edA
Esempi di Architettura

ISSN 2035-7982

EdA on.line is member DOAJ
DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

Beyond the Ruin: An Interpretative Framework for Design and Functional Transformability in Heritage Contexts

Pasquale Cucco, Federica Ribera

Department of Civil Engineering, University of Salerno, Fisciano (Sa), Italy

Abstract

This paper addresses the challenge of contemporary design in the context of ruined heritage, proposing an interpretative framework that links the material state of the ruin to the scope of permissible transformation. The framework is structured through three interconnected dimensions: the Degree of Ruination (DoR), which describes the physical and spatial state of the ruin; the Degree of Design Transformability (DoT), which defines the range of culturally permissible interventions; and the Degree of Functional Transformability (DoF), which addresses the compatibility of new uses.

Rather than prescribing design solutions, the framework supports the interpretation of the relationship between ruin and project, distinguishing between material state, design action, and functional adaptation. Its application is explored through two case studies: the Roman Baths of Acconia di Curinga and the ruined Church of Grottole, both characterized by an advanced state of ruin.

The comparison highlights how similar material conditions can generate different design approaches, revealing different balances between protection, enhancement, and formal expression, as well as varying degrees of functional compatibility. In this sense, the framework does not aim to validate interventions, but to clarify the degrees of coherence and tensions that emerge in the design process. The proposed approach contributes to the ongoing debate on interventions in ruined contexts, offering a structured but non-prescriptive tool to support design reasoning and to articulate the cultural admissibility of contemporary transformations in heritage contexts.

Keywords: Ruins, Design, Architecture, Transformation, Methodology

Introduction

Contemporary design in ruined contexts occupies a critical position in the architectural debate, suspended between conservation, transformation, and the creation of new meanings. Far from being simple material residues, ruins are complex artifacts that embody historical, symbolic, and landscape values, while also offering the potential for reinterpretation and reuse. In this context, design practices often oscillate between two opposing tendencies: the reconstruction of a lost image through mimetic approaches and the refusal of intervention in the name of absolute conservation.

This research addresses the need for a framework capable of supporting design decisions without imposing them, distinguishing between what is technically feasible and what is culturally permissible. The paper proposes the "Degree-based Transformability Framework" (DoR–DoT–DoF), structured around three interconnected dimensions: the "Degree of Ruderization" (DoR), which describes the material state of the ruin; the "Degree of Design Transformability" (DoT), which defines the scope of permissible intervention; and the "Degree of Functional Transformability" (DoF), which addresses the compatibility of new uses.

Rather than introducing new conservation principles, the conceptual framework reorganizes established concepts into a coherent interpretive structure that connects analysis and design. Its objective is to support a systematic reading of ruins and articulate a horizon of admissibility within which contemporary interventions can be critically placed.

The proposed conceptual framework is not intended as a prescriptive method or a validated evaluation tool, but as a conceptual support for design reasoning. Its application is illustrated through selected case studies,

edA
Esempi di Architettura
ISSN 2035-7982
EdA on.line is member DOAJ
DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

used to explore its potential rather than to provide empirical validation. The article is structured as follows: first, a review of current research on adaptive reuse and transformation of ruins; second, a definition of the DoR–DoT–DoF conceptual framework; third, a discussion of its interpretive tools; and finally, its application to selected case studies and the comparative analysis of the results.

The architectural ruin as an autonomous artifact

Architectural ruins constitute a specific category of built heritage, endowed with material, spatial, and semantic characteristics that distinguish them from both intact historical architecture and archaeological remains in the strict sense (Simmel, 1911; Linazasoro, 2010). Their fragmented, incomplete, and functionally degraded state does not simply represent a degenerative outcome of the original structure, but defines a different state, endowed with its own identity and its own conservation and design logic.

In the contemporary debate on heritage conservation, ruins cannot be considered a simple "remain" awaiting reconstruction or completion, but must be recognized as autonomous objects, embodying historical, landscape, and cultural values that have accumulated over time following the loss of their original integrity. This recognition requires a necessary rethinking of both analytical tools and intervention methods, particularly when the conservation project is accompanied by the possibility of incorporating new contemporary architecture or devices (Fidone, 2010).

The variety of conditions in which ruined artifacts present themselves highlights the inadequacy of generalist or exclusively subjective approaches. The varying levels of material loss, structural impairment, and spatial readability require assessment tools capable of objectifying, at least in part, the state of conservation and the possibilities for intervention (Marino, 2013).

Within this framework, the development of parametric indicators is needed to support restorers and designers in defining strategies consistent with the artifact's level of ruin. These tools are not intended to replace critical judgment and professional experience, but rather provide a shared analytical basis, useful for reducing the subjectivity of assessments and making the decision-making process more transparent.

If the ruin is recognized as an object with autonomy and value, it cannot be considered a simple support or a passive constraint with respect to the project of the new. On the contrary, their presence demands that they be embraced as a design invariant, that is, as a generative element capable of guiding spatial, formal, and functional choices (Hill, 2019; Desilvey, 2017).

This conceptual shift marks the overcoming of a dichotomous vision that opposes conservation and design, old and new. Ruins are no longer simply remnants of the past, but become an active part of a design process, in which the extent of contemporary intervention must be calibrated based on their material condition, their legibility, and their cultural significance.

From this perspective, it is necessary to integrate tools for assessing the degree of ruin with broader reflections on the relationship between ruins and the design of the new.

International studies emphasize the importance of considering multiple dimensions in the adaptive reuse process, combining architectural, sociocultural, economic, regulatory, and environmental factors (Zhang et al., 2025; Guidetti et al., 2021; Kahvecioğlu et al., 2023; Alasmar et al., 2024; Vafaie et al., 2023; Mısırlısoy et al., 2016). For example, systematic reviews indicate that adaptive reuse must balance tangible values (such as structural integrity and compatibility of uses) with intangible values (such as historical significance and identity), requiring holistic approaches for effective design decisions (Mısırlısoy et al., 2016).

The literature also highlights that the transformation of ruins is not a mere change in function, but a process that intertwines memory, identity, and collective celebration. Some authors explore how the morphological characteristics and stages of degradation of a ruin influence potential design intervention, opening new perspectives on the spatial and temporal analysis of buildings (Guidetti et al., 2021).

Some approaches classify the success factors of adaptive reuse to understand why some projects are more sustainable and successful than others (Kahvecioğlu et al., 2023). From a technical and methodological perspective, research is developing a growing interest in integrated frameworks that support adaptive reuse

edA
Esempi di Architettura
ISSN 2035-7982
EdA on.line is member DOAJ
DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

choices, not only by evaluating structural and functional factors, but also by engaging stakeholders and policymakers (Cucco et al., 2023).
This research adopts a theory-driven and interpretative methodological approach. The proposed framework is developed through the systematization of existing theoretical contributions and is intended to support design reasoning rather than to provide measurable or predictive outcomes. The application to case studies is exploratory and illustrative and does not aim to constitute a comprehensive validation of the model.

Degree-based Transformability Framework DoR–DoT–DoF

The Degree-based Transformability Framework (DoR–DoT–DoF) is articulated through a set of interconnected layers that do not constitute a rigid procedure or a prescriptive protocol, but rather a logical and interpretative structure supporting the transition from the reading of the artifact to the critical understanding of intervention. The framework operates through mutually informing dimensions: the interpretation of the ruin as a material and spatial condition (DoR), the definition of the admissible scope of transformation (DoT), and the consideration of functional compatibility (DoF). These layers are supported by synthetic interpretative tools that allow design choices to be related to the possibilities and limits emerging from the condition of the ruin. In this sense, the framework can be used both as a support for design reasoning and as a critical lens through which the relationship between ruin, transformation, and use can be articulated. It does not reduce the complexity of the project, but makes explicit its cultural assumptions and responsibilities.
The framework can be described through the following layers:

– Layer 1: Assignment of the DoR ("Degree of Ruderization") (DoR)
– Layer 2: Derivation of the DoT ("Degree of Design Transformability") (DoT)
– Layer 3: Assignment of the DoF ("Degree of Functional Transformability") (DoF)
– Layer 4: Final Check

Layer 1: Assignment of the DoR ("Degree of Ruderization")

The "Degree of Ruderization" (DoR) is an indicator that expresses the quantitative relationship between the preserved authentic material and the architectural organism in its original state (Franceschi, Germani, 2005).
By considering parameters such as the loss of roofing, deterioration of vertical structures, integrity of wall crests, presence of invasive vegetation, and structural stability, the DoR translates a complex condition into a synthetic classification. This does not replace critical judgment but provides a shared reference for comparing cases and supporting initial conservation decisions.
It indicates the extent of material loss but does not define how the new should relate to the existing, nor whether interventions such as integration, juxtaposition, or interpretation are appropriate (Ribera, Cucco, 2019; Id., 2020). For this reason, the DoR must be complemented by an interpretative framework capable of translating the assessment of the ruin into criteria of design admissibility (Table 1).

DoR Code	Brief Definition	Condition of the artifact
DoR 1	Incomplete Architecture	Readable structure, volume, and spatiality
DoR 2	Interrupted Architecture	Missing parts, compromised continuity
DoR 3	Trace/Fragment	Loss of the architectural organism

Table 1. Degree of Ruderization (DoR) classification.

edA
Esempi di Architettura
ISSN 2035-7982
EdA on.line is member DOAJ
DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

Layer 2: Derivation of the DoT ("Degree of Design Transformability")
To overcome the limitations of the degree of ruination as a purely evaluative tool, this research proposes a new interpretative dimension: the degree of design transformability. This concept is not conceived as an additional numerical index, but as a sort of "field of possibilities", defined by the relationship between the state of the ruin, its cultural value, and the admissibility of contemporary intervention.
The degree of design transformability does not indicate what is technically possible, but rather what is culturally legitimate or desirable within a given historical and landscape context.
The integration between the DoR and the design of the new can be formalized through a conceptual matrix that relates the levels of ruin to possible design strategies (Table 2).

Degree of Ruderization (DoR)	Condition of the ruin	Role of the ruin	Interpretative scope of design transformability	Design orientation
DoR 1	Incomplete but readable architecture	Active structure	High transformability (controlled continuity)	The project may operate through spatial continuation, integration, and adaptive reuse, while avoiding mimicry and irreversible alteration
DoR 2	Interrupted architecture with partial loss	Silent structure	Medium transformability (selective mediation)	The project acts as a mediating device, re-establishing spatial relationships without reconstructing the lost architectural unity
DoR 3	Trace / fragment, loss of architectural organism	Testimony	Low transformability (interpretative approach)	The intervention adopts an autonomous and reversible character, enhancing legibility without completing or reconstructing the ruin

Table 2. Relationship between the degree of ruderization, the condition of the ruin, and design strategies.

Assessing the state of conservation of an architectural structure in ruins, while an essential step in the cognitive and decision-making process, does not exhaust the complexity of the choices that accompany a design intervention. When conservation is combined with the possibility of adding new architectural elements or new functions, the need for a conceptual tool capable of translating the assessment data into design admissibility criteria emerges.
The DoT is not a numerical index or a quantitative measure, but rather an interpretative dimension aimed at defining the scope within which the design of the new can legitimately operate in relation to a pre-existing structure in ruins. It does not measure the extent of possible transformation, but rather defines its cultural perimeter, acting as a mediator between the material state of the artifact, its historical and symbolic value, and contemporary needs for use and enjoyment.
In this sense, the degree of design transformability can be understood as a field of possibility, within which the project is called upon to operate not according to criteria of maximizing intervention, but according to logics of coherence and cultural responsibility. The DoT does not prescribe formal solutions or impose typological models but establishes a threshold of compatibility beyond which the intervention risks compromising the identity of the ruin, transforming it into a mere support or pretext for the new.
The introduction of the degree of design transformability thus makes explicit a principle often implicit in restoration and building design practices: not everything that is technically possible is culturally legitimate.

edA
Esempi di Architettura
ISSN 2035-7982
EdA on.line is member DOAJ
DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

The possibility of inserting new volumes, reconstructing missing sections, or repurposing a ruin does not automatically imply their appropriateness (Marino, 2002). On the contrary, the project is called upon to address a critical responsibility that transcends the technical dimension and directly impacts the cultural significance of the intervention.
In relation to the degree of ruination, the DoT acts as a link between knowledge and design. If the degree of ruination provides an objective reading of the material state of the artifact, the degree of design transformability interprets its implications in terms of possible intervention, orienting the project not toward the maximum permissible transformation, but toward the appropriate measure of permissible transformation. With a low degree of ruin (DoR Level 1), the building retains a recognizable architectural structure, capable of accommodating new functions without losing its own identity. Under these conditions, the degree of design transformability is high, as the new project can operate through insertions, adaptations, and spatial continuations. However, a high DoT does not equate to unlimited design freedom; it avoids camouflage, arbitrary reconstructions, and irreversible alterations to the historical structure.
With a medium degree of ruin (DoR Level 2), the loss of significant parts of the building compromises spatial and functional continuity, while leaving the surviving structures legible. Here, the DoT takes on an intermediate value, configuring selective transformability. The new project can no longer continue or complete the original architecture but is called upon to function as an element of mediation, reestablishing spatial and perceptual relationships through autonomous and reversible devices.
When the building is in an advanced state of ruin (DoR Level 3), the architecture loses its recognizability as a unitary organism and presents itself as a trace or fragment. In this context, the degree of design transformability is low, but not zero. The design of the new cannot assume an integrative or complementary function, but rather an interpretative one.
The assessment of the degree of project transformability (DoT) constitutes a crucial phase in the methodological process, occurring between the definition of the intervention's eligibility horizon and the assessment of the quality of the project proposal. Unlike the degree of ruination, which is based on observable and relatively objectively assessable parameters, the DoT is not a measurable value, but rather a criterion of coherence. Its assessment therefore does not consist of a quantitative check, but rather a critical analysis of the relationship established by the project with the ruin.
The assessment is based on a comparison between the level of transformability declared in the interpretation phase and the spatial, figurative, and symbolic effects produced by the design intervention. This comparison does not evaluate the intrinsic quality of the architectural solution but rather ascertains whether the project operates within the culturally admissible range of possibilities defined by the condition of the ruin.
Operationally, assessing the DoT occurs through three main steps: explicitly declaring the degree of transformability, translating this degree into clear design limits, and critically reviewing the project in relation to these limits. A project is deemed consistent with the DoT when it does not assume a complementary or substitutive role for the ruin, when it maintains a clear temporal distinction, and when it does not alter the perceptual hierarchy between pre-existing and new. Conversely, exceeding the DoT occurs whenever the project reconstructs, even figuratively, what is definitively lost, or when the new architecture becomes the dominant element of the relationship.
Assessing the degree of design transformability does not produce a numerical evaluation, but rather a reasoned judgment of coherence or incoherence. It therefore represents a critical assessment tool for the project, aimed not at limiting its expressive quality, but at ensuring its cultural responsibility towards the ruin and the historical-landscape context in which it is located.

From form to relationship: aesthetic compatibility

Aesthetic compatibility is often understood as formal similarity, stylistic continuity, and visual coherence. However, when applied to ruins, this interpretation is problematic because it presupposes an irrevocable original image, tends to favour mimetic or allusive outcomes, and shifts judgment from the process to the visual result.

edA
Esempi di Architettura
ISSN 2035-7982
EdA on.line is member DOAJ
DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

In the context of designing ruined structures, the figurative and aesthetic compatibility of the new cannot be assessed in terms of stylistic analogy or formal imitation of the preexisting structure. Such an approach would be reductive and risk resulting in mimetic operations devoid of critical foundation. Compatibility must instead be understood as relational coherence, that is, as the contemporary project's ability to establish a legible and non-conflictual relationship with the ruin, while maintaining its expressive autonomy.
Three main design attitudes can be identified in relation to the degree of transformability: critical continuity, in which the new engages with the existing spatial logic without imitation; selective mediation, where the intervention re-establishes relationships without reconstructing the lost unity; interpretative abstraction, in which the new acts as an autonomous device enhancing the legibility of the ruin.
Figurative and aesthetic compatibility is assessed through relational parameters such as scale, proportion, materiality, structural autonomy, reversibility, and temporal legibility. These parameters do not function as fixed criteria, but as critical lenses through which the relationship between the new intervention and the ruin can be interpreted (Table 3).

Parameter	Critical Question
Scale	Does the new intervention alter the perceptual hierarchy of the ruin?
Proportion	Is the solid–void ratio compatible with the existing remains?
Materiality	Does the material of the new intervention establish dialogue or dominance?
Structure	Is the new structure independent from the ruin or structurally dependent on it?
Reversibility	Can the intervention be removed without loss of meaning or damage to the ruin?
Temporal legibility	Is the distinction between historic fabric and contemporary addition clearly readable?

Table 3. Design strategies (SP) in relation to the Degree of Transformability (DoT).

Leyer 3. Assignment of the DoF ("Degree of Functional Transformability")
The Degree of Functional Transformability (DoF) expresses the ruin's level of availability to accommodate new functions compared to the original typology, without compromising the historical, symbolic, and landscape values of the structure. The research proposes a three-level scale (Table 4).

DoF Level	Functional Transformability	Key Characteristics	Admissible Uses	Typical Building Typologies
DoF 1	Low functional transformability	Strongly identity-based original function; prevailing archaeological or symbolic value; very limited potential for new uses	Interpretation, visitation, research, contemplation	Archaeological sites, monumental ruins
DoF 2	Selective functional transformability	Strong symbolic identity; possibility of new uses only if culturally congruent; ordinary or invasive commercial uses excluded	Mainly cultural and social functions	Ruined churches, monumental civic buildings
DoF 3	High functional transformability	Typological identity more neutral; available and reconfigurable spatial volume; wide spectrum of adaptive reuse options	Diversified new uses	Factories, warehouses, barracks, customs houses, disused infrastructures

Table 4. Design strategies (SP) in relation to the Degree of Transformability (DoT).

edA
Esempi di Architettura
ISSN 2035-7982
EdA on.line is member DOAJ
DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

The DoF is assigned by evaluating several factors such as the typology's symbolic and identity-building weight, explicit or implicit protection constraints, spatial neutrality of the residual land, ethical and cultural compatibility of new uses.
The introduction of the DoF allows us to distinguish between material transformability and use-related transformability. Not all ruins that can be transformed can be repurposed in the same way. Archaeological sites, churches, and industrial buildings exhibit very different levels of functional availability, depending on the typological nature and symbolic weight of the artifact.

Layer 4. Final Check
The final Check represents the final stage of the method and aims to assess the overall consistency between the state of the ruin, the permissible transformability, and the proposed project. It does not produce a binary judgment, but rather identifies different levels of consistency, recognizing the complexity of the architectural project and the possibility of intermediate conditions that require targeted recalibration.
The coherence of the project is not assessed through numerical or categorical evaluation, but through a critical reading of the relationship between the ruin and the intervention.
Attention is given to whether the project reconstructs what is lost, alters the perceptual hierarchy, or introduces forms of imitation, as opposed to establishing a legible and autonomous dialogue with the existing fabric.

Application to Italian Case Studies
The case studies are not intended to validate the framework in a definitive or generalizable way, but to explore its interpretative potential in different design conditions. They are unpublished projects curated by the authors and were chosen according to criteria of controlled heterogeneity, with the aim of exploring different ruin conditions and different modes of contemporary intervention. The selection favoured two structures with non-homogeneous architectural typologies (archaeological, religious), diverse design outcomes in terms of strategies and languages, and clear design and critical documentation that allowed for in-depth analysis. The two case studies present different design strategies: interpretation and iconic coverage in the first case, and an interpretative device within the space of the ruin in the second.

Case Study 1: Roman Baths of Acconia di Curinga (CZ)
The Roman Baths of Acconia di Curinga present a condition of advanced ruination, characterized by the complete loss of roofing systems, the fragmentation of vertical structures, and the interruption of spatial and volumetric continuity (Fig. 1). Although some parts of the original layout – such as the *frigidarium*, *tepidarium*, and *calidarium* – remain partially legible, the architectural unity of the complex is largely lost, and its value is predominantly archaeological and documentary.

Fig. 1. Current state of the Roman Baths of Acconia di Curinga.

edA
Esempi di Architettura
ISSN 2035-7982
EdA on.line is member DOAJ
DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

This condition suggests a low degree of design transformability, oriented toward an interpretative approach. Within this scope, admissible interventions are limited to reversible and autonomous devices aimed at protection, accessibility, and legibility, excluding any form of reconstruction or volumetric completion.
The project responds through the introduction of a lightweight and structurally independent roof, combined with pathways and elements designed to support visitation and interpretation. Rather than reconstructing the original architectural organism, the intervention frames the ruin as an archaeological landscape, enhancing its readability and supporting its transformation into a narrative device (Fig. 2).
The relationship between the new and the existing is based on principles of reversibility, structural autonomy, and temporal distinction. However, the intervention introduces a significant degree of formal autonomy: the roof, characterized by a strong iconic and tree-like configuration, assumes a visually dominant role within the site.
While this choice reinforces the recognizability of the contemporary addition and avoids mimetic reconstruction, it also generates a tension with the intended mediating role of the project. The scale and continuity of the new element partially alter the perceptual hierarchy between ruin and intervention, shifting the balance toward a form of monumental abstraction.
The case highlights how, even within a condition of low transformability, the relationship between protection, interpretation, and formal expression remains open and requires careful calibration. Rather than providing a definitive assessment, it illustrates the potential of the framework to make explicit both coherence and critical tensions in the design of interventions on archaeological ruins.
The following table summarizes the interpretation of the case study through the different layers of the proposed framework (Table 5).

Layer	**Interpretation**
Degree of Ruderization (DoR)	Advanced ruin with high material loss and loss of architectural unity
Degree of Design Transformability (DoT)	Low transformability, oriented toward interpretative and non-reconstructive interventions
Degree of Functional Transformability (DoF)	Limited to cultural, educational, and museal functions
Design approach	Autonomous and reversible intervention focused on protection and accessibility
Critical interpretation	General coherence with the interpretative scope, with a tension related to the formal dominance of the roof

Table 5. Synthetic interpretation of the case study through the DoR–DoT–DoF framework.

The intervention can be interpreted through a set of relational parameters that clarify its interaction with the ruin. In terms of scale and proportion, the roof assumes a dominant role within the site, introducing a continuous surface that contrasts with the fragmentary condition of the archaeological remains. The architectural language is strongly characterized by an iconic, tree-like form, which results in an ambiguous relationship with the existing fabric: while it avoids mimicry, it asserts a high degree of formal autonomy (Fig. 3, 4).
At the same time, the use of contemporary, non-imitative materials, together with the structural independence of the new elements, supports a coherent distinction between old and new. The intervention is also technically reversible, and its temporal legibility is clear, allowing the different layers to remain perceptually distinguishable.
From a broader interpretative perspective, the project does not aim to reconstruct the lost architecture nor to reproduce its historical image. Instead, it introduces a new autonomous figure that redefines the spatial and

Esempi di Architettura

ISSN 2035-7982

EdA on.line is member DOAJ

perceptual organization of the site. This choice reinforces the non-reconstructive approach but also contributes to the visual dominance of the intervention, shaping a relationship with the ruin that is both legible and, at times, tensioned.

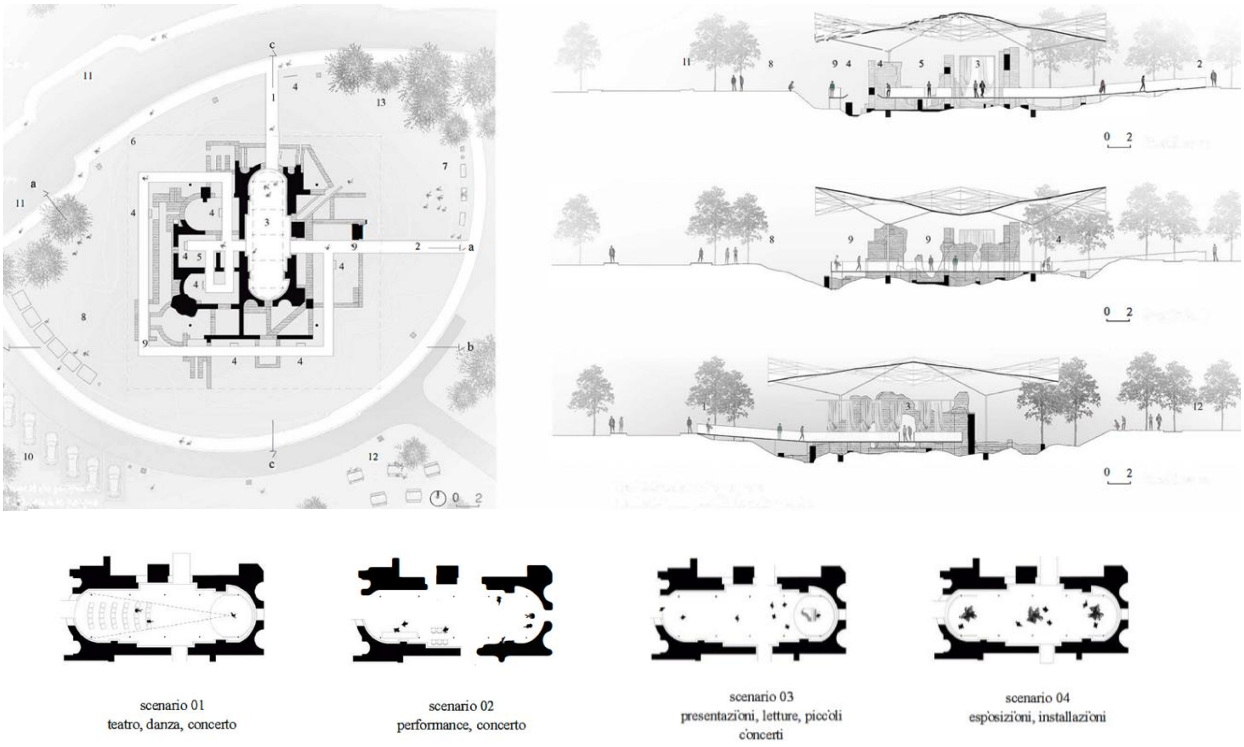

Fig. 2. Project plan and sections. Spatial flexibility.

Fig. 3. Project rendering; graphic elaboration by M. I. Arabia following the authors' indications.

edA
Esempi di Architettura
ISSN 2035-7982
EdA on.line is member DOAJ
DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

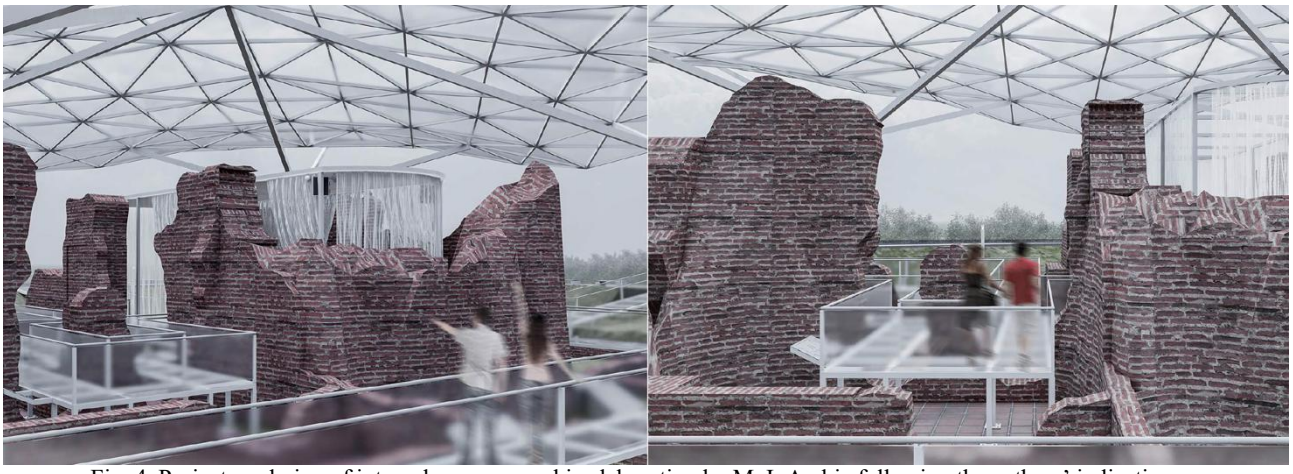

Fig. 4. Project rendering of internal spaces; graphic elaboration by M. I. Arabia following the authors' indications.

Case Study 2: Ruined Church of Grottole (MT)

The ruined church of Grottole presents a condition of highly advanced architectural decay, characterized by the complete loss of roofing systems, the partial collapse of vertical structures, and the disappearance of the bell tower. While some elements of the original spatial configuration, such as the nave and portions of the transept, remain partially legible, the overall architectural unity is compromised, and the building survives primarily as a fragmentary and symbolic presence within the landscape (Fig. 5).

Fig. 5. Current state of the Ruined Church of Grottole.

This condition suggests a low degree of design transformability, oriented toward an interpretative approach. Within this scope, admissible interventions are limited to rspeeversible and autonomous devices capable of supporting new uses without reconstructing or completing the lost architectural organism.

The "Agorà" project responds by introducing a system of lightweight and independent elements, including suspended walkways, stairs, mobile stages, and a retractable textile roof. These devices enable the transformation of the ruin into a cultural and community space, while maintaining the legibility of the existing structure. The intervention does not attempt to restore the original image of the church but rather activates the ruin through temporary and adaptable spatial configurations.

edA
Esempi di Architettura
ISSN 2035-7982
EdA on.line is member DOAJ
DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

The relationship between new and existing is articulated through principles of structural autonomy, reversibility, and clear temporal distinction. The contemporary language of the intervention, expressed through metal elements and a textile covering, avoids mimicry and establishes a readable contrast with the historic fabric. The new elements generally respect the spatial boundaries of the ruin and interact with it without erasing its presence (Fig. 6).
At the same time, the introduction of new functional layers and spatial devices inevitably modifies the perception of the ruin, partially redefining its role from a static fragment to an active architectural setting. While this transformation enhances accessibility and use, it also introduces a degree of tension between the preservation of the ruin's symbolic identity and its adaptation to contemporary collective functions.
The case illustrates how, even within a condition of limited transformability, the integration of reversible and lightweight interventions can support new uses while maintaining a coherent relationship with the existing structure. At the same time, it highlights the need to carefully balance activation and preservation, particularly in contexts where the symbolic and spatial identity of the ruin remains strongly connoted (Table 6).

Layer	**Interpretation**
Degree of Ruderization (DoR)	Highly advanced architectural ruin with loss of structural integrity and partial legibility of spatial configuration
Degree of Design Transformability (DoT)	Low transformability, oriented toward interpretative and non-reconstructive interventions
Degree of Functional Transformability (DoF)	Selective transformability, compatible with cultural and community uses that preserve symbolic identity
Design approach	Lightweight, reversible, and autonomous intervention enabling temporary and adaptable use within the ruin
Critical interpretation	Coherent with the interpretative scope, though introducing a tension between activation of the space and preservation of its symbolic and spatial identity

Table 6. Synthetic interpretation of the case study through the DoR–DoT–DoF framework.

The intervention can be interpreted through a set of relational parameters that clarify its interaction with the existing structure. In terms of scale, the new elements generally respect the original perimeter of the church, maintaining a coherent relationship with its spatial boundaries. The proportions are defined by a contrast between lightweight contemporary insertions and the massive historic masonry, resulting in a balanced yet clearly differentiated composition.
The material strategy, based on metal structures and a retractable textile roof, avoids mimicry and reinforces the contemporary character of the intervention. This is further emphasized by an explicitly modern architectural language, which remains legible in its distinction from the historic fabric. The new structure is fully autonomous from the ruin and composed of demountable elements, ensuring a high degree of reversibility. At the same time, the clear distinction between old and new guarantees strong temporal legibility (Fig. 7).
From a broader interpretative perspective, the project does not attempt to reconstruct the original image of the church or to complete its missing volumes. Instead, it introduces a set of independent spatial devices that activate the ruin without relying structurally on it. While the new elements occasionally assume a perceptible presence within the space, they do not replace or erase the existing structure. On the contrary, the intervention enhances the readability of the ruin, supporting its reinterpretation as a contemporary cultural setting, while maintaining a delicate balance between activation and preservation (Fig. 8).

edA
Esempi di Architettura
ISSN 2035-7982
EdA on.line is member DOAJ
DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

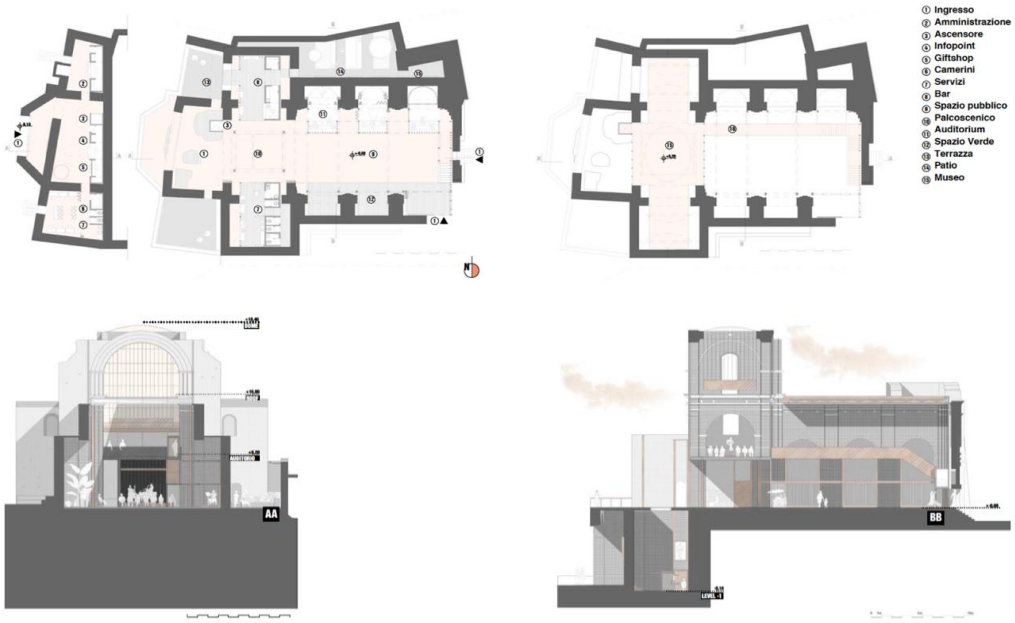

Fig. 6. Project plan and sections; graphic elaboration by J. Theiler following the authors' indications.

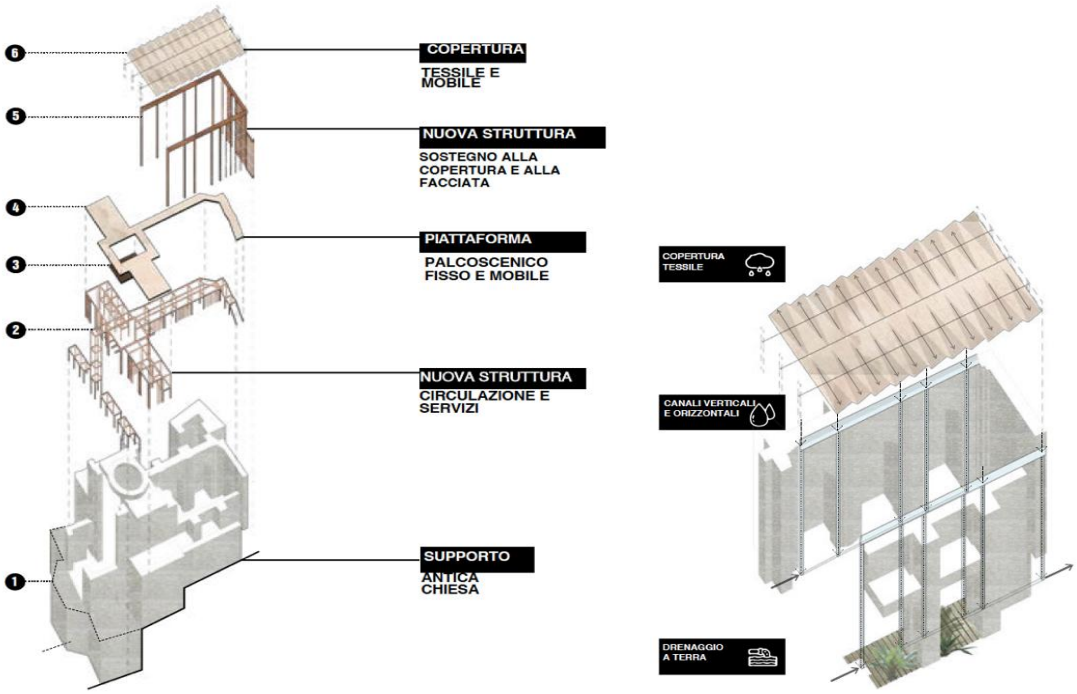

Fig. 7. Construction system with indication of the new grafts and textile covering; graphic elaboration by J. Theiler following the authors' indications

edA
Esempi di Architettura
ISSN 2035-7982
EdA on.line is member DOAJ
DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

Fig. 8. Project rendering of internal spaces; gaphic elaboration by J. Theiler.

Discussion

The two case studies explore different intervention modalities in the presence of advanced ruin conditions, highlighting how similar material states can generate distinct design responses. Rather than representing alternative applications of a predefined method, they illustrate how the relationship between ruin and project can be interpreted through different balances between protection, enhancement, and formal expression.

In both cases, the ruin is assumed as an invariable reference, and the interventions avoid reconstruction or completion. However, the nature of this relationship differs significantly. In the Roman Baths of Acconia di Curinga, the project introduces a strongly characterized architectural element that protects and organizes the site but also assumes a visually dominant role. This generates a tension between the intervention's intended mediating function and its formal autonomy, highlighting the difficulty of calibrating iconic expression in a condition of limited transformability.

In the ruined church of Grottole, the intervention adopts a more diffuse and internal strategy, based on lightweight and reversible elements that enhance the space without redefining its overall image. Here, the relationship between the new and the existing is articulated through contrast and coexistence, rather than through a single dominant gesture. While this approach improves accessibility and usability, it also introduces a different form of tension, linked to the balance between activating and preserving the ruins' symbolic and spatial identity.

The comparison does not aim to establish a hierarchy between the projects, but rather to highlight how different design approaches operate within similar constraints. In both cases, the framework helps clarify the thresholds within which intervention remains culturally permissible, as well as the points at which design choices begin to challenge or reinterpret these limits. The concept of coherence thus emerges not as a binary condition, but as a gradient, within which architecture negotiates continuity, autonomy, and transformation.

edA
Esempi di Architettura
ISSN 2035-7982
EdA on.line is member DOAJ
DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

A further distinction emerges in relation to functional transformability. The Roman Baths, as an archaeological site, allow only limited forms of use, primarily related to interpretation, protection, and controlled access. In contrast, the ruined church of Grottole, while remaining strongly defined by its symbolic and spatial identity, allows for a broader range of cultural and community uses. This comparison highlights how material condition alone does not determine the potential for reuse: functional compatibility depends equally on typology, symbolic value, and spatial configuration.
Taken together, the cases suggest that the proposed conceptual framework functions not as a prescriptive system, but as a tool for structuring interpretation and supporting design reasoning. It allows for the relationship between ruin and intervention to be articulated more explicitly, making both areas of coherence and zones of tension visible.
Future developments could include extending the application of the conceptual framework to a broader range of contexts, including non-monumental ruins, dispersed landscapes, and partially abandoned settlements, to further explore its adaptability. Furthermore, the relationship between transformability and broader issues such as sustainability, accessibility, and long-term management could be explored, broadening the conceptual framework towards a more integrated understanding of contemporary interventions in cultural heritage contexts.

Conclusions

This research has introduced the Degree-based Transformability Framework (DoR–DoT–DoF) as an interpretative tool for addressing contemporary interventions on ruined buildings and sites within the field of Heritage Science (Camocini, Nosova, 2017). By distinguishing between the material condition of the ruin and the scope of its possible transformations, the framework allows for a clearer articulation of the relationship between analysis and design. In doing so, it avoids both the reduction of the ruin to a purely technical problem and its idealization as an untouchable object.
Rather than functioning as a prescriptive system, the framework defines a horizon of cultural admissibility within which contemporary interventions can be critically positioned. It does not determine design solutions but supports the interpretation of how the new may relate to the existing, balancing expressive autonomy with responsibility toward the pre-existing fabric.
The application to the case studies highlights how similar conditions of ruination can give rise to different design approaches, each characterized by specific balances between protection, activation, and formal expression. In this sense, the framework does not produce binary assessments, but helps to make visible gradients of coherence and, above all, the tensions that emerge when design choices approach the limits of admissibility.
These results suggest that the value of the framework lies not in its capacity to verify or validate interventions, but in its ability to structure critical reflection and support design reasoning. By making explicit the relationships between ruin, transformation, and use, it offers a shared interpretative ground for engaging with the complexity of contemporary interventions in heritage contexts.
Further developments may extend the application of the framework to a broader range of conditions and scales, as well as explore its integration with issues such as sustainability, accessibility, and long-term management. In this perspective, the framework should be understood not as a closed system, but as an open structure, capable of evolving through its use in both research and design practice.

edA
Esempi di Architettura
ISSN 2035-7982
EdA on.line is member DOAJ
DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

References

Linazasoro, J.I. 2010. "Ruins". In: Ugolini A (ed) *Ricomporre la rovina*. Firenze: Alinea.
Simmel, G. 1911. "Die Ruine". In: *Philosophische Kultur. Gesammelte Essays*. Leipzig: Klinkhardt. Italian translation by G. Carchia 1981. *Rivista di Estetica* 8:122.
Fidone, E. 2010. "Frammenti. Il progetto e la potenza rinnovatrice delle rovine". In: Ugolini A (ed) *Ricomporre la rovina*. Firenze: Alinea.
Marino, L. 2013. Aree archeologiche e monumenti allo stato di rudere: l'abbandono come procedura abituale. *Restauro Archeologico* 3.
Hill, J. 2019. *The Architecture of Ruins: Designs on the Past, Present and Future*. London–New York: Routledge.
Desilvey, C. 2017. *Curated Decay: Heritage Beyond Saving*. Minneapolis: University of Minnesota Press.
Zhang, Q., Ali, Z.M., Abidin, N.Z. 2025. Sustainable adaptive reuse of historic buildings: development of a framework from systematic review. *npj Heritage Science* 13:619. https://doi.org/10.1038/s40494-025-02155-2
Guidetti, E., Robiglio, M. 2021. The Transformative Potential of Ruins: A Tool for a Nonlinear Design Perspective in Adaptive Reuse. *Sustainability* 13:5660. https://doi.org/10.3390/su13105660
Kahvecioğlu, B., Arslan Selçuk, S. 2023. Adaptive Reuse in the Realm of Architecture: Global Research Trends and Gaps for the Future Studies. *Sustainability* 15:9971. https://doi.org/10.3390/su15139971
Alasmar, R., Anaç, M., Bakan, M.K. 2024. Evaluating the Effect of Adaptive Reuse in the Energy Performance of Historic Buildings: A Case Study from Türkiye. *Heritage* 7:6085–6100. https://doi.org/10.3390/heritage7110285
Vafaie, F., Remøy, H., Gruis, V. 2023. Adaptive reuse of heritage buildings; a systematic literature review of success factors. *Habitat International* 142. https://doi.org/10.1016/j.habitatint.2023.102926
Mısırlısoy, D., Günçe, K. 2016. Adaptive reuse strategies for heritage buildings: A holistic approach. *Sustainable Cities and Society* 26:91–98. https://doi.org/10.1016/j.scs.2016.05.017
Cucco, P., Maselli, G., Nesticò, A., Ribera, F. 2023. An evaluation model for adaptive reuse of cultural heritage in accordance with 2030 SDGs and European Quality Principles. *Journal of Cultural Heritage* 59:202–216. https://doi.org/10.1016/j.culher.2022.12.002
Franceschi, S., Germani, L. 2005. *Manuale operativo per il restauro architettonico: metodologie di intervento per il restauro e la conservazione del patrimonio storico*. Roma: Tipografia del Genio Civile.
Ribera, F., Cucco, P. 2019. *La storia che (r)esiste*. Milano: FrancoAngeli.
Ribera, F., Cucco, P. 2020. Reinvigorating life of Southern Italy fortified architecture in ruin: From knowledge to conservation. *Athens Journal of Architecture* 6(4):319–334.
Marino, L. (ed) 2002. *Restauro dei manufatti architettonici allo stato di rudere*. Firenze: Alinea.
Camocini, B., Nosova, O. 2017. A second life for contemporary ruins. Temporary adaptive reuse strategies of interior design to reinterpret vacant spaces. *The Design Journal* 20(sup1):S1558–S1565. https://doi.org/10.1080/14606925.2017.1352680

Contributions

P.C. and F.R. conceived the main manuscript text. P.C. developed the theory and performed the application. P.C. and F.R. verified the methods. P.C. investigated the application to the case study and F.R. supervised the findings of this work. All authors discussed the results and contributed to the final manuscript. P.C. took the lead in writing the manuscript.