Exhaustion Index Identification of Urban Tissues  
(Case Study: District 3 in the City of Isfahan)

Mohammad Hossein Saraei
Associate Professor of Geography and Urban Planning, Yazd University, Yazd, Iran

Shirin Mohrehkesh
MSc in Geography and Urban Planning, Yazd University, Yazd, Iran

Reza Mostofi Allmamaleki
Assistant Professor of Geography and Urban Planning, Yazd University, Yazd, Iran

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Extended Abstract

1. Introduction
Currently the study of urban exhausted tissues is one of the major issues in urban policies as well as the contemporary urban planning in Iran. Lack of attention to exhausted tissues results in the growth of these tissues and the remove of local residents from these areas over time. Therefore, the problem of identifying the type of exhausted tissues based on appropriate criteria and indexes and the type of intervention methods tailored for the exhaustion are of great importance. In Iran, there are more than 100 cities with exhausted tissue, covering an area of about 87,000 hectares. The city of Isfahan, the third largest metropolitan city in Iran, has 2157.3 ha (about 13% of city area) of exhausted tissues. The exhausted tissues of quarters located in the third municipality District of the city require more attention, because they cover a large portion of the historical tissues of the city (nearly 299.06 ha).

2. Theoretical Framework
The current indexes defined by the High Council of Iranian Architecture and Urban Planning for policy makers to take action on exhausted tissues is limited to only three physical indexes, including fined-grain plot, impenetrability, and instability. These indexes cannot be used as factors in identifying the exhausted tissues of a city or even the quarters of a city to develop solutions for improving and organizing these tissues. Indeed, each city or quarter needs a customized vision of organization and intervention based on their unique characteristics and properties, because the share of each index of exhaustion is different in various quarters. Comprehensive planning and attention to all aspects, including social, economical, physical, structural, environmental, and services result in improving the quality of the human environment and create social and economic values in cities. This study is tracking such attempts with a focus on identifying the indexes of exhausted tissues. This study also investigates the hypothesis that in addition to three well-known and commonly suggested physical indexes, environmental, social, economical, structural and service-related criteria can lead to the exhaustion of the old tissues. Also, this study argues that there is a relationship between the rate, intensity, type of exhaustion, and the methods of interventions in exhausted tissues. It also indicates the pattern used for determining the ordering priorities of exhausted tissues. Therefore, six criteria and 27 indexes are introduced as effective factors in the

1. Corresponding Author: msaraei@yazduni.ac.ir
exhaustion process while 24 of its defined indexes were assessed on eight quarters.

3. Methodology

This paper is a descriptive-analytical study following a qualitative-quantitative approach to the problem of exhausted tissues. During the analysis stage, the Analytical Hierarchy Process (AHP) model and SWOT technique have been used. To collect the necessary data, both theoretical and field surveys extracted from various sources, including books, articles, the information of organizations, questionnaires, maps, and images were used. The survey sample, including the total population and the total number households residing in the area was defined using Cochran formula after adjustments based on the limitations of this research. The survey sample included 262 questionnaires. The sampling method is simple probability and questionnaires were systematically distributed in the quarters. At the pre-test phase, 30 questionnaires were distributed in the quarters to measure the validity and reliability of the questionnaire. Obtaining 0/811 as Cronbach's alpha coefficient, the questionnaires were distributed in the quarters. Indexes in this study (i.e. six criteria, including physical, environmental, social, economic, structural, and services along with 24 indexes) are compared and evaluated using AHP. In addition, exhausted quarters are compared and categorized according to the indexes developed through this model. Finally, the priorities of intervention approaches in the quarters are determined, depending on the amount and type of exhaustion. The modeling of this research has been done using Expert Choice software.

4. Results and Discussion

The results indicate that among the six main criteria, physical, structural, environmental, economic, social and service criteria have the most significant impact on the exhaustion tissues in the studied urban quarters. Furthermore, comparing quarters based on the mentioned indexes, Joybareh, Shahshahan, Sonbolastan, Emamzadeh Ismail, Sarcheshmeh, Naghsh-e-Jahan, Sartaveh and Ahmadabad quarters have acquired the highest to the lowest rank in terms of the exhaustion quantity accordingly. The first and second priority of intervention methods for each quarter according to their exhaustion type is also discussed. Thus, it can be concluded that physical, structural, environmental, economic, social, and service factors are effective in the identification, intervention methods, and prioritization of exhausted tissues.

5. Conclusion

The results of this research showed that several indexes beyond the three common indexes (fined-grain plot, impenetrability, and instability) are involved in the exhaustion of tissues in quarters. Indeed, a series of different processes cause exhaustion also the weakness, and in effectiveness of these tissues. However, to take and organize actions we need to correctly identify and select most appropriate intervention approach based on the type of exhaustion. In summary, there is a need to review all identified indexes for exhausted tissues to codify and offer comprehensive indexes in their all aspects, and consequently evaluate the tissues of quarters and develop intervention approaches and solutions based on the type, intensity, and amount of exhaustion. The exhausted areas identified based on the suggested indexes this research are different from the areas identified and approved by Supreme Council of Urban Planning and Architecture based on the three physical indexes. In this research, the effect of structural, social, economic, environmental, and services is included in exhaustion indexes. The three common indexes are not generalizable for all quarters, regions, and cities; therefore they cannot be used to propose similar intervention approaches. In addition, determining qualitative or
quantitative standards appropriate to the proposed indexes aimed at defining the exhaustion of different quarter of city and the exhaustion limit of these areas based on the mentioned indexes can be offered as an avenue for further research in the future.

**Keywords:** Exhausted issue, exhaustion index, ordering, Isfahan.

**References (in Persian)**


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