

REVIEW ARTICLE

Community recycling of used items: A social design perspective

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Abstract

Social design has rapidly emerged as an interdisciplinary approach that applies design methods to address complex social problems and improve quality of life. Emphasizing sustainable development and social value, it integrates creative thinking and collaborative models across multiple fields to generate innovative solutions, reflecting design's growing responsibility in driving meaningful social progress. This review examines community old-item recycling from a social design perspective by reviewing both international and local perspectives from the international and Chinese literature. It identifies three critical shifts for advancing the field: from functional optimization toward community construction, from digital-centric solutions toward integrated online-offline spatial design, and from universal templates toward contextually adaptive approaches. The review reveals that while scholarly achievements have accumulated considerably, significant gaps remain in integrating social design theory with recycling practice, understanding communities as social organisms, and attending to the symbolic dimensions of used items. By proposing a framework that treats old-item recycling as a process of meaning transfer and social relation reproduction, this review provides theoretical grounding and practical guidance for designing sustainable community resource systems that foster collective well-being.

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1. Introduction

In recent years, social design has experienced rapid development and gradually occupied an important position in design studies. Originating from reflection on living environments, it represents an innovative approach that employs design methods from a developmental perspective to address social problems, improve human quality of life, and make social progress. Social design emphasizes the responsibility and mission of design in driving sustainable social development, focusing on providing products and services with social value. Faced with increasingly complex and diverse social problems, people urgently need more efficient response strategies. As an interdisciplinary innovative method, social design integrates creative thinking, collaborative models, and design concepts to synthesize knowledge and resources across multiple fields, offering new perspectives and solutions to these challenges. Meanwhile, with growing attention to social

sustainability, social design has gradually demonstrated its role in promoting social equity, environmental protection, and rational resource utilization. Furthermore, against the global backdrop of advocating sustainable development, efficient resource utilization and environmental protection have become focal points of social concern. With the prevalence of consumerism, massive amounts of used items have accumulated in daily life. These used items are often abandoned or discarded due to the lack of effective disposal channels, resulting in severe resource waste. At the same time, communities, as basic units of people's lives, contain enormous potential for resource sharing. In recent years, the rapid development of mobile internet technology has provided new opportunities for community resource sharing. By establishing community old-item online sharing platforms, it becomes possible to overcome temporal and spatial constraints, promote interaction and cooperation among community members, and achieve the re-circulation and reuse of used items. From the perspective of social design, such platforms are not merely technological applications but innovative attempts to solve social problems and improve community quality of life in China.

This review, therefore, presents significant theoretical value at the intersection of social design and sustainable community development. First, by reviewing the present state of social design, sustainable design, and community construction, the review identifies several gaps in academic discourse: the integration of social design theory with community old-item recycling practice remains in its infancy, the understanding of community as a social organism is insufficient, and the emotional, memory, and cultural meanings embedded in used items lack in-depth exploration. These findings point the way for subsequent research and help advance social design theory from conceptual analysis toward practical application. Second, the review integrates diverse theoretical resources, including social innovation design, participatory design, and collaborative design, to construct a theoretical framework for understanding community old-item recycling issues, providing analytical tools that can serve as valuable references for related research. Furthermore, the review considers the limitation of insufficient scholarly attention to Asian contexts, emphasizing the importance of localized exploration to enrich the geographical and cultural dimensions of social design.

The review is timely because the intersection of social design and community old-item recycling has reached a critical juncture: while social design has matured as a theoretical field and mobile internet technologies have created unprecedented opportunities for community

resource sharing, the integration of social design theory with recycling practice remains in its infancy. Existing research remains fragmented across disciplines, largely treats recycling as a technical or logistical problem rather than a socially embedded practice, and overlooks communities as social organisms with collective memory and relational networks. By synthesizing international and Chinese literature, this review addresses these gaps at a time when both scholarly and practical demand for cross-cultural, theoretically grounded frameworks is urgently needed.

2. Methodology

This review adopted a narrative review as its methodological framework, aiming to map the knowledge landscape at the intersection of social design and community recycling of used goods, clarify the evolutionary trajectories and debates in the literature, and propose a theoretically illuminating analytical framework. Rather than following the rigid protocols of systematic review, thematic synthesis and critical analysis were employed as the primary methodological tools in this review. This choice was grounded in two main considerations. First, this interdisciplinary domain spans multiple disciplines, including design studies, sociology, environmental science, and urban planning, and encompasses diverse types of literature. Rigid inclusion criteria might lead to the selective neglect of practical wisdom and local experiential knowledge. Second, the objective of this review is not to quantitatively test specific hypotheses, but rather to generate new theoretical perspectives through the critical integration of existing literature. A narrative review is better suited to this theory-building goal than a systematic review.

International literature was retrieved from the Web of Science Core Collection, Scopus, and Google Scholar, covering the period from 2014 to 2026. The keyword combinations were ("social design" OR "co-design" OR "participatory design") and ("community" OR "neighborhood") and ("recycling" OR "reuse" OR "second-hand" OR "sharing"). Based on the retrieved literature, we conducted both forward and backward snowball searches of reference lists to supplement studies not covered by database searches. Chinese literature was sourced from the China National Knowledge Infrastructure (CNKI) and Wanfang Database, covering the same time span. The keyword combinations were the same as those used in the international literature review. Additionally, we conducted targeted searches across design journals, including *Zhuangshi*, *Baozhuang Gongcheng* (*Packaging Engineering*), *Sheji* (*Design*), and *Gongye Sheji* (*Industrial Design*), to capture core Chinese-language outputs in this field.

Inclusion criteria were as follows: the theoretical framework must involve social design, participatory design, co-design, or sustainable design; the research context must be limited to design practices at the community, neighborhood, or residential area level; the discussion must relate to the recycling, reuse, sharing, or circulation of goods; and the document type must be a peer-reviewed journal article, conference proceedings paper, or academically valuable dissertation. Exclusion criteria included studies that discussed recycling systems solely from technical engineering or logistics management perspectives without a design dimension; those that did not involve a community context; and those for which full texts were unavailable. Based on the above strategy, the research team initially identified 87 international documents and 65 Chinese documents after deduplication. After reading abstracts and full texts on a case-by-case basis, 40 representative international documents and 33 Chinese documents were ultimately included, totaling 73 documents (Figure 1).

The analytical method employed was thematic synthesis. First, all included literature was read in full to extract core research questions, theoretical frameworks, methodological designs, and main findings, and a literature summary matrix was compiled. Second, recurring themes and concepts across the literature were identified, and open coding and categorical integration were conducted, initially yielding secondary themes such as sustainable community construction, social innovation design methodology, community participation approaches, inclusive design for specific populations, material-spatial interventions, service system design, value co-creation, and theoretical intervention of social design. Third, a higher-level integration and abstraction was performed above these secondary themes, drawing on gaps and tensions identified through critical reading; the functionalist–relationalist evolutionary axis was distilled, and the three core shifts were ultimately proposed as the theoretical framework threading through the entire review. Throughout this process, international and Chinese literature were placed in a parallel and intertextual structure, enabling readers to compare differences in scholarly production across different contexts under the same theme.

Nevertheless, this review has several limitations. Due to language constraints, academic literature in languages other than English and Chinese was not included, and some important research findings from non-Anglophone academic circles may have been overlooked. Although this review adopts an international perspective, its coverage of representative literature on social design practice in the Global South remains limited. Furthermore, to prevent

the review from becoming superficial due to an excessively broad scope, a relatively traditional spatial definition of community was adopted during literature screening. Consequently, the practice of sharing old items in emerging community forms, such as online communities and virtual communities, was not adequately examined, an issue that warrants further exploration in subsequent research.

3. International views

In terms of international views, the intersection of social design and community sustainability research has shown vigorous development in recent years. Researchers have early on integrated social innovation design, participatory methods, and community construction, forming a research ecology where diverse theoretical resources and rich practical cases mutually nourish each other. Research has mainly unfolded along dimensions including sustainable community construction, social innovation design methodology, community participation mechanisms, inclusive design for specific populations, and material spatial interventions, providing important references and methodological resources for examining community old-item recycling issues from a social design perspective.

For the topic of sustainable community construction, researchers have consistently focused on the multifunctional attributes of community spaces. Pranab and Bansal¹ analyzed the role of multifunctional public spaces in sustainable community construction, pointing out that diversified and composite spatial utilization is not only an important approach to achieving intensive land use but also a material foundation for the continuation and reproduction of community social relations. Zhang and Sun² used urban communities in Shanghai as their research subject to explore integrated design approaches for sustainable public seating. Salmistu and Kotval³ examined the role of spatial interventions and environmental characteristics in constructing age-friendly communities from the perspective of urban planning and design. Additionally, Xie *et al.*⁴ systematically reviewed the conceptual evolution and academic boundaries of sustainable design through bibliometric and review methods, providing a theoretical framework for understanding sustainable design practice at the community scale. D'Adamo⁵ critically noted, from a systems perspective, that the social dimension of community sustainability has long been overshadowed by the technical dimension, and thus urgently requires rebalancing: sustainable communities are not merely an aggregate of environmental performance metrics, but rather depend on the organic integration of socio-economic systems, governance structures, and everyday practices. Schraml and Färber⁶ started from the material design of street furniture to demonstrate the catalytic

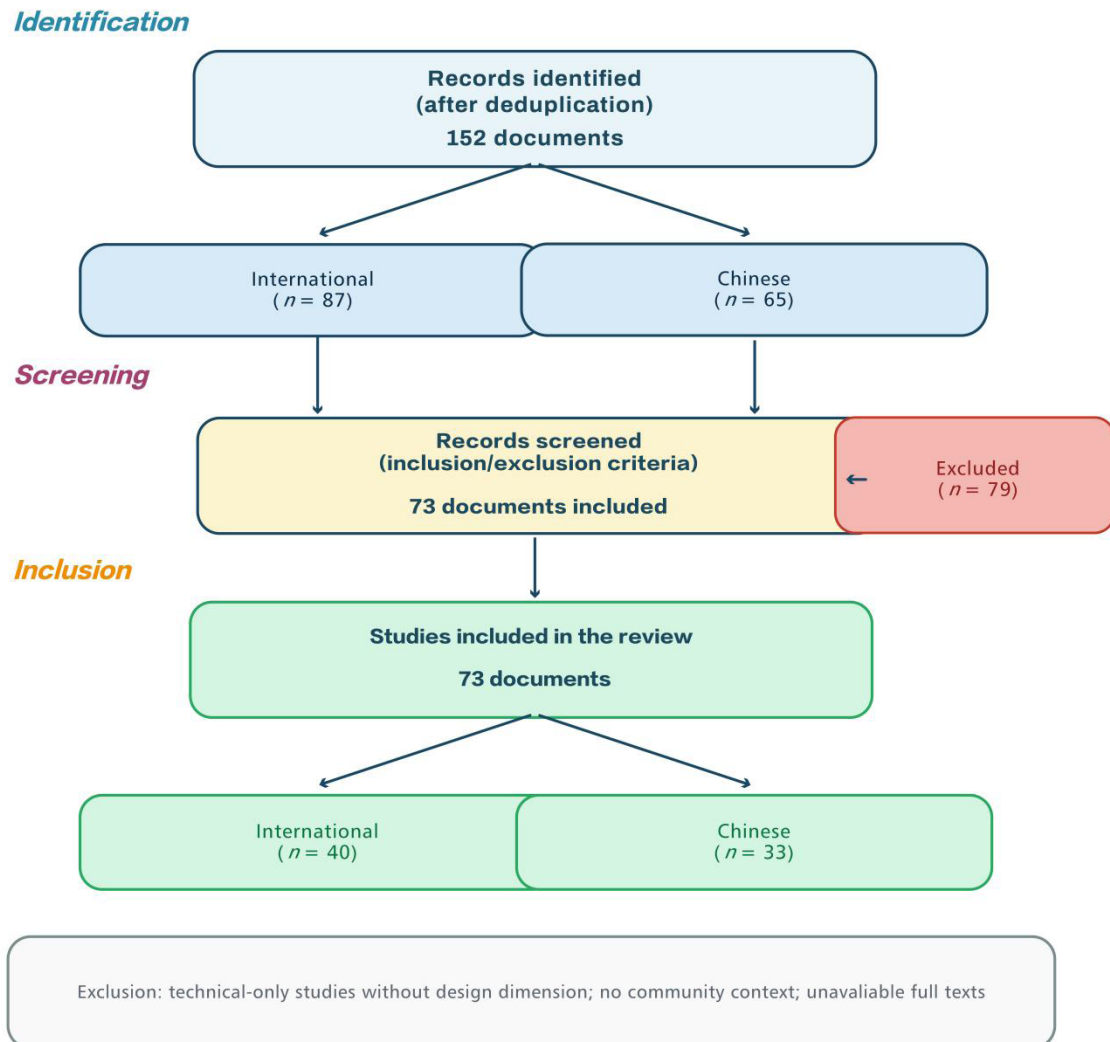


Figure 1. The flow diagram of article selection

role of physical configurations in public spaces for social interaction, emphasizing that street furniture is not merely functional infrastructure but also a material medium of social relations, thereby providing an important reference for understanding the design quality of physical community spaces. Regarding the specific design practice of recycling systems, Xu and Cao⁷ applied the Theory of Planned Behavior to the design of a used-clothing recycling system, analyzing residents' recycling behavioral intentions through the three dimensions of attitude, subjective norm, and perceived behavioral control. They found that subjective norm exerts a significant influence on recycling behavior, thereby revealing, from a social-

psychological perspective, how community atmosphere shapes individual recycling decisions. Lu and Han⁸ used public residential areas in Shanghai as their research objects, focusing on the spatial configuration of recycling bins and the optimization of visual wayfinding systems. They found that the aesthetic quality and information clarity of recycling facilities are significantly and positively correlated with residents' willingness to use them, thereby providing empirical evidence from the Chinese urban context for the offline touchpoint design of recycling systems.

With respect to the issue of social innovation design, Hallgrimsson⁹ systematically explored methodological

issues in conducting social innovation design within traditional communities, emphasizing the collaborative process of designing with the community. Hashmi *et al.*¹⁰ integrated human-centered design and social science research methods to examine how design can empower community health workers. Aichroth and Kempen¹¹ explored the synergies between social sustainability and digital transformation, proposing a design framework for mixed-methods research. Tromp and Vial¹² identified five core components of social design, constructing a unified theoretical framework to support both research and practice. Bevolo *et al.*¹³ explored pathways for building collective well-being and community resilience. Nold *et al.*¹⁴ proposed the “Twelve Potluck Principles,” providing operational guidance for the practical ethics and collaborative approaches of social design. Janzer and Weinstein¹⁵, from a critical perspective, reflected on neo-colonial tendencies in social design, reminding researchers to focus on power relations in design practice. Wang *et al.*¹⁶ then revealed, from the perspective of design school–community interaction, that multidimensional proximity beyond physical proximity plays a pivotal role in social innovation, and elucidated the conditions and mechanisms through which design knowledge achieves bidirectional flow in the social innovation process, thereby providing a more nuanced theoretical explanation for external intervention in social design.

Researchers have also focused on community participation. Llewellyn *et al.*¹⁷ conducted research on residents’ perceptions and interactions regarding community self-sufficiency, community floor area ratio, and civic generosity. Campbell *et al.*¹⁸ analyzed the role of online and offline peer learning in sustainable community development. Simmons and Sanders¹⁹ studied how behavioral interventions can reduce plastic waste and destructive fishing practices. Riskiyanto *et al.*²⁰ explored co-creation mechanisms in community-based design practice through a role-playing model, offering a new view for understanding collaborative forms of community participation.

As for inclusive design for specific populations, Zhu *et al.*²¹ explored how digital narrative interventions enhance social participation among individuals with mild cognitive impairment through usability testing. Svensson and Stjernborg²² examined the relationship between aging, social participation, and everyday mobility. Embarak *et al.*²³ focused on the architectural design of online social communities for elderly people. Gray *et al.*²⁴ used vulnerable communities in social housing as their research subject to explore the restorative and regenerative impacts of community greening projects. Takeo *et al.*²⁵ investigated

methods for conducting continuous health surveys in elderly communities and their relationship with social capital.

Regarding collaborative design and participatory methods, Anderson-Coto *et al.*²⁶ proposed the concept of culturally sustainable design, emphasizing that participatory design should genuinely place community voices at the center. Manchester and Willatt²⁷ proposed the concept of care-full co-design based on a feminist posthuman practice perspective. Lyles *et al.*²⁸ explored the co-design process for building client resources and communication platforms for community organizations. Hertzum and Bossen²⁹ reviewed the methodological frameworks and key characteristics of participatory design. Yu³⁰ further distinguished the boundaries and relationships between participatory design and co-design. Nakao³¹ proposed the reflexive co-design method, emphasizing design ethics based on responsible research and innovation. Kerr *et al.*³² constructed a whole-process model for multi-stakeholder co-design. Kropp *et al.*³³ explored human–machine entanglement in socio-digital co-design practice through case studies. Cassim³⁴ examined how to achieve the goals of social design through gamification. Gutierrez and Jurow³⁵ proposed the concept of social design experiments, emphasizing equity-oriented social transformation through design. da Silva *et al.*³⁶ applied Participatory Action Design Research (PADR) to the development of community recycling initiatives, proposing a social participatory persuasion framework and emphasizing that peer influence and social norms play a central role in behavioral change. The mere provision of recycling facilities is insufficient to alter behavior; rather, recycling practices must be embedded into everyday social practices through socially participatory design. Choi and Lee³⁷ further employed co-design to intervene in food waste recycling, confirming that youth participation in the design process positively affects the sustainability of their behavior. The study illustrates that co-design possesses dual value in inter-generational transmission and environmental education, transforming recycling from “something one is asked to do” into “something co-created by community members.” O’Donnell³⁸ extended the scope of co-design to the ecological relations of multi-species symbiosis, proposing a multi-species ethics design framework and exploring symbiotic futures between humans and non-humans in urban design. Although not directly concerned with used-goods recycling, its inquiry into how design reconfigures the relationships between humans and objects, and between humans and the environment bears methodological affinities with the proposition of used-goods recycling as a form of relational reproduction.

Additionally, for social capital and community interaction, Li *et al.*³⁹ explored the mechanisms by which customer social capital in brand communities is shaped through a gamification affordance perspective. D'Aquino *et al.*⁴⁰ examined how to develop social acceptance questionnaires for renewable energy technologies using design thinking methods.

Based on the above international literature review, several noteworthy academic characteristics and development trends can be identified. In terms of theoretical resources, research demonstrates the interweaving of multiple theoretical perspectives, with frameworks such as social innovation design, participatory design, sustainable design, and inclusive design collectively constituting an academic toolbox for understanding community issues. Regarding research methods, co-design, participatory action research, and mixed methods are increasingly gaining attention. For research topics, studies on specific populations, social capital, material spatial interventions, and their connections to social goals constitute the main orientations. However, the aforementioned studies also present several limitations worth reflecting on. First, research on community item recycling and reuse as a direct object remains relatively scattered, with comprehensive studies still appearing insufficient. Second, most studies concentrate on methodological contributions or theoretical construction, while research tracking the entire design process and real effects of design practice is relatively weak. Third, the relationship between design and society in social design still awaits further clarification.

4. Local views

In recent years, as the concept of sustainable development has continued to gain momentum and social innovation design has gradually risen to prominence, the issue of old-item recycling and reuse within community settings has increasingly entered the research horizon of design studies in China. Chinese literature has mainly discussed this topic from perspectives such as service system design, public participation approaches, sustainable design strategies, and the intervention of social design theory. While relevant achievements have been reached, they have also revealed tendencies and disadvantages that warrant further critical examination.

In the field of service system design, research on community old-item recycling emerged earliest and has become the most mature. Sun⁴¹ systematically constructed an online-offline integrated community recycling service model. From a user participation perspective, the study explored how service design could enhance residents' experience and motivation throughout the entire old-

item recycling process, thereby laying a methodological foundation for community old-item recycling service design. Chen⁴² expanded the research scope to rural settings, examining how special logistics conditions, residents' living habits, and social relation networks in rural communities affect old-item recycling systems, revealing the constraints and insights that urban-rural differences impose on service design strategies. Liu⁴³, using the Dongchang Community in Qingdao as a case study, explored the recycling system design for kitchen waste as a specific category. Although this research focused on waste recycling rather than old-item reuse in a broad sense, its methodological approach to service system construction holds referential value.

It is worth noting that researchers have begun to move beyond the functionalist perspective of recycling as waste disposal, instead examining old-item recycling within broader networks of social relations and the context of community construction. Liu⁴⁴, using the Xingzuo Community in Wuhan as a case study, explored how service design could integrate online platforms with offline recycling touchpoints. This research preliminarily touched upon the design of community participation mechanisms. Peng and Wu⁴⁵ connected waste regeneration and reuse with community construction, emphasizing the role of design in promoting community environmental awareness and collective action. He⁴⁶ approached the issue from a behavioral design perspective, focusing on how facility design could guide residents in developing recycling habits, thereby shifting attention from digital service platforms toward material spatial facilities and offering an alternative pathway for old-item recycling design. Although these studies vary in their theoretical perspectives, they collectively point to a core question: how to transform old-item recycling from individual environmental behavior into collective community practice.

The introduction of value co-creation theory has brought new analytical perspectives to community old-item recycling research. Qin⁴⁷ explored the interaction processes among multiple actors, including residents, recycling enterprises, and community organizations during used clothing recycling, analyzing how various parties achieve synergistic value creation in practice. The study demonstrates that when residents shift from passive service users to active value co-creators, community old-item recycling can become a sustainably operating activity. The significance of this research lies in its redefinition of community residents' roles: community residents transform from singular service recipients into active participants in design co-creation, a shift that imbues old-item recycling and reuse with attributes of social

innovation. Wu⁴⁸ also developed a co-creation design methodology that facilitates inter-generational integration within communities by enabling collaborative participation across different age groups.

In parallel with this direction, Wang and Xu⁴⁹ focused on used kitchenware sharing platforms, exploring how sharing models reconstruct community relationships. Cai⁵⁰ systematically studied the models and mechanisms of tool-sharing services, demonstrating that the sharing of used items is not only resource reuse but also an important medium for the reproduction of community social relations. Wang *et al.*⁵¹ continued this line of thinking, examining the construction strategies of hardware tool-sharing systems from a sustainable design perspective. Yan⁵² investigated how to design community idle resource sharing services by analyzing residents' behavioral intentions to promote sustainable resource utilization among neighbors.

The introduction of social design has provided a broader theoretical horizon for research on community old-item recycling. Xu⁵³ conducted a theoretical analysis of the connotation of social design and its application in community governance, clarifying the interplay between society and design within social design. Zhou⁵⁴ explored sustainable development pathways for ceramic intangible cultural heritage by applying social design principles to bridge traditional craftsmanship with contemporary community engagement. Wu and Tu⁵⁵ further deepened this kind of inquiry, reflecting on the theoretical foundations of social design from an ontological perspective of design studies. Feng⁵⁶ applied social design to rural community practices, exploring how design intervenes in the process of rural community construction. Although the research focused on community construction in a broad sense rather than old-item recycling, it provided a methodological exemplar for community research from a social design perspective. Huang and He⁵⁷, against the background of urban renewal, analyzed the applicability and transformative pathways of social design in community construction practice. Ma⁵⁸ proposed strategies for constructing comprehensive elderly care service facilities in urban communities through a social design approach that addresses the holistic needs of aging populations. Xiang⁵⁹ approached the issue from the angle of urban renewal, exploring the modes of intervention through which social design engages in community spatial reconstruction. These studies analyzed community old-item recycling from a social design perspective and provided theoretical support for subsequent discussions. However, researchers have largely concentrated on the construction of community relations, rendering the discussion of old-item recycling and reuse as a specific practical arena somewhat insufficient.

Within the broader scope of community service design, old-item recycling is often mentioned as one type of service among many. Liu *et al.*⁶⁰ explored the integrated design of community service systems from an age-friendly perspective, proposing design strategies that position community service centers as multifunctional composite spaces. Yang⁶¹ used Hong Kong's GREEN@COMMUNITY recycling service as a case study, analyzing the social structure of community convenience services. This research demonstrates that the success of community recycling services depends not only on the rationality of system design but also on the degree of alignment with the community's social structure. Tan and Wang⁶² focused on the user experience optimization of digital platforms, proposing innovative design strategies for used clothing recycling platforms. Studies by Fang⁶³, Yuan⁶⁴, Peng *et al.*⁶⁵, Li⁶⁶, and Jing *et al.*⁶⁷, though varying in their research objects, collectively constitute a methodological resource pool for understanding community service design. Wang *et al.*⁶⁸ explored innovative pathways for community education services from the intersecting perspective of sustainable design and active aging. Zhao⁶⁹ focused on book sharing as a specific type of community resource sharing, and her explorations in service design methodology offer referential value for old-item recycling research.

Zou *et al.*⁷⁰ centered their research on community gardening without directly discussing old-item recycling. However, their approach, namely introducing sustainable design concepts into the community construction process, offers referential value. Li⁷¹ approached the issue from a spatial design perspective, exploring experiential design strategies for used clothing recycling spaces, providing references for research on the material spatial dimensions of old-item recycling. Liu⁷², using Dingshu Town in Yixing City as a case study, integrated social design with sustainable community landscape development. Although her research focused on landscape design, it offers enlightening insights regarding the application of social design theory in rural communities. Chen and Chen⁷³ introduced a community psychology perspective to explore the mechanisms through which community design influences residents' sense of well-being, providing a theoretical reference for understanding the socio-psychological effects of old-item recycling design.

Based on these studies, several noteworthy trends and issues can be identified. In terms of research perspectives, discussions have evolved from early focuses on service system design to multiple theoretical frameworks including sustainable design, social innovation design, and social design, resulting in increasingly rich theoretical foundations. Regarding research methods, qualitative

approaches such as participatory design, action research, and field investigations have received greater attention, and researchers entering real community contexts to conduct practice has become the norm, bringing research processes closer to actual field settings. For research content, scholarly focus has shifted from recycling efficiency and user experience toward deeper issues such as community participation, social relations, and value co-creation, further deepening the discussion. The introduction of value co-creation theory and social design represents an important turning point, providing new analytical tools for understanding the social dimensions involved in community old-item recycling.

5. Discussion

Through a review and comparative analysis of the aforementioned literature, it can be observed that research on community old-item recycling and reuse has accumulated considerable scholarly achievements, demonstrating a favorable trend of interweaving multiple theoretical perspectives, increasingly diverse research methods, and continuously expanding research topics. From the perspective of research themes, scholars have continued to explore areas such as service system design, sustainable design strategies, public participation mechanisms, value co-creation pathways, and the intervention of social design theory; these related achievements have laid a theoretical foundation for this field while providing empirical references at the practical level. From the perspective of research orientation, studies have shown a shift from functionalism toward relationalism, and researchers are no longer confined to efficiency optimization oriented toward recycling as waste disposal, but instead examine old-item recycling within the holistic context of community relational networks and social construction. Consequently, design is regarded as an important force capable of activating community participation, reshaping neighborhood relationships, and constructing collective identity. From the perspective of methodology, qualitative approaches, such as participatory design, action research, and field investigation, have gradually gained attention, and researchers emphasize establishing equal collaborative relationships with community members, transforming the research process from unidirectional observation to interactive cooperation, thereby accumulating methodological experience in understanding the process of design intervention in social issues.

However, the research also presents several aspects worthy of critical reflection. First, the integration of social design with community old-item recycling practice remains in its infancy, and most studies either focus on conceptual analysis and theoretical elaboration of social

design or concentrate on constructing service systems for old-item recycling, while theoretical dialogue and empirical fusion between the two still await deepening. Second, research often understands community merely in terms of spatial units or population aggregates, rarely regarding it as a social organism with cultural continuity, relational networks, and collective memory. Consequently, it is difficult to truly address issues of community identity and cultural significance underlying old-item recycling and reuse. Used items are carriers in material form that also bear users' memories, emotions, and traces of life. During their circulation, meaning undergoes transfer while relationships are regenerated, yet this dimension has not received adequate attention in research so far. Third, most achievements concentrate on service model design or digital platform development, thus neglecting more materially grounded and place-based practices, such as old-item transformation, regenerative design, and spatial creation. Fourth, research lacks sustained attention to the process and dynamic nature of old-item recycling and reuse, and often remains fixed on the recycling itself, leaving stages such as redistribution, recreation, and re-meaning-making after used items enter the community without systematic examination. Fifth, research shows insufficient attention to differences among various community contexts. Different regions and types of communities exhibit obvious distinctions in old-item types, sharing habits, and value orientations, yet discussions on personalization and adaptability of community old-item sharing platforms remain relatively scarce.

In brief, research lays an important foundation for this topic with respect to theoretical perspectives, methodological pathways, and practical issues, while also clearly identifying research spaces that await further deepening. First, there is a need to shift from service system optimization toward community construction. Future research should distinguish itself from existing studies that focus on improving recycling process efficiency and user experience, instead treating old-item recycling as a process of meaning circulation and social relation reproduction within communities. Consequently, priority should be given to examining how used items, through exchange, transformation, and reuse, carry and transmit personal memories, local knowledge, and collective identity. Design can be approached from two directions. The first is to create a brief circulation archive for each used item, documenting its origin, the previous owner's experience with it, or a short dedication. This information could take the form of a handwritten card or a QR code attached to the item, which can be scanned to view. The goal is not to make the recycling process more intelligent, but to turn the item itself into a medium that connects strangers. The

second direction is to make the exchange process warm. Rather than pursuing the fastest possible handover, the design should create scenarios that allow both parties to have a brief interaction. For example, by establishing an exchange ritual. Once a fixed Exchange Day or Items Farewell Ceremony is instituted, the transfer of items is elevated from a simple act of picking up and dropping off to a public event with communal commemorative significance. This, in turn, enhances the residents' sense of psychological ritual and participation. These practices are neither costly nor difficult to implement. Their core significance lies in transforming the exchange of things into the connection of people. The designer's task is not to create a perfect recycling system, but to provide the conditions and scenarios for such connections to emerge. Second, both digital platform functionality and offline spatial design should be considered. Future research should address the current tendency to overemphasize digital platforms while relatively neglecting material spaces: when designing platform functions, the synergy between platforms and community offline spaces, such as recycling stations, sharing corners, and transformation workshops, should be examined, thereby exploring design pathways that coordinate online and offline channels. For example, the platform could display the real-world location of a used item, along with how many people are currently following it and whether neighbors have left comments. The purpose of presenting this information is not functional, but social. When a resident visits the sharing corner because of an item, they discover not only the object itself, but also a corner where they can sit, a workshop where they can tinker together, and even people chatting casually. The design of offline spaces must consciously create conditions for these serendipitous encounters, such as movable tables and chairs, open workbenches, and message walls. The shared goal of these design details is not to improve spatial efficiency, but to raise the social warmth of the space. The functions of the online platform and the configuration of offline spaces should guide each other: the platform lets residents know "what is there" and "who will be there," while the offline space enables genuine face-to-face interaction. Therefore, the spatial quality of offline recycling touchpoints should be upgraded from functional satisfaction to relationship-friendly. Third, future research should attend to differences among various communities. Given that communities exhibit obvious distinctions in demographic structure, cultural habits, and sharing concepts, multi-case comparative methods should be adopted. Through investigation and analysis of different types of communities, adaptive design principles for social design intervention in community old-item recycling should be summarized, rather than pursuing

uniform universal templates. In communities with a predominantly elderly population, for example, the design should focus on offline, face-to-face exchange of physical items and story sharing, while lowering the barrier to using digital interfaces. In communities with a predominantly young tenant population, the convenience and social appeal of the online platform should be emphasized more, and lightweight gamification methods, such as point rewards and task achievements, can be introduced. More importantly, the design must preserve blank space for the community's self-evolution. Residents should be encouraged to generate their own rules and adjust spatial layouts through use, so that design intervention becomes an open-ended, organic community practice rather than a closed, finalized solution. The above three directional recommendations enable design to narrow the gap between social design concepts and community sustainable practice, while providing theoretical grounding and design reference for constructing old-item recycling systems that adapt to different cultural characteristics and integrate both online and offline channels.

6. Conclusion

This review has examined the intersection of social design and community old-item recycling practice through a comprehensive review of both international and local literature. By tracing the theoretical evolution from service system design to social design, and by analyzing diverse methodological approaches ranging from participatory action research to co-design frameworks, the review has established a foundation for understanding how design can intervene in community resource circulation in meaningful ways. The findings reveal that while scholarly achievements in this field have accumulated considerably, significant gaps remain that point toward future research directions with substantial theoretical and practical implications.

The theoretical contribution of this review lies in its identification of three critical shifts necessary for advancing community old-item recycling research. First, the transition from functional optimization toward community construction represents a paradigmatic change in how researchers conceptualize the role of design in resource circulation. Rather than treating old-item recycling merely as a waste management problem requiring efficient logistical solutions, this review advocates for understanding it as a process of meaning transfer and social relation reproduction. Used items, as material carriers of personal memories, emotional attachments, and cultural traces, possess symbolic dimensions that transcend their utilitarian functions. When these items circulate within communities, they facilitate not only resource

conservation but also the transmission of local knowledge, the reinforcement of collective identity, and the weaving of social fabric. This perspective aligns with the core tenets of social design, which emphasizes design's responsibility in addressing social problems and improving quality of life through value-laden interventions.

Second, the integration of digital platform functionality with offline spatial design emerges as a crucial consideration for future practice. While mobile internet technologies have undoubtedly expanded the possibilities for community resource sharing by transcending temporal and spatial constraints, an overemphasis on digital solutions risks neglecting the material and place-based dimensions of community life. The physical spaces where used items are collected, displayed, transformed, and re-distributed, such as recycling stations, sharing corners, and transformation workshops, serve as important sites for face-to-face interaction, skill exchange, and relationship building. Future platform design must therefore consider how online interfaces can synergize with offline spaces to create seamless experiences that leverage the strengths of both channels. This approach resonates with the collaborative ethos of social design, which advocates for designing with rather than for communities, and recognizes that sustainable solutions must be embedded in the everyday practices and physical environments of their users.

Third, the imperative to attend to contextual differences among communities challenges the tendency toward universal design templates. Communities vary significantly in their demographic compositions, cultural traditions, value orientations, and sharing habits, all of which influence how old-item recycling initiatives are perceived, adopted, and sustained. What proves effective in an urban high-rise community may fail in a rural village setting, and practices that resonate with elderly residents may not appeal to younger generations. Future research must therefore employ multi-case comparative methods to develop adaptive design principles that can be tailored to specific community characteristics rather than imposing standardized solutions. This commitment to localization not only enhances the effectiveness of design interventions but also embodies the ethical stance of social design, which prioritizes community voices and respects local autonomy.

The practical implications of this review extend to multiple stakeholders involved in community sustainability initiatives. For designers and design researchers, the framework proposed here offers analytical tools for approaching old-item recycling as a socially embedded practice rather than a purely technical challenge. For community practitioners and policymakers, the

emphasis on meaning construction, spatial integration, and contextual adaptation provides actionable guidance for developing recycling programs that resonate with residents' lived experiences. For platform developers, the call to balance digital functionality with offline engagement suggests new possibilities for creating hybrid systems that foster both efficient resource matching and genuine community connection.

Furthermore, this review contributes to the broader discourse on social design by clarifying the relationship between design and society in the context of community resource management. Rather than positioning design as an external force that acts upon passive social contexts, this research conceives of design as a collaborative process that emerges from and responds to the dynamic relations within communities. This understanding helps advance social design from abstract conceptualization toward grounded practice, demonstrating how design thinking can be mobilized to address social problems while remaining sensitive to the complex interplay of material, social, and cultural factors.

In conclusion, community old-item recycling represents a fertile terrain for social design intervention, one that demands theoretical sophistication, methodological rigor, and practical creativity. By shifting from efficiency-oriented service design toward meaning-centered community construction, by bridging digital platforms with physical spaces, and by embracing contextual diversity rather than uniformity, future research and practice can unlock the full potential of design to foster sustainable resource use, strengthen community bonds, and cultivate collective well-being. This review, through its literature review and critical synthesis, has charted the contours of this emerging field and pointed the way toward more integrated, inclusive, and impactful approaches to community sustainability. As global challenges of resource scarcity and environmental degradation intensify, the insights generated here acquire renewed urgency, calling upon designers, researchers, and community members to collaborate in reimagining how we relate to our material possessions and to one another.

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Conflict of interest

The authors declare they have no competing interests.

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