

RESEARCH ARTICLE

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Renovation programs in old and inefficient neighborhoods of cities with case studies

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Abstract

This article concerns urban renovation's background, necessity, goals, methods, and outcomes. The addressed question is how shall renew and rehabilitate old and non-functional urban neighborhoods.

The aim is to build a model for cities' renovation respecting general standards of town-building, local characteristics, requirements of inhabitants, and strategic development plans.

The applied research methods are theoretical and experimental, which analyze the situation of worn-out neighborhoods of the case study cities in housing, physical, socioeconomic, and environmental perspectives.

A problem-oriented, systematic, and step-by-step model evaluates the average magnitudes of damages caused by the nonfunctioning neighborhoods in 31 metropolitans of Iran. Certain indicators will introduce neighborhoods to renew them through a mother renovation program, which includes several projects. Simulating the program in the cities lead them to the best possible results in the renovation.

The renovation program is applicable in every other city, which faces inefficiently and nonfunctioning because of oldness.

Keywords: Urban renovation, Worn-out urban neighborhoods, Functioning planning, Problem-oriented method

Introduction

The history of urban renewal goes back to the results of the Industrial Revolution, in which cities such as Manchester in the United Kingdom with densely populated areas and Stockholm in Sweden had been renovated with effective programs (Metzger & Olsson, 2013). Singapore in the Far East also joined the renovation movement and achieved remarkable socio-economic results from its urban renovation plans (Zooehri, 1987).

Urban renovation has always been a necessity for communities because homes, buildings, and various infrastructures are old, destroyed, and nonfunctioning (Chahardowli & Sajadzadeh, 2022). Neighborhoods become inefficient due to various reasons, including poor management, lack of budget allocation for maintenance,

the end of the shelf life of buildings, and disregarding standards of urban quality of life (Ragheb & El-Ashmawy, 2021). Recent economic savings have led to more neglect in urban renewal. The number of old buildings and dilapidated neighborhoods is increasing, creating many problems for citizens, particularly the disabled, elderly and children. Simultaneously, not enough attention is paid to discussing the urban renovation. Therefore, there is a great need for research on urban renovation programs. The need of cities for renovation stems from their nature, which must be taken care of so that they can reciprocally serve the citizens. However, there is no adequate research work on this subject. This study addresses this need by providing a generic urban renovation program. In the renovation of cities, issues like required healthcare facilities, modern urban transportation facilities, digital official bureaucratic services, electronic trade, modern infrastructure, and communication for distance education shall be studied.

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This research builds a comprehensive renovation program with details for Iranian cities based on the physical, environmental, climatic, and socio-economic characteristics of every city and the needs of its inhabitants.

The questions addressed in this paper are how shall renew the old urban neighborhoods? What elements have a renovation program in the city?

Consequently, the following questions arise What is this situation in the city? Where will the city want to go? How shall the city achieve this goal?

This paper also must answer general questions concerning the renovation programs in every city as follows:

What are the strategic factors in an urban renovation program? What are the assets, privileges, and unique features of the city? What are the most significant projects to be included in the urban renovation program? Who are the forces behind an urban renovation program?

The methods applied in this research are both theoretical and experimental in a problem-oriented procedure. Theoretical studies concerning the theories and experiences of scholars have been conducted. A case study strategy concerning 31 metropolises in Iran has been conducted. Structured interviews with the help of a questionnaire ensure public participation in the process of strategic urban renovation planning. Further, the increasing negative impacts of old neighborhoods in the metropolises as the average magnitude of the hazards have been assessed. Finally, with the help of the research methods, a step-by-step urban renovation program has been built.

The outcome of this research is a practical program to assist resolving urban renovation problems.

Theoretical studies

Purpose of theoretical studies

This part reviews the literature concerning urban renovation to lead the old and inefficient neighborhoods toward sustainable and functioning outlooks.

The purpose is also to learn from global experience for the renovation of urban neighborhoods through reforms in their skeletons, infrastructures, and socio-economic features.

These ideas and experiences will be used in the case studies in this paper. The theoretical studies follow a problem-oriented method within certain time intervals. The problem-oriented model has been used earlier to assess the rate of sustainability in regional and urban developments (Shahraki, 2017). Other scholars have also used the problem-oriented method to provide solutions to complex and multi-level problems in cities (Smith et al. 2010).

Background of urban renovation

Modern attempts at urban renovation began in the late nineteenth century in developed countries and experienced a wider scope in the late 1940s (Chigbu, 2012). Urban renewal programs began in the industrial cities of the United Kingdom and Europe to meet the growing needs of citizens after the First and Second World Wars (Klemek, 2011). The cities of England, after the Industrial Revolution, and Germany, after the devastation of the war, used renovation programs. Scandinavia used urban renovation and socio-economic revitalization programs to improve their quality of life of the people (Metzger & Olsson, 2013). Urban renovation has been a program of land redevelopment in metropolises everywhere in the world, from the United Kingdom, the United States, and Europe to the underdevelopment countries and post-war regions (Ragazzo, 2021 and Fuhg, 2021). The rapid increase in the population of the underdeveloped cities has resulted in inefficient and deprived urban neighborhoods, which have shortages of necessary urban spaces, services, and infrastructure (Boadi et al. 2005). The United Nations Center for Human Settlements (UNCHS) has been engaged in urban renewal programs in several cities, particularly in the underdevelopment countries since 1975 (Albuquerque & Guedes, 2021). According to this center, in 2001, 924 million people (approximately 30%) of the world's urban population lived in none standard settlements. These settlements are polluted, infectious, and unsafe that causing health and social problems and require renovation programs.

Today, international, national, regional, urban, public, and private organizations in cities in the United States, Latin America, Canada, Australia, Europe, Africa, and Asia are responsible for urban renewal programs.

Urban renovation is a global necessity

Many cities face numerous problems in terms of spatial aging, exhaustion, and inefficiency (Salthouse, 2000). Following the rapid physical expansion of old towns, many urban districts, particularly the central cores of the cities, plus marginal habitats have remained without infrastructure and services to common concerns, about climate change, increase in population, degradation of natural environments, and traffic emissions (Baer and Singer, 2016). The problems of tight spaces in homes, schools, buildings, infrastructure, and the challenges of public health protection in the old urban neighborhoods are visible. The aging and inefficiency of the mentioned urban spaces are among the challenges that urban renovation programs shall handle (Preisner, et al. 2017). The term of urban renovation has been used widely in the literature with a common concept

that the worn-out urban neighborhoods are the outcome of long time use of buildings, which have been built by previous generations and the present inhabitants cannot afford to renew them (Liu et al. 2021). Additionally, scholars believe that cities need renovation plans since their land-use policies, less investment in rebuilding projects, and incompetent management increase damage there (Shi et al. 2019).

General objectives of an urban renovation program

Cities with old and inefficient neighborhoods should set their renovation plans according to the latest climate, demographic, economic, technological, and cultural changes. An urban renovation program revised land-use policies to gather empty land from every worn-out neighborhood, building, street, and home (Nae et al. 2019).

New economic and livelihood activities also require sufficient urban land for new businesses. Regarding the need for land it will be rational to destroy old private and public buildings to use their lands for necessary businesses and production (Altshuler & Gomez-Ibanez, 2000). Additionally, an urban renovation program shall allocate adequate urban lands to supply homes for low-income groups in the cities. The renovation programs in every city should pay particular attention to the saving of natural resources and water supplied rather from local sources and not from far distant regions (Mayo et al. 1986).

The old, non-functioning, and deprived urban districts do not have adequate infrastructure such as adequate room for physical distances in the streets, transportation terminals and buildings. Therefore, the provision of those spaces should be an important part of the renovation program for the improvement of urban quality of life. An urban renovation program should ensure public participation, especially among the deprived and marginalized residents. They shall be included in the urban economy and in the process of making decisions about the conduction of the planned changes. The main policy of the urban renovation programs shall be development for all residents, regardless of color, race, gender, and rank (Klimova, 2010). Fighting administrative and official structural corruption in the municipalities and authorities shall be a priority too. Promoting and encouraging transparency with free and independent press is indispensable as well. Transparency in the planning, and conduction of the projects is necessary. Generally, the aim must be sustainable development in the cities. Sustainable development of the cities without the renovation of urban exhaustion and inefficiency is impossible, as Li and colleagues recognized too (Li et al. 2021).

Outcomes of urban renovation programs

Urban renovation programs have rehabilitated lands and planned new constructions in many cities. The new constructions used the market requirements, urban regulations, and building standards considering strategic macropolicies. The basic drivers for renovation projects have been legal and financial authorities. The authorities acquired urban lands and real estate and financed new construction according to the needs of the city. The permission to finance the new construction from the donations and to borrow and sell bonds, or increasing taxes to finance the operations are basic tools for urban renovation programs. Therefore, the urban renovation is a process in which first it identifies and selects properties located in urban blocks, neighborhoods, and areas based on certain indicators. Then, the municipalities' renovation agencies take over the lands, which need demolishing, renovation, and new construction.

The next step in this process is the selection of competent engineering companies to conduct necessary construction projects. World experience shows that property owners or tenants receive compensation directly from the national or local governments. The urban renovation programs have improved the urban and regional economy and created numerous job opportunities and an efficient urban management mechanism (Peiser & Anne 2003). The urban renovation programs have been used as a method of social reform in England to renew the industrial areas with a polluted environment. The urban gentrification program in Britain was practically successful, as it provided standard housing and a clean environment (Fuhg, 2021 and Smith, 2012).

Looking at the experiences of urban renovation in Singapore, shows that the urban renovation in that country was a priority and a national agreement (Kong & Yeoh, 1994). The renovation programs also changed the ugly and unsustainable Stockholm into the most beautiful and green capital in Europe (Metzger & Olsson, 2013). This miracle in Stockholm has been realized because of the decisive decision to renovate the cities, agreement, and collaboration between political parties, social groups, and the public. Thus, the renovation programs in advanced countries resulted in the aesthetics of the cities. The programs also played an important role in the demographic development of the cities.

An overview of the history of renovation programs in the cities of Iran showing failures. The renovation of the cities in Iran has only been in the discussion phase and it has not taken place in the field of operations (Mirzakhani et al. 2021).

Indicators

Having accurate indicators to determine the rate of urban tissue erosion is important in deciding the type of renovation project. For this reason, it is obligatory to identify indicators that decide and introduce worn-out urban neighborhoods. The indicators will determine worn-out urban neighborhoods in detail, squares, streets, and other features of the cities.

Scholars have introduced indicators to determine the inefficient and non-functioning spaces. The introduction of indicators has been discussed by scholars, scientists, and experts, i.e. (Peponi, et al. 2022) evaluated a multidimensional analysis in the perspective of urban ecosystem services with several indicators helpful for assessing the functioning of urban neighborhoods.

A sustainable urban renewal model for the high-density city of Hong Kong supplied indicators to contribute to sustainable urban regeneration and to evaluate local urban renewal projects (Lee, 2009).

Scholars have introduced multidimensional indicators to make a decision whether an urban neighborhood is exhausted and needs renovation projects. The indicators are different, but the particular features of every city shall

be respected too. The indicators which will be used for the assessment shall be in the context of the problem-oriented methodology. Table 1 shows indicators supplied by the literature review and workshop experiences.

Methodologies

Applied research methods

Both theoretical and field studies are used in this research to supply a framework for the case studies. The case studies concern 31 metropolises, which are capitals of provinces in Iran with physical and socio-economic problems (Karimi, et al. 2020; Shahraki, 2020). Using a questionnaire concerning urban land-use policies, infrastructure, distribution of energies, water and wastewater, environment, building standards, and socio-economic situation of inhabitants realized public participation in the process of urban renovation planning.

The sample population was 400 respondents who have been identified by random technique and included all social groups from 18 to 80 years old and engineers at road and town building offices. Out of 400 questionnaires, 314 people, or 78.5%, answered. A model has been developed in the context of the problem-oriented

Table 1 Indicators to determine nonfunctional neighborhoods in the cities

Group name	Name of the indicator
Geology	<ul style="list-style-type: none"> ✓ The building is on a slippery and steep land with potential for subsidence ✓ The building is on the bed of a watershed or river
Interior Standards of the Buildings	<ul style="list-style-type: none"> ✓ The building is very old and abandoned ✓ Buildings and blocks do not have light, clean water, washroom, and sewage ✓ The per capita housing is not enough and it is uncomfortable and safe
Standards of outside the buildings	<ul style="list-style-type: none"> ✓ The building is built on illegal land, windows of the building are blocked from outside, and the building exit door is less than 90 cm wide ✓ The width of the street where the building is located is less than 6 m without play-space for children, street furniture, and space for relief and rescue when sudden incidents happen ✓ Distorting of power cables, dangerous distribution of gas and its storage and use without fire stations
Infrastructure and urban amenities	<ul style="list-style-type: none"> ✓ The street grid of the urban district does not contain at least 30% of the urban lands, which is not for the disabled and elderly ✓ There was no standard sidewalk for pedestrians or cycling lines ✓ No access to safe electricity, wastewater collection, internet, water supply, and gas networks
Urban land use policies	<ul style="list-style-type: none"> ✓ The population density is more than 150 people per hectare of urban land with combined land-use for homes and workshops and noise pollution ✓ The ratio of building coverage is more than legally permissible and more than 50% lands of any property. The building site and its yard are too small ✓ There are no spaces for culture, sport, and leisure
The urban environment	<ul style="list-style-type: none"> ✓ The urban neighborhood is located in a zone with severe pollution caused by storms, materials, traffic, etc ✓ Reduced or eliminated urban green space, flora and fauna are not existing due to poorly managed population density
Socioeconomic issues	<ul style="list-style-type: none"> ✓ The people of the neighborhoods have not integrated into the urban economy without adequate job opportunities ✓ People in the neighborhood have not equal access to education, health, and medical treatment services
Urban aesthete	<ul style="list-style-type: none"> ✓ Lack of harmony in the construction, unfair use of urban lands, ugly views in the neighborhoods and ugly colors on the exterior walls of buildings ✓ The architectural and building attractions are not designed to fit the characteristics of the city without harmony and regulation at the height of buildings

Resources: Workshop experiences, theoretical exploration and these references: (La Rosa et al. 2017; Shahraki, 2021; Votinov & Liubchenko, 2020; Maund et al. 2022; Ghera, 2019; Gilbert et al. 2022; Grütter 2020)

method and in a certain time interval to simulate the negative effects of worn-out neighborhoods in 31 cities.

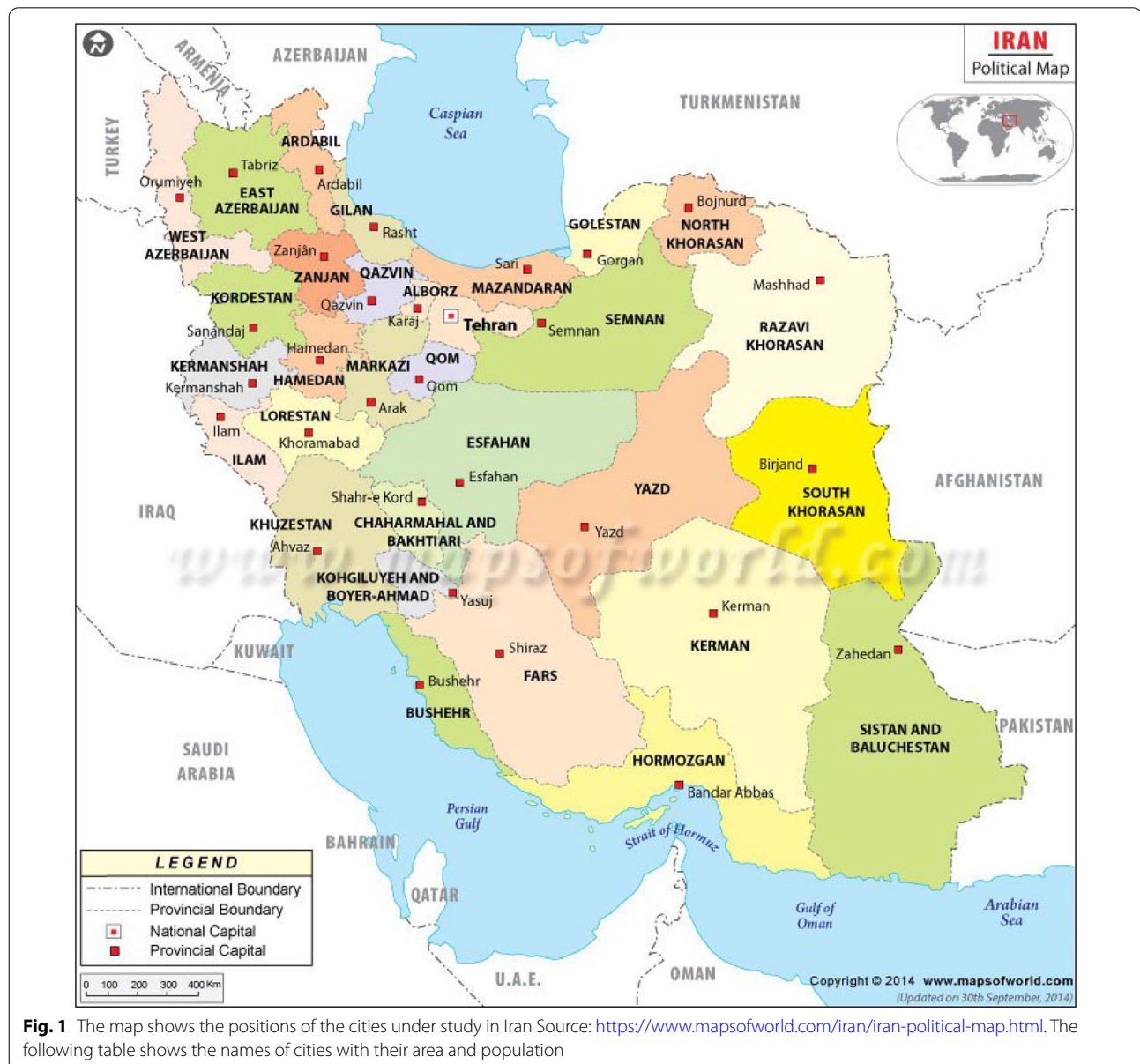
This research sets up a prospect for worn-out urban neighborhoods and introduces projects to renew the built environments.

A comprehensive urban renovation program includes groups of projects in terms of legislation and regulation in urban land-use policies, the physical design of urban skeleton, and socio-economic rehabilitation. The program also has projects for protecting natural resources and the environment, designing and building of the street network, and improvement of buildings and infrastructure.

Case studies

The case studies are about 31 metropolises in Iran with 83 million population (Iranian census organization). Figure 1 exhibits places of the cities in Iran.

Iranian cities are mainly rooted in agricultural production and feudal social relationships. Following socio-economic reforms of the Pahlavi dynasty, manifestations of modernism, including the development of some buildings, emerged with the construction of some modern streets (Gharipour, 2019 and Davidson, 2019). However, the rest of the city remained undeveloped, and the culture of feudal relationships continued to dominate. Therefore, the inequality in civil rights such as unfair



land-use policies and housing has continued similar to the powerful feudalism era. Urban development for people with no dependency on the authorities and poor has also been ignored due to lawlessness, corruption, and lack of competent urban management. Today, the cities of Iran have numerous problems such as no functioning and ugly perspectives. Iranian metropolitans have experienced a rapid increase in worn-out areas. In 2014, the old, marginal, and deprived urban districts were declared a national crisis and encompass one-third of Iran's urban population (Ministry of Roads and Urban Development, 2014). Workshops, field studies, and observations conducted by the author show that approximately 35% of people live in exhausted, nonfunctional, and deprived urban neighborhoods, please refer to Table 2.

A renovation program for cities

The process of urban renovation planning

The worn-out and neighborhoods are the two main groups:

1. Unauthorized and informal settlement.
2. Worn-out neighborhoods located within the legal boundaries of the metropolises. Nevertheless, both groups have the following characteristics:
 - a. Some urban neighborhoods are mainly places for illegal immigrants from rural areas of Iran and neighboring countries
 - b. Some are downtown neighborhoods mainly with native people, who have not afforded to renovate their homes and buildings during the past decades.

- c. Residential blocks belong to government employees supported by banks, but they lose approximately one-third of their lives to building a home. In these areas, urban land has only for homes and buildings. The neighborhoods suffer from nonstandard buildings.

The next step introduces indicators to decide which neighborhoods are worn-out or nonfunctioning. However, the rates vary in intensity of worn-out and types of remedies in different urban neighborhoods that the Table 3 shows.

The process of urban renovation planning in the cities of Iran

The provisioning process for a renovation program is for every city step by step is as follows.

Step 1-Founding a responsible group for the mother renovation program.

Step 2-Definition of the strategic goals of the city.

Step 3-Definition and planning, design, and preparing urban renovation projects in the mother program. Some types of projects are.

- Demolition projects
- Urban land allocation projects
- Street improvement projects
- New street building projects
- Renewing or new building of homes
- Renewing or new building of schools
- Renewing or new building of urban infrastructure

Table 2 Names of metropolises being studied with population and area/km²

Line	Name	Population	Area	Line	Name	Population	Area
1	Karaj	1592492	162	16	Bojnourd	228931	36
2	Ardabil	529374	18.01	17	Mashhad	3208000	328
3	Tabriz	1558693	324	18	Birjand	203636	34.98
4	Urmia	793000	140	19	Ahvaz	1244000	185
5	Bushehr	223504	42	20	Yasuj	134532	27
6	Shahrekord	190441	32	21	Sanandaj	412767	3033
7	Shiraz	1565572	240	22	Khorramabad	373416	62
8	Rasht	713000	180	23	Arak	520944	5511
9	Gorgan	350676	63.2	24	Sari	309820	72
10	Hamadan	554405	71	25	Qazvin	402748	64.13
11	Bandar Abbas	526648	27316	26	Qom	1288000	31.6
12	Ilam	194030	30.13	27	Semnan	134532	35.2
13	Isfahan	2132000	551	28	Zahedan	610000	55.7
14	Kerman	537718	238.8	29	Tehran	9135000	730
15	Kermanshah	1026000	142	30	Yazd	529673	58.9
–	–	–	–	31	Zanjan	430871	22.16

Source: Iranian National Census, 2017, accessible online at www.amar.org.ir

Table 3 exhibits the three degrees of need for renovation projects in every city

A	B	C
The city is in intense crisis. This urgently needs a renovation program The city lacks all indicators in Table 1. (100%)	The city is in a critical situation. It needs continuous renovation programs. The city lacks more than 50% indicators in Table 1. (50%)	The city needs some renovation projects. It lacks approx. 25% of the indicators in Table 1. (25%)
We have three types of nonfunctioning urban neighborhoods with three needed degrees of urban renovation called A, B, and C in Table 3. The three-A, B, and C categories of needs for renovation programs clarify the type of project that shall be conducted		

- Economic empowerment projects for inhabitants
- Social empowerment projects for poor people
- Cultural projects to protect and renew the social heritages
- Political projects to increase social solidarity and sustainable development of the city

Step 4-Provision of an album of executive maps for every project of the mother renovation program.

Step 5-Conduction of urban renovation projects.

Step 6-Auditing and evaluating the outcomes of a renovation program.

Note that every project of the mother program will have micro (user), medium (block), or macro (district and city) scales depending on the necessity.

Findings and discussions

Urban renovation experiences in the world showed that physical, spatial, and socio-economic renovations of cities were parallel to democratic socio-economic reforms. It has been understood that worn-out neighborhoods are hazardous and obstacles to social and economic development. The cities that meet construction standards and requirements of sustainable development have got major socio-economic, and physical crises (James, 2014) found it necessary to decline the hazardous effects of nonfunctioning urban neighborhoods in their cities and outcomes were tremendously positive.

The deterioration and inefficiency of urban neighborhoods in Iran have also caused damage, which has led to social riots. Studies by Iranian experts show that delays in urban renewal in suburban and old neighborhoods cause increasing damage to cities. The Ministry of Road and Urban Development evaluated the average magnitude of agglomerated damage caused by delaying renovation in the 31 metropolises from 1989–2017. The Table 4 shows the data obtained from the ministry have been retrieved according to the author's local cognition and experiences.

Table 4 shows that the entire metropolises of Iran experienced multifaceted crises due to the worn-out areas and inefficiency and no functioning of the urban neighborhoods, with magnitudes evaluated as $M_1, M_2, M_3, \dots, M_n$ in 15-time points of $T_1, T_2, T_3, \dots, T_{15}$. The average magnitude of the losses of worn-out urban neighborhoods to cities is an indicator whose range is assumed to be from 1

to 100 and is determined based on the opinions of urban planning experts. In Table 3, each T denotes a 2-year time and the unit of measurement is the same for all cities at all times. The following curve has been drawn based on the data in Table 3 and shows the increasing magnitude of the damages.

In Fig. 2, the vertical axis on the left side shows the magnitudes of the harms, and the horizontal axis represents the interval time between 1989 and 2017 from the left to the right. The red-colored curve shows that the average magnitudes of harms caused by the worn-out neighborhoods have increased during the time, though there are some fluctuations in the curve. The increase proves that the renovation program and its projects should be started as soon as possible. So far, the efforts to renew the old urban neighborhoods have not been essential, effective, and institutional, and the magnitude of harm has risen from 2.1 to 65 in that period.

Conclusions

This article discussed the hazardous impacts of worn-out and nonfunctioning urban neighborhoods in the development of cities. For this reason, the cities required physical and socio-economic renovation programs to improve their skeletal, spatial, and socio-economic characteristics.

The theoretical and experimental methods, which were problem-oriented conducted case studies in 31 metropolises in Iran to revise the increasing areas of worn-out urban neighborhoods. Indicators belonging to Geology, interior and exterior standards of the buildings, infrastructure, land-use policies, socio-economic, environmental, and aesthetics of cities were selected to evaluate the type of nonfunctioning and remedy to improve them.

The three-A, B, and C types of worn-out urban neighborhoods required different renewal projects. The step-by-step renovation program finally defined the projects to be implemented. The urban renovation program (mother program) introduced several projects to improve the physical and socio-economic features of the cities.

The achievement of this article, which was a step-by-step urban renewal program, can also be simulated in other cities with a similar situation.

The prospect of this research is to define and plan future development projects in urban renovation

Table 4 The average magnitude of damage from old neighborhoods to the cities

Year	1989	1991	1993	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015	2017
T_n	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}	T_{15}
M_n	2.1	1.8	4	5.3	7	6.5	11	14	13	20	29	27	40	39	65

Source: Extracted from the publications of the Ministry of Roads and Urban Development by author

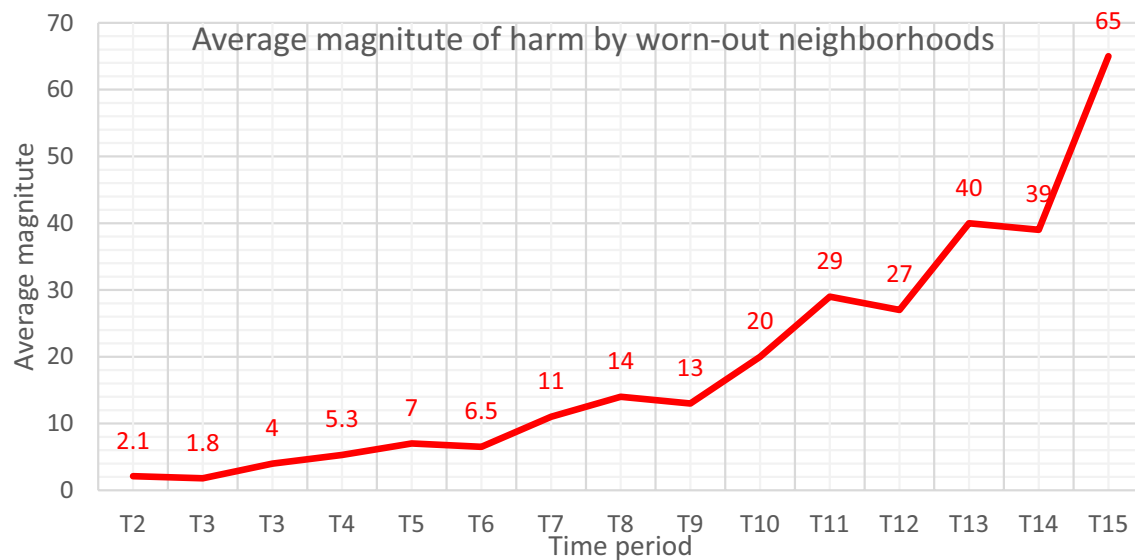


Fig. 2 Average magnitude of damage caused by worn-out neighborhoods in the cities

program details, particularly in group A cities, which are in intense crisis and urgently need renovation programs.

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Competing interests

There is no conflict with any type of interest in this work.

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