

Analysis and Determination of Factors Affecting Flexibility (UR) and Urban Sustainability (US)

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Abstract

Cities are increasingly becoming complex systems of social, economic, and ecological factors. When any of their subsystems are destroyed or unable to adapt to new challenges, they are highly vulnerable. Unknown factors such as natural disasters, climate change, energy crises, political instability, financial crises, food health, and terrorist attacks play an important role in threatening urban development. Three scales of urban, community, and urban facilities are outlined. To study and prepare the questionnaire in this study, two scales of community and urban facilities are considered. Accuracy was not possible. The results of the study showed that the indicators considered in the flexibility section are more important than urban sustainability, meaning that when flexibility is implemented in cities, the city will move towards sustainability. Other important results of the research are the implementation of poverty alleviation programs, the establishment of social poverty alleviation programs with the participation of the private sector, the number and value of small business loans, and the allocation of funds for poverty alleviation programs as influential factors in community management. There are two modes of flexibility and stability.

Keywords: Urban Flexibility, Urban Sustainability, Community, Management, Hamadan.

Introduction

Cities are increasingly becoming complex systems of social, economic, and ecological factors (Aghazadeh et al., 2019). However, when any of their subsystems are destroyed or unable to adapt to new challenges, they are highly vulnerable (Ghadarjani et al., 2013). Such a situation can lead to a fatal crisis or even destruction (Khanian et al., 2019). Unknown factors such as natural disasters, climate change, energy crises, political instability, financial crises, food health, and terrorist attacks play an important role in threatening urban development (Gheitarani et al., 2020; Norouzian & Gheitarani, 2023). Although these threats have existed around the world for a long time, some large cities have been permanently destroyed or abandoned since the 19th century (Gheitarani et al., 2013). For example, famous cities such as Hiroshima, Tokyo, Warsaw, Dresden, Berlin, and Beirut, although destroyed by war or natural disasters, survived even brighter than before. Worn-out urban textures are exposed more than other urban areas because of their structural features.

Damages caused by natural and abnormal disasters are badly in need of improvement, modernization, and planning for optimal crisis management. The strategies that earthquake crisis management offers to reduce the vulnerability of urban contexts are related to areas that are important to urban planning, especially urban planning. Worn tissues are examined (Maleki et al., 2024). Many issues can be discussed in terms of flexibility and sustainability, each of which can be considered individually important issues for the sustainability of neighborhoods, especially with worn-out tex-

tures. Community management and infrastructure refer to the quality of life, healthy living, earthquake-resistant buildings, green buildings, emergency and basic needs of citizens, income, and transportation (Sarabi et al., 2023). The purpose of this study was to determine the factors affecting the two categories of urban resilience (UR) and urban sustainability (US). We are to identify influential indicators at three scales: urban, community, and citizenship.

Literature

Urban resilience (UR) and urban sustainability (US) have been studied concerning the dual characteristics of cities' vulnerability and tenacity. In the field of urban research, UR has gradually shifted from a new research topic to a mainstream one. For example, in 2009, the International Indigenous States for Sustainability (ICLEI) hosted the "First World Forum on Urban Flexibility and Adaptation." The concept of "Planning for Flexible Cities and Areas" was co-developed by the Association of Academic Planning Schools (ACSP, USA) and the Association of European Planning Schools (AESOP) in 2013 and extensively it is recognized by public universities in both the US and the European Union. In May 2014 Resilience Alliance Resilience was held in Montpellier, France.

A growing number of government agencies, researchers, and urban planners have participated in the study of UR, and many scientific organizations (such as Resistance Alliance, Flexible Coalition, Flexible Organization, and Flexible City Organization) have been established around the world. However, resilience, though without precise meaning and often as an additional label associated with prior research, has been associated with sustainability for over a decade (Aydin et al., 2020; Norouzian & Gheitarani, 2024).

In the current studies, some researchers believe that UR has replaced the US as a public concept in the field of urban studies. In similar research studies (Dizaji et al., 2023), they examined the difference between UR and the US, using the New York Sea Gate project as an example to illustrate the contrasting nature of UR and the US. Finally, they have presented a new conceptual framework for understanding the fundamental differences between UR and US and new and inclusive definitions. Sepehr (2014) also analyzes the role of resilience in urban ecosystems and states that resilience in urban ecosystems is a function of human activities and natural habitats that are affected by socio-economic and biophysical processes. Urban areas are managed. The model analyzed in this paper can be a criterion for researchers in this field of urban planning and management. Various studies have examined global, regional, and urban scales.

At each of the scales, indicators of identification and the difference between the two terms flexibility and resilience are partially clarified. At the global scale of global environmental protection (GHADARJANI & GHEITARANI, 2013; Gheitarani et al., 2024- b), resource conservation and exploitation (Farrokhirad & Gheitarani, 2024), population and health (Ghadarjani et al., 2013), regional economic structure (Norouzian & Sarabi, 2023) and regional resource flow (Mohammad & Norouzian, 2023) were among the indices studied. The scales examined in this study are urban scale, community, and urban facilities. At the urban scale, urban governance (Gheitarani et al., 2024- a), urban system (Gheitarany et al., 2013), (Karimimansoob et al., 2024- b) and urban security (Karimimansoob et al., 2024); On the scale of community demand for residents (Aghazadeh et al., 2018), neighborhood (Khanian et al., 2013) and community management (Karimimansoob et al., 2024- a); On the scale of urban facilities, infrastructure management (Kahvand et al., 2015), transportation (Naghobi Iravani et al., 2024- a), and construction (Aghazadeh et al., 2017) have been studied by other researchers. Table 1 summarizes the studies performed.

Table 1. Scale and items examined in UR and US

Urban Sustainability	Flexibility	Item	Scale
Land Use / Urban Planning Urban Management System	Diverse Career Opportunities Social insurance and welfare	Urban Governance	Urban Scale
Urban metabolism Social and economic system	Urban spatial structure Urban flood control and drainage systems	Urban System	
Safety hazard monitoring and alert	Corruption	Urban Security	
Public awareness of the danger	terrorism	Residents' needs	Community Scale
Neighborhood Effect	Community exchange platform	Neighborhood	
Diversity of community income groups	Community emergency response	Community Management	
Infrastructure investment	Key service continuity	Infrastructure Management	Urban Facilities Scale
Integrated Transport Networks	Transportation Safety	Transportation	
The area ratio of buildings	Earthquake Resistant Buildings	Building	

Methodology

The research method was descriptive-analytical and according to the nature of the research, the required data through documentary studies including books, articles, theses, statistics, and reports as well as field studies such as questionnaires, interviews, and observations. Objectively collected. The statistical population of the study consists of all urban experts and experts on urban flexibility and sustainability in Hamadan. In this study, according to the population size, Cochran formula for sample size was used and according to this formula, 85 people were selected systematically. Data were analyzed by SPSS software using quantitative and statistical methods. Excel software was used to draw charts and charts and AutoCAD software was used to map the study area.

Results

According to what has been examined in the theoretical foundations of the research, three scales of urban, community, and urban facilities have been identified. In this research, two scales of community and urban facilities were considered and prepared for this study (Samami et al., 2024). The reason for the lack of impact on the urban scale is the widespread discussions in this section and access to its data was not possible with the necessary precision (Naghibi Iravani et al., 2024- b; Naghibi Iravani et al., 2024- a). More detailed studies are needed to examine this scale at the neighborhood, city, and community levels. Therefore, the research data for indicators are collected at two scales of community and urban facilities. Table 2 shows the indices set for both scales (Norouzian, 2024).

Table 2. Indicators identified in UR and US

Urban Sustainability	Flexibility	Item	Scale
Residents need a healthy life Residents' quality of life	Emergency needs of residents Basic security needs of residents	Residents' demand	Community Scale
The neighborhood is effective Cohesion	New flexible relationships in the neighborhood Community exchange platform	Neighborhood	
The diversity of income groups in society Diversity of age groups	Community emergency response Social Network Development	Community Management	
Infrastructure investment Select infrastructure	Critical Infrastructure Planning Key service continuity	Infrastructure Management	Facilities Scale
Integrated Transport Networks Reliable and compatible communication networks	Emergency Traffic Management Transportation Security	Transportation	
The area ratio of buildings Architectural composition	Green buildings Earthquake Resistant Buildings	Building	

Recognition and problems of the study area based on selected criteria. The Golappa area in Hamedan is surrounded by Bou Ali, Shahid Madani Boulevard, 15 Farvardin Boulevard, and Taleghani St, covering 75% of the entire area and comprising less than 25% of the area. Golappa Neighborhood is one of the most important neighborhoods of Hamedan city as it is located next to one of the main traffic jams of the city. In this neighborhood office, commercial and residential centers are combined. Residential buildings whose skeletons are also unacceptable and inaccessible if properly repaired are included in the list of demolished buildings (Sadigh Sarabi M. et al., 2023; Zaker Haghghi et al., 2014).

The southern faults of Hamedan, including Yelpan, Varkaneh, and Ebro faults are the most important faults that pass near the city of Hamadan and are even likely to pass through the faults, especially the Yalfan and Ebru faults. Due to the built structures, the study of expansion or non-expansion of these faults within the city requires detailed geophysical studies and geological excavations. The Golappa Neighborhood Communication Network is a spiral network that is narrow and an integral feature of this local network (Sadigh Sarabi et al., 2023). This network, whose original design dates back at least 50 years, has been implemented over time, with detailed plans as well as guidance plans approved earlier, more or less by buildings and streets. They have retreated, but this has led to irregularities, irregularities, and regressions. The space used in the network is the original design space (Zakerhaghghi et al., 2015; Safaei-Mehr, 2024).

One of the characteristics of this network is the lack of sidewalks and lack of proper coverage. In the streets and streets of the Golappa neighborhood, the intersection of pedestrians and ca-

verns merges into one. This has reduced network quality and reduced pedestrian network security in the form of osteoporosis in public spaces.

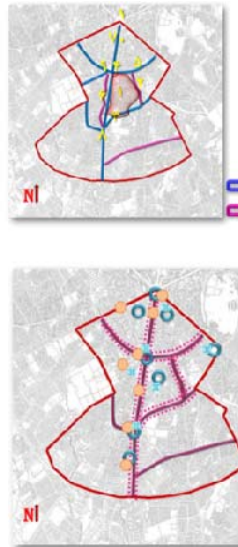


Figure 1. Bone spaces

Results

Community-scale. Hypothesis 1: It seems that there is a significant relationship between residents' demand and (flexibility, urban sustainability) residents of the Californian area (given that the independent and dependent variables in this hypothesis are at a distance level, this hypothesis is used by the Pearson correlation test.

Table 3. Correlation between Residents' Demand and (Flexibility, Urban Sustainability) Residents of Golappa Area

		Flexibility	Urban Sustainability
Residents' needs	Correlation	**0.803	**0.712
	Sig. (2-tailed)	0.000	0.000
	Frequency	85	85

****Correlation is significant at the 0.01 level (2-tailed).**

Table (3) examines the relationship between residents' demand and (flexibility, in urban sustainability) residents in the Golappa area. Since the significance level of these two variables is 0.000 (less than 0.05), it can be said that there is a significant relationship between the two variables. The variable correlation between residents 'demand and flexibility is 0.803% and the residents' demand and urban sustainability is 0.712 which indicates a high and direct correlation between variables.

Therefore, it can be said that the greater the flexibility of the area, which includes the urgent needs and basic needs of the residents' security, the greater the demand of the residents, and the neighborhood will move towards greater sustainability. Hypothesis 2: It seems that there is a significant relationship between neighborhood and (resilience, urban sustainability) residents of the Golappa area (Table 4).

Table 4. Correlation between Neighborhood and (Flexibility, Urban Sustainability) Residents of Golappa Area

		Flexibility	Urban Sustainability
Residents' needs	Correlation	**0.389	**0.309
	Sig. (2-tailed)	0.001	0.01
	Frequency	85	85

****Correlation is significant at the 0.01 level (2-tailed)**

Given that the significance level of these two variables is equal to 0.001 (less than 0.05), it can be said that there is a significant relationship between neighborhood variables and (flexibility, and urban sustainability). The correlation between neighborhood variables and flexibility is 0.389%. And residents' demand and urban sustainability 0.309, indicating a direct correlation between variables. Therefore, it can be said that the greater the flexibility of the area, including the more flexible neighborhood relationships and community exchange platforms, the more flexible the neighborhood will be and the sustainability goals achieved. Hypothesis 3: There seems to be a significant relationship between community management and (flexibility, urban sustainability) residents in the Golappa area.

Table 5. Correlation between community management and (resilience, urban sustainability) residents of Golappa area

		Flexibility	Urban Sustainability
Residents' needs	Correlation	**0.553	**0.659
	Sig. (2-tailed)	0.000	0.000
	Frequency	85	85

****Correlation is significant at the 0.01 level (2-tailed)**

Table (5) examines the relationship between community management and (resilience, urban sustainability) residents in the Golappa area. Since the significance level of these two variables is 0.000 (less than 0.05), The correlation coefficient of community management and resilience is 0.555%, and community management and urban sustainability is 0.659 which indicates a high and direct correlation between variables. Therefore, it can be said that the greater the level of community management, which includes the diversity of income groups and age groups, the greater the urban sustainability than the urban flexibility.

The scale of facilities. Hypothesis 4: There seems to be a significant relationship between infrastructure management and (resilience, urban sustainability) residents in the Golappa area.

Table 6. Correlation between Infrastructure Management and (Flexibility, Urban Sustainability) Residents of Golappa Area

		Flexibility	Urban Sustainability
Residents' needs	Correlation	**0.850	**0.677
	Sig. (2-tailed)	0.000	0.000
	Frequency	85	85

****Correlation is significant at the 0.01 level (2-tailed)**

Table 6 examines the relationship between infrastructure management and (resilience, and urban sustainability) residents in the Golappa area. Since the significance level of these two variables is 0.000 (less than 0.05), the Correlation between the Infrastructure Management and Flexibility variable is 0.850 and the Infrastructure Management and Urban Sustainability 0.677, indicating a high and direct correlation between variables.

Therefore, the greater the degree of infrastructure management, which includes critical infrastructure planning and the continuity of key services, the greater the flexibility of the neighborhood. Hypothesis 5: There seems to be a significant relationship between transportation and (resilience, and urban sustainability) residents in the Golappa area.

Table 7. Correlation between Transportation and (Resilience, Urban Sustainability) Residents of Golappa Area

		Flexibility	Urban Sustainability
Residents' needs	Correlation	**0.702	**0.569
	Sig. (2-tailed)	0.000	0.000
	Frequency	85	85

****Correlation is significant at the 0.01 level (2-tailed)**

Table (7) examines the relationship between transportation and (flexibility, in urban sustainability) residents in the Golappa area. Since the significance level of these two variables is 0.000 (less than 0.05), The correlation coefficient of transport and flexibility was 0.702%, and transport and urban sustainability were 0.569, indicating a high and direct correlation between variables.

Therefore, the greater the amount of transportation, including emergency traffic management and transportation security, the greater the flexibility of the neighborhood. Hypothesis 6: There seems to be a significant relationship between building and (flexibility, urban sustainability) residents in the Golappa area.

Table 8. Correlation between the building and (flexibility, urban sustainability) residents of Golappa area

		Flexibility	Urban Sustainability
Residents' needs	Correlation	**0.835	**0.588
	Sig. (2-tailed)	0.000	0.000
	Frequency	85	85

****Correlation is significant at the 0.01 level (2-tailed)**

Table (8) examines the relationship between the building and (flexibility, of urban sustainability) residents of the Golappa area. Since the significance level of these two variables is 0.000 (less than 0.05), the variable correlation of building and flexibility is 0.835% and urban building and sustainability is 0.588 which indicates a high and direct correlation between variables. Thus, the higher the building index, which includes green buildings and earthquake-resistant buildings, the greater the flexibility of the neighborhood (Dizaji, 2024).

Discussion

Strategy and Variables Analysis. Worn-out neighborhoods face many physical, economic, and social problems due to the lack of sustainable development indicators. The city of Hamadan is no exception, as cities are the main hub of human activities and the largest consumer of natural resources. Therefore, achieving the highest possible sustainability in cities is crucial. The sustainability of cities is not just about environmental issues, but about achieving economic dynamics, living environment, and social equality. Development defines a qualitative concept and can be equated with the qualitative enhancement of life, which includes issues such as health, education, welfare, freedom of expression, rights, and so on. Table 9 summarizes the guidelines for the study area.

Table 9. Summary of solutions for the study area

Urban flexibility and sustainability	Indices
According to the World Health Organization, a healthy city has characteristics such as having a clean and high-quality physical environment, having a strong and cohesive community with mutual support from the public and the government, providing necessities such as food, water, housing, income, Safety shall be the work of all citizens and having at least an adequate level of public health and health services available to the public.	Residents' needs
Squares and open spaces have been the bedrock of people's social interactions and one of the essentials of living in cities, but in recent decades, these spaces have sometimes been forgotten due to the ever-expanding ride routes in modern cities. The spaces within the area must be flexible and adaptable to other uses, as an urban space in a comprehensive communication with the needs of citizens and, considering ecological conditions as an active green space, bio-efficiency Environment and pension.	Neighborhood
Implement poverty reduction programs. Implementation, and establishment of social poverty alleviation programs with the participation of the private sector, the number and value of small business loans, and budget allocation for poverty alleviation programs are effective factors in managing society in both flexibility and sustainability. .	Community Management
By defining the infrastructure of a set of systems, and activities shaping modern societies and economies to name every human resource and network And is usually important and used on a large scale. Infrastructures of transportation, production and storage of gas and oil, water supply, emergency services, government services, banking and Investment, electricity, information and communication, as networks and Introduced critical infrastructure activities.	Infrastructure Management
Traffic management is the optimal use of existing communication network networks and increased road safety.	Transportation

Urban flexibility and sustainability	Indices
<p>Measures to implement urban traffic management depend on the type of traffic.</p> <p>Maintain pedestrian safety (crossing - fencing - traffic islands), control street parks and plan for optimal use of parking lots, measures to build sidewalks, take precautions for buses, status Biking rules, traffic congestion, one-way streets, and street colors.</p>	
<p>The purpose of green buildings is to improve the climate and prevent the negative effects of construction on the environment.</p> <p>Saving and optimizing energy consumption and the use of sustainable energy that currently has no role in the urban culture of Hamadan.</p> <p>Benefits: Using natural energy in everyday consumption, using renewable energy to generate electricity, paying attention to the environment and helping to conserve it, adopting appropriate ways to reduce wasted energy, or Its control and optimization of energy consumption and the use of natural plants as inspiration for live design should be within range of solutions.</p>	<p>Building</p>

Conclusion

Today, worn-out areas around the world continue to grow with varying intensities and features. Recent changes in existing urban patterns have caused numerous problems due to opposing trends in urban development and dissolution and large-scale urban planning processes. The purpose of Sustainable Planning is to integrate knowledge into socio-environmental contexts to implement community-based public actions to improve change and implement sustainability principles. The concept of sustainability of cities has been adopted by planners as a "belief system" or ideology, so a basic rationale for planned activities and decisions is presented.

For the past three decades, approaches to sustainable urban planning and its flexibility have attempted to incorporate social and ecological issues into planning methods and processes. There are many different types of sustainable planning methods, including planning and urban planning, community-based planning and design, environmental/ecological planning, and newer approaches using nature and Ecosystems in cities that are prioritized to provide people with social and ecological benefits.

However, much of the research in these two areas remains unsolved. What we focused on in this research is the needs of residents, neighborhood conditions, community management, infrastructure management, transportation, and buildings in Golappa city of Hamadan. With proper planning, it is hoped that the results obtained can be used to make the neighborhood more resilient and sustainable, both in the sample and in similar cases.

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