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ADAPTIVE REUSE AND SPATIAL TRANSFORMATION IN ARCHITECTURE: A CHRONOLOGICAL REVIEW

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Abstract:

Adaptive reuse has emerged as an important strategy for extending the functional life of existing buildings while supporting heritage conservation and sustainable development. In vernacular architecture, however, adaptation frequently requires spatial and functional modifications that may alter original configurations, architectural character, cultural meanings, and relationships between traditional spaces. Despite growing scholarly attention, knowledge of how adaptive reuse and spatial transformation research has evolved remains fragmented across periods, building contexts, and methodological approaches. This study, therefore, critically reviews the chronological development of adaptive reuse and spatial transformation research from 2012 to 2026. A systematic advanced search was conducted in the Scopus database using combinations of "adaptive reuse," "building reuse," "repurposing," and "recycling" with "spatial transformation," "spatial change," "spatial adaptation," "spatial reconfiguration," and "spatial redevelopment." Following predefined inclusion and exclusion criteria, 41 primary journal articles were retained for chronological analysis. The literature was organised into three phases according to publication development and shifts in research emphasis: Phase 1, Emergence and Conceptual Foundation (2012–2017); Phase 2, Research Development and Diversification (2018–2022); and Phase 3, Acceleration and Research Consolidation (2023–2026). The findings demonstrate a substantial acceleration in publication activity, particularly during Phase 3, with annual publications increasing from six articles in 2024 to 12 in 2025 and 18 in 2026. Chronologically, the field progressed from broad and fragmented interpretations of spatial change toward increasingly architecture-focused investigations of

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functional adaptation, spatial reconfiguration, authenticity, cultural identity, sustainability, and heritage values. Recent studies further demonstrate increasing methodological sophistication through spatial assessment, digital technologies, computational methods, and multidimensional evaluation frameworks. Overall, the review reveals a transition from understanding adaptive reuse primarily as functional conversion toward evaluating the extent, appropriateness, and consequences of spatial transformation. This highlights the need for culturally responsive approaches capable of balancing contemporary requirements with the preservation of significant spatial and socio-cultural characteristics.

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Keyword:

Adaptive Reuse; Heritage Conservation; Spatial Adaptation; Spatial Transformation; Vernacular Architecture

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Introduction

Adaptive reuse and spatial transformation in vernacular architecture have become central concerns since traditional buildings are culturally dense, environmentally situated, and increasingly pressured by modernization, changing comfort standards, neglect, and demolition (Jiao et al., 2023; Pardo, 2023; J. Wang & Zakaria, 2025). Vernacular architecture is not simply old construction. Rather, it is a regional building tradition shaped by local materials, climate, craft, and community needs, and its long-term survival depends on understanding those relationships rather than preserving form alone (Pardo, 2023; J. Wang & Zakaria, 2025).Adaptive reuse offers a practical and increasingly favored way to conserve vernacular buildings by giving them new functions while extending their operational life, reducing demolition, and keeping them embedded in contemporary social and economic life(Büke, 2023; Pardo, 2023; J. Wang & Zakaria, 2025) . This shift is closely tied to sustainability, since reusing existing structures reduces resource consumption, construction waste, and carbon emissions compared with replacement, while also preserving embodied cultural value and urban continuity (Abu-Lail et al., 2025; Ordóñez-Castañón & Ferreira, 2024;Wang & Zakaria, 2025) . Recent scholarship thus treats adaptive reuse not as a marginal conservation tactic. Instead, it serves as a major architectural and research domain, with growing attention to its theoretical gaps, practical methods, and long-term policy implications(Kahvecioğlu & Selçuk, 2023; Pardo, 2023; Plevoets & Sowińska-Heim, 2018).

At the same time, the field rejects a simple opposition between preservation and change, arguing instead that sustainability in heritage settings often depends on transmission through transformation rather than the freezing of buildings in a single historical state(Kalakoski & Thorgrimsdottir, 2022). This perspective is especially crucial in vernacular architecture since adaptation is often intrinsic to the tradition itself. Concurrently, informal reuse, incremental

repair, and modification by non-expert users have long shaped vernacular environments, and community-led "vernacular adaptation" remains a meaningful alternative to purely top-down intervention (Pardo, 2023; Plevoets & Sowińska-Heim, 2018). Research on Ganlan stilt-house heritage in western Hubei reveals that free plans, open envelopes, frame systems, and topological flexibility allowed Tujia communities to respond to changing terrain and shifting functional requirements. This suggests that self-adaptability is itself a heritage value (T. Zhang et al., 2022). Comparable lessons emerge from case studies associated with the School of Porto, where architects reactivated obsolete rural buildings through strategies that balanced preservation with new spatial, aesthetic, and comfort requirements while retaining historical, social, and landscape value (Ordóñez-Castañón & Ferreira, 2024). In this view, authenticity does not reside only in unchanged fabric. It can also reside in the continued legibility of spatial logic, material intelligence, and the capacity of buildings to support changing forms of life (Kalakoski & Thorgrimsdottir, 2022; Liu & Li, 2021; T. Zhang et al., 2022). Despite this, spatial transformation is never only a technical matter of inserting new functions into old shells. Changes in layout, enclosure, access, land use, and public interface alter how memory, identity, and social relations are produced and experienced across houses, streets, and neighborhoods (Jiao et al., 2023; X. Zhang et al., 2025). Studies in Beijing indicate that even when historical neighborhoods undergo significant physical change, some invariant spatial characteristics continue to accommodate shifting local needs and therefore remain crucial to socio-cultural sustainability (Liu & Li, 2021). Studies on the process of revitalizing public space in communities also emphasize that material and symbolic spatial rejuvenation can help to evoke cultural memory, reinforce community identity, and promote proenvironmental behaviors in its linked process of memory reconstruction and identity reconstruction (Zhou & Chen, 2025). Comparative space-syntax work reinforces this point by asserting that different spatial configurations support different forms of continuity. That is, in some historic districts, legibility and integration favor tourism and cultural activation, whereas in others, more introverted structures help sustain crafts, local trade, and community resilience (Ibrahim et al., 2025). Correspondingly, spatial transformation in vernacular architecture is best understood as a negotiation between material form and cultural practice rather than a neutral design operation (Ibrahim et al., 2025; Xiang et al., 2025).

While the promise of adaptive reuse is real, the literature is equally clear regarding its risks. Reuse can revitalize abandoned heritage by converting buildings into museums, libraries, workshops, offices, homestays, or mixed cultural venues that reconnect them to everyday public life and diversify local economies (Abu-Lail et al., 2025; J. Wang & Zakaria, 2025; Yıldız & Kılıçaslan, 2025) . In Bawömataluo, for example, homestay programs appear as a means to generate income while keeping residents in traditional houses. Internal spatial analysis identifies underused private areas as more suitable for adaptation than heavily used communal zones (Atmanti & Uekita, 2023) .). In the Cendere Art Museum, preserved facade form and load-bearing systems maintained spatial memory, while wide spans and high ceilings enabled flexible exhibition use, although some new additions weakened aesthetic coherence (Yıldız & Kılıçaslan, 2025) The application of traditional practices, local knowledge and community-based re-use is also evidenced in the field of Ghoufi and can contribute to conservation and territorial development (Bourayou & Aichour, 2025). Nevertheless, when economic agendas dominate, adaptive reuse can produce socially thin and culturally distorted outcomes: tourism-led conversion in Cappadocia is associated with gentrification, detachment from local communities, and "Disneyfication." Similarly, studies in Macau find that functionally effective heritage transformations can still fail to convey Genius Loci or satisfy visitors' expectations for cultural depth (Büke, 2023; P. Wang et al., 2021).

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For this reason, current research increasingly argues that adaptive reuse in vernacular architecture requires multidimensional, participatory frameworks rather than either rigid preservation or market-led redevelopment alone. Proposed models evaluate historical significance, structural stability, functional performance, economic feasibility, emotional engagement, and community participation together (J. Wang & Zakaria, 2025; P. Wang et al., 2025; Yıldız & Kılıçaslan, 2025). Community knowledge is especially crucial as it reveals intangible values and lived spatial needs that expert systems often miss, helping bridge formal conservation practice and vernacular adaptation (Plevoets & Sowińska-Heim, 2018; X. Zhang et al., 2025). Studies conducted elsewhere in Saudi cities indicate that the modernization of urban areas is not necessarily at odds with heritage protection, as long as the vernacular principles are simultaneously re-infused in the functional and social context through policy and engagement processes (Alnaim & Alnaim, 2026) . Across these studies, the central lesson is consistent: vernacular buildings endure when transformation is carefully directed, culturally grounded, and spatially disciplined, ensuring that reuse sustains both the heritage fabric and the social worlds that make it meaningful.

Materials and Methods

Data Collection

Data collection is a fundamental component of a chronological review because the accuracy of identified research trends depends on the relevance, consistency, and quality of the literature examined. A systematic data collection process provides a reliable evidence base for tracing how knowledge, research priorities, and approaches have evolved over time while minimizing potential selection bias. The primary goal of this study is to explore the chronological development of research on adaptive reuse and spatial transformation from 2012 to 2026 and to understand how existing buildings have been spatially modified to accommodate new functions. Specifically, the review addresses two research questions:

(1) What types of adaptive reuse and spatial transformation were investigated worldwide between 2012 and 2026?
(2) How have approaches to spatial transformation in adaptive reuse evolved during this period?

These questions are important because adaptive reuse can significantly affect the original spatial organisation, circulation, hierarchy, function, and architectural character of existing buildings. As adaptive reuse has gained increasing attention in sustainable development and heritage conservation, examining its development across the 2012–2026 period provides insights into changing research perspectives and priorities. Therefore, systematic data collection using clearly defined Scopus search terms and eligibility criteria strengthens the reliability, validity, transparency, and reproducibility of the review and provides a robust foundation for interpreting chronological trends and identifying research gaps.

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Table 1: Search Strategy and Eligibility Criteria for Adaptive Reuse and Spatial Transformation Literature

Keyword	**Adaptive reuse, spatial transformation**
Inclusion	Article, Journal, English, adaptive reuse and spatial transformation
Exclusion	Besides adaptive reuse and spatial transformation, review article and other languages
Final Search String (Scopus)	TITLE-ABS-KEY (("adaptive reuse" OR "adaptive reuse*" OR "building reuse" OR "repurposing" OR "recycling") AND ("spatial transformation" OR "spatial change" OR "spatial adaptation" OR "spatial reconfiguration" OR "spatial redevelopment"))
Number of Primary Article	41

According to Table 1, The search strategy was designed to capture studies at the intersection of adaptive reuse and spatial transformation, as these concepts directly reflect the physical and functional changes that occur when existing buildings are converted for new uses. The final Scopus search string combined adaptive reuse-related terms, including "adaptive reuse," "building reuse," "repurposing," and "recycling," with spatial transformation-related terms, including "spatial change," "spatial adaptation," "spatial reconfiguration," and "spatial redevelopment." Alternative terminology was necessary since the literature does not employ a single standard term to describe building reuse or changes to spatial organisation. Limiting the search to the TITLE-ABS-KEY fields further strengthened the relevance of the dataset by ensuring the selected concepts formed a substantial component of each publication rather than appearing incidentally in the full text. Journal articles published in English were retained since peer-reviewed journal literature generally provides a more consistent scholarly basis for chronological analysis. At the same time, review articles and publications in other languages were excluded to avoid secondary interpretation of previously published evidence and to maintain consistency in the analysis.

After applying these criteria, 41 primary research articles formed the final dataset. Although this number may appear relatively limited, it is analytically meaningful as it reflects the specific intersection of adaptive reuse and spatial transformation, rather than the much broader literature on heritage conservation, building adaptation, or reuse in general. The dataset's size, therefore, indicates that spatial transformation remains a comparatively focused research strand within adaptive reuse scholarship. More importantly, the selected articles provide a suitable evidence base for tracing how research attention has evolved from earlier concerns with physical conversion and functional reuse toward more complex considerations of spatial reconfiguration, user requirements, heritage significance, and the consequences of adapting existing spatial arrangements. For a chronological review, this focused corpus is advantageous as it enables a coherent temporal narrative. It also allows critical examination of shifts in concepts, methods, building contexts, and research priorities, rather than merely reporting publication frequencies.

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Data Clustering

Clustering publication data into distinct chronological periods provides a systematic approach for interpreting the evolution of research on adaptive reuse and spatial transformation. This is mainly due to the fact that annual publication alone may not adequately reveal broader shifts in scholarly development. In a chronological review, grouping studies by publication year and volume enables periods of emergence, growth, diversification, and intensified research activity to be identified and compared within a coherent temporal framework. The literature examined in this study was retrieved from the Scopus database using predefined keywords and an advanced search strategy. This ensures that the selected publications were relevant to the intersection of adaptive reuse and spatial transformation. Rather than dividing the study period into arbitrary equal intervals, the chronological clustering was informed by observable variations in publication frequency and continuity over time. This approach is important since changes in publication volume can indicate shifts in scholarly attention, the expansion of research interests, and the progressive development of a research domain. Furthermore, clustering improves the interpretability of publication patterns by allowing each period to be examined in relation to its dominant themes, methodological approaches, building contexts, and emerging research concerns. Consequently, chronological clustering provides an analytical foundation for moving beyond a descriptive year-by-year account towards a more critical interpretation of how and when the research field evolved. This, in turn, supports the identification of major transitions, emerging directions, and potential gaps in the literature.

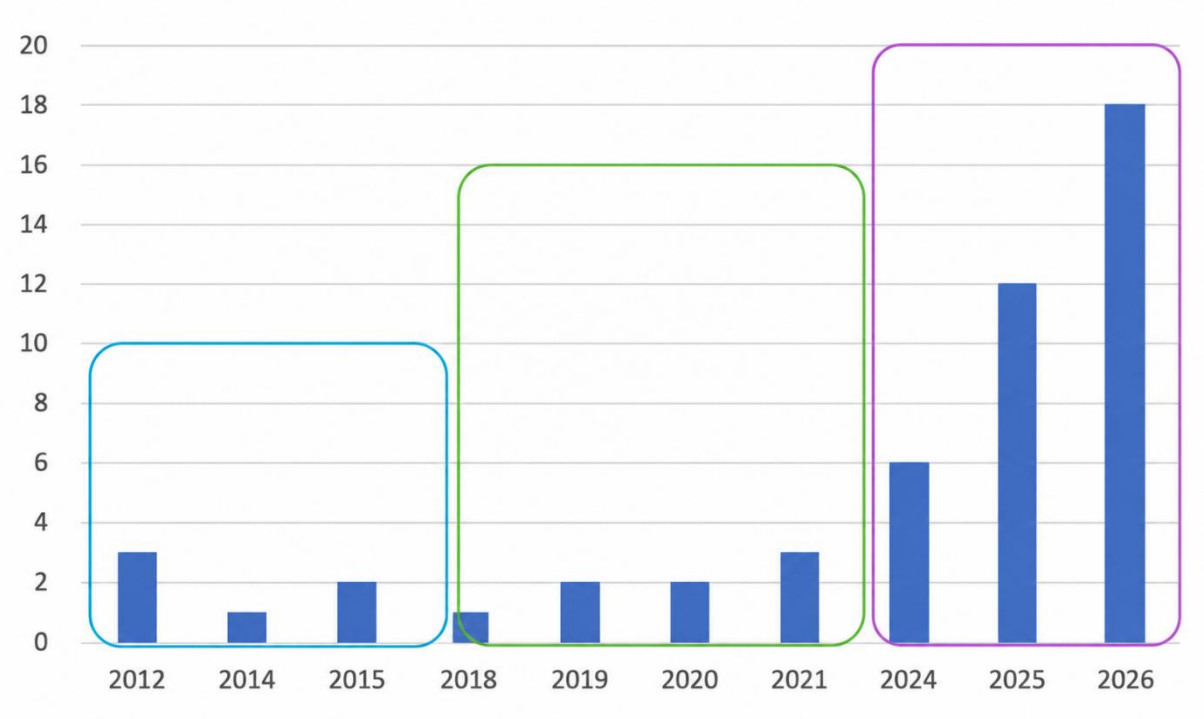


Figure 1 : Chronological Distribution of Publications on Adaptive Reuse and Spatial Transformation.

These 41 studies were not divided into equal time periods, but rather grouped by discernable changes in publication frequency, continuity and research focus. This process has defined three developmental stages: Phase 1 (2012-2017) – Emergence and Conceptual Foundation; Phase 2

(2018-2022) – Research Development and Diversification; Phase 3 (2023-2026) – Acceleration and Research Consolidation. Each of these phases can be used as a temporal point of view to analyze the changes in research priorities, research methods, building contexts and interpretations of spatial transformation throughout the study period.

Results and Discussion

Phase 1: Emergence and Conceptual Foundation (2012–2017)

The earliest part of Phase 1 indicates that the literature captured by the search strategy was still conceptually broad and not yet consistently centred on architectural adaptive reuse. Collectively, these early studies reveal that the retrieved terminology had a broad interdisciplinary meaning. More importantly for the chronological review, this pattern suggests that the conceptual vocabulary later associated with adaptive reuse and spatial transformation had not yet become clearly established as a distinct architectural research domain during the earlier years of the phase

A clearer transition appears in 2015. The study by Xie (2015) represented a more direct movement toward the subject of adaptive reuse. Using LX Factory in Lisbon as a case study, Xie (2015) interpreted industrial heritage transformation through a sequence of territorialization, deterritorialization, and reterritorialization. The findings indicated that post-industrial sites first become recognised as heritage resources, after which tourism and new economic activities introduce alternative meanings and uses. Reterritorialization subsequently occurs when the former industrial landscape is repurposed for creative industries, producing a new territorial identity. This study is particularly important within Phase 1 since spatial transformation is no longer treated merely as physical or environmental variation. Instead, it becomes connected to reuse, changing function, identity, tourism, and the reinterpretation of existing places. This shift provides an early conceptual basis for later adaptive-reuse research, in which spatial change is understood as both a material and socio-cultural process.

Overall, while Phase 1 can be interpreted as an emergence and conceptual-foundation period, the evidence also demonstrates the importance of careful relevance screening. Most records from 2012 to 2015 employ terminology such as spatial change, transformation, adaptation, or recycling in other contexts rather than architectural reuse. Consequently, publication frequency alone would overstate the early development of adaptive-reuse scholarship if all retrieved records were treated as conceptual equivalent. The more relevant turning point appears in Xie's (2015) contribution, where repurpose of industrial heritage is explicitly linked with socio-spatial change, tourism, creative-industry use, and the creation of a new territorial identity. This marks a significant conceptual shift from interpreting transformation as measurable physical variation to viewing it as a process in which existing places acquire new functions and meanings. At the same time, the limited number of directly relevant architectural studies in the supplied Phase 1 material suggests that adaptive reuse and spatial transformation had not yet matured into a strongly defined research field during this period. Rather, the phase established several conceptual ideas that later became central: transformation as a process rather than a single event, interaction between existing conditions and new uses, adaptation across different spatial scales, and the production of new identities through changed functions. For the critical review, this finding also provides a methodological implication: subsequent phases should distinguish records that merely contain search terms from those that genuinely examine adaptive reuse of buildings or vernacular architecture. Such screening will improve the

interpretability of chronological trends and prevent interdisciplinary keyword overlap from being mistaken for growth in architectural research.

Phase 2: Research Development and Diversification (2018–2022)

The second chronological phase, covering 2018–2022, represents a period of research development and diversification in the study of adaptive reuse and spatial transformation within the built environment. During this phase, scholarly attention increasingly shifted from broad discussions of building reuse towards a more integrated understanding of how existing buildings could be spatially adapted to accommodate new functions while retaining their architectural and heritage significance. Adaptive reuse was increasingly recognised not merely as a strategy for extending the physical life of buildings, but as a process involving the reconfiguration of internal spaces, modification of circulation patterns, insertion of new functions, and negotiation between existing spatial characteristics and contemporary requirements.

Research during this period also demonstrated a growing connection between adaptive reuse, heritage conservation, sustainability, and spatial transformation. Studies increasingly examined how changes to existing buildings could respond to new functional demands without unnecessarily compromising significant architectural characteristics. This development was particularly relevant to heritage and traditional buildings, where spatial adaptation requires careful consideration of existing layouts, cultural values, building identity, and the relationship between original and newly introduced functions. Consequently, the literature from 2018–2022 reflects a transition towards a more spatially informed understanding of adaptive reuse, establishing an important foundation for subsequent research on the transformation and preservation of vernacular architecture.

Overall, Phase 2 can be characterised as a period of research development and diversification, in which adaptive reuse became increasingly associated with the management of spatial change rather than solely with changes in building function. The growing emphasis on spatial reconfiguration, heritage significance, and compatibility between old and new uses strengthened the conceptual relationship between adaptive reuse and spatial transformation. This development provided an important basis for the more focused and rapidly expanding research observed in the subsequent phase, particularly studies addressing heritage integrity, vernacular architecture, sustainability, and the consequences of spatial intervention.

A clearer architectural orientation emerged from 2020 to 2021, particularly in studies focused on functional adjustment, building adaptation, and vernacular conservation. Broekhuizen et al., (2020) examined the spatial adaptation of 100 primary school buildings in the Netherlands and revealed that the conventional four-strategy model of conversion, expansion, renovation, and adaptive reuse did not adequately represent the complexity of actual interventions. The analysis identified nine major accommodation strategies used in practice, indicating that building adaptation often involves multiple integrated actions rather than a single modification. This finding is an important development in Phase 2 since adaptive reuse is interpreted as a differentiated spatial process that requires greater analytical precision. Rather than treating building conversion as a uniform intervention, the study establishes that specific building types may require more detailed classifications that explain how functional demands are accommodated through combinations of spatial and physical adjustments.

The most directly relevant contribution to vernacular architecture appeared in Yusran et al., (2021) examination of translocated Javanese Joglo houses at Padi Heritage Hotel in Malang, which presented that conversion into lodging and related commercial functions produced both visual and spatial changes. New functional requirements, visual enhancement, and structural additions altered the original houses and raised concerns regarding authenticity. This study marked a substantial conceptual progression, as adaptive reuse connects the continuation of building use with the consequences of spatial alteration for cultural heritage values. The findings indicated that the transformation of vernacular buildings cannot be evaluated only in terms of functional success. Concurrently, questions of authenticity, original spatial character, and compatibility of new interventions also become necessary considerations.

Phase 3: Acceleration and Research Consolidation (2023–2026)

Phase 3 represents an acceleration and consolidation of adaptive reuse and spatial transformation research, with the supplied records highlighting a clearer architectural orientation and greater methodological sophistication than the preceding phases. In 2024,Li & Liu, (2024) analyzed the re-use of landfill sites as sustainable public urban areas. Results showed the feasibility of achieving multiple outcomes of ecological restoration, community integration, cultural continuity and recreation using spatial-function transformation. The community farms, cultural centres, outdoor sports facilities and ecological spaces are a step towards a multifunctional regeneration of the re-use. During the same year, Adin & Sirel, (2024) conceptualised adaptive reuse through architectural palimpsest, concluding that industrial heritage should retain visible historical layers while accommodating contemporary functions. Collectively, these studies indicate that contemporary adaptive reuse increasingly concerns the degree and character of spatial intervention, rather than functional conversion alone.

Research published in 2025 demonstrates further diversification toward cultural identity, heritage authenticity, spatial configuration, and systematic evaluation.(Q. Wang et al., 2025) identified major functional restructuring in Pingyao Ancient City, including substantial expansion of service and commercial land uses, while stakeholder evidence revealed continuing concern about authenticity. The findings suggest that physical conservation alone may be insufficient when heritage environments must remain culturally active and functionally responsive. In vernacular architecture, Putra et al., (2025)) identified three principal transformations in Traditional Balinese Houses: spatial conversion, spatial reconfiguration, and vertical extension. Commercial hospitality activities encouraged vertical expansion, whereas retail and food functions increasingly occupied communal and profane areas. While sacred spaces remained comparatively protected, traditional zoning hierarchies became less distinct. Such findings establish an important relationship between commercial pressure, spatial transformation, cultural principles, and governance. Other 2025 contributions extended this concern to different socio-cultural settings. Sabri (2025) asserted that religious-building reuse can preserve architectural fabric while simultaneously transforming memory and identity. On the other hand, Dwiasta et al. (2025) noted that the adaptive repurposing of Luwu Palace maintained fundamental Bugis cultural values despite changes in structure and function. Redyantanu (2025) further demonstrated that adaptive interior systems can improve flexibility, spatial efficiency, sustainability, and aesthetic coherence within rapidly changing commercial environments.

By 2026, the literature exhibits stronger consolidation around measurable spatial performance, interdisciplinary frameworks, digital methods, and culturally responsive transformation. Chis et al., (2026) integrated Building Information Modelling (BIM), biophilic design, and artificial intelligence in educational-building rehabilitation, reporting improvements in usable floor area, daylight performance, renewable material utilisation, and acoustic conditions. Han et al., (2026) addressed the separation between architectural and structural decision-making by developing a Collaborative Matrix that coordinates spatial transformation with structural alteration. Similarly, Paulino et al. (2026) presented a computational framework linking the generation of apartment layouts, daylight, circulation, structural stability and impacts of construction and demolition. Meng et al. (2026) moved industrial heritage assessment beyond predominantly qualitative judgement through a multidimensional, machine-learning framework, while Suta & Aydin (2026) used Space Syntax to demonstrate that adaptive reuse can redistribute spatial hierarchy differently across individual floors rather than producing uniform transformation throughout a building. Generally, these studies indicate methodological progression from descriptive case analysis toward quantifiable, reproducible, and performance-informed evaluation.

At the same time, socio-cultural dimensions remain central to recent research.El Harrouni et al. (2026) found that privacy, gender relationships, spatial hierarchy, courtyard performance, and changing family structures influence the adaptive transformation of traditional Riads and Hanoks. A related Riad study demonstrated that vertical extension, circulation improvement, and mixed-use transformation can potentially reconcile contemporary functionality with cultural and environmental requirements.Byun & Yoon, (2026) extended adaptive reuse into technology-supported care environments, indicating that digital monitoring may improve spatial performance without extensive structural intervention. Sevgi et al., (2026); Wei et al., (2026); Wu et al., (2026) likewise emphasised culturally sensitive regeneration, socio-cultural continuity, heritage legibility, public accessibility, and community participation. Consequently, Phase 3 reveals a more mature interpretation of spatial transformation as an interaction among physical configuration, cultural continuity, environmental performance, technology, social use, and heritage value. The strongest progression from 2024 to 2026 is therefore deeper analysis and integration rather than mere publication growth. Adaptive reuse has progressed from determining whether existing structures can accommodate new functions to examining how much transformation is appropriate, which spatial characteristics should remain legible, and how transformation outcomes can be systematically evaluated.

Conclusions

This chronological review examined the development of research on adaptive reuse and spatial transformation in vernacular architecture from 2012 to 2026, based on literature systematically retrieved from the Scopus database. The review aimed to identify how scholarly attention, research focus, methodological approaches, and interpretations of spatial transformation have evolved. Following the application of predefined keywords, inclusion criteria, and exclusion criteria, 41 primary journal articles were retained and organised into three chronological phases according to changes in publication activity and intellectual development: Phase 1: Emergence and Conceptual Foundation (2012–2017), Phase 2: Research Development and Diversification (2018–2022), and Phase 3: Acceleration and Research Consolidation (2023–2026). The chronological findings demonstrate a clear transition from a relatively broad and fragmented interpretation of spatial transformation toward a more architecture-focused understanding of adaptive reuse. During Phase 1, publication activity remained limited and intermittent, and the

term spatial transformation was frequently applied beyond architectural contexts. Nevertheless, this period provided an early conceptual foundation for understanding transformation as a process involving changes in function, physical form, spatial relationships, and meaning. Phase 2 presented greater research continuity and diversification, with increasing attention to building adaptation strategies, spatial reconfiguration, heritage conservation, authenticity, functional requirements, and compatibility between existing architectural conditions and new uses. Phase 3 demonstrates the strongest research acceleration, particularly through the substantial increase to six publications in 2024, 12 in 2025, and 18 in 2026. This recent concentration indicates that adaptive reuse and spatial transformation are becoming more established as interconnected research concerns. More importantly, publication growth has been accompanied by conceptual development, where recent studies increasingly investigate whether existing buildings can accommodate new functions. This includes how the extent and character of transformation influence architectural identity, cultural significance, spatial performance, user requirements, and heritage values.

Across the three phases, several key patterns demonstrate the increasing maturity of the research domain. Earlier investigations focused largely on physical change, functional conversion, and general processes of adaptation, whereas later studies increasingly recognise adaptive reuse as a multidimensional process involving relationships among spatial configuration, cultural continuity, environmental performance, social use, heritage significance, and technological intervention. In vernacular architecture particularly, spatial transformation has become closely associated with questions of authenticity, cultural identity, traditional spatial hierarchy, privacy, circulation, community values, and the continued legibility of original architectural characteristics. The literature also demonstrates methodological progression. Conventional descriptive case studies and qualitative assessments have gradually been complemented by more systematic and measurable approaches. This includes GIS, remote sensing, Space Syntax, BIM, computational modelling, semantic segmentation, multidimensional assessment, machine learning, and artificial intelligence. These developments indicate a shift toward more quantifiable, reproducible, and performance-informed assessment of adaptive reuse. However, technological sophistication alone does not provide sufficient evidence of successful transformation, particularly for culturally significant vernacular buildings. Chronological evidence indicates that measurable performance must remain connected to social, cultural, historical, and spatial values since technically effective conversion may still weaken authenticity or alter significant relationships between spaces. This review's major contribution is its chronological organisation. Rather than presenting adaptive reuse research as a collection of independent themes, time-based clustering clarifies how earlier concepts developed into more sophisticated contemporary approaches. It further reveals when important changes in research direction occurred. The three-phase classification makes visible the transition from conceptual emergence through diversification to consolidation and methodological integration. This provides a more structured interpretation than annual publication counts alone and demonstrates that growth in publication volume should not automatically be interpreted as maturity. Instead, maturity is reflected through increasing conceptual depth, methodological integration, and greater attention to the consequences and appropriateness of spatial intervention. The review identifies an emerging central question within the field: how much spatial transformation can be accepted while maintaining the significant spatial and socio-cultural characteristics of vernacular architecture? This question provides an important direction for moving adaptive reuse research beyond documenting change toward systematically evaluating the limits and consequences of transformation.

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The findings have notable implications for both future research and adaptive reuse practice. For architects, conservation professionals, heritage authorities, building owners, and policymakers, spatial transformation should not be evaluated solely by the successful introduction of a new function. Decisions concerning conversion, reconfiguration, extension, circulation modification, or insertion of contemporary facilities should also consider whether significant spatial relationships, architectural identity, cultural meaning, and community practices remain understandable after intervention. Future research should therefore place greater emphasis on developing context-sensitive assessment criteria and acceptable transformation limits that distinguish changes that support continued building use from changes that substantially weaken heritage and socio-cultural significance. Digital technologies, computational approaches, and AI-assisted evaluation offer considerable potential to compare alternative adaptation scenarios, predict performance, and support evidence-based decisions. However, these techniques should be integrated with field observation, architectural documentation, stakeholder perspectives, and cultural interpretation rather than functioning as independent technical measures. Several limitations of the present review should also be recognised. The dataset was derived solely from Scopus, restricted to English-language journal articles and predefined search terminology within the 2012–2026 period. Relevant publications indexed in other databases, written in other languages, or employing alternative terminology may therefore remain outside the dataset.

The presence of interdisciplinary records associated with broad terms such as spatial change, recycling, and transformation further indicates that future reviews should refine architecture-specific terminology and consider additional screening procedures. In response, future studies may expand geographical comparisons, examine different vernacular building typologies, and test emerging assessment approaches through real-world adaptive reuse projects. Overall, the chronological evidence demonstrates that adaptive reuse and spatial transformation have progressed from a relatively fragmented research area toward an increasingly integrated field concerned with balancing functional adaptation, spatial performance, sustainability, heritage conservation, and socio-cultural continuity. A chronological review is particularly valuable in this context as it reveals what knowledge exists and how research priorities and methods have changed over time. Such temporal understanding provides a stronger foundation for identifying unresolved gaps, directing future innovation, and developing adaptive reuse approaches. This enables vernacular buildings to accommodate contemporary requirements without unnecessarily losing the spatial and cultural qualities that establish their heritage significance.

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References

Abu-Lail, D. M. A., Goriel, W. A. S., Molnár, T., Bachmann, B., Medvegy, G., Borsos, Á., & Zoltán, E. (2025). Preserving the Past to Shape the Future: The Evolution of Office Spaces Through Historic Building Adaptation. *Buildings*. https://doi.org/10.3390/buildings15040574

Adin, M. S., & Sirel, A. (2024). Heritage, Memory and Adaptive Reuse: Vienna Gasometer and Istanbul HasanpaşGasworks as Palimpsest Spaces. *Architecture Image Studies*, *5*(1), 68–85. https://doi.org/10.48619/ais.v5i1.992

Alnaim, M., & Alnaim, M. (2026). Integrating Vernacular Architecture into Contemporary Urban Regeneration: Heritage, Identity and Modernization in Saudi Cities. *Land*. https://doi.org/10.3390/land15030494

Atmanti, F. P., & Uekita, Y. (2023). Adaptive Reuse of Vernacular Architecture for Conservation in Indonesia: Case Study of South Nias Village, Bawömataluo Conservation Project. *Asian Culture and History*. https://doi.org/10.5539/ach.v15n1p64

Bourayou, H., & Aichour, B. (2025). Reusing the Ghoufi's vernacular buildings within the context of sustainable conservation, an action put to the test. *Journal of Cultural Heritage Management and Sustainable Development*. https://doi.org/10.1108/jchmsd-10-2023-0172

Broekhuizen, D., Arkesteijn, M., De Jong, P., & Van Nieuwamerongen, F. (2020). Conversion strategies for dutch primary schools: Practice and refinement. *Journal of Architecture and Urbanism*, *44*(1), 69–77. https://doi.org/10.3846/jau.2020.11448

Büke, F. G. Ö. (2023). Tourism-led adaptive reuse of the built vernacular heritage: A critical assessment of the transformation of historic neighbourhoods in Cappadocia, Turkey. *The Historic Environment: Policy & Practice*, *14*, 474–497. https://doi.org/10.1080/17567505.2023.2236861

Byun, N., & Yoon, Z. (2026). Smart Adaptive Reuse of Vacant Assets for Aging Societies: Integrating IoT-Based Care Systems with Spatial Reconfiguration. *Buildings*, *16*(3). https://doi.org/10.3390/buildings16030636

Chis, T.-V., Chivu, O. R., Enache, C.-I., Rusan, D.-A., & Tegledi, M. (2026). BIM-Integrated Biophilic Rehabilitation of Educational Spaces: An AI-Driven Digital Framework for Sustainable Transformation and Cognitive Ergonomics. *Eng*, *7*(7). https://doi.org/10.3390/eng7070337

Dwiasta, A. Y., Jayadi, K., Abidah, A., & Djirong, A. (2025). LUWU PALACE AND THE PLANNING OF CULTURAL LANDSCAPES: REFLECTIONS OF BUGIS SOCIO-SPATIAL ORDER. *Planning Malaysia*, *23*(5), 458–468. https://doi.org/10.21837/pm.v23i38.1860

El Harrouni, R., Sobhy, I., Benkirane, I. M., & Becue, V. (2026). Sustaining Heritage: Sociocultural and Thermal Adaptations in Riads and Hanoks. *International Journal of Architectural Heritage*, *20*(3), 282–313. https://doi.org/10.1080/15583058.2025.2531396

Han, Y., Dong, Y., You, F., Ji, T., & Qiu, Z. (2026). A methodological framework for adaptive reuse integrating structural and spatial coordination: Evidence from the Xiaoxihu Historic Block, Nanjing, China. *Frontiers of Architectural Research*. https://doi.org/10.1016/j.foar.2026.03.017

Ibrahim, I., Soussi, I., & Qaysi, H. Al. (2025). A space syntax comparative study on sustainable historic districts: Al-Fahidi, UAE and Al-Darb Al-Ahmar, Egypt. *City, Territory and Architecture*, *12*. https://doi.org/10.1186/s40410-025-00274-8

Jiao, L., Wu, Y., Fang, K., & Liu, X. (2023). Typo-Morphological Approaches for Maintaining the Sustainability of Local Traditional Culture: A Case Study of the Damazhan and

Kahvecioğlu, B., & Selçuk, S. A. (2023). Adaptive Reuse in the Realm of Architecture: Global Research Trends and Gaps for the Future Studies. *Sustainability*. https://doi.org/10.3390/su15139971

Kalakoski, I., & Thorgrimsdottir, S. (2022). Learning from the secondary: Rethinking architectural conservation through 'barn architecture.' *Journal of Material Culture*, *28*, 199–220. https://doi.org/10.1177/13591835221123953

Li, J., & Liu, K. (2024). Sustainable Space Transformation Design Strategies for Post-Landfill Closure. *Sustainability (Switzerland)*, *16*(8). https://doi.org/10.3390/su16083463

Liu, H., & Li, B. (2021). Changes of Spatial Characteristics: Socio-Cultural Sustainability in Historical Neighborhood in Beijing, China. *Sustainability*, *13*, 6212. https://doi.org/10.3390/su13116212

Meng, X., Chang, J., Liu, X., & Zhuang, F. (2026). Classifying the Reuse Value of Industrial Heritage Sites Using Random Forest: A Case Study of Jiangsu's Salt Reclamation Zone. *Buildings*, *16*(4). https://doi.org/10.3390/buildings16040796

Ordóñez-Castañón, D., & Ferreira, T. C. (2024). Toward the Adaptive Reuse of Vernacular Architecture: Practices from the School of Porto. *Heritage*. https://doi.org/10.3390/heritage7030087

Pardo, J. (2023). Challenges and Current Research Trends for Vernacular Architecture in a Global World: A Literature Review. *Buildings*. https://doi.org/10.3390/buildings13010162

Paulino, D. M. S., Fivet, C., Ligler, H., & Napolitano, R. (2026). Integrating spatial and structural considerations in floor plan transformations of historic masonry buildings. *Automation in Construction*, *187*. https://doi.org/10.1016/j.autcon.2026.106878

Plevoets, B., & Sowińska-Heim, J. (2018). Community initiatives as a catalyst for regeneration of heritage sites: Vernacular transformation and its influence on the formal adaptive reuse practice. *Cities*. https://doi.org/10.1016/j.cities.2018.02.007

Putra, I. D. G., Setijanti, P., & Dinapradipta, A. (2025). Typological Analysis of Commercialization-Induced Spatial Transformations in Traditional Balinese Houses. *Journal of Design and Built Environment*, *25*(2), 78–95. https://www.scopus.com/pages/publications/105015161956?origin=resultslist

Redyantanu, B. P. (2025). Patterns of Contextual Adaptation: Interiority as a Design Framework for Café Spaces. *Alam Cipta*, *18*(2), 176–193. https://doi.org/10.47836/AC.18.2.PAPER11

Sabri, R. (2025). The uncomfortable truths of adaptive reuse: faith-to-faith conversion of religious heritage buildings in conflict environments. *International Journal of Heritage Studies*, *31*(2), 160–177. https://doi.org/10.1080/13527258.2024.2406000

Sevgi, S., Özeren, Ö., & Juba, İ. (2026). Adaptive reuse review from the perspective of the Aga Khan Award for Architecture. *Journal of Umm Al-Qura University for Engineering and Architecture*. https://doi.org/10.1007/s43995-025-00270-6

Suta, O., & Aydin, M. F. (2026). Design-Driven Reconfiguration of Spatial Hierarchy in Adaptive Reuse: A Visibility-Based Plan-Level Analysis of an Industrial-to-Hotel Conversion. *Buildings*, *16*(5). https://doi.org/10.3390/buildings16051077

Wang, J., & Zakaria, S. (2025). Morphological Characteristics and Sustainable Adaptive Reuse Strategies of Regional Cultural Architecture: A Case Study of Fenghuang Ancient Town, Xiangxi, China. *Buildings*. https://doi.org/10.3390/buildings15010119

Wang, P., Li, C., & Liu, J. (2025). Research on Tourist Satisfaction Evaluation of Macau's Built Heritage Space Under the Genius Loci. *Buildings*. https://doi.org/10.3390/buildings15101701

Wang, P., Liu, Q., Sun, H., Lin, X., & Fan, S. (2021). Temporal and Spatial Variation of Ecosystem Service Values in Red Soil Erosion Areas in South China. *Nongye Jixie Xuebao/Transactions of the Chinese Society for Agricultural Machinery*, *52*(5), 219–228. https://doi.org/10.6041/j.issn.1000-1298.2021.05.024

Wang, Q., Ma, P., & Wang, Y. (2025). Sustainable Heritage Tourism in Transition: Policy, Space, and Authenticity in a UNESCO World Heritage Site. *Sustainability (Switzerland)*, *17*(21). https://doi.org/10.3390/su17219619

Wei, Z., Xiong, Y., & Chen, Y. (2026). Value Positioning and Spatial Activation Path of Modern Chinese Industrial Heritage: Social Media Data-Based Perception Analysis of Huaxin Cement Plant via the Four-Quadrant Model. *Buildings*, *16*(3). https://doi.org/10.3390/buildings16030519

Wu, Y., Wu, Y., & Candeias, A. (2026). Study on the Renewal Mode of Modern Residential Architectural Heritage under the Perspective of"Conjunctive Ecological Theory" - Taking Ancient City of Suzhou as an Example. In Z. Abunada, D. K. Das, K. Y. Foo, & W. I. Goh (Eds.), *E3S Web of Conferences* (Vol. 683). EDP Sciences https://doi.org/10.1051/e3sconf/202668301002

Xiang, L., Feng, C.-G., Liu, Y., & Wang, Y. (2025). Space and culture acculturation: Exploring urban regeneration in historic conservation areas, Yangmeizhu Street in Beijing, China. *Frontiers of Architectural Research*. https://doi.org/10.1016/j.foar.2025.03.009

Xiaomazhan Historical Area in Guangzhou. *Buildings*. https://doi.org/10.3390/buildings13092351

Xie, P. F. (2015). A life cycle model of industrial heritage development. *Annals of Tourism Research*, *55*, 141–154. https://doi.org/10.1016/j.annals.2015.09.012

Yıldız, N., & Kılıçaslan, M. (2025). The transformation of historical and spatial identity through adaptive reuse: The case of Cendere Art Museum. *Journal of Design for Resilience in Architecture and Planning*. https://doi.org/10.47818/drarch.2025.v6i3184

Yusran, Y. A., Titisari, E. Y., & Karomah, H. M. (2021). Visual and spatial changes of translocated Javanese vernacular houses in Padi Heritage Hotel Malang, Indonesia. In G. Widati, U. null, A. G. Abdullah, A. A. Danuwijaya, & C. U. Abdullah (Eds.), *IOP Conference Series: Earth and Environmental Science* (Vol. 878, Number 1). IOP Publishing Ltd. https://doi.org/10.1088/1755-1315/878/1/012035

Zhang, T., Xu, H., & Wang, C. (2022). Self-adaptability and topological deformation of Ganlan architectural heritage: Conservation and regeneration of Lianghekou Tujia village in Western Hubei, China. *Frontiers of Architectural Research*. https://doi.org/10.1016/j.foar.2022.05.007

Zhang, X., Ren, Y., Lv, J., Geng, Y., Su, C., & Ruiqu. (2025). Morphological Evolution and Socio-Cultural Transformation in Historic Urban Areas: A Historic Urban Landscape Approach from Luoyang, China. *Buildings*. https://doi.org/10.3390/buildings15081373

Zhou, Q., & Chen, F. (2025). Sustainable mechanisms for cultural memory activation and community identity from the perspective of community public space renewal: A multiple mediating effects analysis. *Acta Psychologica*, *262*, 106040. https://doi.org/10.1016/j.actpsy.2025.106040