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Service Innovation Strategies for Sustainable Furniture Design: A Systematic Review

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Abstract

The furniture industry is a major consumer of natural resources and exerts significant environmental impacts, requiring urgent sustainable transformation to align with global sustainable development goals. Service innovation has been recognised as a vital driver of industrial sustainability, yet a systematic and targeted synthesis of service innovation strategies for sustainable furniture design, particularly Chinese bamboo furniture, remains absent from existing research. This study aims to identify and summarise service innovation strategies that support sustainable development in furniture design, with a specific focus on Chinese bamboo furniture. To achieve this aim, a systematic literature review was conducted in accordance with the PRISMA 2020 guidelines. Relevant peer-reviewed studies published between 2019 and 2023 were retrieved from Scopus and Web of Science. Following PRISMA-guided screening, 46 studies were included and analysed using thematic content analysis. Six themes emerged: organisational

capabilities for sustainability-oriented service innovation; product–service systems and digital servitisation; circular economy and life-cycle services; furniture design, digitalisation, and market transformation; material-specific sustainable design and value creation; and co-creation, user experience, and social sustainability. The synthesis indicates that these strategies can support environmental, economic, and social sustainability in furniture design. This review systematically integrates service innovation research within the sustainable furniture design domain and provides theoretical insights and practical implications for researchers, designers, and enterprises seeking to advance sustainable furniture development. It underscores the critical role of service innovation in advancing environmental, economic, and social sustainability across the furniture sector.

Keywords: service innovation strategies; sustainable furniture design; systematic literature review; product–service system (PSS); circular economy

1. INTRODUCTION

The furniture design industry, characterised by its high consumption of materials, ranks among the sectors that intensively consume natural resources [1]. As sustainable development rises on the global agenda, the furniture sector is increasingly recognised as an industry in need of transformation to mitigate its environmental footprint [2]. Indeed, in a 2023 assessment by the Joint Research Centre of the European Commission, which evaluated the environmental impact and improvement potential of 19 product groups, the furniture industry was ranked second only to textiles and footwear, highlighting its pivotal role in environmental stewardship. Global furniture sales doubled between 2000 and 2021, reaching approximately \$500 billion, with further growth anticipated. However, this growth has created challenges, particularly in terms of energy consumption and waste management [3]. These challenges reflect the unsustainable nature of the current linear economy model (take–make–waste) [4]. Consequently, the shift towards sustainable furniture design has become increasingly imperative.

In this context, service innovation has emerged as a critical strategy within the furniture design industry. Service innovation not only enables businesses to differentiate themselves and provide added value to customers but also serves as a key tool for small and medium-sized enterprises (SMEs) to address future challenges [5]. It involves organisations offering new or improved services and adopting new methods to serve customers more effectively [6].

Current research has identified five core streams that investigate how companies can integrate sustainability into their service innovation strategies: Product–Service Systems (PSS), Service Innovation (SI), Sustainability-Oriented Innovation (SOI), Sustainability-Oriented Service Innovation (SOSI), and Sustainable Product–Service Systems (S.PSS) [7, 8]. Each of these perspectives offers a valuable theoretical framework for understanding the relationship between service innovation and sustainability.

Given the ongoing advances in sustainable furniture design, a systematic examination of service innovation strategies in both theory and practice is essential. This review aims to provide researchers with an in-depth understanding of the current state of theoretical research on the application of service innovation strategies in furniture design by analysing the existing literature. A preliminary search on this topic identified four similar literature reviews. The differences among these four papers are presented in Table 1.

Table 1. *A comparative analysis of related reviews*

Previous Review	Covered Years	Research Topics	Approach	Major Databases	Analysed Dimensions
Zhang et al. [9]	2001–2021	Sustainable Craft and Service Design	Bibliometric	Scopus and Web of Science	Sustainable Crafts, Service Design, Scientometrics
Zhu et al. [10]	2002–2023	Sustainable Furniture Design Systems	Bibliometric	Web of Science	Publications, Collaborations, Keywords, Journals, Countries
Bumgardner and Nicholls [11]	2010–2020	Sustainable Practices in Furniture Design	Literature Study	Google Scholar	Customisation, Biomimicry, Competitiveness, Product Communication
Kumar et al. [12]	2002–2022	Service Innovation Research	Bibliometric Analysis	Scopus	Articles, Citations, Co-citations, Authors, Journals, Countries

As shown in Table 1, a critical research gap remains: no systematic review has yet integrated service innovation, sustainable furniture design, and bamboo applications, particularly in the context of Chinese bamboo furniture. To address this gap, this review aims to provide researchers with an in-depth understanding of the current state of theoretical research on the application of service innovation strategies in furniture design by analysing the existing literature. Two core research questions guide this study:

1. What are the dominant service innovation strategies adopted for sustainable furniture design?
2. How can service innovation strategies support the sustainable development of Chinese bamboo furniture design?

2. METHODOLOGY

This study employed a systematic literature review, which is a rigorous and transparent approach [13]. This approach uses multiple databases and a transparent, repeatable procedure to select and evaluate relevant literature. The literature is then screened and identified according to the research questions or pre-established criteria, enabling a comprehensive and accurate understanding of the research progress on a specific topic and facilitating the resolution of particular problems. The advantages of the systematic literature review method include its rigour and transparency, clearly defined research questions, comprehensive search strategies, explicit literature-selection criteria, high-quality evaluation methods, comprehensive data

analysis, and reliable research findings. These features can effectively reduce the subjectivity and bias associated with traditional research methods.

This study began by establishing the review procedure and adopted the PRISMA method [14]. PRISMA comprises four research stages: Identification, Screening, Eligibility, and Inclusion. These stages provide a minimum evidence-based framework for the analysis and reporting of existing literature through systematic reviews and meta-analyses. Figure 1 shows the research procedure developed according to the research objectives.

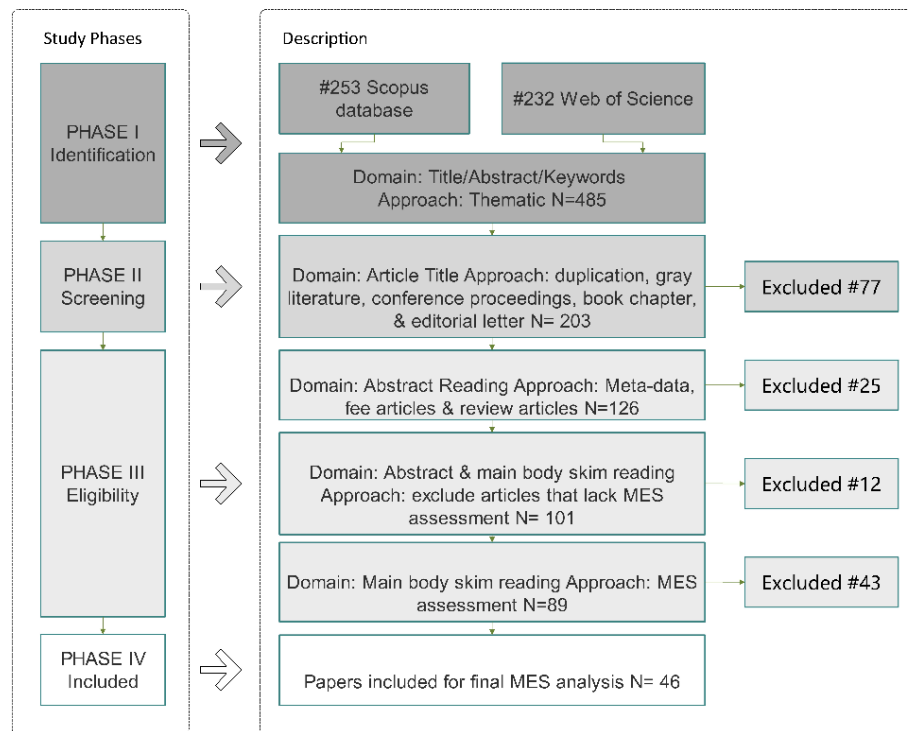


Figure 1. PRISMA flow diagram of the review process

Phase I: Only high-quality, reliable databases were selected for the literature search. Therefore, this study used the Scopus and Web of Science literature databases. These two databases were selected primarily because of their quality standards, broad coverage, and convenient data-download options [15]. The search was limited to English-language journal articles published between 2019 and 2023. Only English-language articles were considered because English is the most widely used language in scientific publications.

The Scopus search string was: TITLE-ABS-KEY (furniture AND ("service strategies" OR "service innovation" OR "service design" OR "service innovation strategies" OR "product-service system*" OR servitization) AND (sustainability OR "sustainable furniture design" OR "sustainable development")) AND PUBYEAR > 2018 AND PUBYEAR < 2024 AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "re")) AND LIMIT-TO (LANGUAGE, "English"). An equivalent topic search was applied in Web of Science, with adjustments made to accommodate the database syntax.

Phase II: Because service-innovation terminology varies across research fields, titles and abstracts were screened against the eligibility criteria presented in Table 2. The retrieved records were imported into EndNote, duplicates were removed, and records that were non-English, non-peer-reviewed, or outside the scope of the review were excluded. This process left 203 records for subsequent screening.

Phase III: Bibliographic records retrieved from Scopus and Web of Science were consolidated in Microsoft Excel. The searches yielded 485 records, comprising 253 from Scopus and 232 from Web of Science. After duplicate records and ineligible publication types were removed, 203 records remained. During title and abstract screening, 77 records were excluded because they were not substantively relevant to furniture, service innovation, or sustainability, leaving 126 records. A further 25 records were excluded because they lacked an identifiable service-related component, and 12 records were excluded because no extractable sustainability implications could be identified. The full texts of the remaining 89 studies were assessed against the eligibility criteria presented in Table 2, and 43 studies were excluded because they failed to meet one or more criteria. The final review sample comprised 46 studies.

Phase IV: A descriptive analysis was conducted in Microsoft Excel to examine the publication year, journal distribution, methodological approach, and geographical context. The extracted evidence was subsequently coded and synthesised thematically to identify recurring service-innovation mechanisms and sustainability implications.

Data from each included study were entered into a structured extraction matrix covering the publication year, research context, methodological approach, service-innovation mechanism, sustainability contribution, and relevance to bamboo furniture. The extracted findings were coded, compared across studies, and consolidated into six analytical themes. Selected studies are presented in Table 3 to illustrate the evidence supporting each theme.

Table 2. *Inclusion and exclusion criteria*

Inclusion criteria	Exclusion criteria
Peer-reviewed journal articles, including empirical, conceptual, and review studies	Conference proceedings, book chapters, theses, editorials, grey literature, and other non-peer-reviewed sources
Studies published in English between 2019 and 2023	Studies published outside the selected period or in languages other than English
Studies addressing furniture, bamboo products, manufacturing, design, or closely related service-innovation contexts	Studies with no substantive relevance to furniture, design, manufacturing, or service innovation
Studies containing an identifiable service-innovation, service-design, servitization, product-service system, circular-service, or life-cycle-service component	Studies addressing only material or product characteristics without a service-related component
Studies reporting environmental, economic, or social sustainability implications	Studies from which no identifiable sustainability implications could be extracted
Full text available for eligibility assessment	Full text unavailable

3. RESULTS

Table 3 presents a thematic synthesis of the 46 included studies, organized according to their principal service-innovation mechanisms, sustainability contributions, implications for Chinese bamboo furniture, and remaining research gaps.

Table 3. *Thematic synthesis of service innovation strategies for sustainable furniture design (n = 46)*

Theme	Representative studies	Core synthesis	Implications for Chinese bamboo furniture	Research gap
Organizational capabilities for sustainability-oriented service innovation	Calabrese et al. [7]; Fernando et al. [16]; Salunke et al. [17]; Hanaysha et al. [6]; Bustinza et al. [18]	Service innovation depends on knowledge integration, collaboration, market orientation, and the ability to coordinate product and service development.	Enterprises need cross-functional teams, customer-feedback routines, and external partnerships before introducing lifecycle services.	Most evidence is cross-sectional and outside the furniture sector; causal effects on sustainability performance remain unclear.
Product-service systems and digital servitization	Liu et al. [3]; Sjödin et al. [19]; Kristensen and Remmen [4]; Bu et al. [20]; Bustinza et al. [18]	PSS models combine products with maintenance, upgrading, monitoring, take-back, and value-recovery services, often supported by digital platforms.	Bamboo furniture can be offered with installation, repair, component replacement, refurbishment, trade-in, and digital product records.	Pricing, customer willingness to pay, reverse-logistics costs, and SME implementation remain underexplored.
Circular economy and lifecycle services	Grotowska and Beer [2]; Li et al. [21]; Şūmakaris et al. [22]; Günal Ertaş [23]; Chipambwa et al. [24]	Circular strategies emphasize material reduction, design for disassembly, life extension, reuse, upcycling, and recovery across the product lifecycle.	Bamboo products should use detachable joints, standardized parts, repairable finishes, residue upcycling, and clear end-of-life pathways.	Studies use inconsistent lifecycle boundaries and indicators; economic and social outcomes are rarely assessed together.
Furniture design, digitalization, and market transformation	Bumgardner and Nicholls [11]; Daglio et al. [25]; Ashraf [26]; Amin and Kumar [27]; Xiong et al. [28]; Phuoc et al. [29]	Human-centered design, customization, modularity, digital configuration, and service-supported retail improve product-user fit and market differentiation.	Digital configuration, standardized quotations, modular design, transparent care information, and coordinated delivery can reduce errors and returns.	Sustainability benefits are often claimed rather than measured through longitudinal or lifecycle evidence.
Material-specific sustainable design and value creation	Connelly and Mutiara [1]; Günal Ertaş [23]; Chipambwa et al. [24]; Yang [8]; Xiong et al. [28]	Bamboo value is strengthened through material-efficient design, ergonomic quality, craft capability, cultural branding, and consumer education.	Material advantages should be connected with customization, care guidance, repair services, craft-based branding, and regional service networks.	Evidence is fragmented and localized; integrated service ecosystems and after-sales performance are insufficiently studied.
Co-creation, user experience, and social sustainability	Zhang et al. [9]; Zhou et al. [30]; Sjödin et al. [19]; Prestes Joly et al. [31]; Lee et al. [32]; Lin et al. [33]	Co-creation and structured interpretation of functional, emotional, and cultural needs improve service relevance, acceptance, and stakeholder ownership.	Users, craftspeople, manufacturers, retailers, and installers should jointly shape touchpoints from consultation and ordering to maintenance and recovery.	Transfer from adjacent sectors requires stronger outcome measures and evidence that improved service journeys extend product life.

Note. Selected studies are listed to illustrate the evidence supporting each theme. The themes are not treated as

mutually exclusive frequency categories.

Publication output remained below ten studies per year between 2019 and 2022 but increased markedly to 20 studies in 2023. This rise indicates growing scholarly attention to service innovation and sustainability in furniture-related research, see Figure 2.

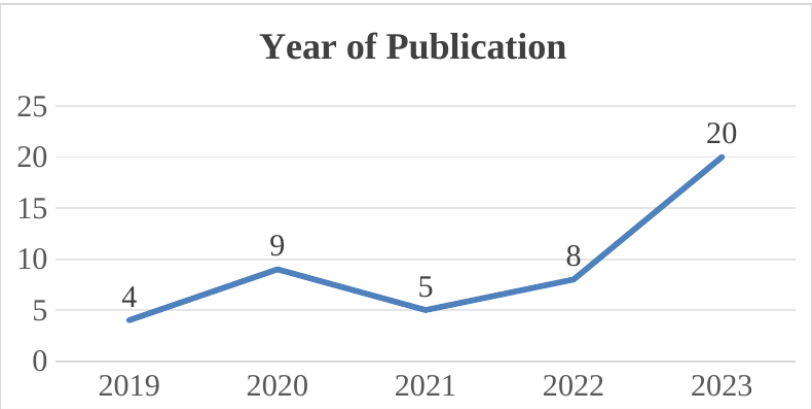


Figure 2. *Year-wise Distribution of Included Studies*

The journal distribution is shown in Figure 3. The journals with the most publications are Sustainability (10), Industrial Marketing Management (3), Science of The Total Environment (2), and Buildings (2). Other journals with fewer publications include Journal of Business Research, Journal of Service Research, Forests, Sustainable Production and Consumption, etc.



Figure 3. *Journal Distribution of Included Studies*

As shown in Figure 4, the majority (41.3%) are mixed research articles, followed by qualitative articles (34.78%), followed by quantitative methods (17.39%), and a minority (6.52%) are bibliometric methods.

As shown in the pie chart above in Figure 5, the majority of the selected article cases are from Asia (50%), followed by Europe (30.43%), North America (13.04%), South America (4.35%), and finally Australia.

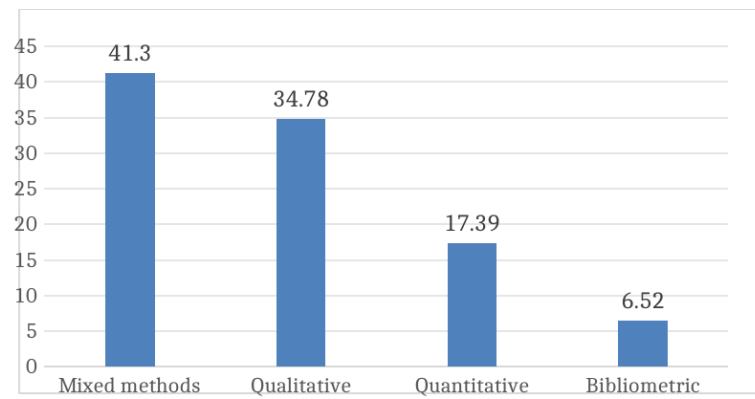


Figure 4. *Research Method Classification*

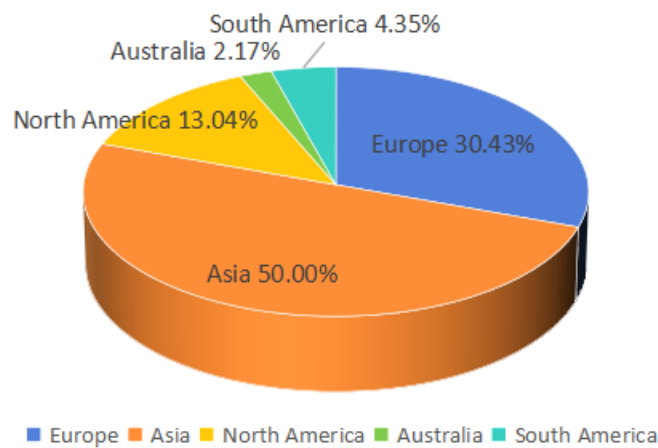


Figure 5. *Geographic Distribution of Included Studies*

4. DISCUSSION

This study aimed to examine service innovation strategies for sustainable furniture design, with a specific focus on Chinese bamboo furniture. Two core research questions guided this analysis: first, what are the dominant service innovation strategies applied in sustainable furniture design; and second, how can these strategies support the sustainable development of Chinese bamboo furniture design. By systematically reviewing 46 studies published between 2019 and 2023, the findings provide a clear overview of current approaches and their implications for both research and practice.

Compared with previous literature reviews in related fields, this study fills a clear research gap. Existing reviews have focused on sustainable craft design, bibliometric analyses of furniture systems, general sustainable practices in furniture design, or service innovation across broader industrial contexts. None of these efforts have systematically integrated service innovation, sustainable furniture design, and bamboo-based applications, nor have they centered specifically on the Chinese bamboo furniture sector. This review therefore offers a new, focused perspective that connects service innovation theory with sustainable furniture practice, while highlighting the unique potential of bamboo materials.

The synthesis indicates that service innovation strategies can support sustainability outcomes in furniture design. Six interconnected themes were identified: organizational capabilities for sustainability-oriented service innovation; product–service systems and digital servitization; circular economy and lifecycle services; furniture design, digitalization, and market transformation; material-specific sustainable design and value creation; and co-creation, user experience, and social sustainability. Collectively, these themes indicate that sustainable furniture development depends not on a single strategy but on the interaction of organizational capability, lifecycle services, circular design, digital tools, material-specific value creation, and stakeholder participation. These strategies collectively help move the furniture industry away from the traditional linear model of production and disposal, toward more resource-efficient, service-centered operations. For Chinese bamboo furniture, such strategies are particularly relevant. Bamboo’s renewable nature, low environmental impact, and fast-growing characteristics align well with service models that prioritize durability, maintenance, reuse, and recycling. In this sense, service innovation does not merely add value but amplifies the inherent sustainability advantages of bamboo

materials.

For Chinese bamboo furniture, the six themes suggest that bamboo's renewable material properties need to be supported by coordinated service systems covering customization, delivery, maintenance, repair, reuse, and recovery.

The findings of this review carry several theoretical contributions. First, they organize and summarize existing service innovation approaches within the specific context of sustainable furniture design, providing a clearer conceptual basis for future studies. Second, they extend the application of sustainability-oriented service innovation and PSS frameworks to bamboo furniture, showing how these theories can be adapted to renewable material-based design. Third, they highlight the close relationship between service innovation and material choice, suggesting that eco-friendly materials such as bamboo can be more effectively leveraged when paired with well-designed service systems.

From a practical perspective, the results offer meaningful implications for different stakeholders in the furniture sector. For the industry as a whole, the findings emphasize the importance of shifting from product-only business models toward service-integrated approaches, which can reduce environmental burdens while enhancing long-term competitiveness. For furniture enterprises, adopting PSS and circular economy practices, alongside digital servitization, can help differentiate products and build more sustainable operations, especially when using bamboo as a core material. For designers, integrating lifecycle thinking and service design principles into bamboo furniture projects can improve durability, repairability, and overall user experience, making sustainability more practical and accessible. For policymakers, the results support the development of policies that encourage service innovation in the furniture industry, promote sustainable bamboo resource management, and create incentives for circular economy transitions.

This study also has several limitations that should be acknowledged. First, the review is restricted to English-language journal articles published between 2019 and 2023, which may exclude relevant non-English studies or older but foundational work. Second, the focus on peer-reviewed articles means that industry reports, practical case studies, or unpublished projects are not included, potentially limiting the scope of practical insights. Third, although Chinese bamboo furniture is emphasized, the literature included contains limited empirical data from Chinese manufacturers, which restricts the depth of context-specific conclusions.

Based on these findings and limitations, several directions for future research can be suggested. First, empirical studies focusing on Chinese bamboo furniture enterprises would help validate how service innovation strategies are implemented in practice and what challenges exist. Second, cross-regional comparative research could explore how service innovation models adapt to different cultural and industrial contexts within the furniture sector. Third, quantitative research could further examine the relationships between service innovation, bamboo material utilization, and environmental or economic performance. Finally, interdisciplinary studies combining digital technology, service design, and bamboo material research may generate new solutions for advancing sustainable furniture design in China and globally.

5. CONCLUSION

This systematic literature review synthesized 46 studies published between 2019 and 2023 and identified six interconnected themes: organizational capabilities for sustainability-oriented service innovation; product-service systems and digital servitization; circular economy and lifecycle services; furniture design, digitalization, and market transformation; material-specific sustainable design and value creation; and co-creation, user experience, and social sustainability. The evidence indicates that service innovation can support sustainable furniture design by extending product lifespans, improving maintenance and recovery, strengthening user value, and enabling service-based business models. For Chinese bamboo furniture, the findings suggest that bamboo's renewable material advantages should be combined with digital configuration, lifecycle services, repair, take-back, and stakeholder co-creation.

This study fills a critical gap by systematically integrating service innovation, sustainable furniture design, and bamboo applications—especially for Chinese bamboo furniture—an area overlooked in prior reviews. It suggests that service innovation can strengthen the sustainability potential of bamboo by connecting material advantages with lifecycle-oriented services. The findings offer clear theoretical frameworks and practical guidance for industry, enterprises, designers, and policymakers. Limitations include English-language focus and limited Chinese empirical data, suggesting future empirical and interdisciplinary research. Overall, this review underscores service innovation as a core enabler for sustainable furniture development, providing a foundation for advancing Chinese bamboo furniture innovation.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

DATA AVAILABILITY

All data required to support the findings of this study are included in this paper.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this manuscript, the authors used ChatGPT to improve the linguistic quality and readability of the content. After using this AI tool, the authors comprehensively reviewed and revised the manuscript to ensure its accuracy, integrity, and scientific rigour. All authors bear full responsibility for the final content of the published work, including any errors or inconsistencies that may remain.

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