Driving Forces of Chinese Consumers' Green Purchase Intentions in the Era of Big Data: A Social Media Perspective

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Abstract. In the era of big data, the green purchase intentions of Chinese consumers are undergoing a transformation, with social media playing a crucial role. Grounded in the Theory of Reasoned Action (TRA), this study employs structural equation modeling to analyze 316 survey responses, yielding the following key findings: social media exerts a significantly positive influence on consumers' green purchase intentions. Further analysis reveals that the impact of social media on green purchase intentions is not a singular, direct effect but is realized through multiple dimensions of intermediary variables, namely, consumers' Green Perceived Value, Green Product Knowledge, Environmental Consciousness, Attitude, and Subjective Norms. The multidimensional influence pathways demonstrate the rich and intricate mechanisms through which social media guides green consumption.

Keywords: Big Data Era, Social Media, Green Purchase Intentions, Theory of Reasoned Action

1 Introduction

In the current digital era, the widespread prevalence of social media and the rapid development of big data have profoundly shaped consumer behavior [1]. Green consumption in contemporary society has evolved beyond being merely a fashion trend, emerging as a symbol of sustainable development and environmental responsibility [2]. As the primary platform for information dissemination, social media has not only altered the ways in which consumers access information but has also fostered social resonance through user interactions and content sharing [3]. Against this backdrop, gaining a deeper understanding of the mechanisms through which social media influences green purchase intentions becomes a research topic of significant theoretical and practical value.

In the era of big data, social media has effectively influenced consumers' green purchasing behavior. Ebrahimi et al. (2022) found significant positive effects of Facebook Marketplace on consumer purchasing behavior [4]. POP et al. (2020) emphasized the importance of social media in influencing consumer attitudes, norms, motivations, particularly regarding the intention to purchase green cosmetics [5]. Drawing on the Stimulus-Organism-Response (SOR) theory, Sun and Xing (2022) elucidated the relationships among social media information sharing, green value perception, subjective norms, and green purchase intentions

[6]. Luo et al. (2020), utilizing the SOR model, investigated the impact of skepticism towards green advertising on consumers' green purchase intentions on social media, revealing underlying mechanisms [7]. These studies indicate that social media positively influences green purchase intentions by enhancing environmental consciousness, affecting consumer motivations and attitudes, with factors such as green advertising and perceived green value playing crucial roles. However, existing research often focuses on specific social media platforms or product domains, lacking a comprehensive understanding of the overall influencing mechanisms. Therefore, this study aims to fill this research gap by delving into how social media impacts consumers' green purchase intentions and revealing the specific mechanisms involved.

Building on the aforementioned context, this study posits the hypothesis that social media influences consumers' green purchase intentions by affecting variables such as green perceived value, environmental consciousness, green product knowledge, attitude, and subjective norms. Grounded in the Theory of Reasoned Action (TRA), the research aims to unveil the relationships among these variables, providing a deeper understanding of the impact mechanisms of social media on consumers' green purchase intentions in the era of big data.

Empirical analysis in this study will employ questionnaire measurements and Structural Equation Modeling (SEM). Through a survey, data will be collected on respondents' engagement with green topics on social media, green product searches, reception of green product promotions, and the level of trust in green content on social media. The Structural Equation Model will be utilized to test the significance of hypothesized paths and overall model fit, comprehensively exploring the impact mechanisms of social media on Chinese consumers' green purchase intentions. This research aims to guide consumers toward greater environmental awareness and sustainability, fostering more significant achievements in society's sustainable development goals.

2 Theoretical Foundation and Model Construction

The Theory of Reasoned Action (TRA) is a classical theory in the fields of social science and consumer behavior, first proposed by Fishbein and Ajzen [8]. The core constructs of TRA consist of two key concepts: attitude and subjective norms, both considered pivotal factors in predicting individual behavioral intentions and actual behavior. "Attitude" reflects an individual's overall evaluation of a specific behavior, composed of the individual's beliefs about the behavior and the importance attached to these beliefs. "Subjective norms" reflect the perceived social pressure on individuals, indicating the degree to which they believe society or significant others expect them to engage in a particular behavior.

This study, grounded in the Theory of Reasoned Action (TRA) and focusing on the influence of social media, puts forward a series of hypotheses. We hypothesize that purchasing attitude has a positively significant impact on green purchase intentions (H1), and subjective norms have a positively significant impact on green purchase intentions (H2). Green perceived value has a positively significant impact on attitude (H3). Green product knowledge plays a positively significant role in shaping purchasing attitudes and subjective norms (H4a and H4b). Additionally, environmental consciousness has a positively significant impact on subjective norms (H5).

In the social media environment of the big data era, we infer that social media, by influencing variables such as perceived green value, green product knowledge, environmental consciousness, attitude, and subjective norms, has a positively significant impact on green purchase intentions (H6a to H6e). Based on the above content, we propose the conceptual model shown in **Figure 1**. To validate these hypotheses, we employ quantitative analytical methods to delve into relevant data.
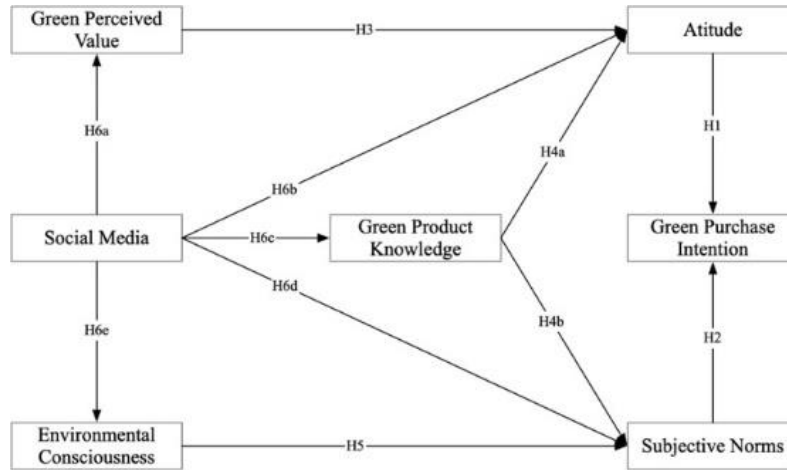
Fig. 1. Conceptual Model of Social Media Influence on Consumers' Green Purchase Intention in the Big Data Era.

3 Methodology

3.1 Data Collection

This study employed a random sampling approach to conduct a questionnaire survey of social media users through online survey platforms, ensuring a random sample across various regions and age groups. To gain a deeper understanding of the impact mechanisms of social media on the green purchase intentions of Chinese consumers, we conducted a survey with 316 participants. **Table 1** provides an overview of the sociodemographic characteristics of the participants. The distribution of participants' gender is balanced, with a wide range of age groups. The participants exhibit relatively high levels of education, and their economic statuses vary across different levels. Through this diverse sample, we can comprehensively explore the extent of social media's impact on consumers of different genders, ages, education levels, and economic statuses, laying the foundation for this study.

Table 1. The socio-demographic profile of respondents.

Variables	Frequency	Percent	Variables	Frequency	Percent
Gender			High school education	5	1.58
Male	128	40.5	Undergraduate education	267	84.49
Female	188	59.5	Master's degree	36	11.39
Age			Doctoral degree	6	1.9
18-22 years	45	14.24	Average Monthly Income		

23-27 years	94	29.75	Less than¥2000	64	20.25
28-32 years	78	24.68	¥2001-5000	132	41.77
33-37 years	51	16.14	¥5001-8000	65	20.57
38-42 years	48	15.19	¥8001-11000	53	16.77
Level of Education			¥11001and above	2	0.63
Secondary education	2	0.63	Total (respondents)	316	100

3.2 Analysis Methodology

Firstly, we developed a measurement instrument based on existing mature scales and validated it through pre-testing. The measurement of social media involvement includes participants' engagement in green topics on social media, searching for green products, the extent of receiving green product promotions, and the level of trust in green product content [9]. Green perceived value focuses on consumers' actual perception of the value of green products, environmental consciousness encompasses the degree of individual acknowledgment of environmental issues, and green product knowledge pertains to consumers' understanding of green products and environmental information [9,10]. For the measurement of attitude, subjective norms, and green purchase intentions, we utilized the classic TRA model scale to ensure consistency with existing research. Attitude reflects individuals' overall views on green purchasing, subjective norms measure the impact of societal pressure and others' expectations on purchasing intentions, and green purchase intentions are measured by the intensity of individuals expressing their willingness to purchase [11].

Finally, we will use Structural Equation Modeling (SEM) for data analysis, conducted in the Smart-PLS software, to test the significance of hypothesis paths and the model fit. SEM allows for the comprehensive consideration of relationships between multiple variables, providing a better reflection of the complex research structure [12]. Through path analysis, we will gain an in-depth understanding of the direct and indirect relationships between variables, comprehensively revealing the impact mechanisms of social media on green purchase intentions.

4 Results Analysis

4.1 Measurement Model Evaluation

We conducted a comprehensive analysis of the reliability and validity of the collected data for each construct. Firstly, all constructs demonstrated high internal consistency, with Cronbach's alpha values exceeding the recommended threshold of 0.70, indicating reliability across various domains. Secondly, Composite Reliability (CR) values, ranging from 0.759 to 0.914, all surpassed the suggested threshold of 0.70, demonstrating high reliability of the measurement tool. Regarding convergent validity, Average Variance Extracted (AVE) values, ranging from 0.573 to 0.853, all exceeded the recommended threshold of 0.50, emphasizing satisfactory convergent validity of the measurement tool. Additionally, Variance Inflation Factor (VIF) values were all below 5, ruling out significant multicollinearity issues.

As shown in **Table 2**, each construct, including social media, green perceived value, green product knowledge, environmental consciousness, attitude, subjective norms, and green purchase intention, exhibited strong internal consistency and reliability. This comprehensive

analysis indicates the effectiveness of the questionnaire in various aspects of the research design, with no significant random errors or multicollinearity issues.

Table 2. The measurement model (reliability, validity, and variance inflation factor (VIF)) analysis.

Constructs	Items	Loading	Cranach's Alpha	rho_A	Composite reliability (CR)	AVE	VIF
Social Media	SM1	0.736					1.438
	SM2	0.762	0.752	0.759	0.843	0.573	1.511
	SM3	0.798					1.533
	SM4	0.730					1.438
Green Perceived Value	GPV1	0.868					2.555
	GPV2	0.886	0.881	0.890	0.918	0.737	2.607
	GPV3	0.802					1.976
	GPV4	0.876					2.548
Green Product Knowledge	GPK1	0.908					2.572
	GPK2	0.845	0.858	0.861	0.914	0.779	1.838
	GPK3	0.893					2.418
Environmental Consciousness	EC1	0.756					2.075
	EC2	0.704	0.792	0.833	0.858	0.603	2.067
	EC3	0.840					1.871
	EC4	0.799					1.503
Atitude	AT1	0.913					2.853
	AT2	0.920	0.908	0.908	0.942	0.844	3.008
	AT3	0.924					3.127
Subjective Norms	SN1	0.912					2.841
	SN2	0.929	0.914	0.914	0.946	0.853	3.377
	SN3	0.930					3.409
Green Purchase Intention	GPI1	0.921					3.827
	GPI2	0.883	0.888	0.894	0.923	0.749	3.077
	GPI3	0.797					1.912
	GPI4	0.857					2.176

According to the results in **Table 3** and in line with the Fornell-Larcker criterion, the square root of each construct's variance exceeds its correlations with other constructs, ensuring the independence of each construct and meeting the requirements of the Fornell-Larcker criterion. Secondly, based on the Heterotrait Monotrait Ratio (HTMT) standard, for all pairs of constructs, HTMT values are below the recommended threshold of 0.85, further confirming the distinctiveness between constructs and supporting the effectiveness of the measurement model.

In summary, the analysis results above indicate that the measurement tools utilized in this study further ensure the accuracy of the questionnaire in precisely measuring multiple concepts involved in the research, providing a solid foundation for the reliability and validity of the study.

Table 3. The findings of discriminant validity, Fornell-Lacker, and HTMT criterion.

	AT	EC	GPI	GPK	GPV	SM	SN
Fornell-Larcker Criterion (FLC)							

	AT	EC	GPI	GPK	GPV	SM	SN
AT	0.919						
EC	0.604	0.777					
GPI	0.734	0.593	0.866				
GPK	0.466	0.482	0.569	0.883			
GPV	0.552	0.451	0.516	0.303	0.859		
SM	0.568	0.49	0.607	0.598	0.453	0.757	
SN	0.675	0.496	0.679	0.579	0.489	0.585	0.924

Heterotrait Monotrait Ratio (HTMT)

	AT	EC	GPI	GPK	GPV	SM	SN
AT							
EC	0.705						
GPI	0.814	0.677					
GPK	0.529	0.519	0.652				
GPV	0.614	0.558	0.579	0.349			
SM	0.686	0.598	0.742	0.738	0.547		
SN	0.741	0.540	0.755	0.653	0.539	0.697	

4.2 Structural Model

Based on the data analysis results in **Table 4**, all hypothesis paths obtained significant support, confirming the theoretical hypotheses proposed in this study. For instance, from the perspective of structural paths, the t-value for the path from purchasing attitude (AT -> GPI) is 7.591, with a p-value of 0 ($p < 0.05$), indicating that the coefficient of this path is statistically significant, thereby supporting hypothesis H1. Regarding R-square and R-square adjusted, the model exhibits a high explanatory power. Specifically, the R-square for green purchase intention (GPI) is 0.601, adjusted to 0.599, indicating a good fit of the model in explaining green purchase intentions. The R-square and R-square adjusted for other variables are also at relatively high levels, ranging from 0.203 to 0.453, suggesting that the model has a comprehensive explanatory ability for various factors contributing to green purchase intentions.

Table 4. The effects of the structural model (p values) and Coefficient of determination (R^2).

HN	Hypothesized paths	M	SD	t value (bootstrap)	p values	Results
H1	AT -> GPI	0.505	0.067	7.591	0.000	Supported
H2	SN -> GPI	0.339	0.059	5.738	0.000	Supported
H3	GPV -> AT	0.368	0.068	5.386	0.000	Supported
H4a	GPK -> AT	0.177	0.060	2.978	0.003	Supported
H4b	GPK -> SN	0.299	0.073	4.073	0.000	Supported
H5	EC -> SN	0.204	0.059	3.398	0.001	Supported
H6a	SM -> GPV	0.455	0.054	8.352	0.000	Supported
H6b	SM -> AT	0.292	0.067	4.449	0.000	Supported
H6c	SM -> GPK	0.597	0.047	12.695	0.000	Supported
H6d	SM -> SN	0.304	0.070	4.429	0.000	Supported
H6e	SM -> EC	0.493	0.045	10.985	0.000	Supported
		R-square		R-square adjusted		
	AT	0.452		0.447		
	EC	0.240		0.237		

GPI	0.601	0.599	
GPK	0.357	0.355	
GPV	0.205	0.203	
SN	0.453	0.448	

Note: For two-tailed experiments, statistical significance is described as $p < 0.05$ (for t-value >1.960).

Table 5. Results of the mediating investigation.

Indirect effects	Std β	T statistic	p-Value	Results Support
SM -> AT -> GPI	0.150	3.508	0.000	Yes
SM -> SN -> GPI	0.104	3.430	0.001	Yes
SM -> GPV -> AT	0.165	4.041	0.000	Yes
SM -> GPV -> AT -> GPI	0.084	3.577	0.000	Yes
SM -> GPK -> SN	0.178	3.506	0.000	Yes
SM -> GPK -> SN -> GPI	0.060	2.910	0.004	Yes
SM -> GPK -> AT	0.107	2.767	0.006	Yes
SM -> GPK -> AT -> GPI	0.054	2.544	0.011	Yes
SM -> EC -> SN	0.099	3.071	0.002	Yes
SM -> EC -> SN -> GPI	0.033	2.587	0.010	Yes
Total effect				
SM -> GPI	0.485	10.702	0	Yes

Through the data analysis results of the mediating effects (detailed in **Table 5**), examining the standardized regression coefficients (Std β) for each mediating path reveals that all mediating effects are positive. Further, by considering the data on T-statistics and p-Values, it can be observed that these paths have all passed the significance tests, indicating support for the results.

To elaborate, social media exerts a significant positive impact on green purchase intentions through mediating factors such as green product knowledge, environmental consciousness, and purchasing attitudes. For example, the path "SM -> GPK -> AT -> GPI" illustrates the mediating role of social media through green product knowledge and purchasing attitudes in influencing green purchase intentions. These results demonstrate that social media, in influencing consumers' green purchase intentions, operates through a complex mechanism involving multiple mediating factors. In summary, this study validates the crucial role of social media in influencing the green purchase intentions of Chinese consumers in the era of big data. Through statistical analysis of sample data and the examination of the structural equation model, combined with Figure 2, the following analytical results are derived:

(1)This study confirms a significant positive impact of social media on consumers' green purchase intentions.(2)Social media indirectly influences green purchase intentions by enhancing consumers' green perceived value, green purchasing attitudes, green product knowledge, and subjective norms, supporting the validity of hypotheses H1, H3, H4a, H4b, H6a, H6b, H6c, H6d, and H6e.(3)The impact of social media includes multiple mediating effects: green product knowledge, green perceived value, environmental consciousness, attitude, and subjective norms all serve as mediators and have been validated.
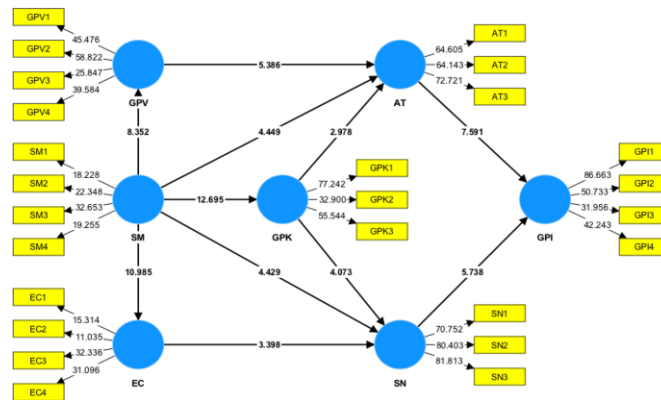
Fig. 2. The results of the structural model.

5. Conclusion

This study delves into the complex impact and mechanisms of social media on the green purchase intentions of Chinese consumers in the era of big data. Through rigorous empirical analysis using questionnaire measurements and structural equation modeling, the following key conclusions are drawn:

1. In the era of big data, the evolution of social media not only surpasses its role as a traditional information dissemination platform but also becomes a crucial platform guiding and shaping consumers' green purchase intentions. Big data technology empowers social media with additional functionalities, allowing for in-depth analysis of historical behaviors, preferences, and purchase records. This, in turn, facilitates more effective dissemination of information about environmentally friendly products and the advocacy of sustainable lifestyles, ultimately inspiring consumers' positive intentions for green purchases. This finding not only deepens theoretical understanding of the role of social media but also provides valuable insights for policymakers to better utilize social media resources and promote widespread adoption of green consumption.

2. The influence of social media extends beyond a single dimension, it operates through a complex network, ultimately enhancing consumers' green purchase intentions. The research indicates that social media elevates environmental awareness, strengthens green perceived value, disseminates green product knowledge, and influences positive attitudes and subjective norms, thereby enhancing green purchase intentions. This multidimensional impact underscores the comprehensive nature of social media information dissemination. Leveraging precision targeting enabled by big data technology allows content to better align with consumer green expectations, further reinforcing green purchase intentions. This provides a systematic and holistic approach for future efforts to promote green consumption.

3. Social media's influence on green purchase intentions operates through various mediating pathways. The study results demonstrate the crucial mediating roles of factors such as green product knowledge, green perceived value, environmental consciousness, attitude, and subjective norms in the impact mechanism of social media. This finding not only provides

avenues for in-depth exploration in future theoretical research but also emphasizes the importance of countries placing greater emphasis on the content-guiding mechanisms of social media. Through targeted information dissemination, social media can guide the formation of positive green attitudes and norms among the public, laying a solid foundation for the overall achievement of sustainable consumption goals in society.

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