

Adaptive Reuse Models for the Regeneration of Small Towns in Inner Areas: a Systematic Review Following the PRISMA Protocol

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Abstract

This paper outlines the first phase of a systematic research project aimed at investigating adaptive reuse models for disused built heritage in small towns located in marginalised areas. The primary objective is to analyse strategies implemented between 2000 and 2025 in order to understand urban and territorial regeneration processes in contexts characterised by socio-economic marginalisation and demographic decline. Starting with a research question formulated according to the PICO framework, the investigation focuses on identifying theoretical-operational models of adaptive reuse. These include design approaches, intervention methods, and strategic frameworks, as well as their application contexts and intended functional purposes, such as cultural, residential, social, productive, tourist or mixed use. The adopted methodology is based on the PRISMA protocol for the systematic review of scientific literature, using a selection process with rigorously defined inclusion and exclusion criteria. The bibliographic search was conducted exclusively within the Scopus database, which was chosen for the breadth and reliability of its indexed scientific sources and for its advanced search filtering capabilities. This investigation identified a significant number of theoretical and operational models of adaptive reuse, applied in small towns located in inner areas, and analysed their distribution in relation to geographical, functional, and strategic contexts. The results provide an overview of adaptive reuse models applied in small towns, highlighting operational trends, evolutionary trajectories, knowledge gaps and potentialities. Furthermore, the analysis allows for a preliminary functional classification of the models, providing the basis for the next research phase (Phase B). The aim of this phase is to evaluate the effectiveness and sustainability of the identified approaches in a comparative manner, paying particular attention to their social, environmental, and economic impacts on the reference territories.

Keywords: Inland Areas Regeneration, Small Towns, Prisma Protocol

Introduction

In recent decades, territorial transformations and socio-economic changes affecting small towns in inland areas have highlighted the urgent need to redefine strategies for managing, enhancing and reusing disused built heritage.

This need has intensified alongside phenomena such as depopulation, ageing populations,

and the weakening of essential services in many small settlements, which are often located in marginalised territories (Barca 2009; Dematteis 2010). The adaptive reuse of disused buildings has emerged as a design practice that is not only environmentally sustainable and conducive to the conservation of built heritage, but also a strategic lever for urban and territorial regeneration. It is capable of activating processes of community resilience and sustainable local development. In recent years, adaptive reuse has gained recognition in the international scientific community, with numerous studies exploring its potential in the fields of the circular economy (Bullen & Love 2011; Plevoets & Van Cleempoel 2019), cultural heritage conservation (Pendlebury et al., 2009) and integrated urban regeneration policies (Veldpaus 2015). However, most existing literature focuses on metropolitan contexts or buildings of monumental significance, overlooking the specificities and critical issues of smaller contexts. Intervention strategies in these contexts require methodological adaptations and approaches that are more sensitive to local dynamics. In light of these considerations, this paper proposes a systematic review of literature on models and strategies of adaptive reuse in small towns in inland areas between 2000 and 2025. The investigation is structured according to the PICO model (Liberati et al. 2009) and follows the PRISMA protocol (Page et al. 2021) to ensure methodological rigour in selecting, analysing and synthesising of the literature. Numerous contributions have been identified and analysed through the interrogation of major international scientific databases, and subsequently classified according to parameters such as geographical location, functional use, involved actors, and design objectives. This initial phase of the study represents the first part of a much broader research project and aims to produce a critical and functional mapping of adaptive reuse models and strategies adopted internationally to date. This mapping will outline recurring trends, knowledge gaps and emerging potentials. The analysis will provide a solid foundation for subsequent research phases with the objective of contributing to the definition of a shared methodological framework for adaptive reuse in marginalised contexts. This reconnaissance phase is therefore a crucial step towards developing an integrated adaptive reuse model capable of reconciling conservation requirements with design innovation as well as local needs, and sustainability objectives in line with European territorial development agendas.

Objectives

The primary objective of this study is to develop a systematic, comparative framework of adaptive reuse models for disused built heritage in small, inland towns. This overarching goal is pursued through a set of secondary knowledge-based and methodological objectives, which are articulated as follows:

1. Critically reconstructing the state of the art on adaptive reuse, with a focus on the main models developed between 2000 and 2025. This will involve highlighting their conceptual evolution, prevailing interpretative frameworks and connections with territorial regeneration policies;
2. Identifying and classifying adaptive reuse models within the international scientific literature according to geographical, typological, functional and methodological criteria. This will enable the creation of a thematic and comparative mapping of existing models;
3. Analyse the intervention strategies associated with different models, paying particular attention to their capacity to generate integrated regeneration effects in contexts

characterised by socio-economic marginality, depopulation and infrastructural fragility;

4. Applying the PRISMA protocol for the systematic review of literature and the PICO model for defining the research question to ensure methodological rigour, transparency in the source selection process and replicability of results;

Developing an interpretative classification of the identified models to establish an initial systematisation of adaptive reuse approaches in small towns and provide a foundation for the subsequent development of evaluative and comparative tools.

Methodology

This study adopts a methodology based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol, which is recognised internationally as a standard methodological framework for conducting systematic reviews (Page et al. 2021). The objective is to ensure rigour, transparency and replicability throughout the phases of literature searching, selection, analysis and synthesis. This approach allows for the systematic identification, evaluation and organisation of scientific contributions related to the adaptive reuse of disused built heritage in small towns located in inland areas, thereby reducing the risk of interpretative bias and ensuring a comparative understanding of existing evidence. In accordance with PRISMA guidelines, the study was structured into four main phases:

1. Identification: retrieval of documents from the Scopus database.
2. Screening: preliminary selection of results based on inclusion and exclusion criteria;
3. Eligibility: verification of the thematic and methodological consistency of the selected studies.
4. Inclusion: construction of the final sample of models to be analysed.

This process was supported by a structured approach based on the PICO framework (Population, Intervention, Comparison, Outcome) (Liberati et al., 2009). This enabled the research question to be defined systematically and reproducibly:

- (a) Population (P): small towns located in inland or marginal areas characterised by depopulation and socio-economic fragility.
 - (b) Intervention (I): strategies, methods and models for the adaptive reuse of disused built heritage;
 - (c) Comparison (C): comparison of different theoretical and operational approaches adopted at European and international scales;
 - (d) Outcome (O): identification of effective and sustainable models of territorial regeneration, evaluated in terms of socio-economic, environmental and cultural outcomes.
- The search string was constructed using the main Boolean logical operators (“AND”, “OR” and “EXCLUDE”) to allow the systematic combination of terms and conceptual groups in line with the PICO logic. In particular:

- The OR operator was used to expand the semantic scope of each conceptual group by including synonyms and linguistic variations of key terms. For example, the concept of adaptive reuse was represented by terms such as “adaptive reuse”, “riuso adattivo”, and “reuse”, while the territorial context included terms such as “inland areas”, “rural areas”, “small towns”, “villages”, “aree interne”, “centri minori”, and “borghi”. This procedure enabled the inclusion of publications across multiple languages and disciplinary domains.
- The AND operator was used to combine different sets of terms, ensuring that the retrieved documents contained all of the core concepts of the research question: adaptive

reuse, models and inland-area or small-town contexts.

- The EXCLUDE operator was applied in a subsequent phase to refine and filter the results by excluding contributions irrelevant to the adaptive reuse of built heritage. Specifically, articles containing keywords related to water management or agricultural processes (e.g. water management, wastewater treatment, agriculture) were excluded as these refer to the reuse of resources or agricultural production systems that are not aligned with the architectural and territorial focus of the study.

At the disciplinary level, the results were limited to the most relevant fields for the analysis of adaptive reuse models: Engineering (ENGI), Social Sciences (SOCI), Computer Science (COMP), Energy (ENER), Business, Management and Accounting (BUSI), Economics, Econometrics and Finance (ECON), Decision Sciences (DECI), Materials Science (MATE) and Multidisciplinary Studies (MULT). This restriction was applied to avoid data dispersion and ensure epistemological coherence of the sample. The temporal inclusion criteria considered publications between 2000 and 2025, as this period was deemed methodologically significant for capturing the recent evolution of adaptive reuse models and their progressive alignment with sustainability paradigms, as well as urban and territorial regeneration agendas.

The inclusion criteria were defined as follows:

- Publications between 2000 and 2025 to ensure a temporal framework consistent with the most recent territorial transformations.
- Contributions in all languages.
- Peer-reviewed studies;
- Geographical context: marginalised inland areas.
- Building typology: disused buildings located in small towns or rural areas.
- Methodological approach consistent with the objectives of adaptive reuse.

The exclusion criteria were defined as follows:

- Publication date prior to 2000.
- Type of publication: editorials, letters, incomplete abstracts and non-peer-reviewed contributions.
- Geographical context: large urban centres.
- Building typology: non-disused buildings or new constructions.

The methodology, which is based on a structured system for querying and filtering bibliographic data, enabled the identification of the main scientific and operational trends in the regeneration of disused built heritage. It also highlighted thematic gaps and emerging research directions, representing rich ground for future research developments.

Results

Processing data extracted from the Scopus database made it possible to create an analytical framework of scientific publications on the adaptive reuse of disused built heritage in small towns in rural or inland areas between 2000 and 2025. Structured according to the PRISMA protocol and the PICO model, the investigation enabled the identification of evolutionary trends, thematic concentrations and methodological specificities that characterise the research field under examination. The temporal distribution of publications highlights a growing and widespread academic and institutional interest in adaptive reuse.

Following a period of slow growth in the early 2000s, a significant increase occurred between

2012 and 2015, coinciding with the establishment of urban sustainability paradigms and the theoretical development of adaptive reuse in the global debate (Bullen & Love, 2011). A second, more significant surge in interest emerges from 2018 onwards, reaching its peak between 2022 and 2024. This period coincides with the dissemination of European policy frameworks, such as the New European Bauhaus, and funding programmes, including Horizon Europe, the National Recovery and Resilience Plan and Interreg. These initiatives have strongly encouraged research into regeneration processes, circular economy models and territorial resilience. The chronological evolution of publications therefore reflects a shift from sporadic interest to a systematic approach, in which adaptive reuse emerges as a practical solution to demographic, environmental, and social issues in marginalised areas. Figure 1 illustrates the geographical distribution of scientific publications on adaptive reuse models. Italy stands out as the leading research hub with over 30 publications, followed by China with around 28, the United States with approximately 13, and India with around 9. The high number of Italian contributions reflects the country's specific context, characterised by a widespread network of small historic settlements and exceptional cultural heritage, which is often affected by abandonment or underutilisation. China, ranking second in terms of publications, provides an interesting methodological comparison: while European studies emphasise a strong cultural, community-oriented and heritage-based dimension, eastern research tends to focus on integrated models of urban and technological regeneration (Yung & Chan, 2012). Although the United States and India contribute fewer studies, they stand out for their focus on the socio-economic dimension of adaptive reuse, particularly the effects of social inclusion and community cohesion generated by regeneration practices in rural and peripheral contexts.

From a disciplinary perspective, Figure 2 illustrates the significant diversity of the scientific fields involved. Engineering (20.1%) and the Social Sciences (18.2%) are the most prevalent domains, followed by Environmental Sciences (13.5%), Computer Science (11.6%), and Energy (9.4%). This distribution confirms the multidisciplinary and cross-cutting nature of adaptive reuse, extending beyond purely architectural or technical dimensions to include territorial planning, economic analysis, environmental sustainability and digital innovation. Although more limited, the presence of Humanities (5%) and Decision Sciences (2.5%) reveals a growing interest in the valorisation of local knowledge, participatory processes, and community-based practices. This is in line with the integrated approach promoted by the 2011 UNESCO Historic Urban Landscape.

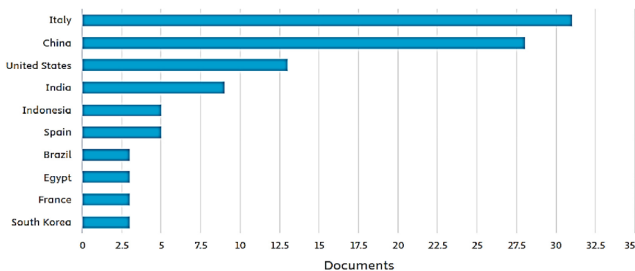


Fig. 1. Geographical distribution of publications by country. Data source: Scopus® database, Elsevier, extracted by the authors in 2025

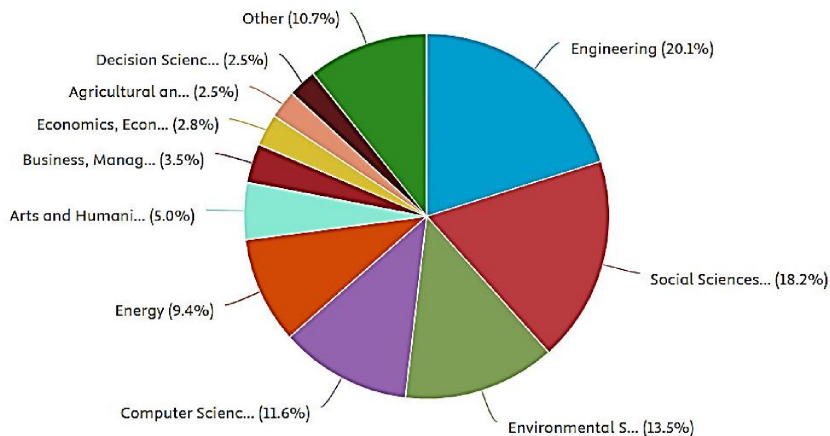


Fig. 2. Disciplinary distribution of publications by scientific area. Data source: Scopus®, Elsevier, extracted by the authors in 2025

Disused built heritage is no longer viewed as merely physical objects, but as strategic resources capable of generating new social meanings and models of endogenous development. Scientific articles represent the largest proportion of publications (54.3%), followed by conference proceedings (22.9%) and book chapters (10%). Reviews and monographs remain marginal. The predominance of journal articles confirms the empirical nature of research in this field, which is largely based on case study analysis and the development of methodological frameworks rather than purely theoretical reflection.

The significant presence of conference proceedings, which are often linked to academic networks and university laboratories, also suggests a significant collaborative and experimental aspect to the field. Here, interdisciplinary exchange and the sharing of local practices are pivotal in advancing knowledge. Overall, the review's results reveal a research field that is evolving rapidly, characterised by a high degree of conceptual density and progressive convergence between technical, social and cultural disciplines..

Discussion

The results obtained allow for critical reflection on adaptive reuse models and their implications within inner-city contexts. Although they were developed within different disciplinary frameworks, established approaches such as ARP (Adaptive Reuse Potential), IconCUR (Integrated Conservation and Urban Regeneration), the Historic Urban Landscape (HUL) promoted by UNESCO (2011) and Cultural Heritage Counts for Europe (CHCFE, 2015) share a common objective: to integrate sustainability and conservation within a systemic vision of regeneration. The PRISMA-based analysis reveals a notable absence of studies focusing specifically on small towns, where the characteristics of adaptive reuse are unique and influence its replicability. These include limited financial resources, infrastructural fragility and strong dependence on local knowledge systems and community participation. The research therefore opens up a new field of methodological

experimentation in which systematic analysis is integrated with participatory and evaluative processes. From this perspective, adaptive reuse is conceived not merely as a conservation strategy, but as a territorial regeneration tool with the capacity to generate long-term environmental, economic and social impacts.

Conclusions

Conducted in accordance with the PRISMA protocol and supported by the PICO model's logical structure, this study has enabled the development of a systematic and up-to-date overview of the scientific literature on adaptive reuse models applied to disused built heritage in small, inland towns between 2000 and 2025. The findings demonstrate that the topic has progressively gained prominence within the international debate, evolving from fragmented, sector-specific approaches towards interdisciplinary, integrated perspectives that combine technical, social, environmental and economic dimensions. Quantitative and qualitative analyses reveal a significant expansion of literature since 2010, coinciding with the consolidation of European policies on sustainability, the circular economy and ecological transition. This growth is particularly evident in Italy, where the widespread presence of villages and small historic towns makes it a key laboratory for experimentation, with adaptive reuse operating as a strategic tool for territorial rebalancing and social cohesion. The predominance of contributions from Italy, China and the United States highlights the geographical and methodological diversity of approaches, reflecting differentiated regeneration models influenced by culture and institutions. From a disciplinary perspective, the distribution of contributions confirms the multidimensional nature of adaptive reuse, which is at the intersection of engineering, the social sciences, the environmental sciences, computer science, and urban planning. This convergence shows that enhancing disused heritage cannot be viewed merely as a construction or conservation practice, but as a complex process that generates innovation, resilience, and shared territorial value. At the same time, the composition of document types—dominated by scientific articles and conference proceedings—indicates a research field that is strongly oriented towards application and grounded in empirical analysis and methodological experimentation. From a methodological standpoint, applying the PRISMA protocol has proven particularly effective in ensuring transparency, replicability and scientific rigour when selecting and classifying sources. This reduces interpretative bias and provides a coherent representation of the state of the art. Adopting the PICO framework has also helped to clearly define the research focus (small towns in inland areas), the intervention (adaptive reuse models and strategies), the comparison (different theoretical approaches) and the outcomes (socio-economic, environmental and cultural impacts). The evidence gathered confirms that adaptive reuse is a key component in the regeneration of marginalised territories, capable of activating local innovation processes and the sustainable reuse of existing assets. This contribution therefore provides a basis for future research into developing predictive, evaluative and participatory tools to guide sustainable, inclusive and reversible adaptive reuse processes in fragile inland and rural areas.

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