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Adaptation of Modern Housing Heritage: A Review through Cultural Significance

Modern Çok Katlı Konut Mirasının Adaptasyonu: Kültürel Önem Açısından Bir İnceleme

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Abstract

Focusing on the modern housing heritage, one of the most numerous typologies of twentieth-century architecture at risk of demolition, this study aims to identify the thresholds of change and continuity of different adaptation strategies, from conservation to transformation, through good practices of this typology. Three case studies from Western Europe, representing two turning points in modern housing architecture, are grouped according to the hierarchy of cultural significance. Accordingly, Unité d'Habitation Marseille with global significance, La Tour Bois-le-Prêtre with local significance and Wallisblok with socio-cultural significance are analysed through literature review and on-site observations. The results show that each case prioritises different forms of values, such as architectural value, social value and economic value, respectively, and that change gradually increases as the hierarchy of cultural significance decreases.

Keywords: *Cultural significance, Modern housing, Modern housing heritage, Conservation, Adaptation.*

Özet

Modern mimarlık mirasının yıkım tehdidi altındaki sayıca en fazla tipolojilerinden biri olan çok katlı konut mirasını konu alan bu çalışma, bu tipolojinin iyi örnek uygulamaları üzerinden, korumadan dönüşüme kadar farklı adaptasyon stratejilerinin değişim ve süreklilik eşiklerini belirlemeyi amaçlamaktadır. Yirminci yüzyılın çok katlı konut mimarisinde iki dönüm noktasını temsil eden Batı Avrupa'dan üç vaka çalışması kültürel önem hiyerarşisine göre gruplandırılmıştır. Bu doğrultuda küresel öneme sahip Unité d'Habitation Marseille, yerel öneme sahip La Tour Bois-le-Prêtre ve sosyo-kültürel öneme sahip Wallisblok, yerinde gözlem ve literatür araştırması aracılığıyla incelenmiştir. Bulgular, her bir vakanın sırasıyla; mimari değer, sosyal değer ve ekonomik değer gibi farklı değer biçimlerine öncelik verdiğini ve kültürel önem hiyerarşisi azaldıkça değişimin kademeli olarak arttığını göstermektedir.

Anahtar Kelimeler: *Kültürel önem, Modern konut, Modern konut mirası, Konservasyon, Adaptasyon.*

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1. Introduction

As a place to dwell, the house has a significant role in our daily routines and experiences. Particularly starting from the beginning of the twentieth century, the design concept of the house has been shaped by a revolution that has, in turn, changed the way we live (Bradbury, 2021). Due to the emergence of industrial society, mass production, new transportation systems, rapid urbanization, excessive consumption of resources, and internationalization led to unprecedented shifts in everyday life's patterns (Yoshida, 2000). Although there are different types, one of the pillars of modern housing is based on a collective way of life, which has emerged from the conditions of the new social revolution (Benton, 1984). Thus, multi-family housing schemes of the twentieth-century are regarded as critical illustrations of not only technological advancements but also social reform (Weddle, 2013). These features explicitly underline the versatility of modern housing theory.

Firstly, the Industrial Revolution paved the way for technological progress and economic, social and political transformations in the history of civilization. As one of the consequences, the new centre of urban life became industrial towns and cities where the population dramatically increased. This rapid population growth led to the need for healthy and affordable housing for all, especially workers. Secondly, after the devastation of the First World War, political and economic initiatives in European countries mainly focused on building affordable housing to solve the housing crisis, the reason of which shifted to social and economic recovery caused by the war conditions. Thirdly, the affordable housing model evolved into social or public housing programmes, which were financially supported by the state during the years of recovery from the Second World War and followed until the 1970s. These tendencies also initiated the right of all people to 'a standard of living' and 'housing', which were mentioned in Article 25 of 'the Universal Declaration of Human Rights' in 1948 (United Nations, 1948).

Today, modern housing, which forms a substantial part of our built environment, is becoming obsolete in line with still rapidly developing technology and constantly changing demography, lifestyles and requirements. In addition, people live more in mobility than in previous centuries, and with the emergence of concepts such as temporary stay, loft, co-housing, etc., residential buildings frequently change hands. For this reason, even if it is sometimes not seen from the exterior, changes might be frequently made in the dwellings' interiors within the structural constraints of the building for the adaptation of new users' needs. In this context, if it is not a registered building, which is still not common in many countries where modern dwellings are listed or registered, its authentic architectural features might be easily changed. In other cases, demolition is carried out for personal, compulsory, economic or political reasons when it is decided that the potential for change has ended. However, modern residential buildings, which constitute the majority of our built environment, are also significant in terms of economic and ecological aspects and urban memory, whether they are heritage buildings or not. Therefore, alternative methods other than demolition, such as adaptation, should be considered.

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1.1. Research Problem

Modern housing, as an essential typology of twentieth-century architectural heritage, is a critical issue in the context of adaptation and conservation. Despite its architectural, historical, social and economic values, modern housing faces numerous challenges that position it as one of the most exposed-to-change type of recent heritage. Adaptation, on the other hand, while offering potential solutions to these challenges, requires a careful balance between preserving heritage characteristics and meeting contemporary needs. However, what strategies should be used, and what are the limits of the change when adapting modern housing heritage?

1.2. Research Hypotheses

The conservation of modern housing heritage requires a nuanced understanding of its cultural significance. The analysis of selected representative cases for each of Henket's (1998) hierarchy regarding modern architectural heritage, categorized into global significance, local significance and socio-cultural significance, has the potential to identify the frontiers of various conservation strategies between continuity and change.

1.3. Research Scope

While a multiplicity of projects around the world are impacting the concept of adaptation of modern housing heritage, the number of such projects has increased significantly in the past decade. In particular, the Pritzker Architecture Prize of 2021 to Lacaton and Vassal, an architectural office known for social housing adaptation projects, has generated a lot of public attention (The Pritzker Architecture Prize, n.d.). The conservation approaches of Unité d'Habitation housing blocks are considered pioneering examples of mass housing and play a canonical role in modern housing architecture and heritage. Moreover, one of the significant issues to be addressed in the renovation of multi-family housing is affordability, as was the case during its initial construction process. Klushuizen is a housing renovation model that emerged in the Netherlands in the early 2000s. Wallisblok is one of its first practices that set an example for many following 'do-it-yourself' initiatives.

Within this framework, this paper investigates the adaptation strategies of these three significant examples of modern housing blocks, respectively: The globally significant Unité d'Habitation, the locally significant La Tour Bois-le-Prêtre, and the socio-culturally significant Wallisblok.

1.4. Research Aim

This research aims to present different intervention approaches from conservation to transformation through good practices of modern housing adaptation in Western European countries, to discuss the limits of change through case studies with different levels of cultural significance, and to emphasize the complexity and versatility of modern housing adaptation.

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1.5. Research Methodology

As a methodology, three representative sites from Western Europe are selected based on Henket's aforementioned hierarchy and analysed through a literature review and on-site observations. Their adaptation approaches, intervention strategies, and variables of change and continuity are then compared and evaluated using a table.

2. Literature Review: Notes on Modern Housing Adaptation

Adaptation, a mode of intervention to sustain existing structures, is one of the responses to how to preserve cultural heritage (Figure 1). It implies (re)functioning the existing or historic building to align with contemporary needs. According to Burra Charter, adaptation involves making minimal changes to a place to sustain its existing use or to provide new use by ensuring compatibility and safeguarding its cultural significance. The Charter adds that adapting a place for a new purpose is commonly known as 'adaptive reuse' (ICOMOS, 2013).

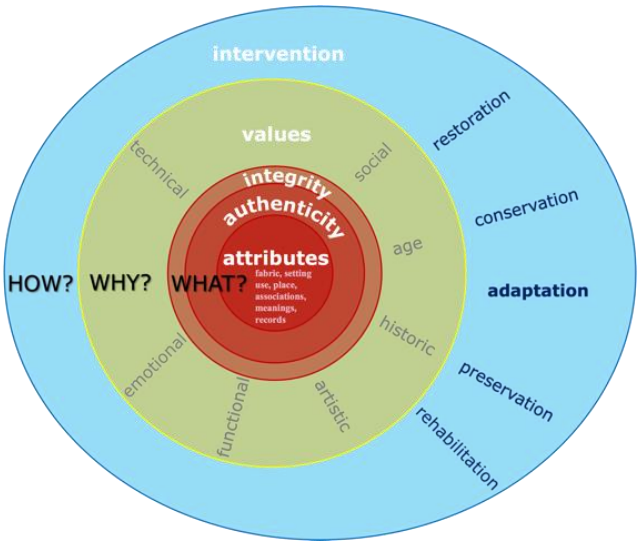

Figure 1. The Circle of Conservation (Author, 2024)

In an urgent need for a more sustainable world, architectural conservation practises should also consider the various approaches to reuse that respond to cultural, social, geographic, financial, and climatic demands (Tostões, 2022). According to Prudon, today's conservation and adaptive reuse tendencies are not about 'architecture of additions', but rather about innovation and creativity without sacrificing the character of the existing buildings, keeping its architectural ethos, and integrating a modern use and vocabulary (Prudon, 2017). He continues that adaptation has always been in practice, but the only change that has occurred is the degree of intervention required to keep it functional (Prudon, 2017).

The adaptive reuse is being encouraged in international conservation documents, starting with the Venice Charter, which states that the monuments are best preserved by repurposing them for socially beneficial uses without altering their decorations and layouts (ICOMOS, 1964). In the case of the conservation of modern architecture, both

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Docomomo Eindhoven-Seoul Statement and ICOMOS Madrid-New Delhi Document affirm the notion of adaptive reuse. The Docomomo Eindhoven-Seoul Statement emphasizes adaptive reuse as a key strategy for modern architectural heritage, aiming to promote its reuse and conservation through developing suitable methods and techniques, and supporting its documentation (Docomomo, n.d.). The ICOMOS Madrid-New Delhi Document underlines the role of use in the conservation of twentieth-century architectural heritage, noting that if the use is integral to the cultural significance, conservation efforts should maintain that use. If there needs to be a change in use, the new function should sustain cultural significance. It should be appropriately interpreted where the new use and where the original use retains cultural significance (ICOMOS ISC 20C, 2017).

Twentieth-century architectural heritage is a breaking point in the history of architecture, so in conservation. Changing worldwide attitudes toward authenticity and conservation values regarding the emerging twentieth-century architectural heritage have still been discussed. In this respect, adaptive reuse is seen as one of the prominent challenges of conservation concerning twentieth-century architectural heritage (Omay Polat, 2008). According to Prudon, modern housing is supposed to be conserved because it represents a significant typology of twentieth-century architecture and includes iconic examples in terms of their design idea and authenticity; however, existing attitudes make this typology today's one of the most challenging and unresolved conservation problems (Prudon, 2008). Although modern housing today possesses significance as a heritage and/or building stock, it also faces a series of challenges, such as the existence of incomplete units, being incompatible with contemporary requirements, having undefined green spaces, generating negative public perception, increasing the land value (Moors & Plevoets, 2019), containing unsuitable living spaces for inhabitants and the notable absence of public facilities (Rowe, 1993). Modern housing is the most exposed-to-change typology of this type of recent heritage.

Fortunately, today, there are increasing efforts to preserve modern housing blocks due to the rising awareness of the preservation of modern architecture. However, this does not prevent the continuous demolition of large numbers of housing blocks due to urban renewal to build new ones. Despite numerous campaigns, the architectural-historically important Robin Hood Gardens (UK) was recently demolished, and modern housing blocks in Ataköy (TR) are threatened by demolition as part of urban transformation projects. On the other hand, there are growing interests and numerous initiatives for their survival, conservation, and adaptation, especially in Western European countries where the case studies of the best practices were selected for this research.

The recently published Frankfurt Declaration on Housing emphasizes that adaptation should be prioritized over new construction and considered in all codes and regulations. Besides, the Declaration underlines the need to harness the potential of existing building stock to address the challenges of climate change and housing shortages through prioritizing preservation, adaptive reuse, renovation and sustainable urban development while balancing ecological, social and architectural heritage considerations, through restricting land and housing speculation, and through fostering public and cooperative housing initiatives (Docomomo_de, 2023).

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Similarly, there are significant publications about the adaptation of modern housing heritage. Carluccio (2013) explores the sustainable retrofitting methods for modern social housing in terms of spatial, structural and energy upgrading through case studies. Tostões and Ferreira (2017) point out that post-war housing is subject to social, technical and functional obsolescence and argue that conservation strategies can address these issues by encouraging social inclusion, upgrading function and improving energy efficiency through three case studies. Diana et al. (2024) assess the adaptation potential of modern housing through various strategies, including rearranging the layout of flats, reducing energy consumption and improving systems for harvesting rainwater. Castiglioni (2013) identifies three categories for modern housing rehabilitation works, including historical value, energy retrofit and adaptation to new needs, and through her research she adds more categories, such as technological, functional and landscape upgrading.

Differing from these notable studies, this paper classifies the selected case studies according to levels of cultural significance, rather than intervention strategies, and evaluates their intervention strategies accordingly.

3. Findings and Evaluation

Henket (1998) mentions that as it is not necessary to keep buildings with an equal level of authenticity, it appears reasonable to propose a hierarchy in terms of intervening. Thus, he suggests three categories: Globally important buildings, locally important ones and socio-culturally important ones. Globally significant buildings are few and should be restored to their initial condition as closely as possible. Locally significant ones may be restored pragmatically. Socio-culturally significant ones may be reused and demolished if they are no longer economically viable, as long as they have previously been carefully documented (Henket, 1998). The third category, also called ‘everyday’ or ‘ordinary’ modern, is an emerging issue in the context of adaptation in particular. The continuity of both ordinary and iconic architecture is based on its enduring functional viability in addition to the widespread acceptance of its social and cultural significance (De Jonge, 2017). Prudon, thus, says that a more designer approach should be developed rather than a conservative one for adaptations (Prudon, 2017). In this sense, the case studies are chosen based on Henket's triarchic classification and Prudon's design-oriented perspective.

3.1. Globally Significance: Unité d'Habitation, Marseille

Unité d’Habitation, designed by Le Corbusier as ‘machine-for-living-in’ and built in Marseilles between 1947 and 1952, was intended to solve the urgent housing demands after Second World War (Weston, 2002). One can say that it then became a model of mass housing world-wide. Based on his ‘five points of architecture’, Unité d’Habitation is a 17-storey apartment building, raised on pilotis, consisting of interlocking L-section duplex units, shops, a hotel and a restaurant, and a roof garden with recreational facilities (Millais, 2015) (Figure 2).

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Unité d'Habitation, a representative of typological, structural, technical, programmatic and plastic innovations of post-war multi-family housing, could not be built by the envisaged construction techniques due to economic reasons. Soon after its completion, the waterproofing of its roof terrace and facade and the central heating system began to deteriorate. As a result of lawsuits brought by the owners, Le Corbusier accepted that the building was strong but technically fragile. In 1963, the appearance of the original concrete deteriorated due to the waterproofing implementation. Partial repairs were carried out in the 1970s and 80s due to waterproofing (Delemontey, 2016).

The housing block was declared a 'historical monument' in 1986 and given the title of '20th-century heritage' with its roof terrace (Figure 3), facades, main hall, semi-open pilotis areas on the ground floor, corridors of the flats 'the internal streets' (Figure 4) and visitable flat number 643 (Delemontey, 2016; Botton, 2019). It was inscribed on the UNESCO World Heritage List in 2016 as one of Le Corbusier's seventeen works in the list.

The poor condition of the building was also noted during the inventory process. This involved exposed concrete reinforcing iron bars, joint cracks, surface spotting, coating crumbling, and inappropriate additions to the roof and porches by inhabitants. Additionally, piecemeal repairs deteriorated the appearance of the building (Delemontey, 2016).

During the renovations between 1986 and 1996, the façades were restored, some rooftop components were rehabilitated, waterproofing was upgraded, and concrete deterioration was repaired. A decision made during this restoration is essential for the conservation theory of modern architecture. The original design of the lift tower could not be applied when it was built due to technical difficulties, and material safety problems emerged over time. However, it was preferred to reproduce it with the technique closer to the initial project rather than its application as a decision of restoration (Delemontey, 2016).

In the early 2000s, a 'comprehensive renovation' was required. To generate the necessary technical solutions, it was decided to first implement on a trial section (Botton, 2019) (Figure 5) on the west façade where damages and problems were first identified, and then both conventional techniques, such as replacing the most deteriorated elements and innovative repair methods such as 'dechlorination and electrochemical realkalisation of the pilotis' and 'preventive impregnation with corrosion inhibitors' to the prefabricated elements were tested (Delemontey, 2016). The most damaged elements, which were 40% of the whole trial (Botton, 2019) were reproduced by moulds on site and replaced unit by unit. The other elements were conserved by preventive measures. The polychrome surfaces were also restored according to stratigraphic analyses and documentation (Delemontey, 2016).

After this trial area, the whole west façade, roof, and east façade were renovated between 2003 and 2017, respectively (Botton, 2019). The partial repairs and spot reinforcements previously applied since the 1980s were not regarded as a long-term appropriate conservation method for this renovation project, the aim of which was conserving the authentic fabric to the extent technically and economically viable (Botton, 2019). In this regard, three main approaches were adopted: 'conservation' for preventive measures of the authentic elements, 'repair' for reconstructing the damaged parts of authentic elements and 'replacement' by fabricating manually on-site for the elements that were not able to be preserved (Botton, 2019).

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The lessons learnt from the results and difficulties of the intervention on the trial section and west façade led to further improvements in the restoration of the east façade (Delemontey, 2016), such as implementing all the requirements zone-by-zone 'in groups of 4 to 6 loggias' to minimise the impact on residents and applying fibraflex rather than steel reinforcement for the consolidation of the concrete elements (Botton, 2019).

The building suffered a fire in 2012, damaging some of the flats and the hotel rooms. This revealed some security defects of the ducts spreading the fire and the structures of internal walls. Two studios, eight duplex apartments, and two hotel rooms were destroyed, and the internal streets and facades were partially affected. The block, not complying with current fire regulations, caused another discussion on whether it should be exempt due to its architectural heritage status or brought into compliance. As a result, although the affected apartments were not listed, they were restored to their initial layout by keeping the 'modulor' sizes of the units and reproducing the built-in furniture such as kitchen, glass panels of loggias and stairs. In addition, technical upgrades were made for fire safety. The polychrome coatings, one of the characteristics of the building, were the decision of the occupants due to a lack of sufficient information (Delemontey, 2016).

The various forms of interventions implemented here, such as restoration, repair, reproduction and adaptation, show the rapid development and complexity in the conservation of a modern social housing (Delemontey, 2016). Nevertheless, Unité d'Habitation can be regarded as a prominent example of modern housing conservation.

Figure 2. The Front Façade of Unité d'Habitation (Author, 2019)

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Figure 3. The Roof Terrace of Unité d'Habitation (Author, 2019)

Figure 4. The Internal Street of Unité d'Habitation (Author, 2019)

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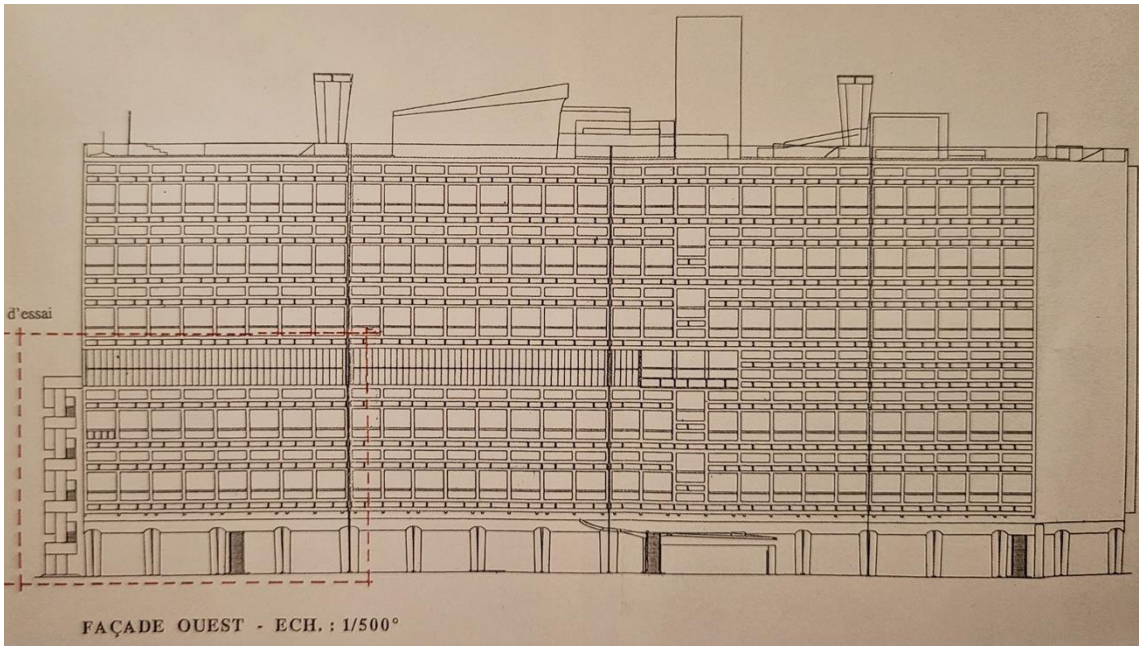

Figure 5. The Trial Part of Restoration Shown in Red on the West Façade of Unité d'Habitation (Botton, 2019)

3.2. Locally Significance: La Tour Bois-le-Prêtre, Paris

La Tour Bois-le-Prêtre, a 16-storey post-war housing block with 96 flats, was designed by Raymond Lopez, a prominent French architect, on the outskirts of Paris in the early 1960s (Figure 6). It was built with prefabricated concrete panels, a new technique widely applied in France then (Rui, 2012). The plan of the rectangular block was designed transversely and longitudinally symmetrical, consisting of four flats on the main floors and two flats on each wing on the mezzanine floors.

In 1990, to improve the energy performance of the building envelope, the facade was insulated, the balconies were closed, and window spans were reduced. As a result, the original design of the façade was changed, and the quality of view and natural light in the flats was lessened (Malighetti, 2012). A decade after this facelift, demolition of the building was on the agenda. In 2002, as part of urban renewal policies, the municipality finally decided to renovate the block instead of demolishing it, and in 2005, a competition was launched for its restoration. The winning team was Frédéric Druot, Anne Lacaton and Jean Philippe Vassal, who recently carried out a research project called 'Plus, les grands ensembles de logements. Territoire d'exception' -supported by the Architecture and Heritage Department of the Ministry of Culture and Communication- (Rui, 2012). The research project, the aim of which is transformation/refurbishment rather than demolition, was developed in opposition to the current public programme of deconstruction[2] of post-war social housing blocks in France (Lacaton & Vassal, 2004). The initial design idea based on the 'plus principle' (Figure 7) theorized in this research was projected between 2006 and 2009 and eventually applied between 2010 and 2011 (Rui, 2012).

[2] demolition + reconstruction

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'Plus principle' relies on remodelling without moving out (Reduce-Reuse-Recycle, 2012), respectively by dismantling the facade and replacing it with transparent elements, placing winter garden+balcony modules on the façade and stacking them unit by unit (Malighetti, 2012) (Figure 8). The main goals are extension, transparency and terraces to improve energy performance, create more living spaces, increase daylight and enhance the view (Malighetti, 2012; Rui, 2012; Lacaton & Vassal, 2004). Rui (2012) called this way of intervention as 'Soft revolution: Preserve, don't demolish. Graft, reshape, and rework with generosity.'

During the interventions, the façade of La Tour Bois-le-Prêtre was dismantled unit by unit and replaced with full-height transparent sliding panels. Three-meter-deep, self-supporting modules with steel structure were then integrated to enlarge the living spaces and improve energy efficiency. The modules comprising a winter garden and balcony were added individually and enveloped the entire façade. Additionally, two larger volumes were attached to the north and south facades, creating more liveable space for the bigger flats. These minor interventions maximised the utilisation area by up to 50% (Lacaton & Vassal, 2011). The stairs obstructing accessibility at the main entrance were replaced with a ramp outside to connect the street level to the ground floor of the building. The ground floor was rearranged with new rooms for collective social activities on the west side. The number of elevators was reduced from 3 to 1 in the centre, and two new transparent elevators were installed to the north and south wings (Malighetti, 2012) to let the natural light in and to make every apartment accessible (Figure 9). The types of flats were also increased. This project was realised with a participatory approach. The users were involved in every decision-making stage (Malighetti, 2012). By maintaining the basic rent calculation, they were given the choice of staying in the same house or moving to a bigger or smaller house according to their needs. Besides, they could continue to be accommodated in their homes during the intervention (Rui, 2012).

Figure 6. La Tour Bois-le-Prêtre in 1960s (Lacaton & Vassal, 2011)

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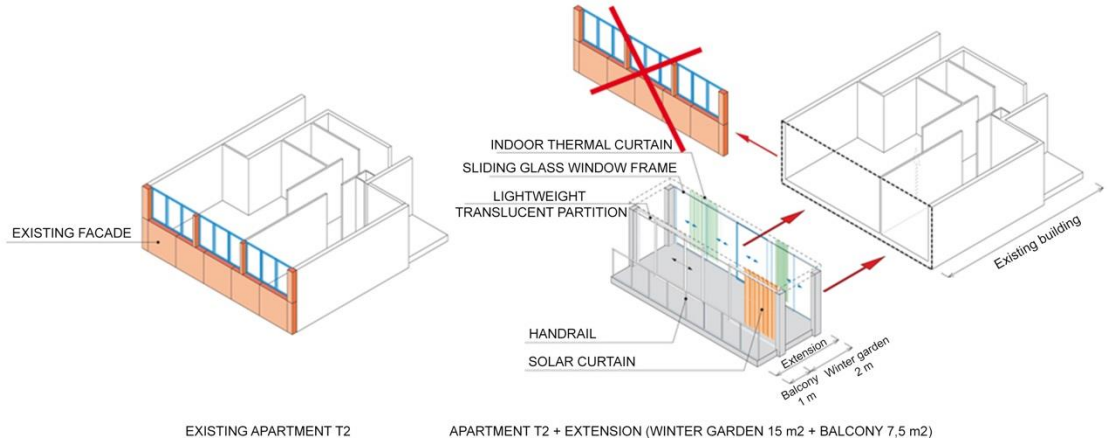

Figure 7. The Plus Principle (Lacaton & Vassal, 2011)

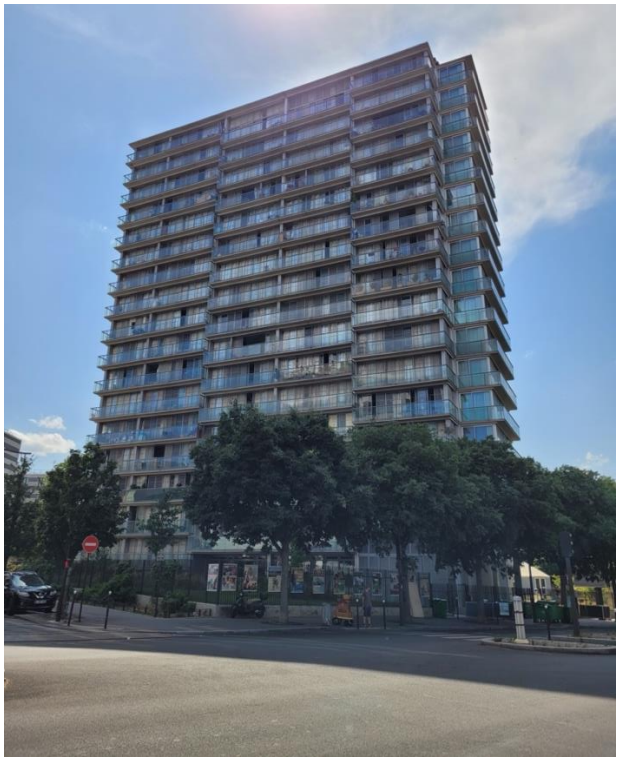

Figure 8. La Tour Bois-le-Prêtre Adapted (Author, 2023)

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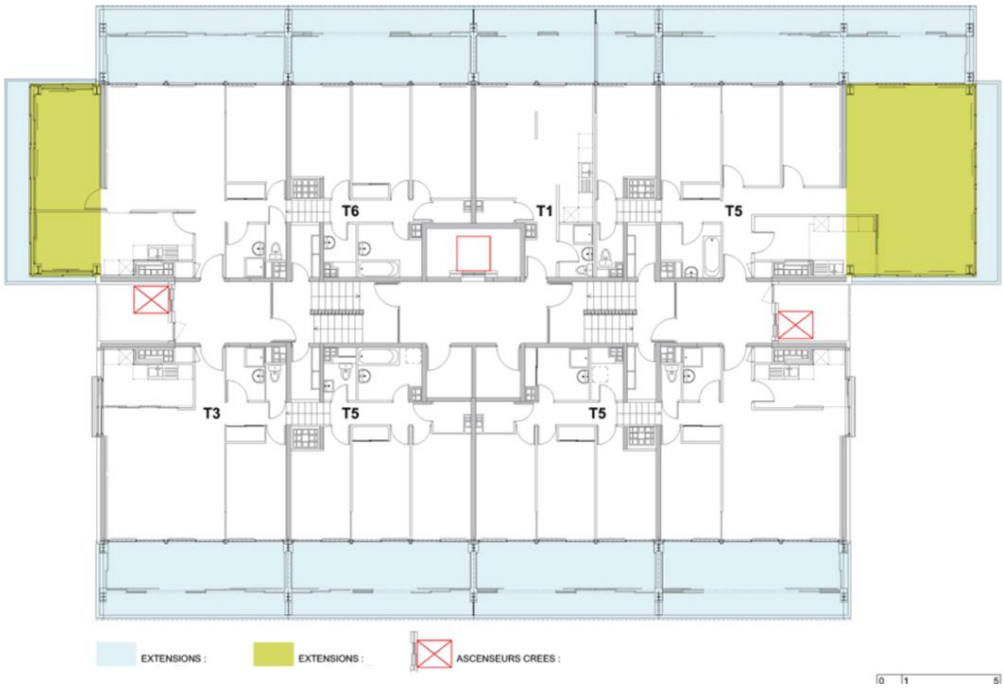

Figure 9. The Adapted Floor Plan -Odd Level- of La Tour Bois-le-Prêtre (Lacaton & Vassal, 2011)

3.3. Socio-Culturally Significance: Wallisblok, Spangen, Rotterdam

'Klushuizen' is a state-funded project launched in Rotterdam in 2003. Within the project's scope, the derelict buildings in vulnerable areas were purchased by the municipality and sold to the citizens at below market prices to improve and revitalise the area. For example, in Wallisblok, the first pilot project, 1 euro per dwelling was demanded as an incentive. Accordingly, the owners of new dwellings were obliged to renovate within a certain period and quality in line with the liability of renovation and home ownership and to inhabit for a particular time[3]. Owners were also expected to submit a renovation and a financial plan. Advice from experts was supplied by the municipality (Spars, Busch & Kämmerer, 2015). It is aimed at preserving valuable urban fabric, preventing speculative misuse, promoting a long-term commitment of the users/developers to the neighbourhood and at the same time improving the neighbourhood socio-economically (Spars, Busch & Kämmerer, 2015; Rieniets, 2020). Most owners were young designers and architects with do-it-yourself skills, producing sophisticated and varied approaches. After renovating their houses, they also revitalised their neighbourhoods. This has also improved the social structure and security of the neighbourhood and the value of the buildings (Rieniets, 2020). 'Klushuizen' has first started in Rotterdam with the Wallisblok project, followed by a more comprehensive programme throughout the city and the country (Spars, Busch & Kämmerer, 2015).

[3] at least 3 years

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Wallisblok, a four-storey, rectangular, multi-family residential block with an inner courtyard, is located along the River Schie in Spangen district which was planned by Pieter Verhagen for workers. The block, consisting of 94 dwellings and multiple entrances, was designed by Architects Krijgsman and Hamdorf in the 1930s with typical plan and façade characteristics of the period. It was built using the brick masonry technique, but the floor beams were made of steel (Rotterdam Woont, 2023). At the beginning of the 2000s, the block was in a state of decay, and so does the neighbourhood. Therefore, the city of Rotterdam sought a chance to revitalize the entire district by renovating this residential block (Hulshof Architecten, 2012). Before the renovation, the condition of the block was poor. Significantly, the foundation, insulation, roof, the wooden frames of windows and doors, loggias and balconies were not in a good state (Hulshof, 2008).

The City had already purchased some of the dwellings of the block, but over the years they became insecure areas because of not being used properly. After the renovation decision, the City decided to initiate a holistic action by purchasing the remaining dwellings in the block. The inhabitants were also allowed to participate in the project or be provided accommodation in another location in the city. As the renovation cost was high, it was decided to sell the dwellings to those committed to renovating and living in them. The City opted to provide the houses at no cost with the condition that new residents would cover the renovation expenses. The initiative prioritized young professionals residing in the city who struggle to afford a house (World Habitat Awards, 2008).

Many actors were involved in the renovation process. The City assigned Hulshof Architects and Steunpunt Wonen to analyse the state of the block and to manage the technical part of the renovation. Hulshof Architects were advising on the demands of users regarding quality, volume, materials and financial resources, and Steunpunt Wonen as a process manager, was dealing with organising the buyers, forming a community, making agreements and scheduling timetables. It was agreed that the consultants would prepare a development concept (Figure 10), in which the common areas and all flats would be provided with minimum requirements following current technical standards and that the implementation and cost would be shared between the groups of buyers. Accordingly, the block was architecturally valuable; therefore, the front façade and the height of the floors were left as they were (Figure 11). The foundation was repaired. The rear façade was demolished and newly built (Figure 12), allowing both the dwellings to be enlarged and the insulation to be improved. The attic and inner courtyard were remodelled for shared use, and 35 different types and sizes of flats were provided (Hulshof, 2008) (Figure 13).

The owners could finish their own houses according to their demands. Besides, they were expected to renovate the entrance halls, stairs, central heating, insulation, technical installations, and shared outdoor spaces. The buyers had to comply with building regulations, such as finishing the construction within six months and living there for at least one year (Hulshof, 2008). Three main groups of inhabitants were formed: One for garden, one for financial affairs and one for construction. The 96 flats were converted into 40 flats of different sizes (World Habitat Awards, 2008). They also collectively decided to choose their homes from various housing types according to their demands.

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In this case, the Klushuizen approach provided possibilities to revitalize the district, encourage independent and collective maintenance, foster community building, and offer affordable ownership (Hulshof, 2008). It has also stimulated similar projects throughout the city and country and initiated different facilities, including cafes, restaurants and art galleries (World Habitat Awards, 2008).

There are similar initiatives in the neighbour countries such as Wächterhäuser in Leipzig, Brunnenstraße in Dortmund, Schipperskwartier in Antwerpen and One-Pound-Houses in Stoke-on-Trent. These examples are not only showing financial models but also leading positive changes for long term due to creativity, personal initiative, and new constellations of actors (Spars, Busch & Kämmerer, 2015).

Figure 10. The Schematic Section Perspective of Renovation Showing that Front Façade and Total Height is Kept (Hulshof Architecten, 2012)

Figure 11. The Front Façade of Wallisblok (Hulshof Architecten, 2012)

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Figure 12. The Altered Rear Façade and the Courtyard of Wallisblok (Hulshof Architecten, 2012)

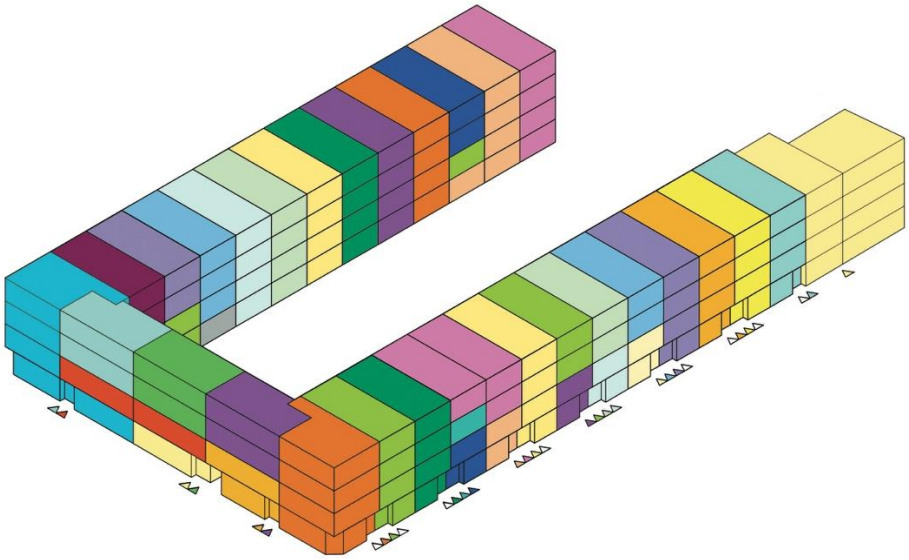

Figure 13. The Spatial Re-Arrangement of Flats in Wallisblok (Hulshof Architecten, 2012)

3.4. Evaluation

This paper analyses the authentic architectural features, the intervention strategies, and the elements in change and continuity of three case studies of modern housing heritage from Western Europe (Table 1). Rowe (1993) identifies two turning points in 20th-century housing development: the Interbellum and the post-war. Wallisblok, built in the 1930s in the workers' housing district of Rotterdam, marks the first period. In contrast, La Tour Bois-le-Prêtre, built in the 1960s as social housing in the suburbs of Paris, represents the second period of postmodernism. On the other hand, Unité d'Habitation Marseille is considered the canonical example of post-war housing in the history of architecture.

Table 1. The Comparison of Case Studies Regarding Their Continuity and Change as a Result of Their Adaptation (Author, 2024)

Case Study	Initial Construction		Adaptation Approach	Intervention Strategy	Continuity	Change
Unité d'Habitation Marseille	**Architect**	Le Corbusier	Globally significance	• Conservation • Repair • Replacement	• Facades • Roof terrace • Structural system • Main hall • Pilotis area • Internal streets • Museum flat as Gesamtkunst werk • Spatial arrangement of flats	• Elevator tower • Fire safety • Waterproofing
	Year	1947-1962				
	Style	modern architecture				
	Size	17 storeys 330 flats of which 23 different types				
	Structure	Reinforced Concrete				
La Tour Bois-le-Prêtre, Paris	**Architect**	Raymond Lopez	Locally significance	Community involved adaptation: Plus principle	• Core structural system • Floor heights • Total height • Inhabitants	• Facades • Mass and total built-up area • Spatial arrangement of flats • Numbers and types of flats • Function of ground floor • Accessibility • Energy efficiency
	Year	1960s				
	Style	Post-war architecture				
	Size	16 storeys 96 flats				
	Structure	Reinforced Concrete Prefabrication				
Wallisblok, Spangen, Rotterdam	**Architect**	Krijgsman and Hamdorf	Socio-culturally significance	Community involved transformation: Klushuizen	• Front facade • Floor heights • Total height	• Rear façade • Spatial arrangement of flats • Numbers and types of flats • Function of attic • Inhabitants • Accessibility • Energy efficiency
	Year	1930s				
	Style	Local architecture of its period				
	Size	4 storeys 94 flats				
	Structure	Masonry Steel floor beam				

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The Unité d'Habitation Marseille, also a World Heritage site, is the least altered of these examples. All the features that determine the architectural characteristics of the building such as its façade, roof terrace, pilotis area, internal corridors, etc. have survived to the present day. Two aspects of the debate on the preservation of modern architecture can be underlined in this case study. Firstly, the preservation method of the block called the trial section is in accordance with current conservation principles for modern architecture. According to article 3.1 of the Madrid New Delhi Document prepared by ICOMOS ISC 20C (2017), the study and design of tailored repair techniques suitable to distinctive construction methods and materials are encouraged. In this context, the trial section applied in this case can be interpreted as a research and development achievement. Secondly, while reproducing the elevator tower according to the initial design rather than how it was constructed emphasizes the continuity of design authenticity, the holistic and conservative intervention on the facades and roof terrace indicates that the continuity of material authenticity predominates. Although the building was exempted from adaptation to the current building codes because of being registered, it became obligatory to comply with the fire regulations due to the devastating fire it suffered in 2012. It points out that exclusion from existing legislation as a registered building can be problematic in cases of risk and disaster. Additionally, although a holistic conservation process has been undergone, the fragmented nature of its national registration process makes some housing elements, such as the arrangement of some apartments, built-in furniture, etc., open to change, either positively or negatively. As a prototype of mass housing, the continuity of all the tangible and intangible original elements of this building might guide the preservation of similar cases.

La Tour Bois-le-Prêtre is the realization of an adaptation principle developed earlier by its architects, the so-called ‘Plus’. This intervention is a remarkable example of bridging the gap between sustaining a post-war housing heritage and addressing the evolving demands of inhabitants and neighbourhoods without gentrification. Although the intervention seems minimal, that is basically a layer of prefabricated winter gardens wrapping the building to enhance living standards, energy efficiency and building quality; the changes in its authentic features are considerable. While the existing structural framework and the floor and total heights of the block are sustained, the façade, the mass, the types, sizes, numbers and layout of flats and the function of the ground floor have altered due to the current requirements and regulations. On the other hand, due to the unit-by-unit construction during the adaptation, the residents continued to live in their houses without displacement, thus preserving the social value of the housing.

Wallisblok is the first implementation of an adaptation model known as ‘Kluishuizen’, which aims to tackle one of the major factors of demolition: economic problems. The housing block was renovated under the supervision of experts assigned by the municipality but through a process in which the inhabitants fully participated. During this adaptation, the front façade and the total height of the block were preserved. In contrast, the rear façade and the layout of the courtyard, flats and attic were transformed considerably due to a more creative intervention. Although this is an economically ground-breaking initiative that encourages the existing residents to live here as well, there might be a risk of gentrification of this formerly working-class neighbourhood due to the growing demands of young professionals who want to buy some of the dwellings, renovate according to their needs and move in.

4. Conclusion

The case studies analysed in this paper emphasize the multidimensionality and complexity of modern housing conservation. The results show that each case prioritises different forms of values, such as architectural value, social value and economic value, respectively, and that change gradually increases as the hierarchy of cultural significance decreases.

The preservation of this living heritage typology requires sustaining its cultural significance while accommodating it to the needs of contemporary life. This might be accomplished through adaptation. The three examples with different levels of cultural significance show that through adaptation, architectural, technological, social and economic values of modern housing are kept while innovative conservation techniques, new design ideas, social participation, affordability and co-preservation are encouraged.

The global climate crisis and the scarcity of non-renewable resources have reduced the capacity to build new housing. In the construction sectors of Western European countries in particular, sensible measures have begun to be taken against this situation, and adaptation, conservation, restoration, renovation, and transformation are encouraged rather than demolition and/or new construction. This issue should soon be on the agenda in Turkey, where formal[4] adaptation in residential architecture is not yet common. More architectural practices that encourage adaptation rather than demolition are recommended for modern housing, especially in countries where adaptation is not yet on the agenda. Moreover, further academic research should be conducted to explore and develop principles of adaptation that both preserve the cultural significance of modern housing heritage and introduce creative ideas.

Author Contribution

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1	Ayça ÖZMEN	0000-0001-6655-8064	1, 2, 3, 4, 5
* Write the number(s) corresponding to the related explanation in the Contribution section.			
1. Designing the study 2. Collecting the data 3. Analysis and interpretation of the data 4. Writing the manuscript 5. Critical revision			

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[4] As opposite of informal

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Conflict of interest

The author has no conflicts of interest to declare.

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