THE ROLE OF RENOVATION MEASUREMENTS AND DESIGN STRATEGIES IN PROVIDING AFFORDABLE HOUSING

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ABSTRACT
New design methods are developing in response to the housing affordability issues. Strategies that utilize more creative approaches rather than formulaic ones are now required. Renovating existing social housing developments is one way to improve affordability. New renovation techniques as an alternative to demolishing large social housing projects is a strategy to provide more affordable housing. This research examines the role of renovation strategies in providing a more cost-efficient consequence. Also, the new design principles' impact on adding quality value rather than cost is investigated. This research aims to determine how renovation and redevelopment of social housing provide greater affordability and quality than the demolition and rebuilding of estates. For this purpose, the study conducts a comparative case study to assess the renovation measurements of large social housing projects in two European cities. Findings suggest that principles used to renovate social housing in Europe increase the chances of improving housing affordability and quality, mainly due to the redefinition of minimum housing standards. The comparative analysis of case studies indicates that the redevelopment of most large-scale social housing projects has led to changes in tenure, typology, density, and delivery methods. The most significant shift in social housing is toward public-private partnerships, mixed-use development projects, sustainable architecture, and new living forms. After many years of standard dwellings, some European countries began to experience a new era in social housing design.

Keywords: Social Housing, Affordability, Quality, Renovation Measurements, and Design Principles.

INTRODUCTION

Social housing has become problematic in recent decades due to uncertainty and increasingly complex challenges such as the lack of affordable housing, overcrowding, resident dislocation, gentrification, and socio-spatial problems. During the historical development of social housing, these transformations lead to different architectural, urban planning, and policy challenges.

In recent years, efforts have been made to redevelop unpopular social housing neighborhoods. So regeneration is essential to make existing homes more sustainable by considering the quality of housing and changing requirements. For this purpose, simultaneous technical, social, and energy renovation is required.

The primary focus of this paper is to examine how renovation and redevelopment of social housing provide greater affordability and quality than the demolition and rebuilding of estates. This study conducts a comparative case study to assess the role of renovation measurements and design strategies in providing affordable housing. For this purpose, two large-scale case studies in the United Kingdom and the Netherlands are analyzed. Case studies were selected to demonstrate two different social housing in two countries with a wide range of planning challenges. In evaluating social housing quality, the problems and potential of its transformation are considered.

The main aim is to examine the role of new strategies in providing new affordable housing in a high-quality structure. These strategies should lead to long-term sustainable development. Creative architectural principles adapted to a wide range of urban circumstances have ushered in a new era in social housing.

1. Place of European Social Housing in Redevelopment and Regeneration Process

Estate regeneration is a strategy focused on social housing estates that are experiencing physical degradation and social and economic disadvantages, such as high levels of poverty, unemployment, overcrowding, poor health, crime, and anti-social behaviour. The goal is to enhance the quality of life through the physical environment and promote employment, education, community engagement, well-being programs, and community safety. Physical, social, and economic initiatives are used to address an estate's issues in an integrated and sustainable approach. A "comprehensive renovation" is required for this objective.

Problematic and disadvantaged social housing neighbourhoods led to a change in social housing policy. Instead of giving people new homes, the policy now focuses on improving the neighbourhoods that are hard to manage.

Estate regeneration usually involves a physical renewal element involving reinvestment in the built environment. In many cases, the solution for problematic social housing projects was radical reforms like the demolishment of estates and their replacement with mixed-tenure housing developments (Mould, 2017). Also, before the 1990s, light-touch renovations were performed with short-term reforms. While a detailed analysis of the specific context of a troubled neighbourhood and the employment of some social programs (such as an increased focus on combating anti-social behaviour), enhancing employment, community safety, and good management improvements (such as privatization and the provision of social housing in mixed-tenure neighbourhoods) are necessary before any intervention (Norris, 2013). According to Henna (2016), "While estate regeneration does not necessarily always include demolition and rebuilding, the term is now frequently associated with such forms of comprehensive redevelopment (p.12).

In recent years a new generation of social housing began with long-term renovation approaches that considered "placemaking." There is a need for an integrated policy to achieve a more sustainable social housing redevelopment. According to Czischke (2009), it is important to consider "the physical conditions of the estate and the degree to which it requires radical measures (such as demolition); the population characteristics and the need for social programs to support vulnerable groups; and (any) management improvements that can help turn the situation

around" (p. 69). A combination of partial demolishment, infill, and building adaption is used for refurbishment. Also, improving physical elements (housing and infrastructure) goes along with resolving the social issues of a neighbourhood.

For a successful social housing regeneration, there is a need for an integrated approach that considers physical redevelopments with social, cultural, and economic measures. Policy for urban regeneration has developed and shifted. It is now a more generalized upgrading program that seeks to renovate low-income areas, housing quality, tenure, and population. The approach is to go beyond physical improvements and create mixed communities. Also, sustainable housing regeneration without Collaboration with community engagement is meaningless. (Reeves, 2013).

2. CASE STUDY ANALYSIS

This research has examined the transformation of social housing through two case studies. Analysing projects in the two-considered country allowed us to identify the transformation of design, concepts, and practices during the renovation of social housing. The changing nature of social housing caused by architectural design development and its effect on housing quality and affordability will be examined in redeveloped social housing projects. The objective is to understand which design choices have been made in examined buildings to meet the identified quality requirements.

In the first step, each project's in-depth investigation is conducted; the projects' post-renovation and after-renovation situations are reviewed. The main problems and renovation measures applied as solutions are analyzed in each project. To this end, both problems and solutions are investigated in terms of physical, aesthetic, social, and sustainability. The next step is to compare the impact of renovation measures on increasing the design quality and their subsequent effects on affordability. For this purpose, the impact of intervention measures on sustainable social housing indicators such as accessibility, identity, diversity, adaptability, density, safety, social interactions, energy efficiency, cost-efficiency, and privacy is considered.

2.1. Analysis of a case study in the UK; Park Hill social housing project

The Park Hill estate in Sheffield was built in 1961 in a new brutalism style by architects Jack Lynn and Ivor Smith. The building is historically significant as one of Britain's first completed schemes of post-war slum clearance and the most ambitious inner-city development of its time. It was listed as Europe's largest grade II building in 1998.

Park Hill was initially famous for its "street in the sky." This deck access aimed to promote the formation of social life. These decks were more than balconies; apart from their functionality, they were built to enhance social interaction and create continuity of horizontal communication within a high-rise development (Blundell Jones, 2011). However, the decks did help in this regard. The other features of Park Hill are streets in the sky, a private balcony for each flat, beautiful views, duplex apartments, a district heating system, excellent space standards, and modular construction systems.

This optimistic vision faded away as the estate was turned into a ghetto by the concentration of disadvantaged people and the spread of anti-social behavior. It was thought that public open spaces would strengthen social relations while becoming a place of crime.

After the town's reconstruction, it is planned to reduce the total number of residential units from 995 to 874, of which 300 are considered social housing. The redevelopment of Park Hill includes five phases that began in 2007. Phases I and II are completed; phase I includes renovating 260 homes and 10,000 sq ft of workspace. "It has been reinvented by reconsidering not only the internal fit-out but also its relationship to the external landscaped spaces. The community now exists in the streets in the sky, as well as in the gardens and redefined public spaces" (Farrelly, 2014).

The redevelopment goal is to create a liveable, mixed neighbourhood and convey this to the rest of Sheffield. At Park Hill, Urban Splash created a mix of social housing and private apartments, and their proposals involved a third of the new accommodation being homes for affordable rent (Levitt, 2009).

Photo-1:Facade of the Park Hill redevelopment, before, during and after refurbishment (URL-1).

Refurbishment architects Hawkins\Brown and Studio Egret West stripped the block back to the bare concrete frame in preparation for the entirely new configuration. Colored aluminum panels are used in the façade, which creates a more attractive and higher quality finish. The redevelopment process also increases the size of the flats by narrowing the "streets."

Photo-2: Interior space of park Hill before and after renovation (URL-2).

Table 1. Problems and proposed solutions for the renovation of Park hill.

Problems	solutions
Physical aspects -Uniformity of the layout did not meet the need of residents -Poor connection with the landscape and the surrounding neighbourhood -Not incoming entrance and stairways	**Physical aspects** -Giving each unit more internal space -Adding street-face view windows -Remodelled internal layout to contemporary standards -establishes a welcoming landscape -renovating lobbies and lifts
Aesthetic aspects: Stigmatized building	**Aesthetic aspects:** The use of colourful aluminium panels creates a more attractive appearance while softening the effect of the massive structure
social aspects: crime, and anti-social behaviour	-The heart of the complex includes shared social facilities which provides a vibrant community -surveillance of "streets in the sky" is increased with wide landing windows
Sustainability	**Sustainability** -living rooms with windows facing south provide natural ventilation, light, and heat -use of existing structure

2.2. Analysis of Case Studies in the Netherlands; Knikflats.

Knikflats was built in 1968 and accommodated 35,000 people of different sizes and densities. Low-income residents occupied the denser area, which includes fifteen L-shaped blocks. The estate's primary issue was the connection to the public space. Despite the large estate size, there were only two elevators and one entrance in each building, making accessibility difficult for residents. BIQ/Hans van der Heijden renovated 4 of 15 similar eight-story blocks in 2006. The plan was developed with the participation of the inhabitants.

Two buildings were renovated into senior housing, including a medical center. The accessibility of these blocks was enhanced, and new apartments were added on the ground floor. Two other buildings were refurbished under the "consumer choice" idea, a Dutch program comparable to the UK's Right to Buy plan. This program implies social mixing and socio-economic diversity.

As the buildings' scale was challenging, the architects divided them into three sections, each with its entrance. The existing access galleries were divided into short and well-defined private decks. New elevator shafts and emergency stairwells were attached to the building.

The renovation also addressed the building's connection with the landscape. The ground floor was completely redesigned to accommodate new residences. The garage on the ground floor was transformed into a care facility in the two buildings allocated for seniors, and garden-facing apartments were added to the two other ones. The pedestrian and cycling paths also become further connected to the surrounding shared environments.

Prefabricated renovation methods were used to make it cost-effective and to minimize inconvenience to residents. This ten-year process led to fundamental and long-term improvements in adapting the flats to the modern lifestyle.

Photo-3: Knikflats before renovation in 1999 (URL-3)

Addition of staircases and modification of ground floor of Knikflats after renovation (URL-3).

Table 2: Problems and proposed solutions for the renovation of Knikflats project

Problems	Solutions
Physical aspects The estate's primary issue was the connection to the public space	**Physical aspects** -adding flats: The garage on the ground floor was transformed into residence flats -altering entrances: Add, enlarge, and modify entrances
Aesthetic aspects Aging facades	**Aesthetic aspects** 'Window frames' as a new shape in the façades create a modern look
Social aspects	**Social aspects** The access galleries were divided into short and well-defined private decks to have a safe place
Sustainability Lack of insulation	**Sustainability** The heating and electric system is installed Replacing windows and frames on building facades Adding thermal insulation to the building's exterior

2.3. Comparative analysis of case studies

This research is based on a multicriteria analysis of affordability, and housing quality of social Both analyzed case studies can be considered "problem estates" that survived. After the renovation, the projects were no longer considered undesirable, and some were in high demand. Although they were predominantly social housing, the projects had changed into mixed-tenure developments.

Regarding quality, the design principles for renovation consider a wide range of interventions at the different neighborhood, building, and dwelling scales. For example, the relationship between private and public spaces and the movement of people is redesigned to solve the neighborhood's social problems. The ground floors of both projects were redesigned to promote social interactions by adding public rooms and integrating them into the green space. The refurbishment of the façade generates added value in terms of social, economic, and ecological benefits.

In the Park hill project, flexible spaces are created that are used according to the different social needs of residents. Balconies and winter gardens are added. These transparent spaces that act as a thermal barrier create homes with a good view and optimal use of natural light. Besides, reusing the existing structures and prefabricated materials helps cope with economic constraints.

The renovation of selected projects reflects new design strategies and creative solutions instead of formulaic approaches. Design principles include radical external and interior interventions to create a high-quality residential environment. These transformations promote the construction of

identity and integration into the surrounding urban areas. Moreover, new design principles will help to add quality value rather than cost (Gharanfoli & Dulgeroglu, 2020).

3. Intervention methods used for renovation of case studies

This part of the research addresses the advantages and disadvantages of different intervention methods used to renovate case studies. The impact of these renovation measures can be evaluated in four categories: physical aspects, aesthetic aspects, social aspects, and sustainability. In terms of the physical aspect, renovation measures include modifying existing units, adding new units, and redesigning accessibility and open spaces. The aesthetic aspects are limited to facade renovations; changing the original exterior with new materials or restoring the facades according to their original condition are two dominant but contradictory methods. Physical and social intervention can be seen as elements of social aspects. Social aspects aim to use design to create mixed communities. Adding shared facilities and providing safe and overlooked open spaces are physical interventions used to solve social issues. Transforming to a mix of tenure development and participation of residents is part of social intervention. Sustainability is achieved by improving the energy efficiency of facades, installing new technologies, and reusing existing structures and materials.

Some renovation measures have been implemented in both projects. These interventions include adapting the internal layout to contemporary standards, installing new baths and kitchens, activating the ground floors, modifying the entrances, redesigning the open space, adding new insulation, and upgrading existing technical installations. High-level renovation methods have been implemented in both projects. The architectural quality, the energy efficiency of the building, and the usage of public space are all considered in the renovation process.

DISCUSSION

Since the 1970s decline and poor reputation of social housing have been expanded, to construct a more significant number of social housing design quality was undermined by poor construction. Besides physical problems, many social issues cause this decline. The reason for this deterioration was manifold but included management and maintenance problems, layout, and urban design issues, decreasing building quality, low quality of public space, and an accumulation of social problems like poverty, unemployment, social exclusion, and segregation (Karakusevic & Batchelor, 2017).

Today social housing should change; this monotonous typology should break up to respond to rapidly changing needs and contexts. A new school of thought in social housing architecture should be created against challenging social housing issues. A revision in housing strategy is required with increased demand for housing and new forms of cohabitation. New strategies should lead to long-term sustainable development.

In terms of housing redevelopment, High-level renovation methods, which include partial demolition, filling, and housing adaptation, are more successful than the light-touch methods, considering only facade renovations. Serious problems may develop in just a few years following a facade renovation.

Physical interventions in social housing programs are no longer relevant to contemporary needs because they neglect social diversity and urban complexity challenges. These strategies must be revised to meet the new challenge and provide sustainable social housing development. There is a need for integral and innovative design strategies.

CONCLUSION

In the renovation of social housing designs, many requirements need to be considered: the refurbishment of housing while preserving the original architecture and considering sustainable development. Also, energy renovation methods should be considered for sustainable development. In addition, we must evaluate the transformation of social housing architecture considering recent demography and lifestyle changes. The decline in household size raises the question of how housing can be changed to meet people's needs, especially the aging population. New demands and lifestyles result in multi-residential settings that provide more shared spaces and facilities. Finally, flexible design, various housing types, and high-density mixed-use developments are essential in contemporary social housing.

Comparative analysis of case studies and literature review indicates tenure, typology, density, and delivery policies have changed in social housing redevelopments. In Europe, social housing is experiencing a significant transformation in quantity, quality, and affordability requirements. Social housing change involves partnerships, people-based design, and place-based planning to create mixed developments. Generally, the emergence of new housing delivery models, the creation of mixed development projects, and the creation of new spatial forms are the most critical shifts in social housing redevelopment.

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