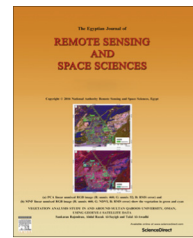




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RESEARCH PAPER

Housing renovation priority in the fabric texture of the city using the analytic hierarchy model (AHP) and geographic information system (GIS): A case study of Zanjan City, Iran



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Abstract Housing is one of the most basic needs of humans, communities and civilizations. In complex societies, the renovation of housing to ensure on-going quality and standards of living is a major issue, causing the institution of urban planners and managers. Renovation of housing in the fabric texture of the cities due to the high wear of residential housing units is complicated when residents are of poor economic status, thus the prioritization and preparation of plans for such renovation entails consideration relative to available resources. This article considers all the units located in the fabric texture of the Zanjan as the statistical population using descriptive, analytical workshops and field methods as well as using census method, and utilizes AHP and Idrisi, ArchGIS data to determine statistically 1385 residential blocks, and uses exhaustion software of the residential housing units of the Zanjan fabric texture, in order to identify the residential housing units' need to modernization (renovation). The outcome of the investigation is the housing prioritization for modernization and its display on the map. 17.86% of the residential blocks belong to the first priority, 77.24% to the second priority the rest belong to and the third to fifth priorities. The results of this study can be presented to a broad range of urban managers and planners such as municipalities, housing and urban development officials to be used in modernization programs.

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1. Introduction

Housing is one of the most basic needs of human communities' people. Article 31 of the Iranian Constitution specifies it as the right of every Iranian individual and family. Paying attention to the supply of urban housing is a step to supply the social justice and the distribution of the fruits of the community

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growth, and part of the policy of urban development. Under several decades of the impact and effectiveness of new developments in the field of modern urban planning and urban development, as well as modernization caused by distribution of oil rents in Iranian cities, the socio-economic structure of the country has been transformed, with the formation of a new texture with more suitable urban facilities, more efficient communication networks and more polished urban furniture in developed areas alongside a fabric texture lacking suitable urban facilities, poor access to roadways and disorder and the disproportionate problems becoming visible in the underbelly of modern cities as the original inhabitants of old buildings migrated within the cityscape to new housing and residential areas, being replaced in increasingly dilapidated older areas by rural migrants, immigrants and low-income families. Thus the fabric texture, due to of its residents' economic potency (ability), was confronted with a reduction in investment to modernize existing dwellings.

Suitable land for building is becoming increasingly scarce with the soaring global population and increasing environmental protection due to the ecological crisis. Inattention to the existing ground in the fabric texture of housing is unacceptably wasteful, and the unrestrained illegal development of cities horizontally in favelas exacerbates pressures on infrastructure (particularly electricity networks and transportation) and undermines the efficacy of proper urban planning. Lack of attention to the modernization and improvement of fabric textures causes such locales to degenerate into problematic social textures, characterized by rundown and dirty appearance, and becoming sites of poverty, deprivation and crime.

To avoid the development of such no-go areas, government intervention is often necessary to renovate the fabric texture to achieve sustainable urban development. Sustainable urban development as a part of national development as a whole is achieved only when the entire corpus of the city (both the old and new textures) are simultaneously taken into account by planners to promote social justice in the allocation of resources, so cities can perform equally for all residents. However, classifying problem areas itself is a formidable task, given there are about 100,000 hectares of urban residential areas in Iran, with a population of about 12 million people. Governmental investment cannot meet renovation of the large-scale of timeworn and old residential units. This issue needs the detailed and comprehensive study of new systems and methods for prioritizing of residential units, which requires modernization.

To help in this herculean task, GIS software and the Analytic Hierarchy Process (AHP) were used in this study. GIS is a suitable tool for implementing spatial analysis, particularly information processing and map production, and it enables use of the WLC model for integrating and overlaying maps. The AHP model is particularly expedient for the analysis of statistical data. This article was written to attempt to improve the viability level of the fabric texture and to respond to the following questions:

1. How is prioritization of housing modernization applied in the fabric texture using physical indicators?
2. What is the role of physical indicators in determining the exhaustion of old residential units?
3. What is the general condition of housing in the fabric texture of the city?

Since the physical aspect (appearance) of housing is indicative and representative of residents' social and economic status, and the income level, occupation (profession) and social situation of residents is manifest in the physical parameters such as the size of the residential units, building quality and building density etc., the authors performed this research by assuming that it is possible to address housing modernization priorities by implementing physical analysis of housing units.

2. International experience of old texture renovating

Urban planning as a modern discipline arose to meet the pressing and immediate needs of the populations of bombed-out cities across the world in the aftermath of World War II. The prevailing ethos of the postwar period was comprehensive modernism, which dominated the intellectual landscape in all fields. A matrix of factors such as mass car ownership and cost efficiency resulted in the abandonment of the city core and an exodus to modern housing in the suburbs. What remained of the old urban core became a vacuum for the poor and disenfranchised, such as the African-American 'ghettoes' of the US and the 'deprived inner cities' of Europe. The lack of economic potency of the new inhabitants confirmed and accelerated the degeneration of the fabric texture. While slower and later in Iran and other countries of West Asia that did not undergo Soviet planning, the same general process was observed.

This only began to be addressed as an urban planning problem in academia (and not yet in practice) from the 1960s onward, and that was on the grounds of architectural preservation rather than socio-economic justice and general development. Venture (1960) criticized modern architecture and urban development as the main cause of the destruction of the old and the historical textures, and Sidler (1964) compared the urban development to premeditated murder, indicting modern urban development by comparing new housing and existing housing in the old and historical parts of the city's using photos and authentic documents. While such critiques were essentially esthetic, they did halt the tide of the unspoken abandonment of the city core, and gradually reoriented urban planning toward a more holistic and coherent approach to strengthen the values of existing fabric texture. Early efforts included the modernization and improvement of the fabric texture in the UK cities of Leicester, York, Bath and Chester, mainly on the initiative of local town planners and architects, while a more regulatory response was evoked in other countries.

In 1962 France adopted the André Malraux law tried to prevent the destruction of fabric textures, instituting a classification of buildings as those which: (a) certainly should be refurbished; (b) should be protected; (c) should impose some changes in performance, form and function; (d) and can be demolished due to reasonable and analytical reasons. Similar codes were applied in programs of renovation and improvement in Toronto and Stockholm during the 1970s, and Bologna and Athens in the 1980s. Likewise, in Iran some measures were gradually implemented concerning the renovation of the residential housing and some regulations were adopted, including:

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