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The Background and Significance of Green Consumption Behavior in The Circular Economy

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Abstract: The study examines green consumer behaviors against the background of a circular economy. Based on an abundant literature review, this research constructs a model that delves into the relationship between green consumption awareness, environmental literacy, consumer attitudes, subjective norms, behavioral willingness, and actual behaviors. By collecting data via questionnaires and analyzing via Kendall's coefficient of concordance and key factor analysis, the study sheds light on a degree of consistency among variables and the conclusion that green consumption awareness, environmental literacy, and attitudes all have a significant impact on actual behaviors. Meanwhile, among the key factors that affect green consumer behaviors, the willingness to put time and effort is the most vital one, followed by price sensitivity and convenience. However, product quality has a weaker influence on whether consumers choose green products. Besides, this study further confirms under the promotion of the circular economy, enhancing consumers' environmental awareness, reducing green product prices, improving product quality, and increasing convenience are vital strategies to promote green consumption. Overall, the study provides empirical evidence for improving the green consumption policies system and corporate green marketing strategies.

Keywords: Circular economy; Green consumer behaviors; Empirical analysis; Consumer behavior; Sustainable development.

1. Introduction

Promoting green cycles and advocating a circular economy has long been a key economic strategy in China. From the time when the Chinese government issued the Guiding Opinions on Promoting Green Consumption (2016) aimed at educating consumers to practise green consumption voluntarily and creating a green consumer base, the circular economy has gained substantial governmental support and momentum. Since the 18th National Congress of the Communist Party, the government has further advocated circular economic practices. In 2024, the government issued the notice on Improving the Recycling System for Used Household Appliances and Furniture, aiming to establish a group of model cities nationwide by 2025, develop model recycling companies, promote typical practices, and create a standard policy and regulation.

However, despite remarkable governmental support, green consumer behaviors still inevitably face several challenges in China, including high prices of green products, a lack of unified standards and certification systems, along with an underdeveloped green product supply chain.

Green consumption protects nature's regenerative capacity, necessary for sustainable development. But natural resources such as petroleum and minerals are limited and can be exhausted sooner or later. If human activities exceed the capacity of the environment, ecosystems will suffer damage, falling into a vicious cycle and ultimately impeding human development. Additionally, within the production-distribution-exchange-consumption chain, consumer demand typically determines the types of products and the methods of production. By practising green consumer behaviors, customers can prompt enterprises to adopt greener practices and offer environmentally friendly services. This demand-side pressure can drive supply-side reform, improving the effectiveness of resource allocation, lowering costs and energy consumption, and expanding effective supply in the meanwhile.

Today, both China and the world are confronted with serious environmental pollution problems, with carbon emissions being the major source and driver. "In China, household consumption contributes to 70% of global greenhouse gas emissions, and residential consumption emissions account for 53% of the total" [1]. Therefore, enhancing public environmental awareness and controlling carbon emissions are essential steps in reducing global greenhouse gas emissions and alleviating environmental pollution. Under China's green development goals of peaking carbon emissions by 2030 and achieving carbon neutrality before 2060, how to promote reductions in residents' carbon emissions has become particularly important.

2. Literature Review and Research Hypotheses

2.1. Key Issues in Green Consumption Behavior

Although China has made notable progress in promoting green consumption, several significant challenges remain to be addressed. Firstly, green products typically incur higher prices, due to the use of eco-friendly materials and cutting-edge technologies, resulting in a higher price than conventional products and in a "green premium" that discourages some consumers from making purchases. Secondly, the standards and certification systems for green products are not yet fully developed, leaving consumers stranded and with no reliable criteria to identify green products, thereby undermining their confidence in purchasing decisions. Thirdly, the supply chain for green products, from raw material procurement to terminal sales, is still underdeveloped, with confined market supply and distribution efficiency. In addition, existing incentives such as financial subsidies and tax reductions are limited in scope, making it difficult to spark the public's enthusiasm for green consumption. More importantly, a segment of the population still lacks awareness of green consumption concepts and does not have adequate access to relevant knowledge and information, giving rise to insufficient penetration of green consumption behavior across various social strata.

2.2. Insights from Green Consumption Practices in Europe and the United States

Western countries, particularly the United Kingdom, offer valuable lessons in green consumption and environmental practices. During the 1960s, the UK experienced severe air pollution due to rapid industrialization, which posed serious public health risks. To address these environmental challenges, the UK government successively enacted a series of environmental laws and regulations, including "the Environmental Protection Acts of 1965", "the Environmental Protection Acts of 1970", and "the Climate Change Act of 1999." Simultaneously, public environmental awareness steadily increased. Enterprises began widely adopting green production methods, such as recycling waste materials, utilizing clean energy, and reducing coal usage, all of which efforts led to marked improvements in the UK's ecological environment. According to reports by the Department for Environment, Food & Rural Affairs (DEFRA), the annual average concentration of PM2.5 in the UK fell from approximately 20 $\mu g/m^3$ in 2000 to about 10 $\mu g/m^3$. Forest coverage has increased by around 50,000 hectares since 2000, and meanwhile, the waste recycling rate rose from 10% in 2000 to 45% in 2020 [2]. The UK's experience demonstrates that a coordinated approach involving government policy guidance, corporate transformation, and public participation can effectively drive green consumption behavior and improve environmental quality [3].

2.3. Policy and Practical Significance of Green Consumption

Green consumption is not only a vital means to achieve carbon neutrality but also a powerful revision to the traditional model of unlimited economic growth. While conventional economic models have imposed a heavy burden on the ecological environment, the green consumption economy revolves around sustainable development, emphasizing the conservation of natural regenerative capacity and the recycling of resources. Against the backdrop of intensifying global climate change and resource depletion, constructing a circular economy has become increasingly critical. Promoting green consumption can lead to resource conservation and environmental protection, drive green transformation in production processes, optimize industrial structures, and ultimately support a win–win scenario for both economic development and ecological sustainability.

2.4. Current Research on the Circular Economy Model

The circular economy is a model intended to minimize resource waste and environmental pollution to the greatest extent, contrasting strikingly with the traditional linear economy model of "take–make–consume–dispose". It emphasizes efficient resource use and encourages product design that takes removability, repairability, and recyclability throughout the products' life cycle into consideration in the first place. Besides, closed-loop recycling and reuse are implemented in all phases of the supply chain. Also, it advocates extending product lifespan through leasing and sharing models, and implementing closed-loop recycling systems throughout supply chains.

Extensive scholarly research has been conducted on the circular economy. To be more specific, William McDonough and Michael Braungart proposed the "cradle-to-cradle" design philosophy, which claims products to be safely returned to natural or industrial cycles at the end of their life span [4]. Moreover, Chinese scholar Fagang Hu, in his work on the interaction mechanisms and implementation strategies of low-carbon and circular economies, emphasizes the need for strengthening industrial coordination, heightening public environmental awareness, the adoption of international best practices, and the establishment of robust monitoring and evaluation systems [5]. Plus, Yongmei Liu, in her "The Summary of Circulation Economy Theory", traces the theoretical roots back to Kenneth Boulding's concept of the "Spaceship Earth economy" and highlights current theoretical shortcomings such as inconsistent standards and incomplete waste-to-resource mechanisms [6]. As a result, maximizing resource utility and optimal allocation remains the theoreticalb core of circular economy research.

Additionally, scholars such as Bigliardi have explored circular consumption behavior in the article "The Intention to Purchase Recycled Products: Towards an Integrative Theoretical Framework.", who categorize influencing factors into personal, product-related, and environmental domains and apply the Theory of Planned Behavior (TPB) and the Value–Belief–Norm (VBN) theory to examine consumer barriers in adopting circular products [7]. Overall, both domestic and international scholars recognize that the successful implementation of the circular economy requires institutional support, technological innovation, increased societal awareness, and multi-stakeholder collaboration.

2.5. Research on the Relationship Between Circular Economy and Green Consumption Behavior

The circular economy model is regarded as a key driver of green consumption behavior. In the paper "Challenges and Countermeasures for High-Quality Development of the Circular Economy under the Dual-Carbon Strategy," Haili He

emphasizes that the circular economy can reduce carbon emissions through industrial chain upgrades and technological innovation in both industrial and daily residential life, thus supporting national carbon neutrality goals [8]. However, some studies also highlight existing limitations in the development of the circular economy, such as insufficient technological innovation, lax policy enforcement, and low levels of public environmental awareness.

In an article titled "An Empirical Investigation into Chinese Consumers' Green Consumption Awareness and Behavior," Linsheng Si found that consumers' understanding of green consumption remains inadequate through questionnaire: awareness of residents in rural areas lags behind that of urban residents, and the environmental awareness of male consumers is generally weaker than that of female consumers [9]. These findings underscore the close interaction between circular economy development and green consumption behavior. In conclusion, to effectively promote green consumption, future research should focus on enhancing policies, advancing technological capabilities, and strengthening public education.

3. Research and Design

3.1. Scales and Questionnaires

This study focuses on analyzing the logic of consumers' green consumption behavior. To accurately measure the values of each variable, except for green consumption behavior (which is measured by inquiring about the frequency and specifics of certain behaviors), all other variables are assessed using a five-point Likert Scale, ranging from "strongly disagree" to "strongly agree". The measurement items for all variables adopt mature scales from prior authoritative research and have been carefully adjusted and refined to align with the specific context of green consumption. The details are as follow:

The opening section of the questionnaire focuses on collecting basic consumer information, including gender, age, education background, occupation, household income, and other demographic factors. This foundational data serves as critical support for subsequent analysis. By distinguishing between different demographic groups, the study can accurately identify significant differences in green consumption-related variables among these groups, thereby uncovering hidden consumption behavior patterns and their influencing factors. Below is a table illustrating the distribution of consumers' basic information:

Table 1. Distribution of Consumer Basic Information

Variable	Category	Frequency	Percentage
Gender	Male	68	45.3%
	Female	82	54.7%
Age	Under18 years	28	18.7%
	18-30 years	32	21.3%
	31-45 years	45	30.0%
	46-60 years	30	20.0%
	Over 60 years	15	10.0%
Education Level	High School or below	40	26.7%
	Associate degree	15	10.0%
	Bachelor's degree	60	40.0%
	Master's degree	25	16.7%
	Doctoral degree or above	10	6.7%
Occupation	Civil servant/ Institutional employee)	30	20.0%
	Corporate employee	45	30.0%
	self-employed	18	12.0%
	Freelancer	15	10.0%
	Students	20	13.3%
	Retiree	10	6.7%
	Other	12	8.0%
Household Income	5000yuan or below	35	23.3%
	5001-10000 yuan	40	26.7%
	10001-15000yuan	30	20.0%
	15001-20000yuan	20	13.3%
	over 20000yuan	25	16.7%

3.2. Measurement of Green Consumption-Related Variables

Awareness of Green Consumption: This variable focuses on consumers' understanding and recognition of the concept, connotation, and specific behavioral scope of green consumption. Clear and precise awareness of green consumption serves as the logical starting point for motivating consumers to adopt green consumption behaviors, directly influencing the formation of subsequent attitudes and behavioral decision-making.

Environmental Literacy: This variable examines the breadth and depth of consumers' concern for environmental issues, as well as their level of environmental knowledge. As an intrinsic trait, environmental literacy significantly shapes consumers' value judgements and behavioral choices regarding green consumption.

Attitude Toward Green Consumption: This variable aims to comprehensively measure consumers' overall preference for green-consumption behaviors across emotional, cognitive, and evaluative dimensions. A positive attitude toward green consumption is a key internal driver in transforming potential consumption intentions into actual purchasing actions.

Subjective Norms on Green Consumption: This variable assesses consumers' perceptions of the attitudes, expectations, and behavioral influences of significant others (including family, friends, colleagues, and other key social groups) regarding green consumption. From a social psychology perspective, subjective norms exert a powerful influence on individual behavioral decisions.

Green Consumption Behavioral Intention: This variable

evaluates consumers' subjective tendencies and specific plans to engage in green consumption behaviors within a defined future time-frame. As a critical link between attitudes and actual behavior, green consumption intention demonstrates high validity and reliability in predicting subsequent consumer actions.

Actual Green Consumption Behavior: This variable measures the frequency and specific details (e.g., types and quantities of green products purchased) of consumers' actual green consumption behaviors over a specified past period (e.g, the last month).

Key Factors Influencing Green Consumption Behavior: Through in-depth exploration, this study identifies product price, product quality, and information transparency as key determinants of green consumption behavior:

For product price, reverse scored items are used.

For product quality, measurement is based on authoritative literature on perceived quality to accurately assess consumers' subjective evaluations of green product quality.

For information transparency, items are designed in strict accordance with cutting-edge research on information asymmetry theory to comprehensively evaluate the role of information in green consumption behavior.

4. Empirical Analysis

4.1. Kendall's Concordance Test

To examine the relationships among variables, in particular awareness of green consumption, environmental literacy, attitude toward green consumption, subjective norms on green consumption, green consumption behavioral willingness, and actual green consumption behavior, we conducted Kendall's concordance test, using the mean values of respondents' scores on the corresponding scales. The results are presented in Table 2.

Table 2. Kendall's Test Results

Analysis result for Kendall's W					
Name	Mean Rank	Median	Coefficient of Kendall's W	X^2	P
Awareness of Green Consumption	4.039	4.25	0.337	283.088	0.000***
Environmental Literacy	5.131	4.667			
Attitude toward green consumption	3.289	4			
Green Consumption Behavioral Willinginess	3.551	4			
Subjective Norms on Green Consumption	2.539	3.818			
Actual Green Consumption Behavior	2.452	3.667			
Note: ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.					

The results of Kendall's W test show that the overall P-Value （0.000***）is statistically significant, leading to the rejection of the null hypothesis. This indicates moderate agreement (W=0.337) among the variables, suggesting a general but not strong consistency in respondents' perceptions across these dimensions.

4.2. Key Factors Influencing Consumers' Green Consumption Behavior

Table 3. Key Factors Affecting Green Consumption Behavior

Variable	N	Max	Min	Mean	Std. Dev.	Median	Variance	Kurtosis	Skewness	CV
Willingness to spend more time/effort	168	5	1	3.935	0.942	4	0.888	1.805	-1.216	0.239
Price sensitivity	168	5	1	3.518	1.072	4	1.149	-0.077	-0.593	0.305
Product quality	168	5	1	3.131	1.103	3	1.216	-0.655	-0.127	0.352
Convenience factor	168	5	1	3.589	1.011	4	1.022	0.125	-0.652	0.282

Willingness to spend more time/ effort had the highest mean score (3.935±0.942), close to the agree" level (4 points), with the lowest standard deviation (0.942), indicating strong and consistent agreements among respondents. The negative skewness (-1.216) and high kurtosis (1.805) suggest a left-skewed distribution with responses clustering toward higher values (see figure 1).

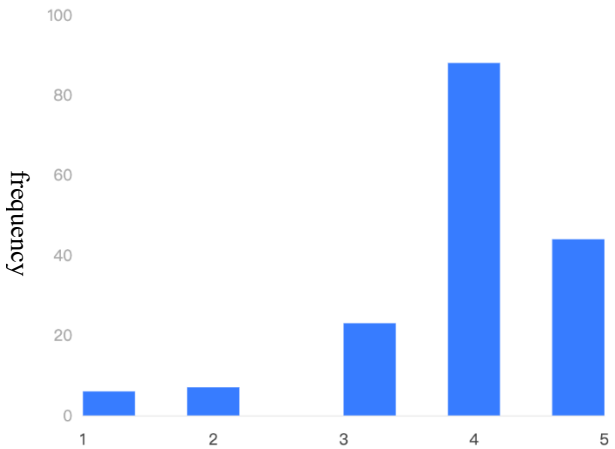

Figure 1. "Even if green consumption requires more time or effort, I am willing to adhere to the principle of 'reduce, Reuse and Recycle.'"

Price sensitivity (3.518±1.072) and convenience factor

(3.589±1.011) showed moderate acceptance, with median scores of 4. However, price sensitivity had greater variance (1.149), reflecting more divergent opinions on cost-related barriers.

Product quality (3.131±1.103）had the lowest mean score, slightly above neutral, with the highest coefficient of variation (0.352), indicating weaker consensus and more dispersed attitudes.

All variables exhibited kurtosis and skewness values within ±2, suggesting no severe deviation from normality, meeting the assumptions for parametric tests.

Conclusion:

5. Conclusion

Respondents showed the strongest willingness to engage in green consumption when it required additional time/effort. Product quality concerns were the least accepted trade-off. Price and convenience factors elicited moderate, conditional support, with greater variability in responses.

Through empirical analysis, it can be concluded that green consumption behavior is influenced by multiple factors. The Kendall's consistency test results show that there is a significant consistent association among green consumption awareness, environmental literacy, green consumption attitude, subjective norms, behavioral willingness and actual behavior. Further analysis of key factors indicates that consumers exhibit the highest acceptance of the time and energy required in green consumption behaviors, are sensitive to high prices and insufficient convenience, and demonstrate the lowest willingness to compromise on the quality of environmentally friendly products. Overall, to promote green consumption behavior, it is necessary to start from enhancing consumers' environmental awareness, optimize the quality of green product supply, lower the prices of green products, and further improve the green consumption environment through policy guidance and social advocacy, thereby promoting the realization of the circular economy goal.

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