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# Adaptive Rehabilitation in Architecture: Heritage, Performance, and Continuity of Use

*Adaptive Reuse in Architecture: Heritage, Performance and Continuity of Use*

Adaptive rehabilitation in architecture: heritage, performance and continuity of use

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**Summary**

Adaptive rehabilitation transcends the mere aesthetic or functional requalification of pre-existing buildings; it consolidates itself as the primary mechanism for maintaining habitability throughout the life course of a building. This article advances the theoretical and methodological discussion of rehabilitation by inextricably linking it to continuity of use and the mitigation of vulnerabilities in the context of building development. Person-environment interaction. The study proposes an authorial repositioning that integrates the needs of *aging in place* with the preservation of the historical and social fabric. A structured critical review methodology is adopted to develop a novel decision-making framework in seven dimensions, capable of guiding interventions in existing buildings. It is concluded that the Architectural continuity is ineffective if it cannot support human continuity, requiring Interventions that balance material compatibility with flexibility and functional inclusion.

**Keywords:** Adaptive rehabilitation; Continuity of use; Habitability; *Aging in place;* Existing architecture; Person-environment interaction.

**Abstract**

Adaptive reuse transcends the mere aesthetic or functional requalification of pre-existing buildings; its consolidate itself as the primary mechanism for maintaining habitability across the life course. This article advances the theoretical and methodological discussion of rehabilitation by inextricably linking it to the continuity of use and the mitigation of vulnerabilities in the person-environment interaction. The study proposes an authorial repositioning that integrates the needs of aging in place with the preservation of the historical and social fabric. A structured critical review methodology is adopted to develop a novel seven-dimension decision framework capable of guiding interventions in existing buildings. It concludes that architectural continuity is ineffective if it does not support human continuity, demanding interventions that balance material compatibility with functional flexibility and inclusion.

**Keywords:** Adaptive reuse; Continuity of use; Habitability; Aging in place; Existing architecture; Person-environment interaction.

## 1. Introduction: The Problem of Architectural and Human Continuity

Contemporary architecture faces the imperative challenge of intervening in the existing built environment.

existing, moving away from the tabula rasa paradigm. Buildings that were once central to the dynamics

Urban structures, such as old industrial or residential buildings, often enter cycles.

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of functional obsolescence, not due to the failure of its materials, but due to a mismatch with new technologies.
social and demographic demands. Adaptive rehabilitation emerges, in this context, not only
as a sustainable alternative to demolition, but as a structural strategy for the
reactivating value and meaning in the built environment.

The scientific problem guiding this investigation, however, is substantially more...
More specific and critical than the generic defense of building reuse. The interest lies in
to investigate how the rehabilitation of pre-existing structures can act as a vector for the
Continuity of use and maintenance of habitability throughout the entire human lifespan.
Architectural intervention cannot be reduced to the preservation of the historical "shell" while
Its internal structure systematically excludes vulnerable demographic profiles, failing to adapt.
to the changes inherent in population aging.

There is a profound gap in the architectural literature that often fragments the analysis:
Heritage rehabilitation is studied from the perspective of material conservation (focus on the building) and
This article studies accessibility and gerontology from a health perspective (focusing on the individual).
It proposes the merging of these two dimensions. It is argued that the material continuity of the building
It only reaches its full value when it underpins human continuity, preventing that...
adaptations that generate functional gentrification or make *aging in place* unfeasible in the territory of
origin.

The guiding question that structures this manuscript is: how can adaptive rehabilitation...
to reconcile property value, environmental performance and habitability, ensuring the
continued use without deepening spatial inequalities and without confiscating the autonomy of
What is an elderly individual? To answer this question, it is necessary to transcend the view of
The building is being repositioned as a mere real estate asset or historical relic, and is being viewed as a support structure.
The dynamic nature of changeable human life.

As its central objective and authorial contribution, the article develops a decision-making framework in
seven interconnected dimensions. This methodological tool, unprecedented in its articulation with the
Vulnerability assessment aims to provide parameters for interventions in pre-existing structures.
The proposal organizes criteria, exposes operational conflicts and trade-offs, and offers a basis.
solid and reproducible so that architects and managers can evaluate the inclusive effectiveness of a
adaptive rehabilitation.

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## 2. Conceptual Framework and Terminological Limits

The field of intervention in pre-existing conditions suffers from chronic semantic imprecision, which
This makes the consolidation of rigorous scientific methodologies unfeasible. Terms such as conservation,
Restoration, adaptation, and renovation are often used synonymously.
interchangeable in professional jargon. However, to structure a framework
For a methodological approach that is applicable and reproducible, it is mandatory to establish terminological distinctions.
clear guidelines that reflect the degree of intervention, the functional objective, and the heritage approach.
adopted by the project.

The term *adaptive reuse* refers to the practice
holistic approach to assigning a new function (or perpetuating a function on new operational bases) to
An existing building whose original function has become obsolete. This concept differs from the mere...
"Renovation," as it often implies a radical change in the architectural program.
while maintaining a historical reading of the volumetry, spatiality, or elements.
Construction elements that make up the identity of the place.

Rehabilitation should be understood within a more circumscribed scope *and*
regulatory. In many regulatory and technical contexts, rehabilitation means repairing, altering, or
To make additions to a property of historical or cultural value in order to enable a use.
contemporary compatibility. The premise of rehabilitation is that the characteristics that define the
The building's heritage value must be preserved without fail during the process of
Technological and space upgrade.

On the other hand, the concept of *building* adaptation encompasses any
intervention in the building — structural, technical, functional or operational — intended to adjust the
Space for new demands without necessarily requiring a change in primary use.
or the involvement of a listed heritage structure. It is the ongoing process of aligning the
The building's performance in response to fluctuations in human and climatic needs throughout its lifespan.
life cycle.

In this study, the terminology "Adaptive Rehabilitation" is adopted to describe the process.
A strategic approach that merges the heritage sensitivity of rehabilitation with functional reinvention.
of adaptive reuse. This choice is not accidental; it underscores the author's central thesis that
Intervening in pre-existing conditions requires adapting the environment to make it conducive to activities.
contemporary issues (including aging), while rehabilitating their cultural value.
intrinsic. It is at this intersection that the mitigation of habitability vulnerability operates.

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## 3. Methodology: Critical Review and Framework Construction

To avoid theoretical dispersion and the formulation of a purely speculative article, the following approach was adopted:
The methodological design of a structured critical review. This approach differs from...
Literature reviews of a purely descriptive nature, common in introductions.
academic, as it requires argumentative synthesis and the formulation of a new instrument.
applicable analytical method. The goal of the method is not to enumerate what has already been said about reuse, but
To extract the essential criteria that support the continued use with spatial equity.
The search strategy was based on the intersection of three fundamental disciplinary fields: a
The theory of architectural conservation, the performance and life cycle of buildings, and the
Environmental gerontology and accessibility. Recognized databases were consulted.
(Scopus, Web of Science) and examined seminal theoretical works, prioritizing publications that
They problematize the tensions and trade-offs inherent in interventions in the built environment.
historical.

The selection of sources followed strict criteria of thematic relevance and scientific rigor.
Studies that addressed building rehabilitation solely from the perspective of [the relevant logic] were excluded.
short-term economic and financial viability, as well as those dealing with
Accessibility as merely a normative checklist detached from human experience.
The analysis focused on identifying the "bottlenecks" that traditionally prevent buildings from...
adapted historical sites are truly habitable for populations in the process of...
aging.

The process of analyzing and synthesizing the data resulted in the organic organization of seven dimensions.
Critical analyses. These dimensions were not defined a priori, but emerged from the contrast.
between conservation literature and the demands of continued habitability. They form the backbone.
The backbone of the proposed framework: Pre-existing Values, Programmatic Compatibility,
Environmental Performance, Habitability and Human Diversity, Structural Flexibility,
Urban Impacts and Continuity of Use.

This methodological structure ensures the reproducibility of the reasoning and anchors the proposition of
The framework is based on solid evidence from the theory and practice of adaptive rehabilitation. The method
ensures that the decision-making instrument formulated in Section 6 of this article is a tool
scientifically testable, capable of evaluating whether a reuse project strengthens or weakens the
The vulnerability of the person-environment relationship over time.

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**4. Values of Pre-existing Conditions and Programmatic Compatibility**

The starting point for any responsible adaptive rehabilitation is accurate recognition.
of the values inherent in pre-existing architecture. Historical or existing architecture is not a resource.
neutral; it carries meanings, social memories, and constructive characteristics.
Singular. Intervening in this fabric requires deciphering the "layers" of the building to distinguish what is
essential for maintaining its identity, that which is attached and replaceable.
or profound change.
The value of a building does not reside solely in its aesthetics or age.
collective meaning, the role of the building in shaping the urban landscape and its memory.
Usage by local communities is often more relevant than stylistic purity.
of its facade. A rehabilitation that excessively sanitizes the space, erasing the marks.
Due to time and the scars of previous use, it can constitute an act of historical falsification.
transforming the heritage into a devitalized setting.
The preservation of these values is intrinsically contingent upon compatibility.
programmatic, that is, the building's natural inclination to absorb the proposed new use. Insert
a high-density population and technological program in a fragile structure and
Compartmentalized rehabilitation will require destructive interventions. Successful rehabilitation relies on...
Spatial synergy: the new program must fit into existing spatial characteristics with
the least possible constructive friction.
Compatibility should be assessed not only from a metric point of view (areas and volumes),
but through the lens of infrastructure requirements (air conditioning systems, exhaust systems, routes of
(escape). An industrial warehouse, with its large open spans and double-height ceilings, presents high
compatibility for collective and exhibition uses, but it can pose Herculean challenges of
thermal and acoustic performance if converted into single-family dwellings, requiring
massive additions that disfigure its original typology.
Therefore, the design decision is not simply about "what" the market wants to put inside the
The building, but "what" the building can accommodate with dignity and respect for its integrity.
The conflict between the desire for preservation and the need for functional adequacy is inherent to
Adaptive reuse, and the architect's role is to mediate this tension, ensuring that the new layer of
The use must be distinguishable from pre-existing conditions, legible, compatible, and reversible.

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## 5. Habitability, Aging in Place, and the Orthotic House in the Existing Fabric

The dimension most frequently neglected in heritage rehabilitation projects is...
guarantee of universal and continuous habitability. There is a dangerous fallacy that buildings
historical buildings, due to their ancient constructive nature, would be exempt (or, at the very least,
forgiven) from meeting the stringent accessibility and human performance requirements
contemporary views perpetuate the systematic exclusion of the elderly and people with disabilities.
of significant portions of the consolidated city.

Integrating the concept of *aging in place* into adaptive rehabilitation is a scientific maneuver.
Strategic and disruptive. It's about claiming that the adaptation of the existing stock must...
primarily to serve to anchor people to their territories of origin. The conversion of
Underutilized buildings converted into intergenerational housing or the requalification of facilities.
Community-based mechanisms in the historic center enable active aging in the region.
city, contradicting the logic of exiling elderly populations to neglected peripheries.

Rehabilitation should be analyzed through the lens of vulnerability in person-person interaction.
environment. If a reuse project includes ramps and elevators, but fails to provide for spaces of
Safe socialization, adequate lighting for elderly eyes, and mitigation of urban noise.
Exacerbated, it solves a normative accessibility problem, but does not achieve the
Full habitability. The intervention should aim for functional independence without suppressing the
The individual's autonomy in decision-making.

It is at this point that the theoretical foundation aligns with the general principles of the Orthotic House.
(Belletato, 2023). When the concept migrates from the residential level to the macroscale of
Adapted building, it is stipulated that the rehabilitated building itself must assume a character
Prosthetic. The custom-constructed tissue should act as a support that compensates for declines.
sensory and motor skills, anticipating human needs not only in times of crisis.
sharp, but structurally and invisibly so in the design of the space.

The success of rehabilitation is not measured solely by the beauty of the contrast between the old brick and the new.
new steel, but due to the effectiveness with which this new configuration prevents falls, it promotes the
Spatial orientation encourages community gatherings and protects the dignity of older bodies.
fragile people who will inhabit it. Habitability, in this context, is not an appendix to the project; it is the
*a sine qua non* condition for the ethical validation of any intervention in pre-existing buildings.

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## 6. Authorial Decision-Making Framework for Adaptive Rehabilitation

Based on the tensions identified by the critical review, the Continuity Framework is formulated.
Architectural and Human. This analytical tool is the primary authorial contribution of this
research, designed to organize the complexity of decision-making in projects of
intervention. He doesn't propose a rigid formula, but establishes the parameters and the
Critical questions that must be rigorously answered to ensure rehabilitation.
Be ethical, sustainable, and inclusive.

The framework works by revealing the inherent "trade-offs" in the practice. In real-world scenarios, maximizing
One dimension may mean the partial sacrifice of another. For example, route suitability.
Accessible and life-support facilities in a historic mansion may require significant alterations.
in the original plan (compromising the morphological integrity of the pre-existing structure in favor of
universal habitability). The tool forces the architect to technically justify the balance.
achieved.

The seven dimensions of the framework operate interdependently. A high score in
Material preservation loses its social value if the intervention catalyzes an acute process.
of gentrification that results in the displacement of entire communities (failure in the dimension of
Urban and Social Impacts). Adaptive rehabilitation is proposed here as an act of
Systemic responsibility that extends beyond the boundaries of the batch.

Table 1 outlines the framework, linking each dimension to a critical question.
guiding principle and the potential risk associated with neglecting that parameter. The use of this matrix
aims to protect the integrity of the *Aging in Place process,* ensuring that the adaptations in
Consolidated buildings result in spaces that promote continued use with equity.
and high performance throughout the life cycle.

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| Framework Dimension | Critical Question and Evaluation Design | Risk of Inadequacy Design |
|---|---|---|
| 1. Values of Pre-existing Structures: | What should remain to preserve the scenic appearance of the structure? | to ensure the preservation of the facade, destroying the structure. |
| | meaning social and spatial | aspects that conferred value |
| | Original typological integrity? | authentic. |
| 2. Compatibility | The insertion of the new program | Forcing a volumetric incongruous, |
| | requires functional structural changes | "scars" |
| | excessive and disproportionate generating | undesirable aspects of pre-existence. |
| | to the building's capabilities? | |
| 3. Performance and Cycle of The intervention aims to produce an intervention of | | |
| Life | efficiently reduce the sustainability footprint | discursive |
| | carbon, the isolation | (greenwashing), omitting the |
| | Thermohygrometric analysis and the associated maintenance costs | |
| | operational? | future. |
| 4. Habitability (Aging in the project eliminates barriers, configuring ableist spaces) | | |
| Place) | neutralizes cognitive risks and those that require spatial segregation. | |
| | compensates for physical limitations or confiscation of autonomy of | |
| | motors inherent to the | elderly user. |
| | aging? | |
| 5. Flexibility and Reversibility: The building possesses resilience. Promote | | interventions |
| | material and modularity for | destructive and definitive, |
| | absorb future technologies accelerating the obsolescence of | |
| | Transformations without loss of rehabilitation itself. | |
| | meaning? | |

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| Framework Dimension | Critical Question and Evaluation Design | Risk of Inadequacy Design |
|---|---|---|
| 6. Urban and Social Impacts: What are the socio-spatial effects? Promoting appreciation In the surrounding area? Does the adaptation serve predatory real estate interests? | to community interests resulting in previous? | displacement and exclusion systemic. |
| 7. Continued Use | The layers of history and of life contemporary if They fuse, ensuring vitality, characterizing a process of real to the built environment? | Produce one work "museumized" and inert, reuse without social permanence significant. |

Table 1 — Decision-making framework of seven critical analytical dimensions and risk mitigation in Adaptive rehabilitation. Source: Author's own elaboration.

The application of this model proposes continuous evaluation at each stage of the project. It is necessary It's important to emphasize that, while the framework doesn't magically resolve programmatic disputes, it... Ensures transparency in decision-making. Documenting the dimension of performance is important. was overlooked in favor of the dimension of material conservation (or vice versa) builds a The practice of architecture based on solid evidence is fundamental to the advancement of the discipline. in critical housing contexts.

**Final Considerations and Research Agenda**

Adaptive rehabilitation presents itself as the most complex frontier of intervention and promising contemporary architecture. The existing building condenses not only the chronicle of urban occupation, but the material challenge of balancing history with modernity. This The study argued strongly that good intervention in built heritage is devoid of of intrinsic value if it does not simultaneously ensure human continuity, equitable access and Continuous functional support in the context of *aging in place.*

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The structured analysis of the seven critical dimensions of the framework shows that decision-making
The decision to reuse does not follow a linear metric. Technical compatibility often
will clash with the dimension of universal habitability, in the same way that the requirements of
Accessibility will require calculated sacrifices of the original historical authenticity of arrangements.
Internal factors. Recognizing, highlighting, and scientifically arbitrating these tensions differentiates the true
The practice of rehabilitation based solely on evidence from purely empirical building renovation.
The potential impact of this approach on public housing policies is significant.
Cities possessing vast, underutilized real estate stocks, located in urban fabrics.
Establishments located near essential services and healthcare facilities should observe adaptive conversion measures.
as the main mechanism for producing low-carbon, high-value supported housing.
of belonging. This perspective redefines elderly housing: from isolation and homogeneity
From the asylum or periphery to the vibrant diversity of redeveloped city centers.
The concepts defined here — Adaptive Rehabilitation, Home-Orthosis applied to the macro scale,
Vulnerability to habitability and continuity of use—form a theoretical core.
robust. The unrestricted adoption of these guidelines imposes severe, but strictly ethical, restrictions on
actions that aim to "revitalize" the urban fabric, preventing predatory and insensitive use.
of the typologies consolidated over time.
As a future investigative step, the practical application of this framework is necessary.
proposed in distinct typological case studies, such as old factories, abandoned schools
and post-industrial office buildings converted into multi-generational residences.
Verifying the effectiveness and calibration of these dimensions in complex regulatory contexts.
This will endorse this method, providing practical ways to intervene in the existing city with
Architectural mastery, respect for long life, and genuine socio-territorial justice.

**References**

BRAND, Stewart. How Buildings Learn: What Happens After They're Built. New York: Viking, 1994.

BULLEN, Peter A.; LOVE, Peter ED Adaptive reuse of heritage buildings. structural survey, v. 29, n. 5, 2011.

CHOAY, Françoise. The Allegory of Heritage. São Paulo: Estação Liberdade; Editora UNESP, 2001.

DOUGLAS, James. Building Adaptation. 2nd ed. Oxford: Butterworth-Heinemann, 2006.

ICOMOS. The Venice Charter: International Charter for the Conservation and Restoration of Monuments and Sites. Venice: ICOMOS, 1964.

MUÑOZ VIÑAS, Salvador. Contemporary Theory of Conservation. Oxford: Elsevier, 2005.

PLEVOETS, Bie; CLEEMPOEL, Koenraad Van. Adaptive Reuse of the Built Heritage: Concepts and Cases of an Emerging Discipline. London: Routledge, 2019.

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UNESCO. Recommendation Concerning the Historic Urban Landscape. Paris: UNESCO, 2011.

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