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ORIGINAL ARTICLE

Presentation and Explanation of the Theoretical and Conceptual Framework for Measuring Urban Resilience, Case Study of Ardabil City

Yaghoub Ahmadi, Nasrin Khodabakhshi Hafeshjani[2], Shima Sharifi[3*]

1. Professor, Department of Sociology, Payame Noor University, Tehran, Iran.
2. Assistant Professor, Department of Public Administration, Major in Decision Making and Public Policy, Khalkhal Branch, Islamic Azad University, Khalkhal, Iran.
3. M.A, Department of Social Sciences, Major in Tourism Planning, University of Tehran, Tehran, Iran.

*Correspondence
Shima Sharifi
E-mail: shima.sharify@ut.ac.ir

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EXTENDED A B S T R A C T

Introduction

As cities grow larger and urban needs diversify, human issues will also threaten cities in addition to natural hazards and threats. Therefore, it is necessary to increase the capacity and capability of urban settlements and their resilience coefficient to provide a basis for quality management of cities for future generations (Namjooyan et al., 2017: 81). Therefore, what is being discussed today in the topic of managing cities around the world is the resilience of cities, which is of great importance, because it can easily affect the life and durability of a city and make cities more functional and capable so that they can respond to crises in the shortest possible time and show the best reaction. This is a topic that can form a bridge between the topics of urban resilience and urban management (Katabchi and Karseipour, 2018: 1). Urban resilience is proposed as a way to strengthen communities by using their capacities, and different definitions, approaches, indicators, and measurement models have been formed about it. Despite the importance of urban resilience for communities and cities, its dimensions and indicators need to be used as a tool to measure this concept in other communities. The importance of the city of Ardabil In addition to its strategic location and location on the ancient Silk Road, it has a prominent historical identity and history as an important destination (Farzaneh Sadat-Zaranji et al., 1403: 8047). In the strategic field, it also has a special place in regional developments, especially cross-border communications with neighbors, and its climatic characteristics play an important role in the political, economic, social, and cultural life of the country (Aghazadeh and Arhami, 1404: 561). For this reason, the importance of resilience in terms of different dimensions can be an important necessity in the city of Ardabil. In addition, urban resilience is increasingly considered a useful approach to adapt to uncertainties. Therefore, this study, by identifying the indicators and factors affecting urban resilience, first presents a theoretical and conceptual framework for measuring urban resilience using existing theoretical approaches, and then measures and evaluates the level of urban resilience in the city of Ardabil so that, while confirming the presented model, it can be used in future research.

Methodology
Based on the main objective of the study, which is to present and explain the theoretical and conceptual framework for measuring urban resilience, the case of the city of Ardabil, the method of this study is considered a descriptive research of the test type. The statistical population of the study includes the employees of the urban management and municipality of Ardabil in 1402 who have experience and work in middle and senior management positions in this city. The number of the statistical population is about 220 people, of which 140 people were selected as the sample size based on the Cochran sample size formula and the questionnaire questions were presented to them in the form of a researcher-made questionnaire. The collected data were analyzed by SPSS and Amos Graphics statistical software. The urban resilience measurement tool in this study is a researcher-made questionnaire that has been developed using the theoretical literature in this field in four main indicators; social resilience, economic resilience, physical resilience and environmental resilience. This questionnaire has 4 main indicators and 25 questions. Since the aim of the present study is to present and explain the theoretical and conceptual framework for measuring urban resilience, the case study of Ardabil city, for this purpose, each component has been scored based on a five-point Likert scale.

Findings
The main findings of the research are based on the measurement model, and the measurement part of the model indicates the relationships between the components and the items and aims to ensure the accuracy of measuring the latent variables by the observed variables. This part of the model has identified the relationships of 25 observed variables with 4 latent constructs. According to the results, all items in relation to the identified construct have positive standardized factor loadings and a critical ratio statistic greater than 1.96, which significantly supports the existence of a positive relationship between the items and the identified constructs and supports the appropriateness and acceptability of the factor validity of the items of each of the four main indicators. In a better description of urban resilience indicators in Ardabil, it should be noted that based on the analysis of the collected data, most of the indicators show average scores, but based on the average score of 1 to 5 for each component, social resilience is ranked with an average of 4.06, environmental resilience with an average of 3.96, economic resilience with an average of 3.51, and finally physical resilience with an average of 2.93, and a column chart has been drawn for a better explanation. In general, based on the final resilience scores that place the scores on a spectrum of 1 to 5, three cases can be considered in interpreting the scores. The average of each indicator is less than 2.5 as a low average, the average score of 2.5 to 3.5 as an average, and the average of 3.5 and above is considered the same as the high average. The proximity of the overall resilience average to around 3.5 in the descriptive findings of this study also indicates the overall resilience level as average. Of course, every country needs a high level of resilience in different circumstances to perform effectively and acceptably in the face of crises. This is in a situation where resilience is not an advantage; but a requirement for every city and society. In order to ensure the level of resilience of Ardabil city, it is necessary to repeat this research at another time and by several other researchers, so that the accuracy and confidence in the findings can be increased.

Discussion and Conclusion
Although resilience is a major challenge for cities around the world, cities

around the world need to make significant efforts to increase their resilience. If urban resilience is to increase, governments and communities need to promote diversity, flexibility and feedback loops, reduce resource consumption, increase self-sufficiency and foster social cohesion and innovation. Resilient cities were initially driven by a top-down, vertical mindset, where government officials worked with various companies to deliver smart cities designed by introducing digital technologies into urban policies and infrastructure. However, resilience requires the rapid emergence of new ways of living, working and consuming in the city. The importance of resilience in large cities can inspire resilience in many small cities. Because small cities face a combination of very limited resources and high vulnerability. They often face a high accumulation of risks and become rapidly vulnerable to the slightest changes in climate and inadequate infrastructure. Accordingly, the need for urban resilience indexing is an efficient tool for staying in the global competition among cities, and by using this tool, it is possible to measure the level of resilience of cities, identify strategies for improving their situation, and introduce the strengths and weaknesses of cities to planners. In general, having a comprehensive framework for urban resilience can be effective at the national and local levels in promoting targeted and disciplined crisis management, and at different stages of the crisis, it can easily provide the necessary coordination between different organizations with tested tools. Therefore, increasing efforts should be made to measure urban resilience, and the urban resilience index should be presented as a theoretical framework for measuring resilience in urban socio-ecological systems, which can provide more data for improving cities. The findings have both confirmed the choice of indexing and shown the average of each indicator in the city of Ardabil. In comparison with other works in this field, it should be noted that this research, unlike similar works, has addressed both conceptualization and modeling, as well as testing the model in four important areas: social, economic, physical, and environmental. Most of the existing literature has assessed one dimension of resilience in a specific society using only the existing theoretical framework, but this research has proposed a more coherent and general perspective, both methodologically and theoretically.

K E Y W O R D S

Resilience, Urban Resilience, Model Test, Ardabil, Physical

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