


A Systematic Pathway Study of Sustainable Built Heritage Management

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Abstract

Heritage holds considerable potential in advancing environmental sustainability, yet existing studies have largely remained confined to the exploration of singular issues and have seldom articulated an integrated pathway that systematically connects heritage management with the Sustainable Development Goals (SDGs). In particular, the field of sustainable built heritage management has not yet established a comprehensive framework encompassing the entire life cycle, a gap that limits both systematic assessment and strategic application within the broader sustainability agenda. Against this backdrop, this study conducts a systematic review of 115 academic publications focusing on sustainable management of built heritage and based on this analysis, proposes a Sustainable Built Heritage Management (SBHM) framework structured around the full life cycle of built heritage. Compared with existing research that remains fragmented or predominantly value-oriented, this framework systematically embeds sustainability principles into all phases of planning, implementation, monitoring, and feedback, thereby enhancing both the operational feasibility and evaluability of management practices. Furthermore, it strengthens the social adaptability and practical applicability of management processes by establishing multi-stakeholder collaborative mechanisms that can more effectively address complex challenges related to value recognition, ownership structures, distribution of responsibilities, and allocation of benefits. The study concludes by emphasizing the need for future efforts to advance more integrated and multidimensional management systems that can provide stronger support for the realization of the United Nations Sustainable Development Goals.

Keywords

sustainable built heritage management, building heritage, sustainable heritage management, heritage management framework, Sustainable Development Goals

Introduction

Since the World Heritage Committee's first session in 1977 explicitly required the preparation of management plans for all heritage sites, heritage management has progressively moved toward institutionalization. Early practices were largely concentrated on national parks and natural heritage, while cultural heritage remained marginalized for a considerable period (Cameron & Rössler, 2018). In 1983, UNESCO official Anne Raidl convened an international expert meeting to address the challenges of cultural heritage site management. The meeting emphasized the depoliticization of heritage management and the importance of interdisciplinary collaboration, which were subsequently institutionalized and widely disseminated through the Guidelines for the Management of World Cultural Heritage Sites published in 1993 (Feilden & Jokilehto, 1998). Since then, heritage

management has gradually developed into an interdisciplinary research field with both normative and methodological dimensions.

As tangible carriers of cultural, historical, and social significance, built heritage plays an irreplaceable role in shaping community identity, fostering social development, and promoting cultural continuity (Tweed & Sutherland, 2007). Nevertheless, its management and conservation continue to face persistent challenges. On

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the one hand, insufficient maintenance and institutional fragmentation remain widespread in practice (Jokilehto, 2017). On the other hand, although policy-driven institutions have actively intervened, they often lack professional expertise and long-term strategic perspectives, resulting in management approaches that are formalistic and insufficiently targeted (Jansen, 2014). The overall effectiveness of built heritage conservation is further undermined by shortcomings in interdisciplinary collaboration and multi-level governance.

Although several studies have attempted to systematize the sustainable management process of heritage, these efforts remain relatively limited. For example, Rabady proposed the incorporation of heritage inventories, asset assessments, conservation planning, and interpretation into heritage tourism management to support sustainable tourism (Rabady & Jamal, 2006). Landorf, in research on British industrial heritage, developed a systemic model that divided management into contextual analysis, strategic positioning, implementation, and iterative optimization, emphasizing the role of stakeholder values in shaping sustainable strategies (Landorf, 2009, 2011). Darlow introduced environmental, socio-cultural, and economic dimensions, highlighting dynamic mechanisms of resource management and multi-actor collaboration (Darlow et al., 2012). Gheyle, in studies of militarized landscapes, proposed multidimensional strategies that encompassed defense, investment, and damage control (Gheyle et al., 2014). Kondo advanced the role of digital inventories and diversified evaluation approaches, underscoring information sustainability and interdisciplinary collaboration (Kondo et al., 2016). These studies consistently stress systemic thinking, multi-stakeholder participation, interdisciplinary approaches, multi-level governance, and the importance of dynamic feedback and continuous optimization to achieve sustainable heritage management. However, they have predominantly focused on cultural heritage in a broad sense, and the cyclical and specific characteristics of built heritage have not been sufficiently addressed.

Traditional management pathways for built heritage generally include identification, conservation, maintenance, monitoring, and promotion (Armitage & Irons, 2013; Kayan, 2019; Pickerill & Armitage, 2009; Seduikyte et al., 2018; Toniolo et al., 2015). However, these approaches often remain confined to discrete projects or short-term objectives, with a primary focus on physical interventions and restoration outcomes, while lacking integrated strategies that encompass social, environmental, and economic dimensions (Sukri et al., 2024; Yan et al., 2024). Furthermore, stakeholder participation remains limited in depth, and decision-making mechanisms are still largely dominated by professional institutions, leading to inadequate coordination and weak

integration with long-term development goals (Eppich & Grinda, 2019; Naima, 2021).

Within this context, embedding sustainable heritage management strategies and mechanisms into the management system of built heritage not only addresses these shortcomings but also enhances the overall effectiveness of conservation and adaptive reuse. It is therefore necessary to build upon the foundations of sustainable heritage management research and develop a more refined and targeted framework for Sustainable Built Heritage Management (SBHM) that responds to the unique characteristics and methodologies of built heritage. This framework adopts a life-cycle perspective and aims to address the multifaceted challenges faced by built heritage in the contemporary era, while providing systematic guidance for practical management. In doing so, it promotes the balanced development of cultural, environmental, and economic dimensions. Based on this rationale, the present study is guided by three key research questions:

- (1) What are the core components of SBHM?
- (2) How can SBHM achieve sustainability across environmental, social, and economic dimensions?
- (3) How can SBHM contribute to the realization of the United Nations Sustainable Development Goals?

Materials and Methods

To comprehensively cover the research achievements in the field of Sustainable Built Heritage Management (SBHM), this study selected Web of Science (WOS), Google Scholar, and Scopus as the primary literature databases. These databases are among the most authoritative and widely used academic resources, providing systematic coverage of core journals and publications in architecture, heritage conservation, and management-related disciplines (Dimitropoulos et al., 2025). During the search process, Boolean OR/AND operators were applied to connect key terms and construct the research string: *TITLE-ABS-KEY ("sustainability" OR "sustainable") AND ("heritage management") OR TITLE-ABS-KEY ("sustainable management") AND TITLE-ABS-KEY ("heritage")*. The search was limited to English-language publications, with a timeframe extending until December 31, 2024.

WOS was chosen as the primary data source because of its superior journal coverage and its ability to retrieve the largest number of unique records (Yang & Meho, 2006). Supplementary results were obtained from Scopus and Google Scholar, yielding an initial dataset of 4,105 publications. After removing duplicates, additional refinements were applied to ensure research relevance by

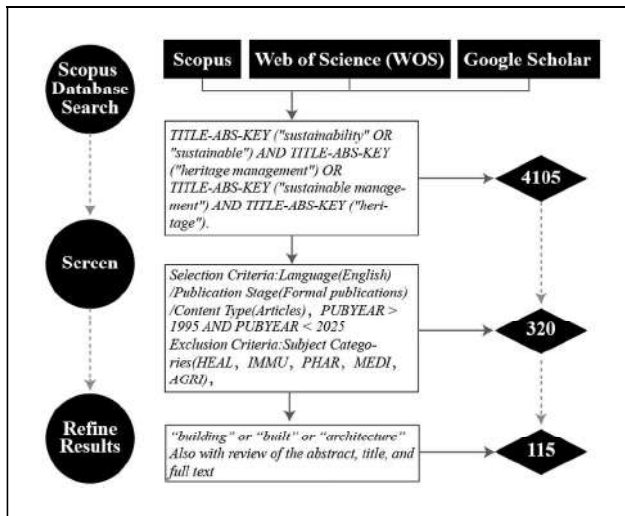


Figure 1. Literature screening process for Sustainable Built Heritage Management (SBHM).

limiting the results to specific research categories and Citation Topics, excluding unrelated fields such as pharmacology, toxicology, medicine and health, agriculture, and the biological sciences. Following this initial screening, 320 highly relevant publications were retained, comprising 301 from WOS, 14 from Google Scholar, and 5 from Scopus.

To emphasize the research focus on built heritage, the results were further refined by applying the keywords “building” OR “built” OR “architecture,” combined with systematic screening of titles and abstracts, and in some cases, full-text or introduction-level reviews. At this

stage, strict exclusion criteria were applied, and only studies closely aligned with the research themes were retained. Ultimately, a total of 115 core publications were selected, forming the foundational dataset for the literature review and theoretical framework of this study (Figure 1).

Results

A systematic analysis of the final 115 publications focusing on SBHM reveals a marked growth trend in this field over the past decade (Figure 2). By 2024, a total of 22 articles had been published, compared with only three a decade earlier, representing a 7.3-fold increase. This rapid expansion reflects not only the substantial increase in research output but also the rising academic prominence of SBHM within the broader framework of Sustainable Heritage Management. It demonstrates that SBHM is gradually becoming a significant international research topic.

In terms of national distribution, research is primarily concentrated in several European and Asian countries. Italy ranks first with 23 publications, highlighting its leadership in the field of sustainable management of built heritage. Spain ranks second with 13 studies, followed by China with 10, and the United Kingdom with 9. Portugal contributed five publications, while Lithuania, Norway, and Poland each produced four studies. Other countries contributed relatively smaller outputs. Overall, European nations dominate the field of SBHM research, although participation from Asian countries such as China has increased significantly in recent years, reflecting the globalization of this research domain.

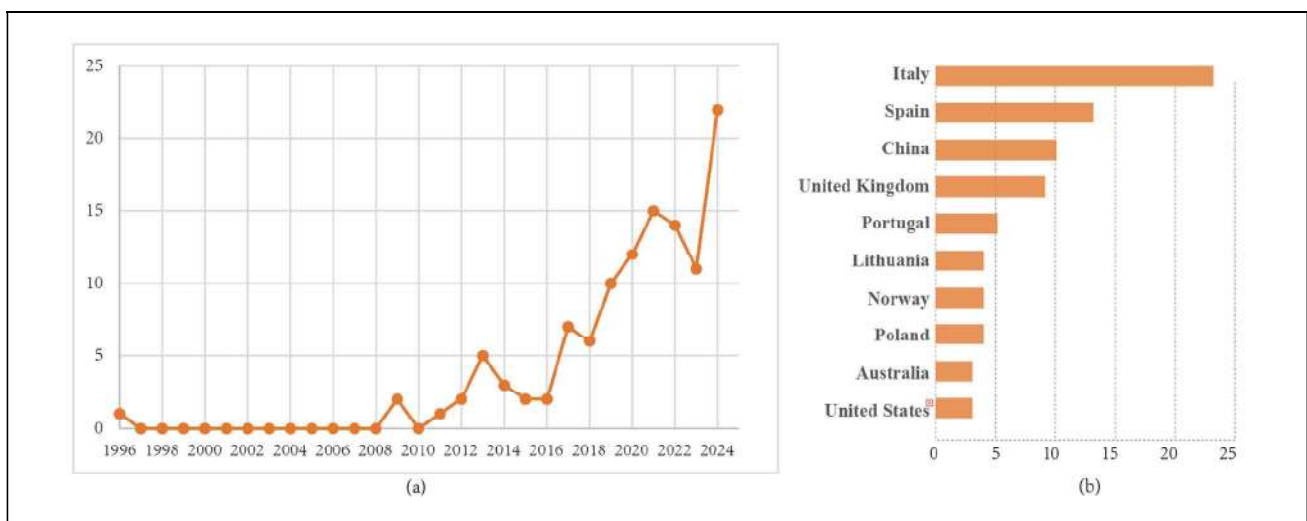


Figure 2. (a) Annual publication counts on Sustainable Built Heritage Management (SBHM) between 1996 and 2024 and (b) distribution of SBHM publications across the top 10 contributing countries.

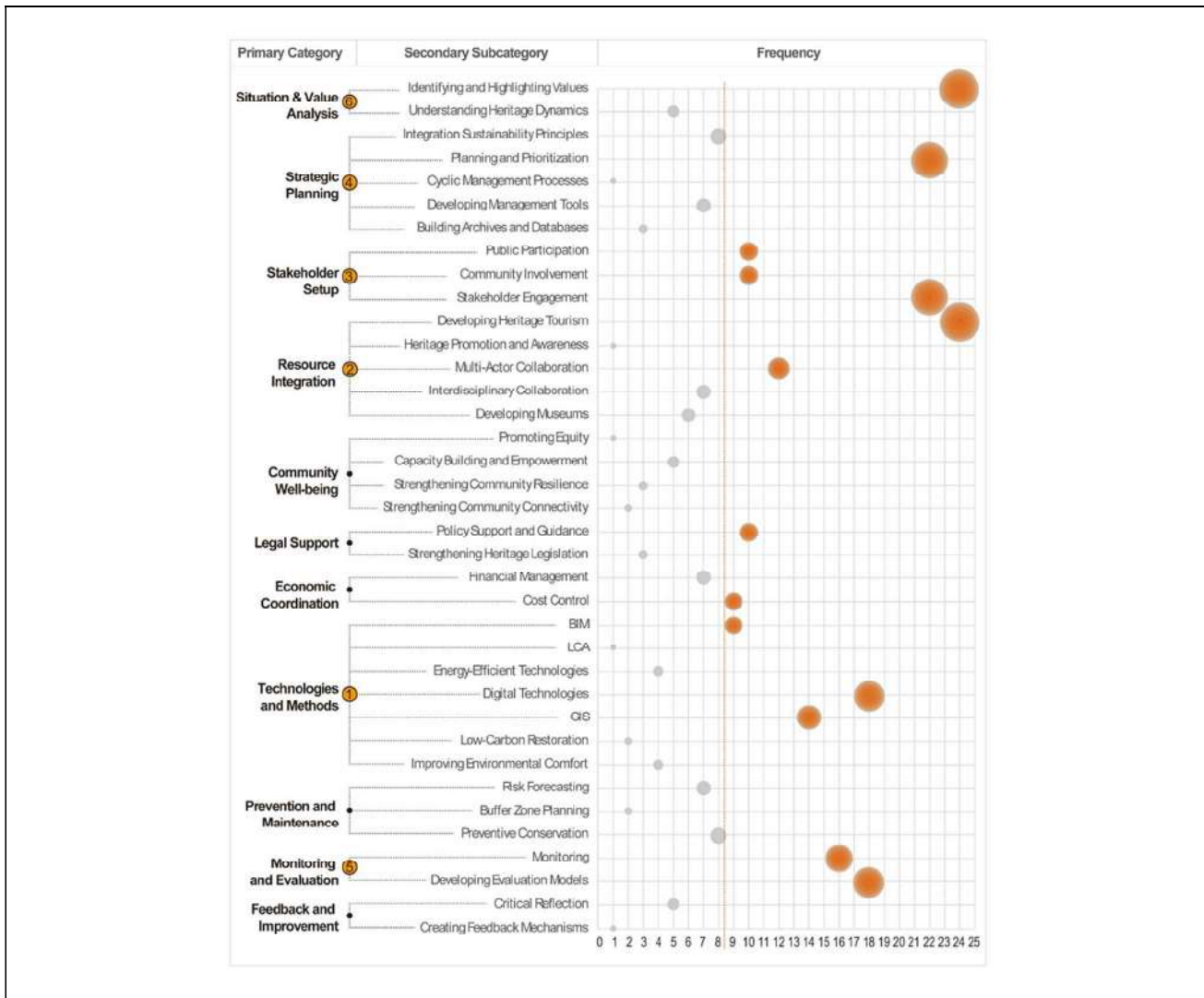


Figure 3. Visualization of SBHM research themes and frequency. The orange dotted line (8.4) represents the average frequency across the field, while the yellow highlighted area indicates priority research directions that exceeded the average level.

Following the systematic analysis of the 115 SBHM-related publications, the core issues identified were further refined into 37 micro-themes, which were categorized as second-level nodes. These themes appeared a total of 311 times across the literature, with an average frequency of 8.4 mentions per theme, indicating a certain degree of concentration and repetition within the research field. Based on their internal logic, the 37 second-level nodes were further consolidated into 11 first-level categories (Figure 3). On average, each first-level category appeared 28.27 times across all mentions.

To highlight the most critical topics, the study focused on categories and subcategories with frequencies above the average level, which were incorporated into the core components of the SBHM framework. The results show

that among the first-level categories, “Technology and Methods” was the most frequently discussed (52 mentions), followed by “Resource Integration” (50), “Stakeholder Identification” (42), “Strategic Planning” (41), and “Monitoring and Evaluation” (34), which together constitute the five dominant thematic areas. “Identification and Value Analysis” also received considerable attention, with 29 mentions, ranking sixth. It is noteworthy that although some first-level categories did not exceed the average overall frequency, certain subcategories under them still demonstrated practical significance. For instance, under “Legal Support,” the subcategory of “Policy Guidance and Support” was mentioned more than 10 times despite the relatively low frequency of the overall category. Similarly, “Cost