint, but an applied perspective; This goal is achieved by acknowledging the different stakeholders, goals and processes engaged in. Understanding the different forms of community development and how they can complement each other is critical to establish future processes that attempt to minimize the weaknesses of each form and promote their strengths [11]. Walzer and Cordes (2012) concluded by overviewing innovative community change programs that programs aspiring prosperity must build the capacity for the change process to continue and create a comfort level with change and the importance of community resiliency to address unexpected challenges and opportunities [8]. In his thesis with title "the Effect of renewal on the creation of placeless sense; case study: Navab neighborhood in Tehran", Tabrizi stated that according to presented statistics, the physical and modern nature does not insist on the sense of place in Navab renewal project and its

programs, the social capitals between neighborhood residents seems lost as well. This will cause older residents of the new Navab neighborhood not to distinguish their local identity underlying the increased quality of life. However, social capital factor that follow human contacts in communities was diminished with Navab development plan along with disintegration of human relationships in reconstruction [12]. Rafieian et al., in a research titled "Feasibility of local development capacities in urban sustainable development process; case study: Kolkatachi neighborhood of Tabriz", represent indicators of sustainable cities and study the facilities and potential human capacities in Tabriz neighborhoods. The study illustrates that except in a few cases, planning for the development of urban areas, had been done regardless of local capacities particularly at the local level which finally has led to dissatisfaction with local development process [7]. Sarayi et al., in their articles titled "Evaluate the sustainability of the city of Babolsar", have determined the sustainability of sixteen urban neighborhoods of the city. They have applied 30 variables such as indicators of social, economic, infrastructural, biological and physical. Results display that from sixteen neighborhoods, one is an ideally sustainable, two are strongly stable, seven are semi-stable, four are poorly stable and at last two of them are unstable. There is a huge gap between neighborhoods in terms of development indicators [13]. The research carried out by Gharakhlou and colleagues about sustainability of Sanandaj city's informal settlements using variables in three dimensions of social, economic and environmental has shown that the sustainability of selected variables is very low in all dimensions [14]. Azizi et al. compared two residential patterns (normal and high density) and found that the normal pattern provided better residential environment in comparison with the other one. In their view, sustainability principals could make suitable place for living and provision of services and facilities for residents in residential complexes [15].

3. Materials and Methods

This paper is an applied, developmental research which has been done using a comparative descriptive-analytical approach. Main data were collected through archival and library documents, then survey and questionnaire were utilized to measure the indicators. Finally, the criteria were used to analyze the sustainability dimensions and prioritize the neighborhoods' indexes. Surveys were done utilizing questionnaires, structured interviews, observation and content analysis. Cochran is the formula used to determine the statistical sample society. Evaluation matrix, standardized values using linear elasticity, paired comparisons to evaluate multifactor and hierarchical analysis were used for measurements and assessments. The SPSS and Arc Map software were

operated to analyze the collection of data and produce the final graphical output.

3.1. Population and Sample Size

The population of this study consist of 8660 households in Sarab and Sajjad neighborhoods. To determine the sample size based on the Cochran formula, 370 households were sampled randomly. Thus, sample size was set at 150 based on the number of households in Sarab neighborhood (948 households), and in Sajjad neighborhood (7,712 households) was fixed on 220. Cronbach's alpha coefficient was used to assess the validity of the survey. The Cronbach's alpha values for these indexes are more than 0.8. It represents the highest level of reliability for the survey instrument. Research validity is based on Content validity. According to McLaren, indexes of sustainability are different in each country and region, since various societies have their distinct economic, environmental and societal conditions and they have different understanding of sustainability [16]. Hence it is impossible to determine the fixed criteria for sustainability analysis. In this research, after the study of sources and documents on community sustainable development in different countries, neighborhood sustainability indicators were analyzed in 5 main fields which have been taken from UNSD paradigm shown in the figure 1.

3.2. Research Location

According to the latest Census of Population in 2006, Mashhad is the second largest metropolitan city in Iran with a population of have 2.4 million, and it has substantial roles and functions at local, national and transnational scales. The aim of this research is to analyze the sustainability of Mashhad neighborhoods, and each area was considered a prominent neighborhood from a specific point of view.

3.2.1. Sarab Neighborhood

Sarab, one of the historical neighborhoods in Mashhad with a population of 3200 and an approximate area of 502,960 m² is located in region 8 in Mashhad municipality. According to historical backgrounds, this region has a significant identity among the city neighborhoods. Until 1941, this district had narrow streets and paved courtyards. Physical changes have been made afterward. Radial design of a shrine and reconstruction of the former Pahlavi Avenue (Avenue of Imam Khomeini) near Sarab neighborhood perpendicular to Sarab traditional bazar began to accelerate the process of weakening native and community identity. It changed the Market performance and has reduced the glory and credit of neighborhood and bazar. Also, during 1956 to 1966, construction of Saadi square within the context of Sarab neighborhood caused fragmentation. From 1966 onwards, Sarab area has seen extensive anatomical, and functional changes from inside. With the spread of modernity and

technology innovations at that time, Saadi Street had been converted to the hub of home appliance shops and its traditional functions confronted with pervasive metamorphosis. The continuity of this powerful business led to the failure of revival of historical market.

3.2.2. Sajjad Neighborhood

Sajjad, a new neighborhood in Mashhad city with a population of 11600 and an approximate area of 3'120'661 m² is located in region 1 in Mashhad municipality. According to historical backgrounds, the history of this district about 30 years old. Until 1985, this district had no urban facilities or good accessibility, but it began to advance after a decade due to the private investments of residents and imperative changes have been occurred since then. Grid design of its urban fabrics is bordered by Ferdowsi Boulevard in north, Khayam Boulevard in east, Malek-Abad Street in south and Azadi highway in west. Also during 1985 to 2015, the construction of high-rise buildings within the context of Sajjad neighborhood caused an increase in population density. Since 2005, Sajjad area has seen extensive structural and functional changes. With the outburst of modernism and innovation, Sajjad Street transformed to a window-shopping and recreation hub. During this time, the steadiness of these powerful commercial activities caused the whole area to wear out.

3.2.3. Comparison between two Areas

Despite the differences in the context of social and physical characteristics in these neighborhoods, they share some aspect: both neighborhoods were known as successful high-class districts in Mashhad in a period of time. Sajjad neighborhood currently benefits from this characteristic, but Sarab neighborhood enjoyed this reputation before city's expansion to the West and South-West in the middle of 1970s.

4. Survey Results

4.1. Profile of Respondents

4.1.1. Gender

As table (3) shows, 55.3 percent of the respondents in Sarab district and 32.7 percent of the respondents in Sajjad district were women and the rest are men.

4.1.2. Age

The age distribution of respondents is as the following table shows: (table 4)

4.1.3. Education of Householder

Table (5) shows that there is a huge difference between Sarab and Sajjad neighborhoods in terms of education. According to the level of education in both areas, Sarab is dramatically with Sajjad district.

5. Discussion

5.1. Factors Analysis

Researchers often seek to compact data contents in a new structure to analyze in a more academic approach and get more operational results by utilizing a model. In this study, variables of sustainability were categorized in five key factors including social, economic, environmental, physical and institutional. Using factor analysis and Varimax rotation in SPSS, criteria analysis has been done for above-mentioned categories to find the significance factors on the sustainability of existing neighborhoods.

5.1.1. Sarab Neighborhood Analysis

Table (6) shows initial Eigenvalues (total, percent of variance and cumulative) of each factor in the neighborhood.

5.1.1.1. Social Factor

Several variables were considered in this factor; after analyzing the data, total for the index is 1.314 which shows 26.28 percent of variance. This factor has a great impact on the sustainability of Sarab neighborhood among all **factors**. This shows that sustainability of this neighborhood is due to social and cultural factors or historical background. The neighborhood has had a good position with respect to its antiquity and history. It can be considered the underlying factor for other factors; and if the focus on this category continues, it is hoped that other factors enhance in way that the sustainability would be more easily reachable. In other words, any plans in this field should be done with consideration of local culture and society strength.

5.1.1.2. Institutional Factor

The final result for this factor is 1.109 which shows 22.18% of variance. After social factor, the institutional factor has had a great influence on the sustainability of Sarab neighborhood. High value of this index, as well as the first one (social) indicates their importance and that performance of Mashhad municipality is moderately appropriate in this area.

5.1.1.3. Environmental Factor

The third affecting factor in Sarab neighborhood's sustainability is environmental issues. The total value of this index is 1.003 which reveals 20.06% of variance. According to the historical characteristics of this district, there is less attention on reducing private cars and improving public transportation. Thus, the environmental factor has a significant rate of variance in comparison with economic and physical factors. The summary of above three factors displays 68.52% of variance. In fact, it can be said that social, institutional and environmental factors are major determinant of sustainability in Sarab neighborhood.

5.1.1.4. Economic and Physical

Values of the two last factors namely economic and physical are low which are 0.827 and 0.747 and

illuminate 16.53 and 14.95 percent of the variance, respectively. This is perhaps due to neighborhood's changes towards economic improvement. On the other hand, because of old urban fabric- deformation to brownfields- the process of regeneration and renovation advances slowly.

5.1.2. Sajjad Neighborhood Analysis

Variance values in this neighborhood are very different from Sarab. The results are presented in table (5) indicating values for eigenvalues, percentage of variance and cumulative variance percentage of each factor.

5.1.2.1. Economic

After analyzing the data, it became clear that economic factor has the highest value. Total rate for this factor is 1.842 and percent of variance is 36.83 which includes more than one third of overall sustainability impact on Sajjad neighborhood. The high rate of this factor shows that the sustainability of neighborhood derives from economic, financial and welfare grade and should be highly considered in future planning. Certainly, economic factor can be considered as a basic underlying factor for other factors.

5.1.2.2. Physical

Various variables are mentioned in this field and total

rate is 1.260 which indicates 25.20% of variance. This factor has a great impact on Sajjad neighborhood sustainability after economic factor. The high value of this factor, as well as the previous one approves their importance. Given that Sajjad district is a modern area in Mashhad with gridline form, it can be said that the neighborhood has good a condition in physical aspect. Therefore, physical issues comprise a significant percentage of variance. It can be said that since Sajjad neighborhood is considered a modern urban district, the main influential criteria on sustainability are economic and physical.

5.1.2.3. Institutional, Social and Environmental

Institutional, economic and environmental values are very low. The total value of these criteria are 0.904, 0.771, and 0.239, respectively; their variances are 18.09, 15.41 and 4.79 percent approving the factors' weakness. This is perhaps due to the fact that Sajjad neighborhood is a new part of city and it does not have significant social and cultural identity. On the other hand, due to the grid land preparation with focus on vehicles movement, private transportation is highly ranked.

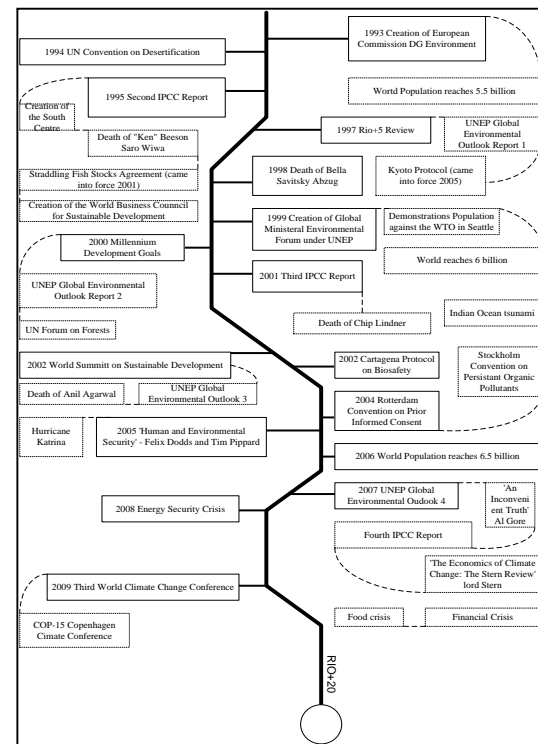
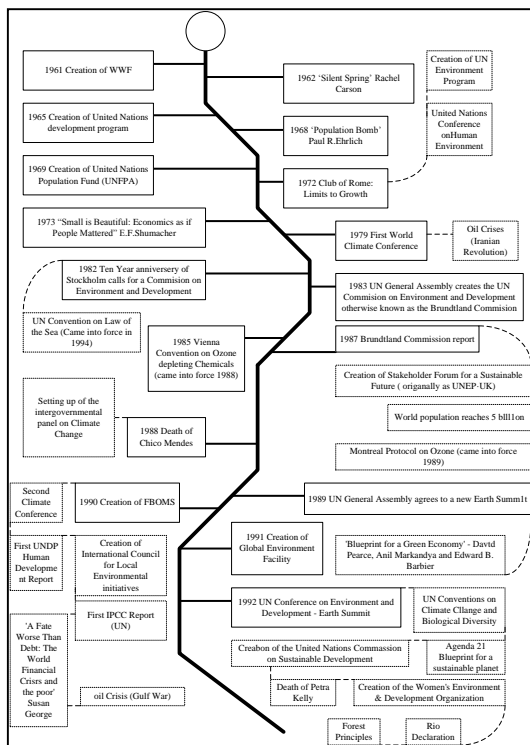


Fig 1: Conceptual Diagram of the Sustainable Development Theory Evolution 1960-2010 (Akbari Motlaq, 2013)



Fig 2: Aspects of Urban Sustainability (UNSD, 2016)



Fig 3: Sarab and Sajjad Neighborhoods Location in Mashhad (Authors, 2016)



Fig 4: Aerial Image of Sarab Neighborhood (Authors, 2016)

Table 1: Demographic Characteristics of Sarab Neighborhood (Taash Consulting Engineers, 2010)

Name	Area (M ²)	Population	Number of Households	Number of Housing Units	Population Density (Hectares)	Number of Households in Housing Units
Sarab	502960	3227	948	847	64	1.11



Fig 5: Aerial Image of Sajjad Neighborhood (Authors, 2016)

Table 2: Demographic Characteristics of Sajjad Neighborhood (Taash Consulting Engineers, 2010)

Name	Area (M ²)	Population	Number of Households	Number of Housing Units	Population Density (Hectares)	Number of Households in Housing Units
Sajjad	3120661	7648	1841	1157	36	1.59

Table 3: Gender of Respondents to Questionnaires in both Areas (Authors, 2016)

Gender	Frequency		Percent	
	Sarab	Sajjad	Sarab	Sajjad
Female	83	72	55.3	32.7
Male	67	148	44.7	67.3
Total	150	220	100	100

Table 4: Distribution of Respondents According to Age in both Areas (Authors, 2016)

Age	Frequency		Percent		Cumulative Frequency	
	Sarab	Sajjad	Sarab	Sajjad	Sarab	Sajjad
Less than 15	2	2	1.3	0.9	1.3	0.9
15-30	29	70	19.3	31.8	20.7	32.7
30-45	58	62	38.7	28.2	59.3	60.9
45-60	40	39	26.7	17.7	86	78.6
+60	21	47	14	21.4	100	100
Total	150	220	100	100	-	-

Table 5: Education Level of Households (Authors, 2016)

Education	Frequency		Percent	
	Sarab	Sajjad	Sarab	Sajjad
Illiterate	24	0	16	0
Less than high school diploma	63	13	42	5.9
Diploma	43	45	28.7	20.5
Higher diploma and Bachelor	11	108	7.3	49.1
Master's degree or higher	4	44	2.7	20
Missed	5	10	3.3	4.5
Total	150	220	100	100

Table 6: Initial Eigenvalues in Sarab Neighborhood (Authors, 2016)

Name of Factor	Total	Variance %	Cumulative %
Social	1.314	26.28	26.28
Institutional	1.109	22.18	48.46
Environmental	1.003	20.06	68.52
Economic	0.827	16.53	85.05
Physical	0.747	14.95	100

Table 7: Initial Eigenvalues in Sajjad Neighborhood (Authors, 2016)

Name of Factor	Total	Variance %	Cumulative %
Economic	1.825	36.51	36.51
Physical	1.260	25.20	61.71
Institutional	0.904	18.09	79.80
Social	0.771	15.41	95.21
Environmental	0.239	4.79	100

6. Conclusions

Urban management is strongly associated with the nature of city on the one hand, and social and economic structures on the other hand. It also has close relation with government agencies and citizens [17]. Hence, investigation city neighborhood is considered a major issue in urban studies, particularly it becomes imperative with respect to modern urban conditions as well as urban management advancement. Currently, community-based micro urban design and planning is appointed in the national agenda with regard to its benefits and privileges. Because the level of heterogeneity and homogeneity within urban micro-level (local) is high, management approaches can lead to more constructive and sensible results if their features change to characteristics of neighborhood planning. In order to understand community development, it is important to comprehend the meaning of different causes and effects in different urban public places and contemplate on how to initiate appropriate community development for expanding the society considerably in few years [18]. In this paper, social sustainability is examined in two different neighborhoods in terms of social, economic and ... perspectives. Sarab

neighborhood is considered a traditional neighborhood in the city with a great historical value, however Sajjad neighborhood is considered a modern neighborhood enjoying distinctive features. Comparative results of factors affecting on neighborhood sustainability demonstrates that while social, environmental and institutional factors have a great impact on sustainability in Sarab neighborhood, the economic and institutional factors are mostly influential in Sajjad neighborhood. Experts pointed out that the theory of sustainable urban development is an attempt to find a strategic solution for the city development in order to protect the environment in the whole world. This study indicates that the principles of sustainable zones can be implemented in non-sustainable areas to promote the quality of life. Consequently, any planning in these places should be done according to the perceived strength or weakness of these criteria. To draw a general conclusion, it can be said that social issues play an important role in managing system in historical neighborhoods of city to prepare the base of economic and physical

advancements. In modern neighborhoods, economic and environmental factors are strong indicating that social

and environmental disadvantage can be reduced by considering their strengths.

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