

Impact of Live Streaming on Green Purchase Intent: The Role of Environmental Debt[☆]

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ABSTRACT

With the continuous emergence of green fresh agricultural products in today's consumer market and the rise of live streaming platforms as an emerging sales channel. The rise of green fresh agricultural products and live streaming as a sales channel has spurred interest in how live streaming strategies impact consumer purchase intentions. This study examines the effects of interactivity, professionalism, usability, and sustainability in live streaming on green purchase intentions, with a focus on the mediating role of perceived environmental debt. Regression analysis of 660 questionnaires revealed that interactivity ($\beta = 0.310, p < 0.001$), professionalism ($\beta = 0.268, p < 0.001$), usability ($\beta = 0.250, p < 0.001$), and sustainability ($\beta = 0.305, p < 0.001$) significantly positively affect green purchase intentions. Perceived environmental debt partially mediated the effects of interactivity ($\beta = 0.137, p = 0.005$), professionalism ($\beta = 0.224, p < 0.001$), and usability ($\beta = 0.131, p = 0.005$), but not sustainability ($\beta = 0.112, p = 0.029$). The results suggest that enhancing interactivity, professionalism, and usability in live streaming can promote green consumption by fostering environmental responsibility. It is also recommended to improve green infrastructure and policies to encourage sustainable living habits.

☞ keyword : live streaming strategy, Sense of environmental deficiency, Purchase intention.

1. Introduction

This study examines how live streaming strategies influence consumer willingness to purchase green fresh agricultural products, focusing on environmental responsibility. As the market for green products grows, producers and retailers face challenges in increasing consumer adoption. The study introduces the concept of environmental debt, where individuals feel responsible for offsetting environmental harm[1]. It aims to provide marketing strategies that align with consumer preferences and promote the sustainable growth of green products, while offering insights into the relationship between environmental debt and consumer behavior[2].

This study introduces the psychological factor of “environmental debt perception” into green consumption research, examining its mediating role in how live streaming

strategies affect green purchase intention. This concept enriches consumer behavior theory and offers a new perspective on green consumption. The study analyzes the impact of live streaming strategies—interactivity, professionalism, usability, and sustainability—on green purchase decisions, providing guidance for future marketing strategies. Empirical data validate the structural equation model, revealing the complex relationships between variables and enhancing the study's practical relevance and reliability[3].

2. Literature Review

2.1 Review of References

The green fresh agricultural product market has rapidly grown recently. Consumers increasingly prioritize food quality, safety, and environmental impact, favoring green products. These products, which minimize chemical pesticide and fertilizer use and support eco-friendly practices, are seen as crucial for enhancing health and environmental awareness. Hill (2001) [4] suggests that sustainable enterprise development involves protecting the environment while achieving economic benefits through improved living standards for all

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stakeholders. This trend has led more producers and retailers to engage in the fresh food industry, though consumer willingness to buy green products is still influenced by various factors[5].

Emotional factors play a crucial role in consumer behavior. In green purchasing decisions, these factors may involve environmental awareness, a sense of duty, and emotional ties to the product or brand. Particularly, the concept of environmental indebtedness, as a novel emotional experience, can significantly influence consumers' inclination towards eco-friendly purchases. This notion reflects an individual's accountability and concern for environmental issues, motivating them to adopt environmentally friendly practices, such as buying fresh green agricultural products [6].

As a mature and innovative marketing strategy, live streaming has achieved significant success in various industries. Through online live streaming platforms, participants in the fresh agricultural product industry can showcase product characteristics, production processes, environmental protection measures, and other information to consumers, while engaging in real-time interaction with consumers. This interactivity and information transparency may influence consumer purchasing decisions and interact with emotional factors, shaping their willingness to make green purchases[7].

2.2. Research Purpose and Importance

This study aims to explore the impact of live streaming strategies on consumer willingness to purchase green fresh agricultural products, with particular attention paid to the mediating role of environmental debt. Through in-depth analysis of the application of live streaming strategies in the green fresh agricultural product market, as well as the potential impact of environmental debt on consumer behavior, we are expected to provide targeted marketing strategy recommendations for practitioners in the fresh industry, and provide new theoretical insights for emotional and consumer behavior research. This is of great significance in promoting the dissemination of sustainable development and environmental awareness in the current social context.

3. Research hypothesis

The basic assumption of this study is that interactivity, professionalism, usability, and sustainability will significantly affect consumer willingness to purchase green fresh agricultural products. Meanwhile, we assume that environmental debt plays an important mediating role in this process, influencing individual purchasing decisions through their emotional experiences.

3.1. Interactivity

Platform interactivity in online live streaming refers to the level of engagement between the audience and the host. It is vital for content success, enhancing audience participation and brand loyalty. Scholars like Jiang Jiaqi (2019)[8] studied anchor interactivity's impact on consumer decisions. Ji Man (2020)[9] analyzed consumer purchase factors in e-commerce live streams using the SOR model. Chen Haiquan (2020)[10] explored how internet celebrities and interactivity influence fan purchases. Dai Jianping (2022)[11] found that interactivity boosts user engagement on agricultural live streams. Liu Xiaoyun (2023)[12] noted that more product information in live streams increases consumer satisfaction and repurchase intent.

3.2. Professionalism

Professionalism in live streaming involves applying expert knowledge, skills, and standards to content creation. It ensures content quality, credibility, and appeal. Zhang Xiaoman (2018) [13] emphasized that opinion leaders' professionalism stems from their expertise. Liu Xiaoyun (2023) found that professionalism impacts consumer satisfaction. In this study, professionalism in TikTok live streams relates to hosts' expertise.

3.3. Availability

Availability denotes how well a product or service meets user needs and expectations. Customer satisfaction is closely linked to product usability in live streaming e-commerce. This study defines usability as the provision of pollution-free, trustworthy fresh agricultural products during

live streams. Higher availability of such products in the e-commerce model correlates with increased customer satisfaction [14].

3.4. Sustainability

Availability refers to the extent to which a product or service fulfills user requirements and anticipations. Customer satisfaction is intricately tied to product usability in live streaming e-commerce. This research delineates usability as the provision of pollution-free, reliable fresh agricultural products during live streams. Enhanced availability of these products within the e-commerce framework corresponds with heightened customer satisfaction.

3.5. Environmental sense of inadequacy

Based on the pre survey results, the questionnaire was revised to obtain three measurement items, including “If I keep asking for the environment without giving back, I will feel guilty.” [15].

The following hypothesis is proposed:

H1a: The interactivity of the live streaming platform has a positive impact on green purchase intention.

H1b: Sense of environmental debt partially mediates the relationship between interactivity and green purchase intention.

H2a: Professionalism in livestreaming has a positive impact on green purchase intention.

H2b: Environmental debt perception partially mediates the relationship between professionalism and green purchase intention.

H3a: The availability of products in the live stream has a positive impact on green purchase intention.

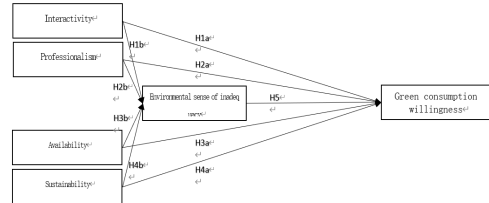
H3b: Perceived environmental debt partially mediates the relationship between usability and green purchase intention.

H4a: Sustainability features in live streaming have a positive impact on green purchase intention.

H4b: The mediating effect of environmental debt perception on the relationship between sustainability and green purchase intention may be weak or insignificant.

H5: Environmental debt perception has a significant positive impact on green purchase intention.

Based on the comprehensive assumptions, the model is obtained, as shown in Figure 1.



(Figure 1) Model of Live Streaming Strategies and Green Purchase Intention

4. Research design and data analysis

4.1. Questionnaire design and variable measurement

A preliminary survey preceding the formal questionnaire aimed for 5 to 10 observation samples per variable, totaling at least 60 pre-survey samples with six variables. Participants, aged 18 and above from Gyeonggi University, South Korea, were selected between September 2nd and September 9th, 2023. Of the 66 data points collected, 30 were validated. Analysis revealed that 51.52% of the population purchased green fresh agricultural products through live streaming platforms, with 69.7% of males and 66.67% watching live broadcasts weekly.

Using SPSS Statistics 22, a reliability analysis of the questionnaire produced positive outcomes. The Kaiser-Meyer-Olkin (KMO) measure and Bartlett’s test signified strong variable correlations, enabling further factor analysis (KMO = 0.722, $p < 0.001$). The R-squared value (0.721) exceeded the mature scale threshold, indicating substantial explanatory capability. The Durbin-Watson value (1.709) fell within an acceptable range ($1.5 < DW < 2.5$), confirming model adequacy. Each latent variable’s reliability surpassed 0.945, endorsing robust convergent validity (Cronbach’s Alpha > 0.945).

4.2. Data collection and sample description

Based on the analysis results, we have revised the initial questionnaire. After the final version of the questionnaire was formulated, we redistributed the electronic questionnaire. First, we produced the questionnaire through the questionnaire network platform, and then distributed and collected the questionnaire on social media such as WeChat, Tiktok, KakaoTalk, etc. on the Internet. Because in the preliminary survey, the main age group of the survey respondents was between 18 and 30 years old, while the main target group for purchasing green fresh agricultural products through live streaming were working people over 30 years old, which is in line with the basic logic. Therefore, this survey mainly focuses on the age group of 30+.

(Table 1) KMO and Bartlett's test

KMO sampling suitability quantity		.722
Bartlett's sphericity test	approximate chi square	588.891
	freedom	153
	Significance	.000

(Table 2) reliability statistics

Clone Bach Alpha	Cloning Bach based on standardized terms Alpha	Number of items
.945	.948	18

(Table 3) Model Summary b

model	R	R square	Adjusted R-squared	Errors in standard estimation	Durbin Watson
1	.849 ^a	.721	.667	.45743	1.709

a. Predictive variables: (constant), sense of environmental deficit, interactivity, usability, professionalism, sustainability

b. Dependent variable: Green purchase intention

The questionnaire was distributed from September 12, 2023 to March 12, 2023, and a total of 759 questionnaires were collected. The situations where invalid questionnaires are excluded include: (1) selecting the same option for all questions; (2) The answering time is significantly lower than

the normal answering time; (3) Trap question item (if you carefully read the question, please choose option 2) is typed incorrectly; (4) I have never purchased green fresh agricultural products on a live streaming platform. Finally, 660 valid questionnaires were obtained, with a response effectiveness rate of 87%.

From a gender perspective, the male to female ratio of the survey questionnaire collected in this study is close to 4:6. Women have a slightly higher desire to purchase green and fresh agricultural products than men. From an age perspective, the majority of people who purchase green fresh agricultural products in live streaming rooms are working staff aged 30, accounting for 56.2%. Education-wise, the survey skews towards individuals with associate and less represented. This distribution may relate to income levels and leisure time availability. Career-wise, full-time students comprise less than 10% of respondents, with more stable job holders showing increased interest in green fresh agricultural products.

Online spending on green fresh agricultural products typically falls between 1001 and 1500 yuan, reflecting a focus on health-conscious purchases. Participants exhibit traits like purchasing power, time management skills, and health preferences, engaging in online live broadcasts for product acquisition. Despite product inaccessibility during purchase, this ingrained consumption habit underscores the intertwined nature of online shopping with green product procurement, meeting research criteria and setting a groundwork for deeper investigations.

4.3. Data analysis

Using SPSS Statistics 22 The reliability of the questionnaire was analyzed for 0 pairs, and the results are shown in the table. The KMO and Bartlett's tests were $0.844 > 0.7$, respectively. Generally, the closer the KMO value is to 1, the stronger the correlation between variables, and the factor analysis is approximately consistent. The significance of Bartlett's sphericity test is $0.000 < 0.001$, indicating that further factor analysis can be conducted.

(Table 4) Basic information of the sample

variable	classification	Number	percentage%
Gender	male	305	44.7
	female	377	55.3
Age	31~40years old	383	56.2
	41~50years old	221	32.4
	Over51years old	78	11.4
Education level	High school and below	0	0
	Specialist	271	39.7
	undergraduate course	262	38.4
	master	102	14.9
	doctor	47	6.9
occupation	Full time students	5	7
	Production personnel	19	2.8
	Sales personnel	123	18
	Marketing/PR personnel	29	4.3
	Public officials	51	7.5
	Customer service personnel	22	3.2
	Administrative/logistics personnel	24	3.5
	human resources	54	7.9
	Financial/Audit Personnel	83	12.2
	Technical/R&D personnel	61	8.9
	administrative staff	26	3.8
	teacher	45	6.6
	Professional	140	20.5
other	0	0	
Monthly expenses for online shopping	Under500RMB	80	11.7
	501~1000RMB	171	25.1
	1001~1500RMB	197	28.9
	1501~2000RMB	106	15.5
	2001~2500RMB	58	8.5
	2501~3000RMB	40	5.9
Over3000RMB	30	4.4	
belief	Having faith	365	53.5
	No faith	317	46.5
character	Extraverted	519	76.1
	Introverted	163	23.9

(Table 5) KMO and Bartlett's test

KMO sampling suitability quantity	.844	
Bartlett's sphericity test	approximate chi	4231.677
	freedom	153
	Significance	.000

Pearson correlation tests revealed strong positive correlations (0.399, 0.401, 0.432) between interactivity, professionalism, usability, and green purchase intention ($p < 0.01$). Structural Equation Modeling (SEM) validated these relationships, supporting the research hypothesis. Leveraging SPSS and SEM ensures precise results, guiding practical

marketing strategies. Enhancing interactivity and professionalism directly increases green purchase intent, providing actionable insights for businesses.

(Table 6) Pearson correlation

	IN	PL	UL	SL	EI	GPI
IN	1					
PL	.209**	1				
UL	.161**	.206**	1			
SL	.238**	.233**	.278**	1		
EI	.218**	.281**	.221**	.223**	1	
GPI	.399**	.401**	.432**	.432**	.367**	1

(Table 7) Variable Description Statistics

dimension	Question items	mean value	standard deviation	skewness	kurtosis	Common factor	Cronbach's
IN	IN1	3.95	1.032	-0.829	0.091	.692	0.763
	IN2	3.77	1.109	-0.733	-0.110	.670	
	IN3	3.57	1.089	-0.523	-0.360	.681	
PL	PL1	3.88	1.071	-0.817	0.063	.733	0.796
	PL2	3.68	1.126	-0.654	-0.277	.727	
	PL3	3.48	1.131	-0.508	-0.428	.684	
UL	UL1	4.08	0.997	-1.057	0.711	.680	0.774
	UL2	3.90	1.044	-0.842	-0.201	.692	
	UL3	3.70	1.075	-0.716	0.018	.697	
SL	SL1	4.16	0.936	-1.116	1.042	.696	0.786
	SL2	4.02	0.988	-0.957	0.541	.742	
	SL3	3.83	1.055	-0.845	0.251	.686	
EI	EI1	4.20	0.949	-1.283	1.421	.706	0.773
	EI2	4.06	0.993	-1.083	0.848	.700	
	EI3	3.92	1.049	-0.913	0.352	.665	
GPI	GPI1	3.77	1.120	-0.769	-0.160	.773	0.842
	GPI2	3.68	1.180	-0.699	-0.413	.754	
	GPI3	3.48	1.172	-0.551	-0.525	.755	

4.4. Description Statistics

The mean range of each variable item in the survey questionnaire is 3.48-4.16, and the standard deviation range is 0.936-1.172. The degree of data dispersion is not high. In addition, the absolute range of data skewness is between -1.283 and -0.508, both of which are less than 2; The absolute range of kurtosis is between 0.665 and 0.773, both of which are less than 10. Cronbach's for all variables The coefficients are all within 0.77 or above indicates that the measurement scale has good reliability. According to the analysis results, it can be concluded that the sample data of this study presents a normal distribution.

Analyzing the rotated component matrix reveals item load values on components, reflecting item-component correlations. Higher load values for PL1, PL2, PL3, EI1, EI2, EI3 in component 1, and SL2 in component 2, signify strong associations. These insights aid in interpreting consumer attitudes effectively, guiding tailored marketing strategies. Highlighting professionalism, environmental concerns, and sustainability in product design and promotion aligns with consumer preferences, enhancing competitiveness by meeting consumer needs accurately.

The results after principal component analysis. Through this table, we can comprehensively understand the contribution of each component to the overall variance and

the proportion of cumulative variance explanations. In this analysis, a total of 18 components were extracted, but we usually pay special attention to the components whose cumulative explanatory variance reaches a certain proportion to ensure that the model can retain sufficient information.

(Table 8) Total variance explanation

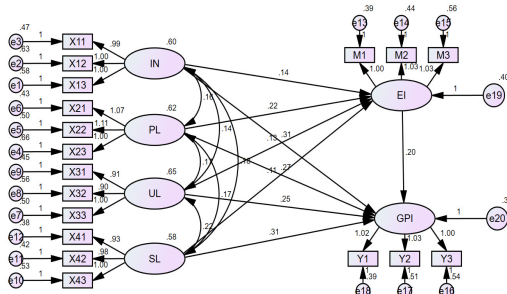
component	Initial eigenvalue			Sum of squared rotational loads		
	total	Variance percentage	Accumulated %	total	Variance percentage	Accumulated %
1	5.253	29.184	29.184	2.163	12.016	12.016
2	1.768	9.822	39.005	2.144	11.909	23.926
3	1.711	9.507	48.512	2.138	11.877	35.803
4	1.525	8.474	56.986	2.107	11.703	47.506
5	1.462	8.121	65.107	2.103	11.683	59.189
6	1.016	5.646	70.753	2.082	11.564	70.753

The total variance explanation table provides d

Firstly, we observed that the initial eigenvalue of the first component was 5.253, explaining 29.184% of the total variance. The sum of squared extracted loads and the sum of squared rotated loads are both 5.253, indicating that component 1 fully retains the contribution of initial variance. This indicates that component 1 has a significant contribution to the overall variance, with a cumulative

explanatory variance of 29.184%, indicating that component 1 can effectively represent the variability of the original data.

As the composition increases, the explanatory variance of each component gradually decreases, but the cumulative explanatory variance continues to increase. For example, components 2, 3, 4, and 5 explained 9.822%, 9.507%, 8.474%, and 8.121% of the total variance, respectively. Their cumulative explained variances were 39.005%, 48.512%, 56.986%, and 65.107%, respectively. This indicates that as the components increase, the cumulative explanatory variance gradually increases, but the contribution of each component gradually decreases.



(Figure 2) The result of Structural Equation Model (X11=IN1,X12=IN2,X13=IN3;X21=PL1,X22=PL2,X23=PL3 :X31=UL1,X32=UL2,X33=UL3;X41=SL1,X42=SL2,X43=S L3;M1=EI1,M2=EI2,M3=EI3;Y1=GPI1,Y2=GPI2,Y3=GPI3.)

4.5. Structural Equation Model

These outcomes play a vital role in deciphering data variability and identifying key explanatory variables. Principal component analysis streamlines data dimensionality,

(Table 9) Assuming results

Hypotheses			Estimate	SE.	CR.	P	Outcome
H1a	EI	(←) IN	.137	.048	2.838	.005	Supported
H1b	EI	(←) PL	.224	.048	4.689	***	Supported
H2a	EI	(←) UL	.131	.047	2.800	.005	Supported
H2b	EI	(←) SL	.112	.051	2.186	.029	Unsupported
H3a	GPI	(←) EI	.200	.056	3.563	***	Supported
H3b	GPI	(←) IN	.310	.052	5.991	***	Supported
H4a	GPI	(←) PL	.268	.051	5.301	***	Supported
H4b	GPI	(←) UL	.250	.049	5.076	***	Supported
H5	GPI	(←) SL	.305	.054	5.637	***	Supported

*** indicates P < 0.01

(Table 10) Model adaptation test

Project	CMIN/DF	NFI	TLI	CFI	RMSEA	GFI
Ideal Value	<3	>0.9	>0.9	>0.9	<0.05	>0.9
Acceptable Value	<3	>0.8	>0.8	>0.8	<0.08	>0.8
Result	0.918	0.974	1.003	1.000	0.000	0.982

enhancing comprehension and interpretability. The total variance explanation table elucidates each component’s contribution to overall variance, facilitating the effective application of principal component analysis results.

In the structural equation model, the influence of each variable on green purchase intention is as follows. The standardized regression coefficient of interactivity on green purchase intention was 0.310 (CR=5.991, p < 0.001). The standardized regression coefficient of professionalism on green purchase intention was 0.268 (CR=5.301, p < 0.001). The standardized regression coefficient of usability on green purchase intention was 0.250 (CR=5.076, p < 0.001).

Sustainable development ensures meeting current needs without compromising future generations. Environmental debt mindset signifies negligence towards environmental responsibilities. To counter this, actions like promoting sustainable lifestyles, enforcing environmental laws, and encouraging sustainable business practices are vital. Environmental education boosts awareness, fostering positive environmental actions through courses, community initiatives, and media campaigns.

AL Armoster’s article delves into environmental education’s forms, methods, and effects on individual attitudes and behaviors, crucial for sustainable development. Society-wide collaboration is key for sustainable goals, with environmental debt risking neglect of such aims. Misunderstandings and information gaps can fuel environmental deficit psychology, hindering support for sustainable efforts[16].

Fit analysis of the model indicates overall acceptability, with minor deviations in CMIN/DF. Exceptional performance in NFI, TLI, CFI, RMSEA, and GFI demonstrates the model’s accuracy in explaining relationships among interaction, professionalism, usability, sustainability, environmental perception, and green consumption intent. High NFI, TLI, and CFI values signify

excellent fit, while low RMSEA denotes precise error measurement. GFI, slightly above ideal values, indicates robust factor relationship measurement.

The sense of environmental debt partially mediated the relationship between interactivity, professionalism, usability and green purchase intention. The indirect effect of interactivity on green purchase intention through environmental debt perception was 0.137 ($p = 0.005$). The indirect effect of professionalism on green purchase intention through environmental debt perception was 0.224 ($p < 0.001$). The indirect effect of usability on green purchase intention through perceived environmental debt was 0.131 ($p = 0.005$).

The actual CMIN/DF result of 0.918, significantly below the ideal threshold of less than 3, typically indicates a good fit. However, despite this favorable outcome, several factors could explain why the ideal value wasn't met. A larger sample size, as employed in this study, can diminish the chi-square statistic, thereby lowering the actual CMIN/DF value. Hence, the discrepancy between the actual and ideal values may be attributed to the significant influence of the extensive dataset utilized in this research.

5. Conclusion

5.1. Research Conclusion

The text highlights the significant data support and theoretical direction it offers for researching consumer behavior and devising marketing strategies. Utilizing methods like reliability analysis, descriptive statistics, Pearson correlation coefficient testing, factor analysis, and fit analysis, it delves into consumer attitudes and preferences across various dimensions and the interrelationships among these dimensions. These analytical outcomes not only provide empirical backing for understanding consumer behavior but also furnish valuable insights for crafting effective marketing strategies.

Moreover, Pearson correlation coefficient testing uncovers correlations between different dimensions, revealing significant positive associations like the robust link between professionalism and green consumption willingness, offering essential insights into consumer attitudes.

Factor analysis delves into item loadings on various factors, showcasing their correlations and significance, thereby identifying focal points and preferences across specific dimensions in consumers. Lastly, fit analysis assesses the model's alignment with data through structural equation modeling. While some indicators slightly surpass ideal values, the model's overall performance remains strong, indicating high accuracy and explanatory power in interpreting consumer attitudes and behavior.

5.2. Insights

This study, by investigating and analyzing consumer attitudes across different dimensions, reveals the correlations between consumer behavior and marketing strategies, as well as the influence of environmental deficit psychology on sustainable development. The following are the conclusions and insights drawn from the research results:

5.2.1. Correlation between Consumer Behavior and Marketing Strategies

The analysis of the relationship between live streaming strategies and purchasing intentions underscores that live streaming can significantly impact consumer behavior. It enhances consumer product comprehension, boosts purchase confidence and interest, and fosters emotional connections between consumers and brands or products. This highlights the importance for companies to prioritize interactive formats like live streaming in their marketing strategies, offering real-time interaction and information access to elevate consumer engagement and trust, ultimately driving product sales and enhancing market competitiveness.

Moreover, the positive correlation observed between green fresh agricultural products and purchasing intentions indicates consumers' growing focus on health and environmental sustainability. In response, companies should prioritize the environmental attributes and health benefits of their products. By highlighting the green, organic, and sustainable features of their offerings, companies can capture consumer attention and willingness to pay premium prices for environmentally friendly products. This strategic emphasis not only boosts product sales but also expands market share, aligning with consumer preferences for

eco-friendly and health-conscious choices.

5.2.2. Impact of Environmental Deficit Psychology on Sustainable Development

Environmental deficit psychology refers to a weak sense of responsibility for environmental issues and a lack of emphasis on and action towards environmental protection. This study suggests that environmental deficit psychology may lead individuals to overlook and disregard sustainable development goals, hindering sustainable development. Therefore, governments, businesses, and society should work together to strengthen environmental protection awareness through propaganda and education, encourage individuals and organizations to pay more attention to environmental issues, take active environmental actions, and contribute to sustainable development.

5.2.3. Significance of Environmental Education

Environmental education is an important means to raise awareness of environmental issues, cultivate environmental awareness, and encourage active environmental behavior. Through education programs, community activities, and media campaigns, people can enhance their understanding of environmental issues, stimulate their sense of responsibility and action towards environmental protection, and promote the realization of sustainable development.

5.2.4. Joint Efforts of Various Sectors of Society

Achieving sustainable development requires joint efforts from all sectors of society, including governments, businesses, and individual citizens. Governments should strengthen the formulation and enforcement of environmental protection laws and regulations to provide legal protection and policy support for sustainable development; businesses should implement sustainable operations, actively promote the development of green industries, and reduce negative environmental impacts; and individual citizens should enhance their awareness of environmental protection, change bad living habits, take environmental actions, and jointly build a beautiful homeland.

5.2.5. Limitations and Future Prospects of the Study

Although this study reveals the correlation between consumer behavior and marketing strategies and the influence of environmental deficit psychology on sustainable development, it also has some limitations. Firstly, environmental deficit psychology is a complex concept that requires a clear definition and measurement. In practical research, an operational definition of environmental deficit psychology should be provided, and appropriate measurement tools should be used to measure it. Secondly, the research methods and data analysis methods may not be comprehensive and in-depth enough. Therefore, future research can further expand the sample size, adopt more comprehensive and in-depth research methods to obtain more accurate and reliable research conclusions.

In conclusion, this study delves into the relationships between consumer behavior, marketing strategies, and sustainable development, revealing the significant impact of consumer behavior and environmental deficit psychology on sustainable development. The research findings provide important insights and guidance for companies to formulate marketing strategies, governments to formulate environmental protection policies, and individuals to improve their lifestyles, thereby offering valuable references and insights for promoting sustainable development.

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Appendix

Appendix A: List of Abbreviations

Abbreviation	Full Term
IN	Interactivity
PL	Professionalism
UL	Usability
UL	Usability
EI	Environmental Debt
GPI	Green Purchase Intention
SEM	Structural Equation Modeling
KMO	Kaiser-Meyer-Olkin Measure
SPSS	Statistical Package for the Social Sciences
CR	Critical Ratio
RMSEA	Root Mean Square Error of Approximation
NFI	Normed Fit Index
CFI	Comparative Fit Index
TLI	Tucker-Lewis Index
GFI	Goodness of Fit Index

Appendix B: Questionnaire structure and sources of references

Constructs	Items	Measurement	source
IN	IN1	The host actively responds to me.	Jiang et al.(2019)
	IN2	I actively respond to the topics initiated by the host.	
	IN3	I interact with the host in the live broadcast room.	
PL	PL1	Because of the host's professionalism, I believe the quality of the purchased green fresh agricultural products will be good.	Bansal et al. (2018)
	PL2	The host is knowledgeable about product information.	
	PL3	The host has rich practical experience.	
UL	UL1	I believe the product quality is trustworthy.	Le et al. (2020)
	UL2	I believe the product is pollution-free and harmless.	
	UL3	I believe the product's production quality is good.	
SL	SL1	I believe the product's production method is energy-saving and environmentally friendly.	Munerah et al. (2019)

Constructs	Items	Measurement	source
	SL2	I believe environmental promotion will enhance my favorability.	
	SL3	I am easily persuaded to make a purchase.	
EI	EI1	If I constantly take from the environment without giving back, I will feel indebted.	Du et al. (2022)
	EI2	If the environment is damaged, I believe everyone has a responsibility.	
	EI3	If I don't do something beneficial for the environment, I will feel bad about myself.	
GPI	GPI1	I like to purchase green fresh agricultural products.	Trivedi et al.
	GPI2	I believe purchasing green fresh agricultural products has long-term benefits.	
	GPI3	I am willing to purchase green fresh agricultural products.	

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