

Research on the Guiding Mechanism of Industrial Design to Sustainable Lifestyle under the Background of Green Transformation

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Abstract: Under the background of accelerating global green transformation, industrial design is shifting from traditional function and aesthetic orientation to systematic guidance of sustainable lifestyle. Focusing on the theoretical level, this article aims to clarify how industrial design can intervene and shape the practice of sustainable life through value reset, behavior intervention and meaning construction without relying on case demonstration or data analysis. The research adopts the methods of conceptual analysis and logical deduction. Firstly, it deconstructs the three dimensions of sustainable lifestyle: material practice, meaning construction and system embedding, and then reveals the process of value reset experienced by industrial design in green transformation. On this basis, the theoretical framework of guiding mechanism with matter-behavior-meaning as the core is constructed. Industrial design can embed the logic of sustainable choice with low resistance and high recognition in users' daily practice through four kinds of action paths: situation presupposition, feedback reinforcement, meaning awakening and system connection. The effectiveness of this mechanism depends on the cooperation between design objects and social technology systems, and its essence is to reconstruct the cognition of the relationship between people and objects, resources and responsibilities in a non-mandatory way, so as to provide support for promoting the transformation of sustainable life from bottom to top.

Keywords: Industrial design; Green transformation; Sustainable lifestyle; Guiding mechanism; Value replacement

1. Introduction

Under the macro background of accelerating global climate governance and the universal establishment of carbon neutrality goal, green transformation has evolved from a marginal issue to a core driving force to reshape industrial logic and social operation mode [1]. This transformation not only involves the systematic adjustment of energy structure, production mode and technical path, but also deeply affects the structural changes of consumer culture, daily practice and value judgment [2]. In this process, industrial design, as an intermediary force connecting technical rationality and life world, is undergoing a profound transition from formal beautification and function optimization to value guidance and behavior intervention [3]. Traditional industrial design has been embedded in the linear economic paradigm for a long time, and it is oriented to maximize efficiency and market expansion. Its implicit logic of "use up and discard" invisibly strengthens the habit of living with resource consumption [4]. The closed-loop thinking, life cycle consciousness and ecological responsibility ethics required by green transformation force industrial design to re-examine its position in the ternary relationship of product-user-environment [5].

Although the existing research initially identifies the role of industrial design in sustainable development, it lacks a systematic explanation of its mechanism of guiding sustainable lifestyle, especially in terms of value reset, behavior trigger and institutional coordination [6]. This article constructs a theoretical framework with industrial design as the dynamic intermediary, and discusses how it reconstructs users' cognition of resources, time and responsibility through the construction of material form, interactive logic and meaning, and promotes the evolution of daily practice to low environmental load and high social welfare. Based on concept discrimination and logical deduction, this study tries to clarify the theoretical possibility of industrial design from passive response to active shaping, and provides a new analytical perspective for understanding the non-mandatory generation path of sustainable lifestyle.

2. Green transformation and the value reset of industrial design

Green transformation puts forward the requirement of value reset for industrial design beyond the traditional function and aesthetic category, making it change from the end link of product development to the front builder of sustainable value system [7]. This reset process is reflected in three shifts: from materialism to relational ontology, from short-term utility orientation to full-life cycle responsibility, from user demand satisfaction to ecological citizen cultivation. In this process, industrial design no longer only pays attention to how to create things, but also needs to think about why and how to embed them into the sustainable living network [8]. The boundary of the design object thus extends to the service system, the use situation and even social norms, and its value core also shifts from the superposition of exchange value and use value to a composite structure containing ecological value, educational value and ethical value. This kind of value reset is not a simple superposition of abstract ideas, but a concrete design language and interactive mechanism to realize the embodied transmission of value. For example, modular structural design not only prolongs the product life, but also implies the redefinition of maintenance right and ownership. The identification of bio-based components in material selection conveys the awareness of carbon footprint in silence. The energy consumption feedback mechanism in the interactive interface transforms the abstract environmental impact into a sensible basis for daily decision-making. These design strategies together constitute a kind of "gentle discipline", which guides users' behavior to deviate to a sustainable direction without depriving them of their autonomy.

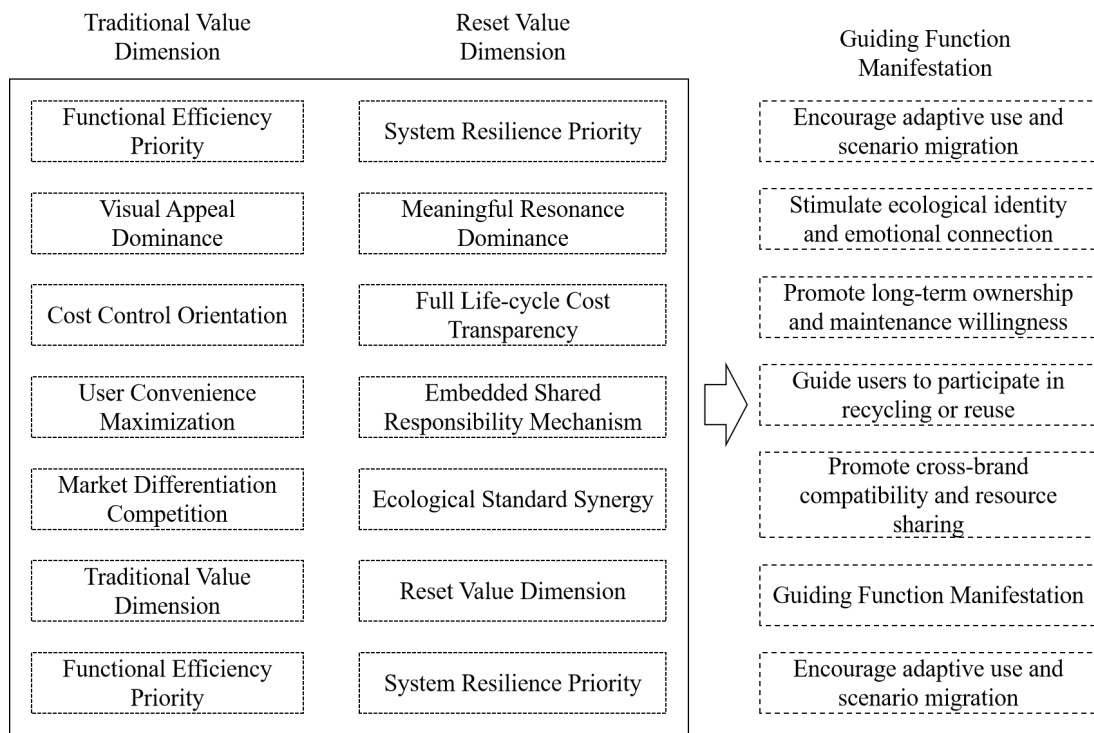


Figure 1 Mapping of Green Transformation in Value Dimensions of Industrial Design

Figure 1 shows the evolution characteristics of the core value elements of industrial design driven by green transformation and their corresponding guiding functions, and reveals how the value reset can be transformed into the potential path of life practice through design grammar.

3. Constitutive dimension and behavioral logic of sustainable lifestyle

Sustainable lifestyle is not a simple superposition of a single behavior pattern, but a complex system embedded in social structure, cultural cognition and individual practice, and its internal composition is multidimensional and dynamic [9]. Traditional understanding often simplifies it into isolated behaviors such as saving, recycling or low-carbon travel, but ignores the value premise, institutional environment and cognitive framework behind these behaviors. From the perspective of theoretical construction, sustainable lifestyle can be decomposed into three intertwined dimensions: material practice dimension, meaning construction dimension and system embedding dimension. The

dimension of material practice pays attention to the specific behaviors of individuals in resource use, product selection and daily operation, such as energy consumption mode, waste disposal mode or traffic structure. The dimension of meaning construction involves how individuals endow these behaviors with value rationality, including the understanding and internalization of concepts such as necessity, responsibility and moderation. The dimension of institutional embeddedness emphasizes how external rules, infrastructure and social norms shape and constrain individual choice space, such as the existence of garbage sorting policy, sharing economic platform or community mutual assistance network. These three dimensions together form a feedback loop: the institutional environment provides the possibility of behavior, material practice accumulates experience perception, and meaning construction sublimates experience into a stable value orientation, which in turn adversely affects the acceptance of the system and the willingness to participate. Under this framework, behavioral logic is not derived from pure rational calculation or moral consciousness, but is driven by the triple mechanism of habit-situation-identity. Habitual mechanism is embodied in the automation of repetitive behaviors, such as long-term use of refillable cleaning containers. Situational mechanism refers to the immediate triggering of behavior by physical or social environment, such as clearly classifying the layout of trash cans in public space to reduce the probability of wrong throwing. Identity mechanism makes sustainable behavior a part of identity expression by binding it with self-image. For example, choosing second-hand clothes is regarded as resistance to fast fashion consumerism. These three mechanisms are not mutually exclusive, but play a role in different life scenes with different weight combinations. The stability of a sustainable lifestyle is highly dependent on the coordination among various dimensions [10]. If the system supply lags behind the individual's will, or the meaning construction is missing, the behavior is difficult to sustain. Table 1 systematically combs the typical behavior characteristics, supporting conditions and potential breaking points under the three dimensions of sustainable lifestyle, aiming at revealing its internal tension and collaborative logic.

Table 1 Constituent Dimensions and Supporting Structures of Sustainable Lifestyles

Constituent Dimensions	Typical Behaviors	Supporting Conditions	Breaking Points
Material Practices	Choose durable goods, reduce disposable items	Repairable design, local service network	High repair costs, unavailability of alternatives
	Participate in item sharing and exchange	Trust mechanisms, platform availability, logistical convenience	Privacy concerns, inconsistent experiences
Meaning Construction	View low consumption as quality enhancement	Media Narration, community identity and educational infiltration	Social comparison pressure, association of material success with symbols
	View conservation as a civic duty	Policy discourse, public education system	Sense of powerlessness due to individualization of responsibility
Institutional Embedment	Follow waste sorting regulations	Clear guidelines, facility coverage, reward and punishment mechanisms	Complex sorting, lack of transparency in recycling destinations
	Adopt green energy or low-carbon transportation	Charging stations/bike lanes, price incentives	High initial investment, increased time costs

4. Theoretical construction and action path of industrial design guidance mechanism

In the macro context of green transformation, industrial design is no longer just the shaper of product form, but also the implicit guide of sustainable lifestyle. The theoretical construction of its guiding mechanism needs to go beyond the traditional dual framework of function-form and turn to a systematic intervention model centered on matter-behavior-meaning. The core of this mechanism lies in the subtle reconstruction of users' cognitive schema of resource use, time allocation and responsibility attribution through the triple attributes of materiality, interactivity and symbolism of design objects without relying on mandatory norms or economic incentives. The guiding role of industrial design is not to directly command behavior change, but to make sustainable choice the most natural, smooth and even enjoyable operation path by presupposing usage situation, embedding feedback loop and reconstructing value narrative. This guidance is non-invasive, situational

adaptability and long-term cumulative effect, and its effectiveness depends on whether the design can accurately intervene in the friction points of users' daily practice. For example, when a user hesitates in the face of a complicated recycling process, a trash can interface that integrates intelligent identification and automatic sorting tips may transform environmental protection behavior from cognitive burden to unconscious operation. For another example, when consumers waver before the temptation of fast fashion, a garment marked with a full life cycle carbon footprint and accompanied by a repair course may activate their rethinking of the relationship between ownership and care.

The above process reveals two key action paths of industrial design guidance mechanism. The first is the "behavior scaffolding" path, that is, through structured product logic, the implementation threshold of sustainable behavior is lowered, making it easy to realize both physically and cognitively. The second is the "meaning anchoring" path, that is, through the design languages such as materials, colors, and interactive rhythms, the abstract ecological value is materialized into perceptual emotional experience, thus strengthening the intrinsic motivation of behavior. These two paths are not separated, but intertwined in the specific design practice, which together form a low resistance-high identification guidance closed loop. The effectiveness of this mechanism highly depends on the in-depth understanding of users' life habits and the collaborative consideration of social and technical systems. If isolated product innovation lacks institutional interface or cultural resonance, it is difficult to trigger sustained behavior change.

5. Conclusions

This article systematically explains the internal logic and action path of industrial design guiding sustainable lifestyle under the background of green transformation. It is found that the guiding function of industrial design is not derived from external discipline or economic incentives, but from its re-coding of materiality, interactivity and symbolism. When the design changes from meeting immediate needs to cultivating long-term relationships and from emphasizing possession to advocating care, it has the potential to reshape daily practice. This change means that design no longer only serves the instant pleasure of consumption, but is committed to building a more responsible and emotional interaction between people and things. The formation of sustainable lifestyle is essentially the result of the dynamic coupling of material behavior, meaning identification and institutional environment, and industrial design can be used as an intermediary to connect the three. It lowers the maintenance threshold through modular structure, strengthens resource awareness through energy consumption visualization, and promotes system compatibility through standardized interfaces, thus reducing the implementation cost of sustainable behavior at the operational level. With the help of the tactile sensation of bio-based materials, the retention of product use traces and the embedding of origin stories, it awakens users' inner recognition of ecological responsibility at the emotional and cognitive levels. This double intervention makes design a kind of "gentle infrastructure", which quietly adjusts the focus of behavior habits without depriving users of their autonomy, making sustainable choice the most natural, smooth and even enjoyable operation path.

The guiding effect of industrial design cannot be realized in isolation, but it must be embedded in a wider social and technical system, including a wide maintenance network, an efficient and transparent recycling system, unified and coordinated policy standards and cultural discourse supporting moderation aesthetics. Without these cooperative conditions, even the elaborate design may become a symbolic gesture, and it is difficult to trigger real behavior changes. Therefore, the future design practice needs to go beyond the product standard, turn to system thinking, and actively participate in the construction of institutional interface and the production of public significance. The designer's role should also be expanded from a formal creator to a value coordinator and a relationship weaver, so as to build a bridge between technical possibility and social feasibility. In this way, industrial design can truly change from a passive responder of green transformation to an active co-builder of sustainable lifestyle, and its value will also be upgraded from a tool of market competition to a deep force to promote the evolution of ecological civilization and life ethics.

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