ORDINARY MODERN HOUSING BETWEEN OPERATIONAL FRAMEWORKS AND HERITAGE RECOGNITION

Giulia Famiglietti*
Department of Architecture and Design, Faculty of Architecture
University of Rome La Sapienza, Rome, Italy

Carlo Vannini
Department of Structural and Geotechnical Engineering, Faculty of Architecture
University of Rome La Sapienza, Rome, Italy

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1. Introduction

The crisis currently impacting ordinary modern residential buildings has now become a global issue. In many urban areas, a significant proportion of the housing stock dates back to the intensive post-war construction cycles, driven by social urgency and by strong confidence in the industrial rationalisation of building production.

Today, this housing stock is entering a critical phase marked by the decline of originally guaranteed technical performance when assessed against contemporary standards, the ageing and vulnerability of building systems, and widespread typological inadequacies concerning accessibility, spatial flexibility, and the quality of intermediate spaces. These conditions are compounded by fragile management and maintenance frameworks, as well as by the worsening of housing inequalities and energy poverty [1].

Nevertheless, the issue at hand is not purely technical in nature. The consequences of this phenomenon extend to the stability of the so-called "social infrastructure" of housing, that is to say, those public residential systems that have had guaranteed access to housing as a right and as a means of urban inclusion for decades. The progressive deterioration of this heritage gives rise to a series of questions that interweave material, social and cultural dimensions, thereby challenging established models of intervention on the built environment.

This scenario must be understood within a broader technical and cultural transition, commonly framed as an ecological transition, which is becoming increasingly urgent in international policy agendas. In this context, the construction sector plays a strategic role, as it exerts a substantial influence on global energy and environmental balances. As demonstrated by the Global Buildings Climate Tracker, a substantial proportion of total emissions can be attributed to the energy demand and emissions associated with buildings. The residential sector is responsible for a significant share of these emissions. Consequently, the manner in which the built environment is managed, renovated and transformed, constitutes a pivotal mechanism for achieving international climate objectives.

The ratification of the Paris Agreement in 2016, and the subsequent establishment of programmes such as Next Generation EU and the Renovation Wave (limiting the

* Corresponding author: giulia.famiglietti@uniroma1.it

scope of these programmes to the European context), have resulted in the recognition that enhancing the performance of existing buildings is a prerequisite for achieving both climate and social objectives. From this perspective, China constitutes an especially significant case study, as it is marked by the coexistence of seemingly contradictory dynamics. China's position as one of the world's leading investors in the energy transition and the implementation of renewable sources is in stark contrast to its continued occupation of a critical position in the main international indicators relating to greenhouse gas emissions and the use of fossil fuels [2]. This tension is indicative of the significant influence exerted by the construction sector, particularly with regard to residential construction, which constituted a substantial proportion of the sector during the latter half of the 20th century. However, this segment is now characterised by a suboptimal performance in the field of energy and environmental issues.

In both European and Chinese contexts, albeit through different institutional instruments and structures, there is a clear need to move beyond approaches based on the indiscriminate replacement of buildings. Instead, strategies are needed that are capable of integrating environmental objectives, quality of life and responsible management of material resources.

From this standpoint, the renovation of conventional modern residential buildings cannot be considered as a mere issue of performance adaptation; rather, it is a terrain for confrontation between environmental policies, design practices and the recognition of the technical and social value of buildings.

In particular, the pressing need to address substantial housing stock frequently prompts the adoption of redevelopment initiatives that can be readily replicated on a large scale, particularly those pertaining to energy-related measures. Concurrently, heritage protection measures encounter challenges in extending the designation of heritage to any entity that does not manifest as a formal or authorial exception. This results in a structural tension between the need for operational effectiveness and the need for cultural recognition.

However, this scenario also risks generating uncertainty about the cultural value of ordinary modern housing stock. In recent decades, heritage recognition has focused primarily on the most celebrated works of modern architecture, including authorship-driven buildings, symbolic complexes, and canonical icons. By contrast, the majority of ordinary modern residential buildings has remained in a grey area. Although often perceived as repetitive and lacking clear architectural distinction, this housing stock is highly significant from both a technical and a social point of view.

In these buildings, value does not coincide with formal exceptionality; rather, it is articulated in a complex set of dimensions, including cultures of prefabrication and industrialisation, typological and constructional experimentation, memories of use, material economies, and a legacy of design and production skills. In other words, it is a “widespread” heritage, whose relevance lies in its capacity to document housing policies, technological regimes, and forms of everyday urban life, rather than in any individual iconic quality.

Protection, as traditionally conceptualised, is inadequate for capturing this complexity. Buildings that do not immediately appear as being exceptional risk either replacement or, conversely, being frozen in forms of abstract conservation that disregard the real conditions of contemporary living. In both cases, the result is often the adoption of univocal strategies that are insensitive to the technological, typological, and use-specific characteristics of these buildings. In particular, standardised solutions, adopted as a supposedly “neutral” response to degradation, may improve selected performance indicators in the short term, but can also prove incompatible with original construction logics, joints and connections, and with the transformations in use that have taken place over time.

From these premises, the paper derives three main objectives.

a. Firstly, it seeks to acknowledge the technical and social value of ordinary modern residential construction where such value has remained under-recognised.
b. Secondly, it demonstrates how the renovation of these housing stocks requires operational tools capable of guiding interventions that are both differentiated and coherent, thereby overcoming the “one-size-fits-all” paradigm that has characterised many redevelopment practices.
c. Thirdly, it highlights a methodological convergence between two research trajectories developed in different contexts. On the one hand, it considers the case of Rome’s first *Piano per l’Edilizia Economica e Popolare* (PEEP); on the other, it refers to Chinese residential complexes developed from 1949 onwards and conceived as working-class neighbourhoods. Although not directly comparable, both contexts reveal the need for structured and adaptive frameworks for managing modern housing stock.

Rather than proposing a direct comparison, the focus is on the ways in which the two contexts construct tools (interpretative and/or regulatory) capable of making transformation "governable". These tools include criteria, degrees of intervention and scenarios.

The paper employs a qualitative-operational approach, articulated on three levels. In order to gain a comprehensive understanding of the subject, three approaches must be adopted. The following three approaches are employed in order to achieve the desired outcome: (i) An interpretative and historical-technological reading of the contexts, aimed at clarifying the logic of stock production and the ways in which these buildings have been culturally interpreted, valued, and, where relevant, framed as heritage; (ii) A technological and performance analysis of artefacts, with a focus on industrialised systems, nodes and maintenance stratifications; (iii) A conceptual construction of decision-making tools (criteria and scenarios) as devices for mediating between social value, technical feasibility and governance.

2. Ordinary modern housing as a heritage issue

The question of whether ordinary modern residential buildings should be recognised as objects of socio-cultural interest remains a subject of debate in the international discourse on the conservation of built heritage. For a considerable period, large housing estates constructed in the latter half of the 20th century were not included in conventional classifications of architectural heritage. This was due to the perception that they were associated with serial production, industrialised methodologies and an aesthetic of repetitiveness, which was considered to be incongruent with the criteria of exceptionality and uniqueness that historically formed the foundation for their preservation. This exclusion has produced a paradoxical effect: what is quantitatively dominant in contemporary cities tends to remain qualitatively "invisible" to instruments of recognition, evaluation and management.

However, the utilisation of the term 'ordinary modern residential' as a singular category may lead to the oversimplification of significant variations, not only among geographical regions, but also across building production regimes, technological supply chains, governance models and residential cultures. In this study, the distinction between the European context (with particular reference to Italy) and the Chinese context is utilised to elucidate two historical trajectories. These trajectories, while exhibiting a

shared necessity to produce large quantities of housing in the aftermath of the Second World War, gave rise to divergent assumptions concerning the recognition of value and the implementation of renewal.

In the European context, the industrialisation of construction in the second half of the 20th century frequently manifested as a vast field of technological and design experimentation. The focus of the applied research, disciplinary debate and institutional experimentation was on prefabricated systems, standardised housing types and new construction site organisations. This gave rise to a plurality of construction solutions and a building heritage characterised by significant technical and cultural complexity. In many cases, the term "standardisation" does not imply uniformity, but rather the presence of a range of variants. These variants can be understood as different industrialised systems, with specific details and nodes, and varying degrees of integration between structure, envelope and systems. This inherent complexity renders the implementation of undifferentiated retrofit packages particularly challenging, given the significant variations in technological compatibility and margins for transformation between systems that appear similar.

In the Chinese context, particularly in the period following the establishment of the People's Republic of China in 1949, the focus of residential construction was on quantity, speed and efficiency. The construction techniques and settlement models adopted during this phase were largely influenced by external references, primarily Soviet and, more indirectly, European. However, there was no concomitant development of independent technological experimentation.

Consequently, conventional residential construction was predominantly driven by the pressing need for shelter, rather than being a domain for design and construction research. Consequently, the acknowledgement of value was predominantly (or to a lesser extent) influenced by governance mechanisms and urban management criteria, frequently facilitated by regulatory and manual tools (Figure 1).

Figure 1. A) Torrevecchia, Rome, Italy. Credits: Vannini, C. (2018); B) Lingyun Xincun, Shanghai, China. Credits: Famiglietti, G. (2025).

This discrepancy exerts a substantial influence on the perception and evaluation of contemporary residential buildings in both contexts. In Europe, the stratification of design and technological experiences has fostered, albeit with delays and ambiguities, the recognition of cultural value even in non-monumental contexts. In China, however, the

weakness of the experimental dimension and the primacy of productive function have made it more difficult for a conservative interpretation of ordinary modern buildings to emerge [3]. In other words, while in Europe the debate tends to move from the "culture of value" towards the construction of operational tools, in China the urgency of governing large-scale transformations has favoured the construction of tools that only recently have begun to incorporate value-based criteria.

Despite these differences, in both contexts, ordinary modern residential construction is now a structural component of the contemporary city and an important testimony to the housing policies, building cultures and social transformations of the second half of the 20th century. However, traditional approaches to conservation demonstrate clear limitations in dealing with this reality, oscillating between standardised performance adaptation interventions and forms of abstract protection that are incapable of responding to the needs of contemporary living. It is precisely this oscillation that makes a change in scale and vocabulary necessary: from the protection of the object to the management of the system; from conservation as an end in itself to conservation as a constraint operating within scenarios of transformation.

In this context, standardisation is characterised by an ambivalent role. On the one hand, it is an intrinsic feature of contemporary construction, resulting from the rationalisation of building processes; on the other hand, when it is taken as the sole criterion for renovation, it risks producing undifferentiated interventions that do not take into account the specific technological, typological and usage characteristics of the buildings. Concomitantly, standardisation has the potential to function as a methodological apparatus, provided it is interpreted as an informative structure. The utilisation of typological and constructional repetition enables the recognition and formalisation of patterns (families of elements, recurring nodes, mechanisms of degradation, performance conditions) into criteria, thereby facilitating the construction of selective and graduated scenarios.

Recognition of the heritage value of ordinary modern residential buildings thus necessitates a paradigm shift. This shift should not be understood as the mechanical extension of monumental protection models or the reduction of renovation to an exclusively technical problem. Instead, it should be understood as the construction of an interpretative framework capable of bringing together cultural value, transformability and performance. The crux of the challenge confronting the concept of ordinary modernity as heritage, is to be found in the tension between diffusion, standardisation and specificity. In this perspective, heritage does not coincide with intangibility; rather, it coincides with the definition of "what" must remain (elements, spatial relationships, construction logic, collective spaces) and "how" it can be transformed (degrees of intervention, compatibility, reversibility, maintainability). This makes explicit, the link between cultural recognition and operational tools.

3. The case of the first housing plan in Rome: cultural value and technological complexity

The first Economic and Popular Housing Plan (PEEP) in Rome serves as a prime case study for examining the conditions and potential for the renovation of ordinary modern residential buildings within the European context. This planning tool was developed during a period of intense urban growth and strong demand for housing. It functioned not only as a public policy measure to guarantee access to housing, but also as a field of architectural and technological experimentation [4]. In this field, social demands, architectural cultures and industrialisation processes in construction were intertwined. In the context of post-war

housing policies, housing was regarded as a social service, on a par with education and healthcare, rather than merely as a market commodity. Indeed, in Rome, public housing had a considerable impact on urban expansion, accounting for a substantial proportion of the built-up area. The approval of the first PEEP (1964), implementing Law 167/1962, and in accordance with the provisions of the *Piano Regolatore Generale* (PRG) – Rome's general urban development plan – signalled the commencement of the period known as "large-scale" development, which focused on the planned expansion of suburban residential areas to address an unprecedented demand [5].

Within the confines of this theoretical framework, the PEEP should not be interpreted exclusively as a "building programme", but rather as an urban mechanism that operates in parts. The 1962 PRG identified significant areas for new settlements and provided for the implementation of 73 zoning plans for over 200,000 homes in suburban areas (Figure 2), in accordance with contemporary urban planning trends. The underlying logic is twofold.

In principle, the concentration of housing supply in large-scale projects is intended to achieve two objectives: rationalizing infrastructure and reducing costs.

Conversely, the conception of residential districts endowed with amenities and communal areas is posited as a strategy to mitigate reliance on the traditional core of a city.

However, the concept of a "self-sufficient city" envisioned in the plan has proven to be significantly fragile over time. Numerous facilities, including schools, cultural centres and health centres, were constructed behind schedule or were never completed, thereby compromising the quality of life and exacerbating forms of isolation.

In contrast to other instances of serial residential production, the Roman PEEP sectors are distinguished by a marked heterogeneity in design and construction. Whilst there is a shared objective of standardisation, cost containment and rapid execution, these results are the product of complex negotiations between designers, contractors, public administrations and academia. These negotiations have generated a range of technological solutions, often linked to specific prefabricated systems, different construction site configurations and variable interpretations of housing types. At this stage, standardisation does not coincide with formal repetition alone, but with the adoption of industrialised processes.

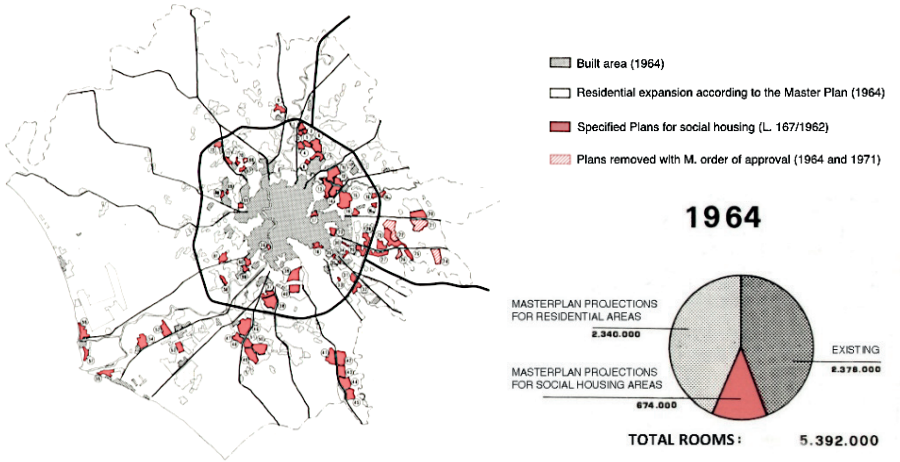

Figure 2. Rome, first social housing plan (PEEP): distribution of the planned areas within the municipal territory. Credits: Municipality of Rome, 1964.

Megastructures and rationalised systems have been developed with the aim of reducing time and costs, and the introduction of international references into the Roman debate (English estates, French grands ensembles, Metabolist influences) has contributed to the definition of new settlement paradigms [6].

It is imperative to underscore that the term "large scale" does not signify a mere figurative choice; the consolidation of volume within a single edifice facilitates the rationalisation of resources, encompassing both construction costs and the optimisation of infrastructure networks. Consequently, the urban development of these neighbourhoods was characterised by a self-sufficient design, often exhibiting discontinuity with the compact morphology of the historic city. These new neighbourhoods were composed of "finished parts", isolated from their immediate context. It is evident that, in the long term, this discontinuity has engendered certain vulnerabilities within the urban context. These vulnerabilities can be characterised by a paucity of functionality, a dearth of mixed uses, and a diminution of social vitality. The combination of these conditions with maintenance issues has contributed to adverse perceptions of numerous public housing estates, thereby reinforcing processes of socio-spatial marginalisation. To summarise, the fragility is twofold: material and relational. The relational aspect pertains to the interaction between urban form, local facilities and everyday practices. When services, public space and mobility are not commensurate with the times, the neighbourhood project gradually loses its capacity for inclusion and attractiveness. Consequently, building problems are interpreted (and experienced) as symptoms of a wider failure.

More than six decades after their construction, these regions presently find themselves at a pivotal juncture. The ageing of materials and construction systems, the progressive obsolescence of plant engineering, performance shortcomings with respect to contemporary energy and environmental standards [7], and the inadequacy of certain typological solutions with respect to changing living requirements, raise urgent questions about how to intervene. However, it is important to note that age should not be considered the sole criterion for legitimising replacement. Instead, it should be understood as a threshold that necessitates a more detailed assessment of value and potential for transformation. A salient point is that the critical issues are not uniform but recur as "families" of problems: energy inefficiency due to historically poor insulation, façade degradation and infiltration linked to insufficient maintenance, obsolete systems, distributional rigidity and urban isolation of many neighbourhoods. The aforementioned factors intertwine material conditions and socio-spatial vulnerabilities. Surveys have revealed recurring patterns:

– the phenomenon is characterised by elevated levels of heat loss and above-average energy consumption;
– the deterioration of façades, water infiltration and obsolete systems are indicative of a lack of investment in maintenance;
– the issue of distributional rigidity can be attributed to the presence of standardised and inflexible housing models;
– the city is poorly connected, a phenomenon that is frequently associated with inadequate public transportation and a lack of integration with primary urban centres.

These dimensions are interconnected: material fragility and socio-urban fragility tend to reinforce each other, transforming physical degradation into perceived degradation and perceived degradation into disinvestment [8]. In this spiral, maintenance assumes a strategic function: not solely as a technical practice, but also as an indicator of governance, administrative capacity and continuity of care.

Research has demonstrated that these buildings embody a value that exceeds mere functional performance [9]. The focus of their research is the stratification of technological solutions, experimentation with prefabricated systems, the definition of housing standards that have contributed to the development of an urban welfare concept, and

the material memory of late 20th-century construction practices. This value is particularly evident in the "construction logic" of PEEP complexes. Rather than being a historical-artistic value in the traditional sense, it is characterised by a recognisable tectonic character, in which an economy of means, modular repetition, standardised openings and components, combine to define a coherent language [10]. The "skin" of the building (infill panels, joints, finishes, panels) is not merely an aesthetic consideration, but rather a technical-perceptual device that affects the use, recognisability and quality of living [11]. The project archives (e.g. the tables of prefabricated façade panels) facilitate the interpretation of this dimension as both a documentary and operational legacy. In other words, for these sectors, value does not coincide with formal exceptionality, but rather with the ability to bear witness to a technical-productive regime (industrialisation, standards, construction site), a culture of public living (thresholds, intermediate spaces, services) and an idea of the city in which residence is part of a collective project.

It is from this standpoint that the concept of "character" can be utilised to establish the role of the building envelope not solely as a performance prerequisite, but also as a cultural and perceptual interface for regeneration[1]. From this standpoint, value does not align with the attribution of a monumental aura, but rather with the acknowledgement of a material culture of public living, in which technology and social purpose are inextricable. This has a significant operational consequence: intervening on these structures necessitates addressing a 'character' that is both technical and social, which can be compromised to an equal extent by demolition and purely cosmetic redevelopment.

At this stage, it is imperative to engage in profound reflection on the matter of cladding[2]. In the Roman PEEP, this issue assumes a particular manifestation (see Figure 3). On the one hand, the fundamental nature of the construction is frequently obscured or 'mediated' by the skin. On the other hand, the façade is not a neutral surface, but rather contributes to the compositional logic and, in certain instances, to the very grammar of the building (panels, joints, modular rhythm). The presence of tables and archive documents on prefabricated façade panels demonstrates that the surface was conceptualised as a system and not as a mere finish. A consequential outcome of this approach is that modifying the façades engenders a transformation in the character of the entire complex. This transformation has implications for more than just the formal aspects; it also has perceptual and social ramifications[3]. Consequently, intervention on the envelope cannot be reduced to standardised "energy specifications". Instead, regeneration should aim at a controlled rewriting of the surface, capable of improving performance without neutralising – or worse, contradicting – the rhythms and proportions through w--hich the original industrial logic remains legible. In operational terms, this implies considering the envelope as a place of compatibility between three dimensions: performance requirements (energy, durability, sealing), actual conditions of the construction system (details, joints, discontinuities) and recognisability objectives (reduction of stigma, perceptual quality, identity) [12].

This approach is exemplified by interviews[4] conducted as part of the research with designers of recent regeneration programmes, relating to interventions in which prefabrication is claimed as an architectural and cultural value (see Figure 4).

In summary, the function of cladding is to bring together three levels that are often separated:

– the performance of the material is characterised by its durability, insulation properties and weather resistance;
– the construction of the structure should be given due consideration, with particular attention to the joints, panels, and the compatibility with prefabricated components;
– the following aspects must be considered in order to achieve recognition: identity, character, reduction of stigma and perceived quality.

Figure 3. A) A façade as a system: modular rhythm, joints, and panel logic derived from an analytical abacus extracted from a digital model. B) Same façade elevation with window openings highlighted (fenestration pattern), extracted from the digital model, to make the modular rhythm and openings' hierarchy legible. Credits: Vannini, C. 2025

At this intersection, renovation can avoid both heritage erasure through demolition and forms of "mummification" produced by abstract conservation, while adopting a transformative approach capable of modernising the building without disregarding its constructional lineage. In this sense, the envelope assumes a strategic function, not only because it is "measurable" (transmittance, thermal bridges, degradation), but also because it simultaneously traverses technical and social dimensions. It is a medium that protects, represents and communicates, thus conditioning both the quality of living and the public perception of social housing neighbourhoods.

Figure 4. On-site view of envelope renovation: performance upgrade through a controlled rewriting of the original modular scan. Credits: Vannini, C. 2025.

It is therefore essential to have adequate tools for interpreting and intervening in these sectors. A salient issue that has come to the fore pertains to the inadequacy of renovation strategies that are predicated on uniform or standardised interventions. Despite the presence of technological and typological similarities, these buildings differ significantly in terms of their state of conservation, construction configuration, performance and retrofit feasibility. The indiscriminate application of standard solutions therefore risks producing ineffective or incompatible interventions, compromising both the future performance and technological value of the built heritage. In addition to the aforementioned

points, it should be noted that a specific "technological complexity" is linked to industrialisation processes. Load-bearing structures are often constructed using standardised cast-in-place techniques (e.g. tunnel formwork or inverted U systems) (see Figure 5), while perimeter closures are based on prefabricated infill panels. While these choices have ensured speed, control and structural durability, they have also revealed weaknesses over time, especially in the connections between the panels and the structure, with repercussions on the building's thermal and energy performance. It can thus be concluded that intervening on the envelope does not equate to 'adding performance' in the abstract sense; rather, it is a matter of dealing with a constrained construction system in which details, connections and technological compatibility become central. The 'best' solution in terms of performance may be inadequate if it does not interact with the physics of the building, its critical points and its actual maintenance capabilities.

The research conducted on the first housing plan in Rome clearly reconstructed the two main areas of technological innovation that were tested during this phase[5]. This duality directly affects the way buildings age: load-bearing structures can prove to be robust and durable, while closure systems and connection details are more vulnerable to infiltration, surface degradation and loss of thermo-hygrometric performance. In terms of renovation, this suggests a change of perspective: rather than treating the building as a "uniform container", it is necessary to distinguish between systems and subsystems (structure, closures, systems, common areas) and define graduated interventions that address the real weaknesses without introducing incompatibilities (technical or managerial).

As previously discussed, the envelope fulfils dual roles as both a performance interface and a cultural interface. Consequently, it is imperative that every intervention be mindful of technological compatibility and the recognisability of the original construction, while eschewing solutions that, though efficient, engender standardisation or loss of legibility. This awareness gives rise to the necessity of transitioning from a prescriptive logic to an approach founded upon a systemic reading of heritage. From this standpoint, the objective is not to establish uniform solutions that are applied indiscriminately, but rather to devise interpretative frameworks that enable interventions to be adapted in accordance with the particular characteristics of the buildings and their respective contexts of utilisation. This also necessitates an engagement with the discourse surrounding demolition and reconstruction as opposed to regeneration. Whilst demolition has historically been advocated as a rapid means of enhancing building performance, increasing environmental and social consciousness has given rise to a re-evaluation of the merits of extending a building’s life-span and utilising adaptive reuse as alternatives, particularly in contexts where the objective is to enhance living standards and performance without the dissipation of material capital and the attrition of a building’s original use [13].

From this perspective, the issue of PEEP can be regarded not as a problem that should be "normalised", but rather as an urban laboratory in which to experiment with progressive transformations (energetic, functional, spatial and urban connection) capable of maintaining the recognisable character of the building while responding to contemporary living requirements. The reference to European experiences of transformation "as an alternative to demolition" (a concept present in the disciplinary debate and referred to in the Rome case study) highlights how innovation lies not only in the technical solution, but also in the ability to build incremental processes that are compatible with the permanence of the inhabitants [14] and with continuity of use. This point is particularly relevant in the context of public housing, as renovation projects frequently operate in suboptimal conditions, characterised by budgetary, managerial and governance constraints. Consequently, in addition to performance, maintainability, reversibility (where possible), accessibility and management over time become central.

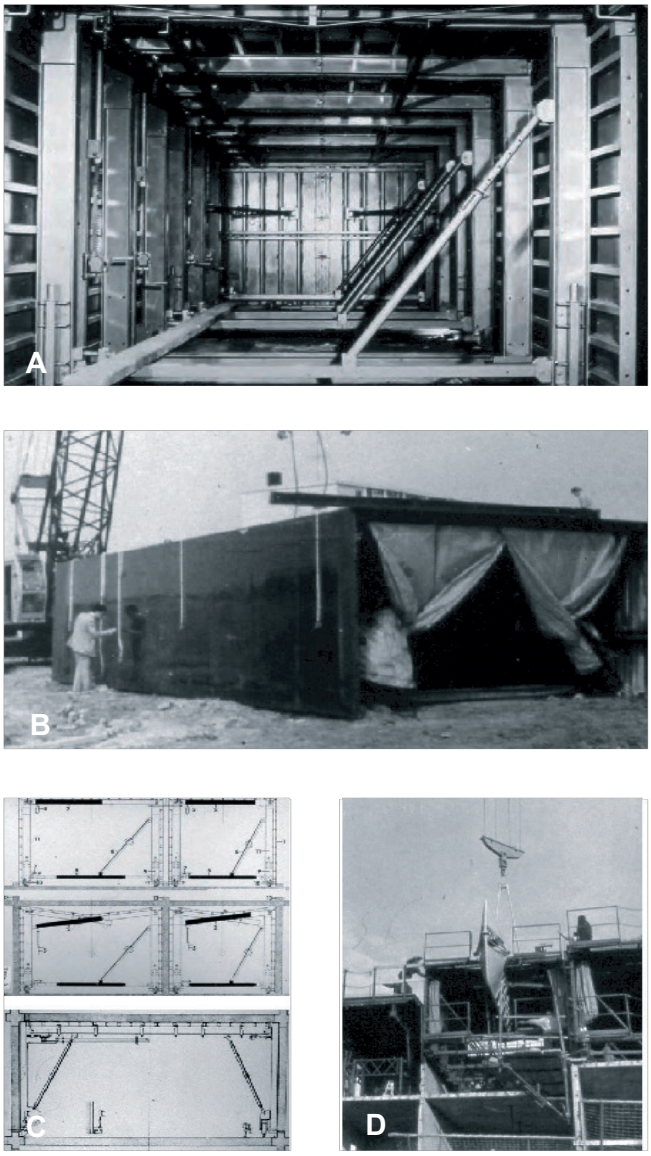

Figure 5. (A) Internal view of a tunnel-form module prepared for casting (repetition and modularity as time/cost compression device); (B) large-span hydraulic tunnel-form system (not adopted in the reported case), shown as a comparative technological variant; (C) operational diagrams: tunnel form in casting position and in stripping (decoffrage) position after accelerated curing—highlighting the cycle logic; (D) on-site positioning and handling of tunnel forms during casting operations (site logistics and assembly sequence). Credits: Archivio Pietro Barucci.

The expansion of the scope of intervention, from the building to the neighbourhood, is thus a necessary condition. Research indicates that many of the critical issues of the PEEP cannot be addressed through building maintenance alone. The problems of urban isolation, lack of services, fragmentation of the fabric, and lack of neighbourhood-level services and amenities, require integrated actions on mobility, public space and collective facilities. In this sense, the renovation of public housing does not coincide with a technical "upgrade", but with a regeneration strategy capable of reactivating the centrality, accessibility and safety of shared spaces.

Operationally, this implies integrated regeneration that enhances existing infrastructure without resorting to indiscriminate demolition. This may be achieved through advanced energy efficiency (high-performance insulation, integration of renewables, natural ventilation strategies), functional redevelopment (reorganisation of interiors and introduction of elements that improve living quality), enhancement of connections and integration with public transport, redesign of public spaces to promote inclusion and recognisability. In this perspective, the quality of common areas and intermediate spaces becomes pivotal, as it is precisely "between" housing and the city that security, comfort and a sense of care are negotiated. This encompasses staircases, entrance halls, balconies, courtyards, thresholds, paths and, more generally, the minute infrastructure of living that can mitigate or amplify socio-spatial vulnerability.

Finally, it is important to note another methodological aspect: the selection of case studies within the first PEEP (belonging to a Zone Plan pursuant to Law 167/1962 and adoption of common industrialised techniques) allows us to observe how the same construction logic can produce different results in terms of degradation, perception and potential for transformation. This approach serves to reinforce the notion that the process of renovation should not be regarded as a series of "neutral" solutions, but rather as an interpretative process that brings together technical aspects, the utilisation of space, and its integration within the urban landscape. It can thus be concluded that repetition should not be regarded as a valid reason for standardising the intervention, rather, it should be viewed as an opportunity to identify recurring problems and define graduated intervention scenarios. The project should be based on compatibility and priorities (e.g. durability, comfort, accessibility, safety, quality of common areas) and measured against the actual conditions of management and maintenance.

In consideration of the Roman case, it is evident that the renewal of ordinary modern housing cannot be addressed exclusively as a construction issue. The construction of decision-making criteria, the capacity for large-scale operations, and the definition of graduated levels of transformation that are congruent with construction characteristics, usage practices, and governance conditions are imperative. From this perspective, the interest of the comparison lies not in comparing formal outcomes or individual projects, but in observing how different contexts construct mechanisms (cultural, regulatory and operational) to make the transformation of large residential stocks "governable". The transition to the Chinese context thus enables a shift in focus from the interpretation of value and technological complexity – central to the PEEP case – to the analysis of regulatory frameworks and manuals. These manuals, which are instrumental in a top-down decision-making system, delineate procedures for evaluation, classification and progressive degrees of intervention.

4. The Chinese context: regulatory frameworks and operational tools

The renovation of ordinary modern residential buildings in China is part of a highly structured and hierarchical regulatory system, developed in response to the country's

vast territory and marked diversity of climatic, geographical and economic conditions [15]. Urban and building policies are defined through state directives that are progressively implemented and adapted at regional and local level, giving rise to differentiated regulatory frameworks. The multi-level structure has a direct impact on the methods of intervention on existing buildings and on building management practices.

In this context, it is challenging to address the issue of building renovation and retrofitting in a unified manner. Consequently, it appears more logical to circumscribe the analysis to the central and southern regions of China, which are predominantly situated south of the Qinling-Huaihe line (秦岭 – 淮河) and are distinguished by temperate and subtropical climates. In these contexts, construction practices and technological solutions have evolved according to different logics than in the northern regions of the country.

A salient feature is the incorporation of a thermal comfort control system. In the regions north of the Yellow River, indoor comfort in winter is traditionally guaranteed by the state through the provision of centralised heating systems. Conversely, in the southern regions, the management of indoor comfort is predominantly accomplished through the utilisation of individual air conditioning systems, thereby exerting substantial implications for building typologies and the energy performance of edifices [16].

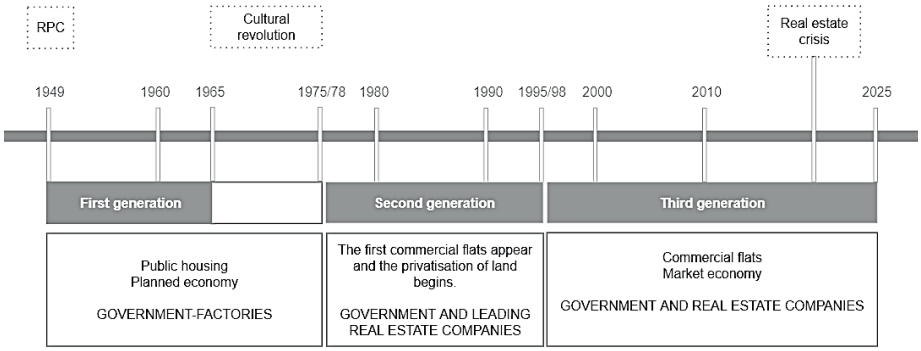

Figure 6. Shanghai's residential urban development by construction phases.

In this context, the municipality of Shanghai represents a case of particular interest. In addition to being one of China's major megacities, since 1949 the city has undergone successive construction phases (Figure 6) that reflect the evolution of housing policies and economic models. The first phase, which developed in the early years following the founding of the People's Republic of China, was linked to the production of public housing and governed by a planned economy and the danwei model, with settlements mainly intended for workers. This was followed by a second phase, between the 1970s and 1980s, marked by the gradual introduction of forms of housing, commercialisation and the first processes of land privatisation. A third phase, which commenced in the 1990s, coincided with the emergence of the market economy and the growing role of real estate companies, resulting in a substantial stock of multi-storey residential buildings.

In this context, the built environment has historically been oriented towards demolition and reconstruction practices, supported by economic logic and top-down decision-making processes. Consequently, the conservation and renovation of ordinary modern

buildings have been marginalised, partly due to the weak cultural recognition attributed to buildings constructed after 1949.

Since the early 2000s, there has been an evolution in the criteria used for the identification and management of existing buildings. In accordance with national directives, a number of Chinese cities have progressively established local standards that incorporate or exclude time thresholds as an administrative criterion for initiating assessment and control procedures in demolition, renovation or transformation processes [17]. In this context, the approaches adopted by local administrations can be traced back to four main thresholds[6]:

- buildings constructed prior to 1949;
- structures that are over fifty years of age;
- buildings over thirty years old;
- temporal sequence is not a prerequisite.

The absence of a time threshold is particularly significant, as it allows selective assessments to be carried out even for relatively recent buildings, if they are considered significant in terms of their historical, social, urban or technological value. In this sense, the time criterion does not operate as a necessary or sufficient condition for recognition, but as one of a number of possible administrative measures within differentiated regulatory frameworks.

The application of these criteria is heterogeneous and highly dependent on local contexts, reflecting different urban strategies and development priorities.

In this context, the chronological criterion serves as a flexible administrative reference rather than an exhaustive indicator of value. In fact, China has gradually moved from an approach based on static conservation to a strategy geared towards promoting conservation through reuse, in which the preservation of buildings is subordinate to their ability to be functionally, performance-wise and economically reintegrated into urban transformation processes.

It is against this backdrop that the most recent developments in the regulatory and operational framework have taken place. The approval, in February 2025, of the Guides for the Assessment and Renovation Design of Modern and Contemporary Buildings introduces a system of assessment based on levels of value (outstanding value, general value and other values). This system is integrated with an analysis of the state of conservation and the identification of architectural and technological elements to be subjected to specific assessment and control procedures (depending on the value class). Pursuant to the foregoing preliminary deliberations, a range of intervention modalities are delineated [18]:

- the initial approach may be considered analogous to the conservative restoration of the edifice's external and internal components;
- the second option permits the reutilisation of external areas while simultaneously regulating the intervention on the façades;
- the third option permits reconstruction and expansion in accordance with specific renovation objectives.

In support of these guidelines, technical manuals – which have been validated since the early 2000s – play an operational role in translating regulatory criteria into intervention plans and technological solutions. These solutions are aimed at improving the energy, structural and functional performance of existing buildings (Figure 7) [19].

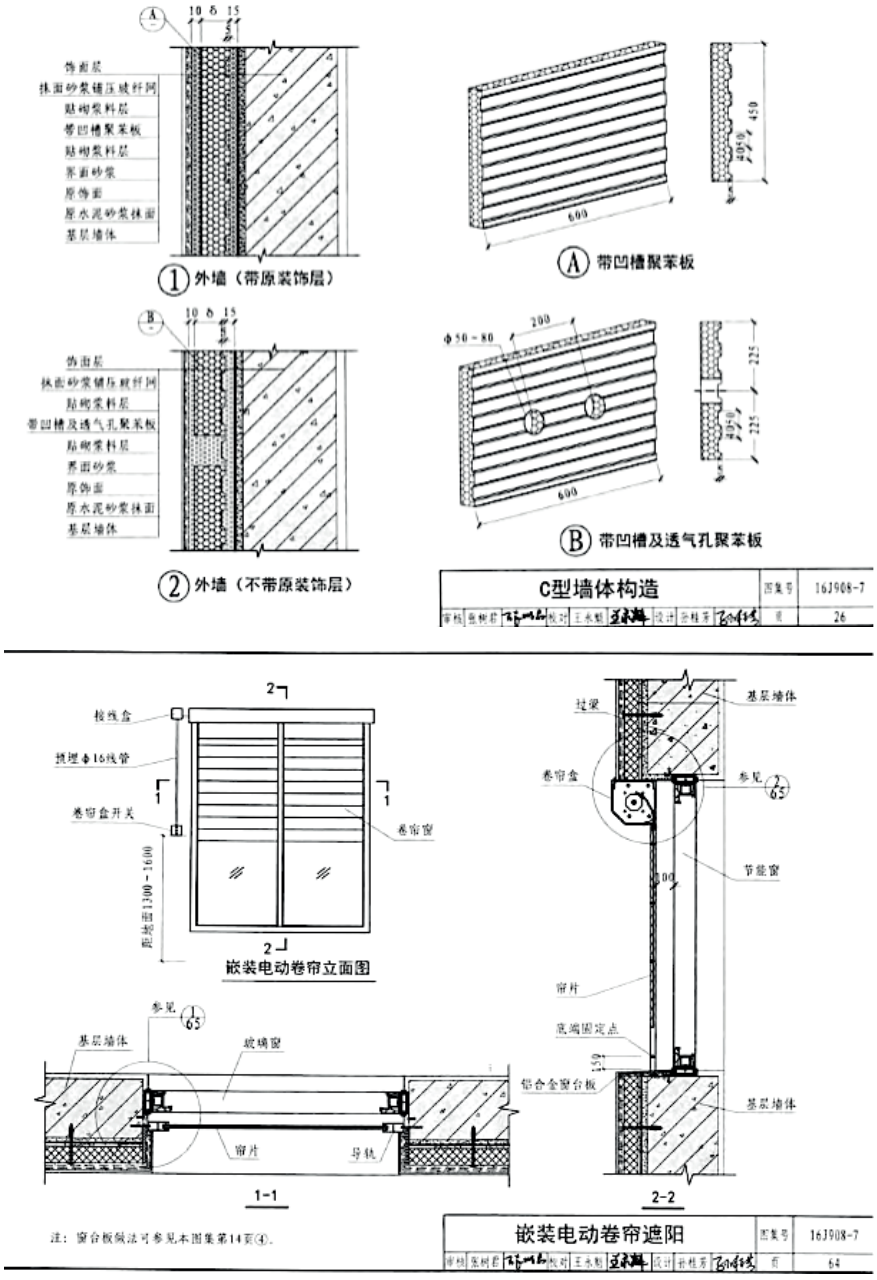

Figure 7. Excerpt from the handbook "Energy-saving renovation of existing buildings" 16J908-7 (2016).

In a context where socio-cultural recognition of ordinary modern residential buildings remains limited, these tools help to make decision-making processes on large-scale building transformation more manageable.

However, it should be noted that the conceptual and operational framework outlined in the latest guidelines is currently applied selectively with respect to the vastness of the ordinary modern residential building stock. As was elucidated in an interview with the President of the Shanghai Society of Architects[7], these instruments are chiefly designed for the identification and management of edifices and districts regarded as exemplary or symbolic, with a particular emphasis on those constructed during the first and second periods of urban development following 1949, which embody a distinctive urban and social narrative.

Concurrently, a key objective of the academic and professional community is to direct attention towards buildings that have not yet reached the time thresholds for the automatic activation of government consultation procedures, yet possess technological, architectural or representative value. In the absence of such mechanisms, economic operators are at liberty to intervene in these areas, with the risk of obliterating the material and constructional traces of the building tradition of the second half of the 20th century.

In light of this, the initiative promoted by the Shanghai Society of Architects and the academic world seeks to augment the number of edifices undergoing identification and preliminary assessment processes, with a view to curtailing the loss of material and urban memory, and to guide transformation interventions through the utilisation of shared criteria. The objective of the proposed measures is not to ensure general protection, but rather to regulate and calibrate interventions on buildings recognised as significant. This approach will allow for their functional and performance updating without compromising their testimonial value.

In the absence of targeted interventions, prevailing practices are focused on specific and temporary actions. These include the removal of architectural barriers and the minimal adaptation of common spaces. The primary aim of these actions is to improve accessibility and safety conditions [20]. Concurrently, in a considerable proportion of residential areas, the transformation of the built environment is still primarily entrusted to building replacement processes, which are frequently associated with urban densification strategies. These strategies are intended to achieve objectives such as the functional reorganization of the residential fabric, the optimisation of land use, and the potential for enhanced economic returns.

It is within this selective framework that the cases of Cao Yun Village and the 228 Neighbourhood Changbei complex in Shanghai are situated.

Cao Yang Xincun (Figure 8) is a foundational exemplar of the first workers' housing in China, whose significance lies not only in its social meaning, but also in the technological and construction principles that inspired its creation. The construction of the settlement commenced in 1951, marking the inaugural establishment of a new workers' village in Shanghai. This development epitomises a residential production model that is in close alignment with the principles of the planned economy. Within this economic framework, standardisation, efficiency and collective living were conceptualised as intrinsic components of urban development.

Consequently, Cao Yang Xincun exemplifies a pivotal juncture in the evolution of Chinese public housing, melding spatial experimentation with a meticulously regulated construction process.

From a structural and urban-planning perspective, the layout of Cao Yang Xincun demonstrates a deliberate adaptation of building form to the overall planning geometry. The streets are arranged along circular arcs, and the residential blocks follow a fan-

shaped distribution rather than a rigid orthogonal alignment. The configuration was designed with the intention of ensuring adequate natural lighting and ventilation. In order to achieve this, inter-building distances were calculated to exceed the minimum sunlight-exposure standards that were applied in Shanghai at the time.

From a technological standpoint, Cao Yang Xincun exemplifies an early manifestation of standardised collective housing, materialised through conventional construction techniques that have been reinterpreted in a serial key. Load-bearing structures are predominantly constructed from brick masonry, with timber floors and staircases, according to a simple and replicable construction logic. The external finishes, in natural lime render, draw on models inspired by Soviet farms and Shanghai's new-style lanes, establishing the image of "white walls, red roofs and stone paths" as the project's formal hallmark. The primary façade is distinguished by its fenestrations, which are accentuated by wooden frameworks, in conjunction with the double-pitched roof, which is adorned with red tiles. This results in a chromatic equilibrium between beige and deep red. The utilisation of materials such as brick, cedar wood and lime plaster, while consistent with available resources, has over time entailed limited durability, evidenced by surface deterioration and acoustic and structural vulnerability. Concurrently, the implementation of repetitive layouts facilitated uniform management, predictable construction programmes and cost control, thereby contributing to the expeditious execution of large-scale residential projects during a period of accelerated industrialisation.

Standardised design played a pivotal role within the overarching state-promoted "system of standard indicators", which regulated per-capita living space, average dwelling size, and construction costs. It is through these parameters that housing production can be directly aligned with the objectives of economic planning, thus rendering standardisation a key operational instrument rather than a purely architectural choice.

Whilst this approach resulted in a marked acceleration in construction and a mitigation of shortages of skilled labour and design capacity, it also precipitated a progressive lowering of housing standards during the 1950s. A decline in per-capita living space was observed in comparison with pre-1949 conditions. The presence of shared kitchens and sanitary facilities was noted, and the architectural expression was found to be intentionally sober, with the removal of decorative elements in favour of functional simplicity. These features underscore the dual nature of standardisation as both an enabling factor for mass housing and a source of long-term spatial and technological constraints.

In the present phase of renewal, these constructional and technological characteristics are acquiring renewed relevance. The designation of Cao Yang Xincun as an "Excellent Historic Building" in 2004 has informed recent interventions within a selective approach that prioritises improvements in living conditions – such as accessibility, safety and environmental performance – while preserving the legibility of the original structural rationale and standardised construction system.

Rather than serving as a universally replicable model, Cao Yang Xincun illustrates how targeted renewal strategies in the Chinese context are increasingly calibrated to specific technological configurations and historical production systems, balancing performance upgrades with the conservation of constructional identity[8] [20–23].

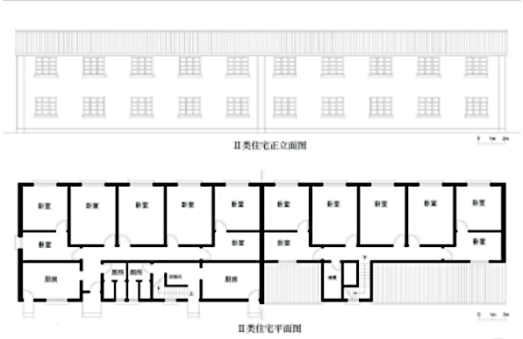

Figure 8. Cao Yang Yicun, Putuo, Shanghai. A) General floor plan (1980). Source: Pan Xinhua, Hua, 1981: p. 212; B) facade and ground floor plan; Credits: SUPEC, Shanghai; C) typical residential building, facing the street. Credits: Famiglietti, G.

The refurbishment of the 228 Changbei neighbourhood provides a valuable example of how standardised construction and first-generation modern housing can be reinterpreted through targeted regeneration rather than replacement. The 228 Changbei neighbourhood (see Figure 9) was originally developed in 1949 as part of the early post-revolutionary housing programmes promoted under the "20,000 families" initiative. The aim of this initiative was to provide rapid, standardised housing for urban workers. From a constructional standpoint, the neighbourhood reflects typical characteristics of first-generation modern residential complexes in China, namely repetitive building layouts, simplified structural systems and standardised dwelling units conceived to ensure efficiency in design, construction and management.

The architectural and technological configuration of the settlement is shaped by a rationalised approach to building production. This approach is characterised by the use of limited material resources, accelerated construction schedules and uniform housing standards, which influence both spatial organisation and technical solutions. Whilst the implementation of such standardisation measures has indeed facilitated the expeditious delivery of large-scale projects, it has concomitantly engendered a decline in adaptability, the obsolescence of infrastructure, and an escalating pressure on shared spaces and services.

By the early 2010s, these conditions had become particularly evident, as overcrowding, the deterioration of building envelopes and the obsolescence of building services compromised residential quality and weakened the neighbourhood's capacity to respond to contemporary housing needs In accordance with Shanghai's more general transition from extensive urban growth to regeneration-oriented policies, 228 Changbei was incorporated into a series of pilot renewal programmes initiated around 2015.

The strategy for renewal was centred on the upgrading of the existing fabric, as opposed to its replacement. This approach encompassed a combination of improvements to housing performance, public space and accessibility, in conjunction with targeted measures aimed at restoring environmental quality and strengthening community life. In this particular context, the project sought to address the limitations of the original stanDardised construction by introducing selective technological upgrades and spatial reconfigurations. This was achieved while maintaining the recognisability of the settlement's basic structural and morphological features.

The intervention under scrutiny does not propose a comprehensive transformation. Rather, it exemplifies a calibrated approach to the renewal of early modern residential complexes, in which standardised construction systems are reinterpreted through incremental, context-specific design actions. These actions are aligned with broader urban-regeneration objectives.

Beyond the technological and urban-regeneration aspects, the 228 Changbei case also embodies a set of social and demographic dynamics which, although not central to the present discussion, contribute to understanding the broader significance of its renewal process[9].

Figure 9. 228 Changbei neighbourhood, Yangpu, Shanghai. Credits: Famiglietti, G. (2025).

These edifices are regarded as examples of the targeted implementation of renewal strategies, with particular attention to conserving identity-defining features while improving living conditions. However, it should be noted that these housing sectors should not be regarded as universally applicable models for the city's entire modern building stock. Instead, they should be regarded as experiments and testbeds for the renewal of ordinary modern residential fabric.

5. Converging methodological trajectories: toward structured and adaptive renovation frameworks

The analysis of the Roman and Chinese contexts, despite their historical, cultural and institutional differences, makes it possible to identify a methodological convergence in the ways in which the renewal of ordinary modern residential housing is currently addressed. This convergence does not concern development models or design outcomes, but rather the means through which tools for reading, evaluating and managing large building stocks – characterised by diffusion, repetition and progressive obsolescence – are constructed.

The fundamental commonality between these approaches lies in a shift of focus from "solution-based" innovation to "process-based" innovation. The latter involves the definition of criteria, thresholds and decision-making pathways that enable the replication of renewal at scale without resulting in uniformity:

a. In the case of the housing sectors of Rome's first PEEP, the reflection commences with the recognition of the cultural, technological and social value of the built fabric. The design and construction stratification, an outcome of a period of

experimentation with industrialised building, highlights the inadequacy of univocal and undifferentiated interventions. This necessitates approaches capable of distinguishing between differing performance conditions, guiding renewal through interpretative readings grounded in case sets and adaptable intervention scenarios, rather than through typified solutions applied indiscriminately. Within this framework, value functions as a design parameter: it determines what should be preserved (constructional character, compositional logics and intermediate spaces) and what may be transformed (performance, building services, accessibility). This prevents technical upgrading from resulting in a loss of recognisability or homogenisation.

b. Within the Chinese context, reflection develops within a framework in which the cultural recognition of ordinary modern housing remains weak, and decision-making processes have historically been structured in a top-down manner. In response to the necessity of governing large-scale urban transformations, normative and operational devices have emerged in a progressive manner. These are based on multi-level evaluation systems, the identification of architectural-technological elements to be protected, and the definition of differentiated degrees of intervention. In this case, the objective is not to provide a single, unambiguous solution, but rather to establish a framework for decision-making that considers value, performance, and renewal objectives. The sequence "assessment – classification – degree of intervention" serves to reduce the element of arbitrariness and thereby renders the decision-making process manageable on a large scale. However, it should be noted that this sequence also serves to perpetuate the tension between selective renewal and demolition-driven practices.

The two trajectories differ in terms of the point of departure for design reflection.

a. In the Roman case, attention is directed towards the recognition and interpretation of value – in its cultural, technological and social dimensions – as a precondition for orienting renewal.
b. Within the Chinese context, reflection primarily focuses on the organisation of tools and devices capable of governing large-scale intervention within strongly structured normative and decision-making frameworks.

In consideration of these discrepancies, the results of the two trajectories can be interpreted through the lens of methodological complementarity: the development of interpretative criteria for value has the potential to enhance cultural awareness within the Chinese context, while expertise in establishing normative and operational instruments, such as guidelines and technical manuals, may provide valuable references for the effective structuring of decision-making processes in the Roman context, without presuming direct transfers or universally applicable application models.

In lieu of a "dialogue between models", an analogy between mirrored deficits has been established. The existence of a robust culture of value is indicative of a paucity of scalable translation into decision-making tools. Conversely, the presence of strong regulatory operability is concomitant with the weakness of integration of use memory, recognisability and perceptual quality.

Consequently, methodological convergence is predicated on the transcendence of the "one-size-fits-all" paradigm, favouring the adoption of structured yet adaptive frameworks. In both contexts, standardisation – understood as typological and constructional repetition – is no longer treated as a formal outcome to be replicated, but as an informational basis for constructing criteria and scenarios. The act of repetition facilitates the identification of recurring patterns and performance-critical issues, thereby transforming

the mass building stock into a knowledge base that supports the process of renewal design.

Adaptivity, from this standpoint, is defined as the capacity to grade transformations by establishing priorities (durability, comfort, accessibility, safety, quality of shared space), recognising technological compatibility constraints, and linking interventions to the real conditions of management and maintenance.

Within this framework, the renewal of ordinary modern residential housing is configured neither as mere preservation nor as simple performance upgrading, but as a selective and graduated process. It is therefore imperative that renewal design serves as a conduit between the recognition of value, technological updating, and adaptation to contemporary dwelling needs. This can be achieved through the utilisation of operational tools capable of governing the complexity of the built fabric dispersed over time.

Acknowledgements

This contribution is the result of a shared scientific elaboration and arises from a process of joint reflection between the authors. It was conceived and written with the objective of delineating an integrated methodological framework to support structured, adaptive and sustainability-oriented upgrading interventions.

The contents concerning the recognition of cultural value and the reading of the technological complexity of modern housing – particularly with reference to the Roman case of the 1st PEEP – are attributable in particular to Carlo Vannini's contribution, developed within his doctoral thesis entitled Digital models for technological design towards the sustainable renewal of public housing. The case study of Rome's 1st Economic and Popular Housing Plan (PEEP) is grounded in a broader and consolidated corpus of research that has matured over time through teaching, research and design experimentation.

The considerations concerning the Chinese context, normative frameworks and operational tools of intervention, as well as the comparative methodological trajectories between systems, are attributable to Giulia Famiglietti and were elaborated within her ongoing doctoral research. These reflections are also derived from a research period conducted at East China Normal University (ECNU) in Shanghai, which facilitated a direct examination of policies and practices for the regeneration of modern heritage within the Chinese context.

Notes

[1] In this direction, the distinction proposed by Auguste Perret between "character" and "style" is a useful interpretative key. The concept of "character" pertains to the work's capacity to respond to its designated function or purpose. In contrast, the concept of "style" encompasses the art of utilising matter to achieve harmony. When applied to the PEEP sectors, this distinction suggests that value does not lie in stylistic refinement, but in constructional character and social function. Indeed, buildings are conceived to respond to a housing emergency through an industrial and serial logic. This reading shifts the focus from the image to the building's operative logic. Modular repetition, economy of means, clarity of openings and the rationalisation of components define a language that is not 'poor' in qualitative terms, but intentionally essential.

[2] A seminal theoretical contribution to the interpretation of these artefacts can be found in Gottfried Semper's reflection on the role of cladding in architecture. As Joseph Rykwert Pobserves in Rassegna 73 (1998), in the essay "Architecture is all surface. Semper and the principle of cladding", modern architecture has progressively prioritised representational aspects overprotective and functional dimensions. Semper's theory of Bekleidung (cladding) posits that the architectural character of a building is primarily defined by its surface cladding, thereby underscoring the significance of this design element in shaping the building's visual identity. This position is in clear tension with the ideal of “pure" tectonics, in which structure and matter are exposed without mediation. In this framework, the envelope is not merely a decorative addition, but rather a cultural and constructional device that facilitates the comprehension of the relationship between technological logics, compositional order and perception. It thereby becomes a determining factor in the processes through which the value of ordinary modern residential housing is recognised. For a similar argument, see Semper, G. (1860). Der Stil in den technischen und tektonischen Künsten oder der praktischen Ästhetik: Ein Handbuch für Techniker, Künstler und Kunstfreunde. Frankfurt am Main: Verlag für Kunst und Wissenschaft.

[3] In Adolf Loos's critique of applied ornament, the surface is posited as never neutral, with the argument that it exerts a direct influence on the quotidian experience of the built environment and the reactions of users. This demonstrates how material, finish and appearance participate in the social meaning of architecture. In the public housing context, this implies that interventions on the envelope affect not only measurable performance (e.g. durability, insulation, airtightness), but also recognisability, perceptions of care and stigma – dimensions that influence the lived-in quality of shared spaces and the public image of a neighbourhood.

[4] This refers to an interview with architect Emanuela Valle (Valle 3.0), coordinator of the executive design within the PUI programme for Tor Bella Monaca, in which she repeatedly states that "the aim is to make prefabrication speak again". The objective of the interview is not the quotation itself, but rather the design criterion it elucidates: the enhancement of performance is conceptualised as an operation that is compatible with the original character, as opposed to its erasure. In this case, the ventilated façade has been calibrated to the proportions of the original prefabrication (reconstructed also through archival drawings), and the cladding functions not only as a performance upgrade, but also as a compositional gesture that maintains the legibility of the articulation of the panels, thus avoiding both flattening and surface homogenisation. The chromatic strategy is described as the outcome of in situ surveys conducted at different times of day and in different lighting conditions, to verify how the new cladding would influence volumetric perception and the readability of the original modular articulation. In this approach, colour is not regarded as an arbitrary cosmetic choice, but rather as a design variable integrated into the retrofit, with the capacity to orient everyday perception and signal care and maintainability. The perceptual dimension, therefore, becomes an integral part of design responsibility, aligning performance upgrades with the social and symbolic effects produced in the collective life of the complex. In the context of the preceding argument, the interview functions as qualitative corroboration, demonstrating how 'value' (in this context, understood as the legibility of prefabricated logic) can operate as an internal design parameter within a retrofit process, rather than as an external constraint or figurative nostalgia.

[5] To be more precise, the period's technological innovation can be interpreted in accordance with two recurring trajectories: the rationalisation of in situ casting through the utilisation of industrialised and reusable formwork systems (for example, tunnel formwork), and prefabrication – heavy or light – based on the on-site assembly of serial

components (including façade infill panels and sandwich-type solutions). This framing helps explain why structures and enclosures often "age at different speeds" and why renewal strategies should treat joints and interfaces as critical zones, rather than considering the building as a uniform body.

[6] Within the Chinese context, such thresholds do not constitute automatic forms of protection nor constraint systems comparable to European ones; rather, they operate as flexible administrative devices aimed at activating evaluation and control procedures within decision-making processes.

[7] On 4 June 2025, an interview was conducted at the Shanghai Society of Architects with Cao Jiaming, who occupies the positions of Vice President of the Chinese Society of Architects and Honorary President of the Shanghai Society of Architects. The interview provided insights into current regulatory orientations, the selective application of recent guidelines, and prevailing decision-making practices concerning renewal, transformation and replacement of modern residential building stock in Shanghai. The interview is employed as an interpretative source; it does not serve as a normative or regulatory reference.

[8] Beyond its architectural and technological characteristics, Cao Yang Xincun also embodies significant social and cultural values linked to the first socialist period in China. As Shanghai's inaugural new workers' village, it functioned as a spatial instrument of planned urbanism, where housing allocation, collective facilities and everyday life were closely intertwined with systems of social organisation and governance. Despite the absence of detailed discussion of these dimensions in this article, they offer significant contextual insights that are vital for comprehending the settlement's cultural significance and the sensitivity required for its contemporary renewal.

[9] The renewal of the 228 Changbei neighbourhood also addressed issues related to demographic ageing, temporary populations and the reactivation of local community networks. Despite the absence of detailed examination of these social dimensions in this particular context, they constitute a significant contextual element in relation to the regeneration of the neighbourhood and the governance strategies that are concomitant with physical and technological interventions.

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Biographical notes

Giulia Famiglietti BSc in Architectural Sciences, Roma Tre University, 2020; MSc in Construction Project and Building Systems Management, Sapienza University of Rome, 2022; Postgraduate Master in Construction Digital Twin & AI, Sapienza University of Rome, 2023. Currently PhDc in Architecture and Construction (DRACo – DiAP, Sapienza). Her research focuses on the renewal and enhancement of modern building heritage, exploring technological design strategies and innovative approaches for ecological transition.

Carlo Vannini Architect, Ph.D, is a Postdoctoral Research Fellow (CEAR-08/C) at DISG – Sapienza, Università di Roma. His research focuses on Technological Design for the improvement and conservation of modern and post-war architectural heritage, with attenti on to public housing, urban quality and public space. His interests focus on innovative design tools and construction processes; he develops methodologies to address the digital transformation of the construction sector. He is a partner of BEST Design srl, Sapienza spin-off.

Summary

The process of renewal of ordinary modern residential housing represents a challenge in contemporary cities, where a substantial proportion of the post-war housing stock is reaching technological and functional obsolescence. Such buildings are often regarded as standardised systems, yet their primary motivation was the pressing need for housing rather than monumental or representational ambitions. Their future raises questions of cultural recognition, technological performance, and the definition of appropriate and sustainable renewal strategies.

The present paper addresses these issues through two complementary research trajectories on modern residential heritage. The first draws on research on Rome's first social housing programme, where prefabricated estates – now approaching seventy years of age – are increasingly recognised as carriers of technical, social, and design-related values. In this context, the adoption of a one-size-fits-all approach to renewal is ill-advised. Instead, typological and technological criteria are needed to guide scenarios based on recurring construction features and performance conditions. The second trajectory examines Chinese regulatory and technical frameworks for the assessment and renovation of modern and contemporary buildings. The focus is on value-based classification systems, the identification of architectural–technological elements subject to protection, and the role of prescriptive handbooks in defining graduated degrees of intervention, ranging from conservation-oriented renewal to controlled reconstruction and expansion.

Rather than proposing a direct comparison, the paper highlights a shared methodological convergence: moving from case-by-case actions toward structured yet adaptive frameworks for managing large modern housing stocks. It argues that operational tools are pivotal in balancing cultural recognition, technological upgrading, and long-term urban sustainability.

Riassunto

Il rinnovo dell'edilizia residenziale moderna ordinaria rappresenta una sfida rilevante nei contesti urbani contemporanei, dove una quota consistente dello stock abitativo del secondo dopoguerra sta raggiungendo avanzati livelli di obsolescenza tecnologica e funzionale. Tali edifici sono spesso considerati sistemi industrializzati e standardizzati; è tuttavia importante ricordare che la loro origine rispondeva principalmente a un'urgenza abitativa, più che a intenti monumentali o rappresentativi. Oggi il futuro di questi paesaggi costruiti solleva questioni complesse che riguardano il riconoscimento del valore culturale, la valutazione dell'efficacia tecnologica e la definizione di metodologie d'intervento adeguate e sostenibili.

Il contributo affronta questi temi attraverso due traiettorie di ricerca complementari sul patrimonio residenziale moderno. Da un lato, si basa su ricerche in corso sul primo Piano di Edilizia Economica e Popolare (PEEP) di Roma, in cui i comparti prefabbricati – ormai prossimi ai settant'anni – sono sempre più riconosciuti come portatori di valori tecnici, sociali e progettuali. In questo contesto, le strategie di rinnovo devono adattarsi a condizioni diverse e non possono fondarsi su una soluzione unica e standardizzata; richiedono invece criteri tipologici e tecnologici in grado di orientare scenari differenziati, basati su ricorrenze costruttive e condizioni prestazionali.

Dall'altro lato, lo studio esamina i quadri regolativi e tecnici sviluppati in Cina per la valutazione e il rinnovo degli edifici moderni e contemporanei, concentrandosi su sistemi di classificazione *value-based*, sull'individuazione di elementi architettonico-tecnologici da proteggere e sul ruolo di *handbook* prescrittivi nella definizione di gradi progressivi di intervento, dal rinnovo conservativo alla ricostruzione e all'espansione controllata.

Più che proporre un confronto diretto, il lavoro mette in evidenza una convergenza metodologica: il passaggio da interventi puntuali a framework strutturati ma adattivi per la gestione di grandi stock residenziali. Attraverso una lettura critica di questi approcci paralleli, il contributo sottolinea il ruolo degli strumenti operativi nel bilanciare riconoscimento culturale, aggiornamento tecnologico e sostenibilità urbana di lungo periodo.