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Using Social Network Analysis to Identify the Critical Factors Influencing Residents' Green Consumption Behavior

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Abstract: Green consumption is an important tool to accelerate the circular economy and promote sustainable development. The identification of critical influencing factors for green consumption is the key to promoting green consumption behavior (GCB). Firstly, based on the joint framework of theory of planned behavior (TPB) and the attitude–behavior–context (ABC) theory, we summarized 32 influencing factors from six dimensions: consumer attitude, cognitive factors, sense of responsibility, economic factors, government regulation, and green product supply. Secondly, the Delphi method was used to modify and optimize the initial influencing factor index. Thirdly, we constructed a social network analysis (SNA) model of influencing factors to determine the causal relationships between each influencing factor. All factors were divided into driving factors and result factors via the calculation of degree centrality, and the critical influencing factors and influencing paths of residents' GCB were ultimately determined. Finally, based on the empirical research results, corresponding countermeasures and suggestions were put forward. The results show that the top five critical influencing factors include green purchase intention, willingness to pay, risk perception, green product certification, publicity and education, green product price, and green attribute information. Among them, green product certification, publicity and education, and green product price are critical driving factors in GCB.

Keywords: green consumption behavior; critical influencing factors; social network analysis; circular economy

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1. Introduction

With the rapid development of the economy and the improvement in people's living standards, the quality of residents' consumption demand is constantly improving, which at the same time brings a series of environmental problems such as resource consumption, environmental pollution, ecological damage, and greenhouse gas emissions [1]. Previous studies have shown that human irrational consumption patterns and habits have caused nearly 40% of environmental pollution and destruction, becoming one of the most serious problems facing humanity [2–5]. Therefore, more and more people are realizing the harmful effects of excessive consumption on the environment, and seeking green consumption models has become a topic of widespread concern in various countries around the world [6]. In recent years, the United Nations' Sustainable Development Goals Report 2020 has emphasized the necessity of "ensuring sustainable consumption and production patterns". China has also emphasized the importance of "promoting green development and accelerating the green transformation of development methods" [7,8]. With the gradual popularization of the concept of green consumption, promoting green consumption has become a profound transformation in the field of consumption. Green consumption is a specific form of the circular economy in the consumption field, which requires residents'

consumption activities to be conducive to environmental protection, resource utilization, and an overall improvement in human quality. The work of the circular economy should be carried out from a macro perspective to promote the green transformation and upgrading of industries. On the other hand, it is necessary to pay attention to individual behavior from a micro perspective and advocate for residents to widely engage in green and low-carbon lifestyles. How to effectively promote green consumption among residents and leverage the power of consumers to achieve sustainable development goals is an important issue worth exploring in the academic community.

Green consumption, also known as sustainable consumption, is a form of consumption characterized by resource conservation and environmental protection [9,10]. Previous studies have suggested that green consumption behavior is influenced by individual values. Scholars hold different views on the impact of altruism in personal values on green consumption. Research has shown that altruism that incorporates altruistic and biospheric values positively influences consumers' pro-environmental behavior [11–13]. However, other researchers have studied consumers' green consumption behavior based on value–belief–normal (VBN) theory, but the research results have not shown the impact of altruistic values on the overall model [14–16]. With the improvement in global environmental awareness, positive progress has been made in green consumption work. A previous study has shown that the green consumption structure of urban residents in China has reached a higher level, with a proportion of green consumption reaching 29.75% [17,18]. Scholars have also explored green consumption strategies and their impact mechanisms on green consumption behavior (GCB) in the context of "dual carbon", in order to improve residents' green consumption levels and promote sustainable economic development [4,19]. However, the field of green consumption still faces many problems, such as a weak awareness of green consumption among residents, the attitude–behavior gap in green consumption, and an insufficient effective supply of green products [18]. At present, scholars' research in the field of green consumption mainly focuses on green consumption theory, green consumption models, green consumption marketing strategies, and the influencing factors of green consumption. Among them, the field of influencing factors of green consumption is one of the most concerned fields in the academic community [9]. Green consumption is a complex decision that involves both current and long-term interests, as well as personal and social interests. The complexity of green consumption itself leads to numerous influencing factors [20]. Therefore, how to identify the critical influencing factors of residents' GCB and explore the influencing mechanisms between each factor play important roles in effectively guiding green consumption and optimizing the green consumption market [21].

Traditional theories used for GCB mainly include the theory of planned behavior (TPB) and the attitude–behavior–context (ABC) theory. The former emphasizes the influence of internal psychological factors on GCB, while the latter pays more attention to the role of external context in GCB [22,23]. In the TPB model, consumer behavior is influenced by attitude, subjective norm, and perceived behavioral control. This theory has good explanatory and predictive abilities for the psychological decision-making process of goal-oriented behavior [24]. However, with the in-depth development of research, some scholars have found that TPB is not sufficient to fully explain the complete mechanism of real behavior. This is because this theory does not consider environmental or economic factors that may affect a person's behavioral intention [25]. The ABC theory is the main theory that studies the impact of external environment on GCB. This theory believes that the external context is the key to determining whether residents implement green behavior. Previous studies have confirmed that incorporating external context into consumer behavior research can make theoretical models completer and more reasonable [26,27]. However, there is currently a lack of systematic understanding of the factors that affect residents' GCB. Therefore, the TPB-ABC theoretical framework based on TPB theory and ABC theory is an effective model for exploring the influencing factors and decision-making mechanisms of residents' GCB.

On the basis of constructing the influencing factor system, existing research on identifying the core influencing factors of GCB and analyzing the relationship between factors still needs further deepening. Identifying the critical factors that affect residents' GCB is beneficial for the government to formulate targeted policies and measures related to green consumption and accelerate the promotion of sustainable development. On the other hand, it is beneficial for residents to strengthen their awareness of green environmental protection and voluntarily implement GCB. The existing research on GCB was mainly based on the hypothesis testing method, and the structural equation model (SEM) was used to verify the rationality of hypotheses. By using this method, it is possible to determine which factors have an impact on promoting GCB. However, our study combines the current research status of GCB and considers exploring the influencing factors of residents' GCB from the perspective of social network analysis (SNA). This is because the method of SNA cannot only identify the critical influencing factors of GCB, but also more clearly reflect the network relationship between various influencing factors. Furthermore, objective laws of interaction between network nodes can be obtained.

In this study, we explore the answers to the following questions: (1) What dimensions and influencing factors should be considered in studying residents' GCB? (2) What are the critical influencing factors and how do they interact with each other? (3) What are the critical driving factors and result factors? Additionally, (4) which are the critical influencing paths affecting residents' GCB? Answering these questions is beneficial to providing effective suggestions for promoting residents' GCB.

The main contributions of this article are as follows. Firstly, by employing the theoretical framework of TPB-ABC, a comprehensive and reasonable influencing factor index of GCB is formed. The impact mechanisms of consumer attitude, cognitive factors, sense of responsibility, economic factors, government regulation, and green product supply on residents' GCB are also elucidated. Secondly, based on the data obtained from the survey, the SNA method is used to construct the network diagram. By calculating the degree centrality, closeness centrality, and betweenness centrality of the network, the critical factors and influencing paths that affect residents' GCB are determined, which can provide guidance for promoting GCB.

The remaining content of this paper is arranged as follows: Section 2 reviews and sorts out the previous research results on GCB, and summarizes the influencing factor system of GCB. Section 3 introduces the research method of this study. Section 4 is the empirical research part, which includes the revision and optimization of the influencing factor system based on the Delphi method, the identification of the critical influencing factors of residents' GCB based on SNA, and the analysis of the relationship between factors. Section 5 discusses relevant management suggestions based on empirical research results. Section 6 is the conclusion.

2. Literature Review

Economic development has driven the continuous upgrading of consumption, and the public's demand for high-quality consumption has also increased. More and more consumers are realizing the importance of green consumption. Green consumption is a key support point for meeting the needs of people for a better life, and also an important measure to promote national green development and ecological civilization construction. At the micro level, conducting research on the influencing factors of residents' GCB is an important means to promote green consumption. At present, scholars have conducted in-depth research on this issue from different perspectives, mainly from three aspects: internal motivation, external context, and global perspective.

2.1. Influencing Factors of GCB Based on Internal Motivation

Regarding the research of the influencing factors of GCB, some scholars have built a theoretical model based on TPB to explain and predict the green purchase behavior of residents. They believed that an individual's willingness to take action was mainly influ-

enced by internal psychological factors such as attitude, subjective norm, and perceived behavioral control [22,24]. Under the background of e-commerce, Liu and Hu analyzed the influencing factors of consumers' GCB from the two stages of pre-purchase decision-making behavior and post-purchase practice and interactive behavior based on the theory of planned behavior (TPB) and the unified theory of acceptance and use of technology (UTAUT) [28]. Alambeigi et al. constructed the model based on the TPB, the value–belief–norm theory, and the influence of media. They believed that consumers' consumption behavior was affected by green purchase perception, price fairness, purchase intention, and the media [29]. Sheng et al. introduced three variables: environmental responsibility, environmental concern, and price sensitivity from the perspective of attribution of responsibility. They studied the GCB of Chinese residents from the perspective of environmental co-governance [30]. Nekmahmud et al. investigated the sustainable consumption value and choice behavior of European tourists toward green products by integrating TPB and the consumption values (TCVs). The results showed that there was a significant positive correlation between environmental attitude, environmental knowledge, subjective norms, perceived behavioral control, conditional value, emotional value, and the green purchase intention of European and non-European tourist groups [31]. Xie et al. used the TPB as a model framework to analyze the relationship between environmental cognition and GCB from a micro perspective [24]. Based on the theory of planned behavior in an emerging country, Yarimoglu and Binboga revealed the relationships between ecologically conscious consumer behavior, green purchase conspicuous behavior, and green purchase intention. Additionally, the results showed that consumer behavior with ecological awareness had a significant impact on green purchase conspicuous behaviors and green purchase intentions [32]. Ruangkanjanasses et al., Yadav and Pathak, and Zhang et al. all thought that the traditional TPB had certain limitations in the study of GCB, and on this basis, they revised and extended it. They used the optimized and expanded model for research and verified its rationality using certain case studies [33–35].

2.2. Influencing Factors of GCB Based on External Context

Some scholars believe that green consumption is not only an individual's choice and behavior, but is also influenced by the surrounding environment. Based on the attitude–behavior–context (ABC) theory, they focused on exploring the impact of external contexts on GCB, mainly incorporating external factors such as economic factors, social environment, and product supply into the study of GCB. Xiong et al. studied the influencing factors of public GCB under the carbon peaking target. They constructed an indicator system based on two types of factors: self-characteristics and external environmental, and then subdivided each factor into 14 subindicators [17]. Aral and Lopez-Sintas examined how European Union (EU) citizens exhibit systematic differences in environmental attitude–behavior relationships based on background driving factors at the national level. Additionally, their research found that more environmentalist patterns were associated with more privileged social positions [36]. Wang analyzed the internal and external factors behind the separation of green consumption attitudes and behaviors. He focused on exploring the impact mechanism of matching external advertising intervention strategies with internal psychological characteristics on the effectiveness of advertising persuasion [21]. Sobhanifard and Apourvari studied the impact of reference group on green product consumption behavior using exploratory factor analysis. They took Iran as an example and ultimately extracted reference groups for green product consumption behavior to achieve environmental sustainability [37]. Yang et al. established a dynamic decision-making model based on social networks. He explored the impact of government regulation on GCB among external factors by integrating two regulatory policies based on order regulation and emotional regulation [38]. Marcon et al. linked the design of green product development with consumer behavior and explored the impact of green product attributes on consumer behavior in different stages of the product lifecycle [39].

2.3. Influencing Factors of GCB Based on Global Perspective

With the continuous deepening of research content, scholars have begun to comprehensively analyze the impact of internal and external factors on GCB. They have held the view that studying GCB from a "global perspective" can provide a more comprehensive and accurate understanding of the current situation and impact mechanisms of green consumption. For example, Capiene et al. believed that consumers' pro-environmental and pro-social engagement in sustainable consumption is not only influenced by internal factors, but also by external factors. Through analyzing research on the previous literature, they identified internal factors including cognitive factors, attitude factors, and social psychological factors, as well as external factors such as background factors, promotion, and social factors [40]. Piligrimiene et al. studied the external and internal determinants of consumer engagement in sustainable consumption. Their research findings confirmed that internal factors, including environmental attitude, perceived responsibility, and perceived behavioral efficiency, as well as external factors, including conditions for sustainable consumption, social environment, and the promotion of sustainable consumption, have been identified as having a direct positive impact on consumer participation in sustainable consumption [41]. Qin and Song, Ahmed et al., and Joshi and Rahman believed that the existing research mainly analyzed sustainable consumption behavior from a single perspective of internal motivation or external context. Additionally, they constructed a TPB-ABC-integrated theoretical framework that included both internal and external aspects to study the influencing factors, influencing paths, and decision-making mechanisms of consumer sustainable consumption behavior [42–44]. Wang et al. considered that residents' behavior is the result of a combination of external environmental factors and internal psychological factors, and developed an extended TPB-ABC model. They replaced the behavioral intention in the TPB model with the implementation intention, which enhanced the ability of variables to explain and predict pro-environmental behavior. Finally, they explored the impact of policy support on residents' psychological factors and pro-environmental behavior [26].

We searched for keywords such as "green consumption", "green consumption behavior", and "influencing factors of green consumption behavior" by consulting a large number of works in the literature on CNKI and the Web of Science. By searching for relevant papers in core and above journals, more than 150 papers related to the topic were selected. After in-depth reading, 21 papers with a measurable influencing factor system were selected. These research findings on the influencing factors of GCB have certain guiding significance for our study. Based on the actual situation of GCB, we integrated and optimized the influencing factor system based on previous research. Through induction and summary, a scientific and comprehensive set of initial influencing factors on residents' GCB was obtained, as shown in Table 1.

Table 1. The initial influencing factor index of residents' GCB.

Category	Dimension	Influencing Factor	Indicator Description	References
Internal psychological factors	Consumer attitude	Green purchase intention	The probability of consumers willing to purchase green products	[24,28,29,35,37,40,43]
		Transformation of consumption habit	The transformation from traditional consumption to green consumption	[37,41,43,44]
		Willingness to pay	The highest price consumers are willing to pay for green products	[34,38]
		Consumer loyalty	The overall feeling and deep attachment to a product, service, or brand	[21,28,32]
		Consumer satisfaction	Satisfaction with green products or services	[28]

Table 1. *Cont.*

Category	Dimension	Influencing Factor	Indicator Description	References
	Cognitive factors	Consumer perceived effectiveness	Subjective judgment of consumers on their ability to address issues such as environmental resources and social ethics	[21,26,31,41,42,44]
		Quality perception	Consumer's overall perception of the quality of the product upon receipt	[24,28],
		Value perception	Consumer's overall value perception of product utility (by comparing the effectiveness of product use, benefits, and costs paid)	[28,34]
		Risk perception	A feeling of uncertainty in the process of purchasing a product or service	[21,44]
		Green product awareness	Ability to discern green products	[28,31,40,41]
		Environmental cognition level	Consumer awareness of environmental issues and protection	[28,29,40,41,43]
	Sense of responsibility	Environmental values	The overall view and attitude of consumers toward the environment	[18,31–33,44]
		Individual sense of responsibility	Consumer responsibilities in overall environmental maintenance	[30,32,33,36,41]
		Perception of environmental issues	Direct perception of environmental issues that may arise from implementing consumer behavior	[18,30,44]
		Convenience of product recycling	The difficulty level of implementing green recycling behavior	[36]
External contextual factors	Economic factors	Green product price	The cost of purchasing green products	[18,21,28,36,43,44]
		Waste recycling cost	The cost of recycling waste	[36,42]
		Personal disposable income	Income used for discretionary purposes	[24,40,43]
		Socio-economic development	The scale or level of socio-economic phenomena at different times	[24,36]
		Environmental benefits	Positive external benefits after purchasing green products	[38]
		Consumer costs	The fixed costs, green costs, and information search costs required to understand green products	[38,42]
	Government regulation	Policies and regulations	Relevant green legislative policies issued by the state	[21,36,40,42]
		Government subsidy	Some financial support provided by the government to consumers to stimulate green consumption	[36,38,42]
		Green product certification	Green certification of products based on the entire lifecycle	[38,44]
		Publicity and education	Increase public awareness of green products via internet and offline promotional activities	[29,36,38,42]
		Group reference effect	Consumers in different regions transmit and exchange green consumption information	[21,37,38,43,44]

Table 1. *Cont.*

Category	Dimension	Influencing Factor	Indicator Description	References
	Green product supply	Green product performance	The ability of green products to achieve their intended purpose or specified purpose	[39,43,44]
		Green product quality	The characteristics of green products that meet the prescribed use	[18,21,43,44]
		Green product brand	A series of impressions, concepts, and concerns about the brand, which are related to environmental issues	[18,44]
		Green attribute information	Information on product raw materials, energy efficiency, environmental technology usage, etc.	[28,43]
		Green product production label	Various expressions and instructions for green product information	[18,39,44]
		Green product marketing strategy	Promotion strategies for green products	[18,39]

By reviewing the existing literature, it was found that these studies mainly studied the influencing factors of GCB from a single perspective of internal psychological factors or external contexts. The existing research lacks a systematic exploration of decision-making mechanisms for GCB from a multidimensional perspective. Wang et al., Qin and Song, and Joshi and Rahman in the above literature all studied the influencing factors, influencing paths, and decision-making mechanisms of consumers' GCB by constructing the TPB-ABC integration theory [26,42,44], and these TPB-ABC models were applicable to the construction of the model in our study. Their research comprehensively considered the internal and external influencing factors of green consumption behavior, which were also applicable to our research. Therefore, our study constructed an initial influencing factor system for GCB based on the TPB-ABC joint model. Then, we integrated and optimized this theoretical framework to form a more comprehensive and complete system of influencing factors. Firstly, this study considered the influencing factors of residents' GCB from both internal psychology and external context, which avoided the limitation of previous studies only considering issues from a single perspective. We studied residents' green purchasing behavior from the perspective of consumers. Among them, the internal psychological factors were divided according to the psychological variables in the consumer market segmentation variables, and the external factors were divided according to the PESTEL analysis model [45,46]. Secondly, many studies view cognition as an important foundation for behavior, believing that behavior is often based on a person's cognitive level [24,47,48]. At the same time, many scholars have established the current situation of social responsibility and its impact on green consumption [49,50]. Therefore, we considered incorporating cognitive factors and sense of responsibility into the internal psychological factors section of the TPB-ABC theoretical model. Among them, we subdivided cognitive factors into six secondary indicators: consumer perceived effectiveness, quality perception, value perception, risk perception, green product awareness, and environmental cognition level. Additionally, we divided the sense of responsibility into four secondary indicators: environmental values, individual sense of responsibility, perception of environmental issues, and convenience of product recycling. Finally, external factors were reflected from three aspects: government regulation, economic factors, and green product supply. Then, we subdivided government regulation into order-based regulation and emotion-based regulation, which compensated for the limitations of previous studies that only considered government regulation from a single perspective. Therefore, based on internal and external factors, we summarized 32 influencing factors from six dimensions: consumer attitude, cognitive factors, sense of responsibility, economic factors, government regulation, and green product supply. On this basis, this study focused on exploring the critical influencing

factors of residents' GCB and analyzing the relationships between these critical influencing factors, which provided a theoretical basis for effectively promoting green consumption.

3. Methodologies

Most of the existing research on residents' GCB was based on questionnaire surveys and hypothesis testing methods. These studies mainly used the structural equation model (SEM) to empirically analyze the factors that affect residents' consumption behavior, in order to verify the validity and reliability of their hypotheses [51,52]. The method of hypothesis testing can identify favorable factors that promote green consumption by analyzing the influencing factors of GCB. However, this method can only demonstrate whether the research factors have a significant impact on green consumption, but cannot determine the degree of influence of the factors. That is to say, this method cannot provide detailed information on the importance of various factors in SEM, nor can it identify which are the critical influencing paths in the influencing factor index [53,54]. Therefore, having constructed the influencing factor system, we used the Delphi method to screen and optimize the initial set of influencing factors, and formed the final influencing factor system of residents' GCB. Then, based on the method of SNA, we further explored the internal relationships between various factors and the identification of critical influencing factors.

3.1. Delphi Method

The Delphi method, also known as the expert investigation method, was founded and implemented by RAND Corporation in 1946. Its essence is a method of anonymous expert inquiry, which involves soliciting opinions multiple times and providing feedback until a consensus is reached. This method has the characteristics of anonymity, feedback, and statistics. The Delphi method is anonymous or back-to-back, so that experts can make their own judgment independently. Therefore, this method can fully utilize expert knowledge and experience while overcoming subjective differences caused by differences in expert fields, experiences, personal cognition, etc. Overall, it is a scientific and practical analysis method [55]. Before using the Delphi method to determine the formal research framework, it is very necessary to select representative scholars with professional knowledge and rich experience in decision-making issues. It is the key to the success of the Delphi method. Then, anonymous expert decision-making is used to ensure that experts independently present their opinions. By introducing background materials and relevant requirements, the experts are provided with as much information as possible to make more accurate and reasonable judgments. Finally, after multiple rounds of feedback, consistent expert opinions were obtained.

The specific implementation process of the Delphi method is shown in Figure 1.

Implementation steps of the Delphi method:

- Determine the survey topic and draft the survey outline.
- Select experts and scholars with rich experience to form an expert group, and determine the number of experts in the expert group and the background of each expert.
- Provide as much information as possible to the expert group regarding decision-making issues, relevant requirements, background materials, etc., in order for the experts to make reasonable judgments.
- The experts independently make their own judgments based on existing information to evaluate the necessity of factors in the influencing factor system.
- Summarize the expert opinions for consistency testing.

If the opinions of the experts are consistent, the final results are collated and analyzed based on the opinions of the experts. If the opinions of the experts are inconsistent, they are provided with feedback and additional information, and the next round of investigation is conducted until their opinions reach a consensus.

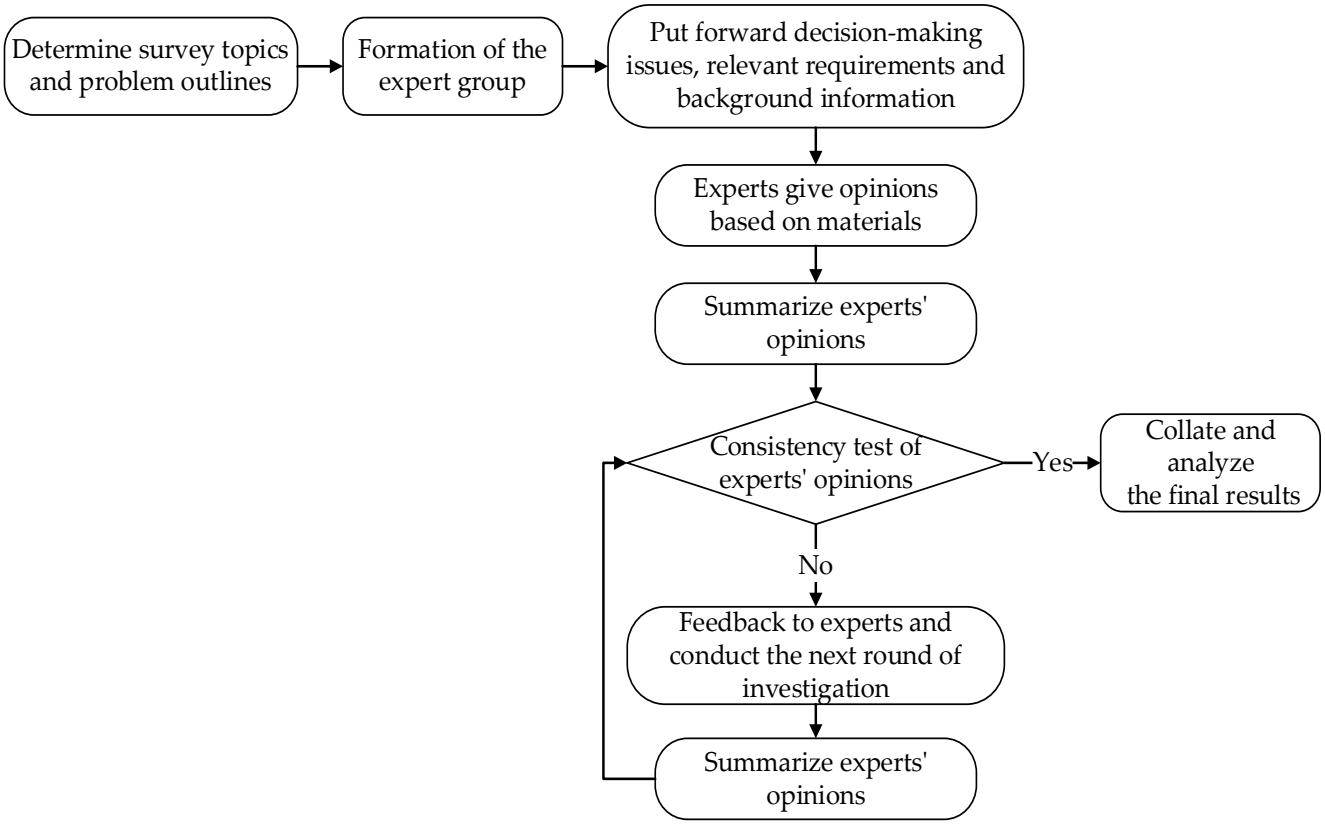

Figure 1. Implementation process of the Delphi method.

3.2. Social Network Analysis

Social network analysis (SNA) is a structural analysis method based on certain data relationships. It conducts quantitative analysis and research on existing social network member relationships through the comprehensive application of mathematical methods and graph theory [56]. Social network analysis has extensive applications in many fields such as sociology, psychology, management, etc. It can help decision-makers to understand issues related to social organizational structure, information dissemination, and impact mechanisms [57]. On the basis of the adjacency matrix, we used Pajek to construct a network diagram with each influencing factor as the node and explore the relationship between the influencing factors of residents' GCB through the network characteristics.

The specific operating steps are as follows [58]:

- Step 1: Determine the correlation between influencing factors. After constructing the influencing factor system, experts in the research field are invited to score the correlation between factors, and then form an adjacency matrix.
- Step 2: Network visualization of influencing factors. Use Pajek for network visualization analysis and draw a directed graph network of the relationships between influencing factors.
- Step 3: Overall network analysis to determine the degree of network correlation. We used network density and clustering coefficient to describe the degree of correlation between factors and conduct global network analysis.

The overall network density represents the closeness of node relationships in the network, and the closer the relationships, the higher the density value. The calculation is shown in Equation (1).

$$D = \frac{K}{N(N-1)} \tag{1}$$

where D represents the overall network density value, K represents the number of edges in the network, and N represents the number of nodes in the network.

The clustering coefficient reflects the group characteristics of adjacent nodes, and is calculated as shown in Equation (2).

$$CC_1 = \frac{2|E(G_1(v))|}{\deg(v) \times (\deg(v) - 1)} \tag{2}$$

where CC_1 represents the aggregation degree when the number of adjacent nodes in the network is 1, $|E(G_1(v))|$ represents a node directly connected to node v and with a number of adjacent nodes of 1, and $\deg(v)$ represents the number of adjacent nodes of node v.

- Step 4: Individual network analysis to identify critical influencing factors. By calculating degree centrality and closeness centrality, the centrality of each influencing factor in the entire network is obtained, and then the critical influencing factors are determined.

Degree centrality emphasizes the value of a single node. The "out-degree" of a node in the network indicates its influence on other network nodes, while the "in-degree" indicates that the node is influenced by other nodes. The larger the "out-degree" of nodes in the network, the closer the connection between the node and other nodes, and the more profound the impact. All influencing factors in our study were divided into driving factors and result factors by calculating the degree centrality.

Closeness centrality emphasizes the value of the network. High centrality indicates that this node has a strong correlation with other nodes and is close to the core of the network. It is used to determine the critical influencing factors, and the calculation is shown in Equation (3).

$$C_C(v_i) = \frac{N-1}{\sum\limits_{j=1, j\neq i}^{N} d_{ij}} \tag{3}$$

where $C_C(v_i)$ represents the closeness centrality of node v_i, N represents the number of nodes in the network, and d_{ij} represents the distance from node v_i to node v_j.

- Step 5: Identify critical influencing paths. Betweenness centrality emphasizes the regulatory ability, control ability index, and mediating regulatory effect of this node among other nodes. It is used to measure the control force of a node in the influence path. If a node has a strong correlation with other nodes, the calculated betweenness centrality will be greater. By using betweenness centrality, the nodes in the network that are in the "intermediary" position can be determined. Then, the line at a critical position in the network can be identified to determine its ability to affect other paths in the network. The calculation process of betweenness centrality is shown in Equation (4).

$$C_B(v_k) = \sum_{i=1}^{N} \sum_{j=1}^{N} \frac{b_{ij}(k)}{b_{ij}} \tag{4}$$

where $C_B(v_k)$ represents the betweenness centrality of node v_k, N represents the number of nodes in the network, b_{ij} represents the number of paths between node v_i and node v_j, and $b_{ij}(k)$ represents the number of paths passing through node v_k between node v_i and node v_j.

The specific implementation process of the SNA method is shown in Figure 2.

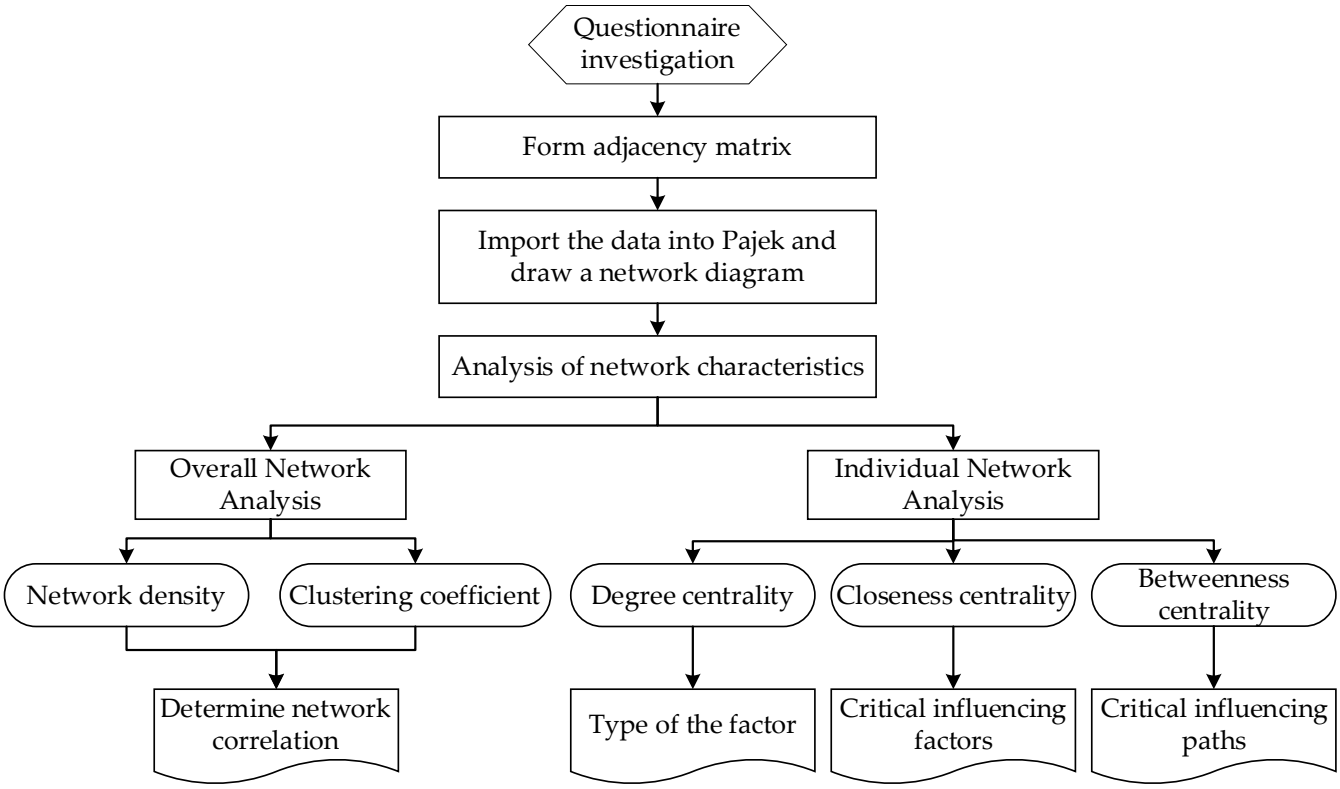

Figure 2. Implementation process of the SNA method.

4. Empirical Study

The influencing factors of residents' GCB form an overall network. The influencing factors constitute the nodes in the network, and the interaction between nodes forms the paths in the network. These relationship pathways play a crucial role in studying the overall influencing factor network. Firstly, we used the Delphi method to modify and optimize the system of influencing factors of residents' GCB, and determined the final research framework. Then, we conducted network feature analysis on the influencing factors network of residents' green consumption based on SNA. The identification of the critical influencing factors of GCB was divided into overall network analysis and individual network analysis. Among them, the overall network analysis included the construction of the overall influence network and the calculation of the overall network density and clustering coefficient. Individual network analysis included degree centrality analysis, closeness centrality analysis, and the identification of critical influencing paths [59].

4.1. Determination of the Formal Influencing Factor Framework Based on Delphi Method

Through the literature review, the initial set of influencing factors on residents' GCB summarized in this article included six dimensions and 32 indicators, as shown in Table 1. In order to verify the scientificity and effectiveness of the influencing factor system, it was necessary to use the Delphi method to consult experts on the initial influencing factor system. Six experts, with rich practical experience and theoretical backgrounds in the field of green consumption, were selected, as shown in Table 2. We used the points between 0 and 10 to measure the interaction between various factors in the influencing factor system of residents' GCB.

Table 2. Professional backgrounds of the selected six experts for the Delphi survey.

Expert	Duty	Gender	Age	Specialist Topic	Working Area	Seniority
A	Professor	Male	45	Green consumption	Beijing	15~20
B	Professor	Male	40	Green consumption	Beijing	15~20
C	Associate Professor	Male	45	Green development	Beijing	15~20
D	Associate Professor	Male	38	Consumer behavior	Beijing	10~15
E	Research Fellow	Female	36	Consumer psychology	Shandong	10~15
F	Senior Manager	Male	45	Circular economy	Shanghai	15~20

Then, the necessity of influencing factors was judged based on the average score and the consensus deviation index (CDI) [60]. The specific calculation formula was as follows:

$$CDI = \frac{\sigma}{\mu} = \frac{\sqrt{\frac{1}{n}\sum_{i=1}^{n}(x_i - \mu)^2}}{\frac{1}{n}\sum_{i=1}^{n} x_i} \quad (5)$$

In Equation (5), x_i represents the expert's rating of the necessity of each influencing factor, n represents the number of experts, σ indicates the standard deviation of the experts' scores, and μ represents the average of the experts' scores.

The judgment rules for using the Delphi to correct the influencing factor system are as follows: Firstly, the average score of each influencing factor is considered. If the average score is lower than the threshold, it indicates that the necessity of the influencing factor is low and needs to be removed from the factor set. Then, the coefficient of variation for each influencing factor is considered. If the CDI value is too high, it indicates that experts have a significant disagreement on the necessity of this factor, and there is no consensus on expert opinions. The next round of the Delphi questionnaires is required until the experts reach a consensus on all factors. In our study, we set 6 as the critical value for necessity and 0.2 as the critical value for CDI. A panel of six experts and scholars from the field of green consumption was invited to rate the necessity of various influencing factors on GCB.

When conducting the first round of the Delphi questionnaires, we provided the expert group with information on the problems to be solved, as well as the initial influencing factor system of GCB determined via a literature review. Based on their own experience, the experts determined whether the initial set of influencing factors could be effectively used to study residents' GCB, and checked whether the definitions of each influencing factor were accurate and reasonable. Ultimately, based on expert opinions, the "environmental values" and "individual sense of responsibility" of the sense of responsibility dimension were unified into "environmental responsibility awareness". The "green product performance" and "green product quality" in the dimension of green product supply were uniformly measured using the factor of "green product functional attributes". The "group reference effect" in government regulation was changed to "social discussion". After the first round of Delphi, we obtained a system of influencing factors on residents' GCB, which included six dimensions and 30 influencing factors.

In the second round of the Delphi questionnaire, experts scored the necessity of various influencing factors in residents' GCB in a back-to-back manner based on scores between 0 and 10. A score of 0 indicated that the influencing factor was completely unnecessary, while a score of 10 indicated that the influencing factor was very necessary. The necessity analysis of factors in the second round of the Delphi questionnaire is shown in Table 3. The experts unanimously believed that the three influencing factors of consumer satisfaction, convenience of product recycling, and socio-economic development were unnecessary and could be directly removed, because the average scores of these factors were below 6 and the CDI values were below 0.2. In addition, the average scores of 16 influencing factors were higher than 6, indicating that these influencing factors were necessary in the study of residents' GCB. Moreover, the CDI values of these factors were below 0.2, indicating

that the experts reached a consensus on these indicators. The CDI values of the other 11 influencing factors were higher than 0.2. In order for the experts to reach a consensus, the third round of the Delphi questionnaire survey was conducted.

Table 3. Necessity analysis of influencing factors in the second round of the Delphi questionnaire.

Dimension	Influencing Factor	Necessity Scoring						Mean Value	Standard Deviation	CDI	Whether to Eliminate
		A	B	C	D	E	F				
Consumer attitude	Green purchase intention	8	10	7	9	7	9	8.333	1.211	0.145	No
	Transformation of consumption habit	7	5	3	6	5	6	5.333	1.366	0.256	No
	Willingness to pay	8	7	9	8	7	8	7.833	0.753	0.096	No
	Consumer loyalty	6	7	7	6	4	8	6.333	1.366	0.216	No
	Consumer satisfaction	5	6	5	7	4	5	5.333	1.033	0.194	Yes
Cognitive factors	Consumer perceived effectiveness	9	8	9	8	10	8	8.667	0.816	0.094	No
	Quality perception	6	9	6	5	7	6	6.500	1.378	0.212	No
	Value perception	7	6	8	7	8	7	7.167	0.753	0.105	No
	Risk perception	7	8	7	7	8	8	7.500	0.548	0.073	No
	Green product awareness	7	6	5	6	8	4	6.000	1.414	0.236	No
	Environmental cognition level	6	7	8	7	9	8	7.500	1.049	0.140	No
Sense of responsibility	Environmental responsibility awareness	5	9	5	6	8	6	6.500	1.643	0.253	No
	Perception of environmental issues	6	6	8	5	7	7	6.500	1.049	0.161	No
	Convenience of product recycling	6	5	4	6	6	5	5.333	0.816	0.153	Yes
Economic factors	Green product price	8	9	8	10	7	8	8.333	1.033	0.124	No
	Waste recycling cost	5	7	8	5	8	6	6.500	1.378	0.212	No
	Personal disposable income	6	5	7	7	6	8	6.500	1.049	0.161	No
	Socio-economic development	4	4	4	5	5	3	4.167	0.753	0.181	Yes
	Environmental benefits	6	3	6	5	7	6	5.500	1.378	0.251	No
	Consumer costs	7	6	7	7	6	8	6.833	0.753	0.110	No
Government regulation	Policies and regulations	7	8	4	5	8	7	6.500	1.643	0.253	No
	Government subsidy	8	9	9	8	8	9	8.500	0.548	0.064	No
	Green product certification	6	10	7	8	6	10	7.833	1.835	0.234	No
	Publicity and education	6	7	5	6	7	6	6.167	0.753	0.122	No
	Social discussion	7	6	6	7	7	8	6.833	0.753	0.110	No
Green product supply	Green product functional attributes	9	8	7	6	6	7	7.167	1.169	0.163	No
	Green product brand	7	5	6	4	6	8	6.000	1.414	0.236	No
	Green attribute information	8	7	9	8	6	10	8.000	1.414	0.177	No
	Green product production label	9	6	5	5	7	8	6.667	1.633	0.245	No
	Green product marketing strategy	6	8	7	5	7	7	6.667	1.033	0.155	No

Before the start of the third round of the Delphi questionnaire survey, in order to avoid errors caused by unnecessary factors, experts who scored outside the average value (plus or minus one standard deviation) in the previous round were required to provide the reasons for the second round of scoring. The third round of expert scoring is shown in Table 4. After the statistical analysis of the questionnaire survey results, it was found that the CDI values

of all of the influencing factors were less than 0.2, indicating that all indicators passed the consensus test of expert opinions. Among them, the average scores of five influencing factors, namely transformation of consumption habit, quality perception, environmental benefits, policies and regulations, and green product brand, were lower than 6. According to the principle of determining the necessity of influencing factors, these five factors that were unanimously deemed to be unnecessary by experts were ultimately eliminated.

Table 4. Necessity analysis of influencing factors in the third round of the Delphi questionnaire.

Dimension	Influencing Factor	Necessity Scoring						Mean Value	Standard Deviation	CDI	Whether to Eliminate
		A	B	C	D	E	F				
Consumer attitude	Green purchase intention	8	10	7	9	7	9	8.333	1.211	0.145	No
	Transformation of consumption habit	6	6	4	5	6	5	5.333	0.816	0.153	Yes
	Willingness to pay	8	7	9	8	7	8	7.833	0.753	0.096	No
	Consumer loyalty	7	6	8	6	5	8	6.667	1.211	0.182	No
	Consumer satisfaction	5	6	5	7	4	5	5.333	1.033	0.194	Yes
Cognitive factors	Consumer perceived effectiveness	9	8	9	8	10	8	8.667	0.816	0.094	No
	Quality perception	5	6	6	5	6	7	5.833	0.753	0.129	Yes
	Value perception	7	6	8	7	8	7	7.167	0.753	0.105	No
	Risk perception	7	8	7	7	8	8	7.500	0.548	0.073	No
	Green product awareness	6	7	6	5	7	6	6.167	0.753	0.122	No
	Environmental cognition level	6	7	8	7	9	8	7.500	1.049	0.140	No
Sense of responsibility	Environmental responsibility awareness	5	8	7	6	7	7	6.667	1.033	0.155	No
	Perception of environmental issues	6	6	8	5	7	7	6.500	1.049	0.161	No
	Convenience of product recycling	6	5	4	6	6	5	5.333	0.816	0.153	Yes
Economic factors	Green product price	8	9	8	10	7	8	8.333	1.033	0.124	No
	Waste recycling cost	5	6	8	7	8	6	6.667	1.211	0.182	No
	Personal disposable income	6	5	7	7	6	8	6.500	1.049	0.161	No
	Socio-economic development	4	4	4	5	5	3	4.167	0.753	0.181	Yes
	Environmental benefits	5	4	6	5	6	6	5.333	0.816	0.153	Yes
	Consumer costs	7	6	7	7	6	8	6.833	0.753	0.110	No
Government regulation	Policies and regulations	7	5	4	5	5	6	5.333	1.033	0.194	Yes
	Government subsidy	8	9	9	8	8	9	8.500	0.548	0.064	No
	Green product certification	8	10	7	7	8	10	8.333	1.366	0.164	No
	Publicity and education	6	7	5	6	7	6	6.167	0.753	0.122	No
	Social discussion	7	6	6	7	7	8	6.833	0.753	0.110	No
Green product supply	Green product functional attributes	9	8	7	6	6	7	7.167	1.169	0.163	No
	Green product brand	7	5	5	5	6	6	5.667	0.816	0.144	Yes
	Green attribute information	8	7	9	8	6	10	8.000	1.414	0.177	No
	Green product production label	9	7	6	7	8	8	7.500	1.049	0.140	No
	Green product marketing strategy	6	8	7	5	7	7	6.667	1.033	0.155	No

After three rounds of the Delphi questionnaire surveys, the formal research framework of our study was finally obtained. The final influencing factor system of residents' GCB included six dimensions and 22 factors, as shown in Table 5.

Table 5. Final influencing factor system of residents' GCB.

Dimension	Influencing Factor	Code
Consumer attitude (A)	Green purchase intention	A1
	Willingness to pay	A2
	Consumer loyalty	A3
Cognitive factors (B)	Consumer perceived effectiveness	B1
	Quality perception	B2
	Risk perception	B3
	Green product awareness	B4
	Environmental cognition level	B5
Sense of responsibility (C)	Environmental responsibility awareness	C1
	Perception of environmental issues	C2
Economic factors (D)	Green product price	D1
	Waste recycling cost	D2
	Personal disposable income	D3
	Consumer costs	D4
Government regulation (E)	Government subsidy	E1
	Green product certification	E2
	Publicity and education	E3
	Social discussion	E4
Green product supply (F)	Green product functional attributes	F1
	Green attribute information	F2
	Green product production label	F3
	Green product marketing strategy	F4

4.2. Identification and Analysis of Critical Influencing Factors Based on SNA

4.2.1. Construction of the Network Diagram of the Influencing Factors

We conducted research on the identification of critical influencing factors in residents' GCB based on the method of SNA. According to the analysis of existing research on the influencing factors of GCB, we finally sorted out six dimensions and 22 factors, which were used to identify the critical influencing factors and critical influencing paths of GCB. In terms of data acquisition, having determined the set of influencing factors on residents' GCB, we used expert questionnaire surveys to determine the impact of pairwise comparisons between factors. The questionnaire was designed as a paired comparison question, with scores from 0 to 10, where 0 represents no impact between two factors. The scores from 1 to 10 indicate that factor i has an impact on factor j, and the larger the score, the higher the degree of influence between factors. The questionnaire was filled out by experts and scholars from the field of green consumption, as shown in Table 2. The question was as to "Whether there is a correlation between residents' green purchase intention and willingness to pay. What is the impact of residents' green purchase intention on green product awareness?" Part of the questionnaire is shown in Table A1 in Appendix A.

When processing the data, we treated the opinions of each expert equally. The average scores calculated by the experts were used as the final impact between factors. We set the average value below 0.5 as 0 and believed that there was no impact between these two factors. The adjacency matrix of the influencing factors of residents' GCB was obtained. Since the matrix of 22 × 22 involved more data, only the adjacency matrix among the first 10 influencing factors was given as an example, as shown in Table 6.

Table 6. Partial adjacency matrix of influencing factors for residents' GCB.

Influencing Factor	A1	A2	A3	B1	B2	B3	B4	B5	C1	C2
A1	0.000	6.167	1.833	0.000	0.000	0.500	0.000	0.000	1.500	0.000
A2	8.000	0.000	0.000	0.000	0.000	0.667	0.000	0.000	0.000	0.000
A3	4.500	4.167	0.000	1.333	1.667	0.667	0.000	0.000	0.000	0.000
B1	1.667	1.833	2.500	0.000	0.000	1.167	0.000	0.000	0.667	3.000
B2	3.167	1.167	1.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B3	3.333	2.000	1.167	1.000	0.000	0.000	0.000	0.000	0.000	2.500
B4	1.667	1.500	0.000	0.667	0.000	2.500	0.000	0.000	1.000	0.000
B5	2.500	1.167	0.000	0.000	0.000	3.500	0.000	0.000	4.667	2.500
C1	3.167	1.833	0.000	2.167	0.000	1.833	4.333	4.000	0.000	2.667
C2	2.333	1.000	0.000	0.000	0.000	3.833	1.000	2.000	0.000	0.000

Based on the adjacency matrix of the influencing factors, we used Pajek to construct the initial network, as shown in Figure 3.

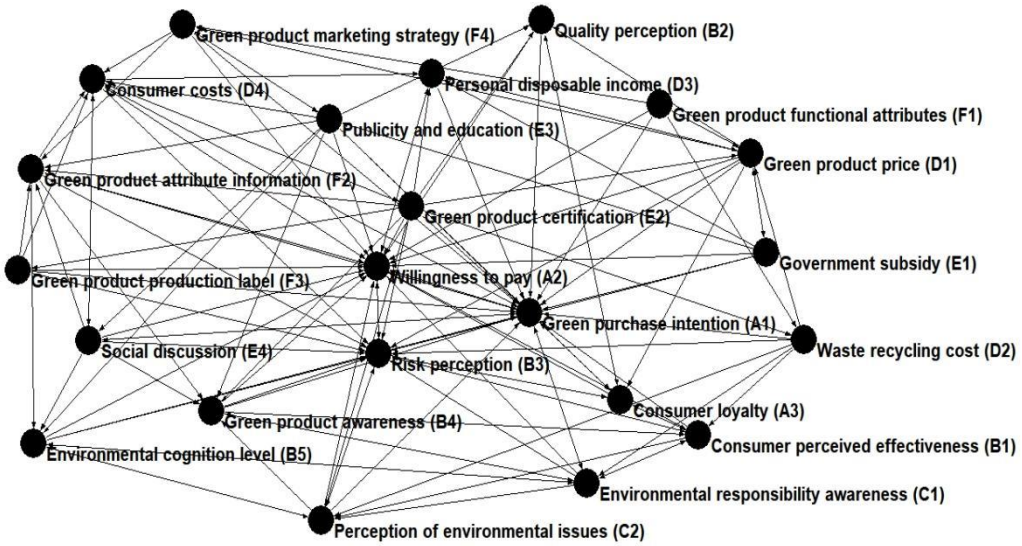

Figure 3. Network diagram of influencing factors on residents' GCB.

4.2.2. Identification of the Critical Influencing Factors

We conducted an overall network analysis to determine the degree of network correlation. According to Equations (1) and (2), the overall network density and clustering coefficient were calculated, and the results were 0.533 and 0.432, respectively. This indicated that the relationship between various factors in the entire network was relatively close. Additionally, these factors all played an important role in the relationship network of factors affecting residents' GCB. This result also indicated that the influencing factors of residents' GCB were the combined effect of internal factors (consumer attitudes, cognitive factors, sense of responsibility) and external contexts (economic factors, government regulation, green product supply). These factors had varying degrees of impact on green consumption behavior, but for most of the residents, each of them had its own role and was indispensable.

Then, we conducted individual network analysis to identify the critical influencing factors and critical influencing pathways. According to Step 4 of SNA, we calculated the degree centrality and closeness centrality of the network for individual network analysis. The critical influencing factors of residents' GCB were ultimately determined. The SNA analysis results are shown in Table 7.

Table 7. The SNA analysis results of influencing factors on residents' GCB.

Influencing Factor	Degree Centrality (Out-Degree)	Degree Centrality (In-Degree)	Closeness Centrality	Sorting
A1	6	21	1.000	1
A2	3	20	0.955	2
A3	5	6	0.600	9
B1	6	5	0.618	8
B2	3	4	0.583	10
B3	5	16	0.808	3
B4	5	6	0.656	6
B5	5	5	0.618	8
C1	7	5	0.618	8
C2	5	6	0.636	7
D1	8	5	0.677	5
D2	6	2	0.618	8
D3	2	5	0.583	10
D4	6	7	0.656	6
E1	6	1	0.583	10
E2	12	1	0.700	4
E3	10	2	0.677	5
E4	7	3	0.618	8
F1	5	0	0.568	11
F2	6	5	0.677	5
F3	5	1	0.583	10
F4	6	3	0.600	9

The nodes with relatively high out-degree in the network indicated that the impact of these factors on other factors was strong, and we referred to these factors as driving factors. The nodes with relatively high in-degree indicated that the factors were influenced by other factors strongly, and these factors were named as the result factors. According to the results in Table 7, the driving factors included green product certification (E2), publicity and education (E3), and green product price (D1), indicating that these factors constituted the direct factors that affected residents' GCB. The result factors included green purchase intention (A1), willingness to pay (A2), and risk perception (B3). These factors were indirect factors that influenced residents' GCB, and could be influenced by controlling the driving factors.

According to the ranking results of closeness centrality in Table 7, we considered the top five factors as critical influencing factors. The critical influencing factors of residents' GCB included green purchase intention (A1, 1.000), willingness to pay (A2, 0.955), risk perception (B3, 0.808), green product certification (E2, 0.700), publicity and education (E3, 0.677), green product price (D1, 0.677), and green attribute information (F2, 0.677).

The final critical factors influencing residents' GCB are shown in Table 8.

Table 8. The final critical factors influencing residents' GCB.

Sorting	Code	Critical Influencing Factors	Type
1	A1	Green purchase intention	Result factor
2	A2	Willingness to pay	Result factor
3	B3	Risk perception	Result factor
4	E2	Green product certification	Driving factor
5	E3	Publicity and education	Driving factor
5	D1	Green product price	Driving factor
5	F2	Green attribute information	Driving factor

4.2.3. Identification of the Critical Influencing Paths

After identifying the critical influencing factors and their types, we further calculated the betweenness centrality of each factor, as shown in Table 9. We considered factors with

betweenness centrality greater than 0.1 as the critical intermediary nodes. It was clear that green purchase intention (A1, 0.352), consumer cost (D4, 0.284), green product certification (E2, 0.244), and green product price (D1, 0.148) were the critical intermediary nodes.

Table 9. Betweenness centrality of various influencing factors.

Number	Influencing Factor	Betweenness Centrality
1	A1	0.352
2	A2	0.033
3	A3	0.035
4	B1	0.011
5	B2	0.001
6	B3	0.063
7	B4	0.010
8	B5	0.009
9	C1	0.028
10	C2	0.017
11	D1	0.148
12	D2	0.010
13	D3	0.000
14	D4	0.284
15	E1	0.022
16	E2	0.244
17	E3	0.024
18	E4	0.044
19	F1	0.000
20	F2	0.012
21	F3	0.000
22	F4	0.046

We further calculated the betweenness centrality of each edge between the critical intermediary nodes. According to the edge betweenness centrality, we considered the top five influencing paths as the critical influencing paths. The results are shown in Table 10.

Table 10. The critical influencing paths of GCB among residents.

No.	Influencing Path	Edge Betweenness Centrality	Description
1	D4 → A1	0.636	Green purchase intention was affected by consumer cost with a centrality of 0.636.
2	E2 → A1	0.596	Green purchase intention was affected by green product certification with a centrality of 0.596.
3	E2 → D4	0.528	Consumer cost was affected by green product certification with a centrality of 0.528.
4	D1 → A1	0.500	Green purchase intention was affected by green product price with a centrality of 0.500.
5	D1 → D4	0.432	Consumer cost was affected by green product price with a centrality of 0.432.

In order to further explore the internal correlation of the critical influencing paths, a network diagram was drawn as shown in Figure 4.

As shown in Figure 4, green product certification (E2) and green product price (D1) were critical driving factors. As for green product certification, it cannot only directly affect residents' green purchase intention (E2→A1), but also indirectly affect green purchase intention by influencing consumer costs (E2→D4→A1). As for green product price, it cannot only directly affect residents' green purchase intention (D1→A1), but also indirectly affect green purchase intention by influencing consumer costs (D1→D4→A1). Consumer costs was a critical intermediary node in the network.

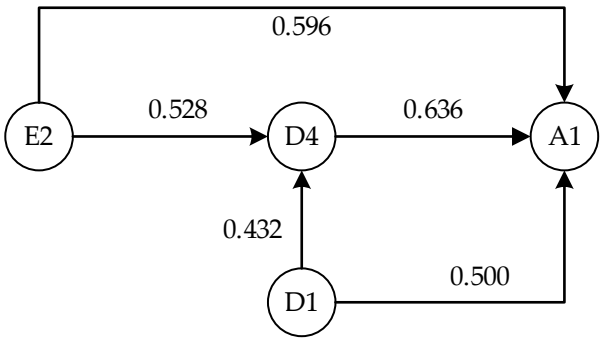

Figure 4. Network diagram of critical influencing paths.

5. Discussion and Implications

Differing from the conventional hypothesis testing method and SEM method, we used the SNA method to identify not only the critical influencing factors but also the critical influencing paths of residents' GCB. The results show that the top five critical influencing factors are green purchase intention (A1), willingness to pay (A2), risk perception (B3), green product certification (E2), publicity and education (E3), green product price (D1), and green attribute information (F2). The top five critical influencing paths are D4→A1, E2→A1, E2→D4, D1→A1, and D1→D4.

- Green purchase intention (A1) reflects consumers' green consumption attitude, and when consumers hold a positive attitude, they are more likely to implement GCB. This result is consistent with previous studies [42,61]. Additionally, we should notice that this factor is the result factor and is easily influenced by other factors. As shown in the critical influencing paths, green purchase intention is affected by consumer costs, green product certification, green product price, and risk perception. In practice, consumers with green purchase intention ultimately do not implement their green consumption behavior due to factors such as economic capacity, cognitive limitations, and the supply of green products. Therefore, decision-makers should focus on strengthening green purchase intention by reducing the price and cost of green products and promoting green product certification.
- Willingness to pay (A2) refers to the cost that consumers are willing to pay to buy green products, which reflects consumers' trust in green products from the side. When consumers have a higher willingness to pay for green products, they are more willing to implement GCB. According to the influencing factor matrix, we found that willingness to pay is a result factor, and is vulnerable to green purchase intention, green product price, government subsidy, and other factors. If consumers think that the price of green products is too high, they may reduce their willingness to pay; so, they will not adopt GCB. Therefore, in the process of developing the green economy, policymakers need to gradually reduce the price of green products, or provide consumers with subsidies to a certain extent to improve the public's green willingness to pay, thereby promoting a larger scale of GCB.
- Green product certification (E2) is a critical driving factor. This research result is consistent with the findings of Yang et al. [38]. Green product certification cannot only directly affect green purchase intention, but can also affect consumer costs. Actually, residents always doubt whether green products can truly be environmentally friendly. The eco-friendly characteristics of green products belong to intangible attributes, and consumers cannot identify them easily via observation or use. Third-party certification can help to alleviate the aforementioned phenomenon. Additionally, green product certification can reduce consumers' search costs for green products, thereby reducing their total cost and expanding the utility of consumer decision-making. Therefore, the government should actively publish more green product standards, implement

green product certification work more strictly, and strengthen the supervision of green product certification.

- Green product price (D1) is a critical driving factor, which directly affects their willingness to purchase green products. This is consistent with previous research results [38,62]. Usually, due to the high quality and green attributes, the production cost of green products will be higher than that of similar traditional products. Therefore, green products usually have a higher price. Most residents will not make sacrifices themselves due to environmental protection voluntarily. So, the higher price will reduce consumers' purchasing desire to some extent. Therefore, subsidies to green consumption and green production will be beneficial in lowering the green product price. Meanwhile, the development and application of green science and technology can further reduce costs, which will ultimately reduce the green product price.
- Publicity and education (E3) is also a critical driving factor affecting residents' GCB. Usually, consumers' vague understanding of green products leads to cognitive barriers. For example, a lack of detailed understanding of the value and functions of green products may make residents abandon green products. Publicity and education are effective ways to improve the level of awareness of green products and strengthen the concept of green consumption. Therefore, the government can release public service announcements related to green consumption via television, radio, official websites, and other online media to promote the concept of green consumption to the public.
- Risk perception (B3) is a critical factor affecting GCB, reflecting consumers' feelings of uncertainty in the process of purchasing products or services. Usually, green consumption willingness is negatively affected by risk perception, thereby limiting the implementation of green consumption behavior. Risk perception reflects residents' distrust in green products. To address this issue, on the one hand, strengthening publicity and education can improve consumers' cognitive level, thereby reducing their sense of uncertainty. On the other hand, by improving the green product certification system, consumers can be provided with scientific and truthful information about green products from an objective and fair perspective, thereby alleviating their inner doubts.
- Green attribute information (F2) refers to information on the environmental protection, sustainability, energy conservation, and other aspects of green products, which can help consumers to increase their willingness to purchase green products. It is a critical driving factor and has a significant impact on green product awareness and risk perception. Ambiguous green attribute information not only leads to a crisis of trust among consumers, but also easily poses cognitive barriers to consumers. In order to save cognitive efforts, consumers may abandon green standards. Therefore, the government should build an official green product information platform and provide clear, accurate, and reliable green attribute information to enhance public awareness and trust in green products, thereby promoting more GCB.

6. Conclusions

To effectively promote residents' GCB, this study identified the critical influencing factors and critical influencing paths using the SNA method.

Firstly, an initial influencing factor set was established based on the TBP-ABC framework. Six dimensions affecting green consumption were considered, namely consumer attitude, cognitive factors, sense of responsibility, economic factors, government regulation, and green product supply. Secondly, a formal influencing factor set was determined using the Delphi method, including six dimensions and 22 influencing factors. Thirdly, the network diagram of the influencing factors was constructed. By calculating the out-degree, in-degree, and closeness centrality, the top five critical factors were identified, including green purchase intention, willingness to pay, risk perception, green product certification, publicity and education, green product price, and green attribute information. By calculating the betweenness centrality, five critical influencing paths were determined, including

D4→A1, E2→A1, E2→D4, D1→A1, and D1→D4. Finally, some managerial implications were put forward accordingly.

There are some limitations to this study. Although we classified 32 influencing factors into six categories in detail based on existing research results, we were still unable to exhaust all factors and conduct a thorough investigation one by one. The established behavioral decision-making mechanism can only explain the occurrence of GCB from a limited perspective. Moreover, with the innovative development of green consumption and the publication of relevant research, the selection of influencing factors should be further expanded. In addition, the data processing process in this study treated each expert equally, while in reality, the importance of each expert may vary. At the same time, the ambiguity and uncertainty of various indicators were ignored. The identification of the critical influencing factors and influencing paths could contribute to the promotion of residents' GCB. Hopefully, the limitations mentioned above will be addressed in future research.

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Data Availability Statement: All data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Part of the questionnaire.

1. What is the impact of green purchase intention on willingness to pay? (The greater the impact, the higher the score) - no impact (0) - moderate impact (1–5) - high impact (6–10)
2. What is the impact of green purchase intention on consumer loyalty? (The greater the impact, the higher the score) - no impact (0) - moderate impact (1–5) - high impact (6–10)
3. What is the impact of green purchase intention on consumer perceived effectiveness? (The greater the impact, the higher the score) - no impact (0) - moderate impact (1–5) - high impact (6–10)
4. What is the impact of green purchase intention on value perception? (The greater the impact, the higher the score) - no impact (0) - moderate impact (1–5) - high impact (6–10)

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