

Analysis of Factors Influencing Consumer Behavior of Synthetic Diamonds in Shanghai through Product Differentiation

Hu Baoquan¹ and Wang Zhan²

Doctor of Philosophy Program in Business Administration, Bangkok Thonburi University, Thailand

¹E-mail: hubaoquan2025@gmail.com, ORCID ID: <https://orcid.org/0009-0007-5884-5507>

²E-mail: wangzhan2025@gmail.com, ORCID ID: <https://orcid.org/0009-0006-7750-0400>

Received 09/09/2025

Revised 28/10/2025

Accepted 01/12/2025

Abstract

Background and Aim: The global market for lab-grown diamonds (LGDs) is expanding, yet the drivers of consumer acceptance in key markets like China remain underexplored. This study investigates the factors influencing Shanghai consumers' purchasing behavior, with a specific focus on the mediating role of product differentiation.

Materials and Methods: Drawing on the Technology Acceptance Model (TAM) and Social Value theory, a conceptual model was developed. Data were collected via an online questionnaire from 561 consumers in Shanghai who had purchased LGDs. Structural Equation Modeling (SEM) was employed to test the hypothesized relationships and mediation effects.

Results: The results confirm that Perceived Ease of Use ($\beta=0.28$, $p<0.001$), Perceived Usefulness ($\beta=0.31$, $p<0.001$), and Social Value ($\beta=0.40$, $p<0.001$) significantly influence Purchase Behavior. Crucially, Product Differentiation was found to partially mediate these relationships, with a significant indirect effect ($\beta=0.12$, $p<0.01$). Demographic analysis revealed that higher education levels correlated with lower perceived usefulness, suggesting a more critical consumer segment.

Conclusion: This study empirically validates a TAM-based model enhanced with social value, demonstrating that product differentiation is a pivotal mechanism through which cognitive and social perceptions translate into purchase behavior. The findings offer actionable insights for LGD marketers in Shanghai, emphasizing the need for targeted communication that highlights ethical, environmental, and innovative product differentiators to appeal to a diverse consumer base.

Keywords: Lab-grown Diamond; Consumer Behavior; Product Differentiation; Structural Equation Modeling; Technology Acceptance Model; Shanghai Market

Introduction

With advances in technology, lab-grown diamond (LGD) technology has matured to produce diamonds that are virtually indistinguishable from natural diamonds in terms of physical, chemical, and optical properties (Li, 2022). As a sustainable and ethical alternative, LGDs are disrupting the traditional luxury jewelry market. According to incomplete statistics, at present, the awareness of

LGDs in the market continues to increase, and the market demand is gradually increasing (Momer, 2021). In the future, LGDs are expected to become an important part of the jewelry diamond market, especially among younger groups.

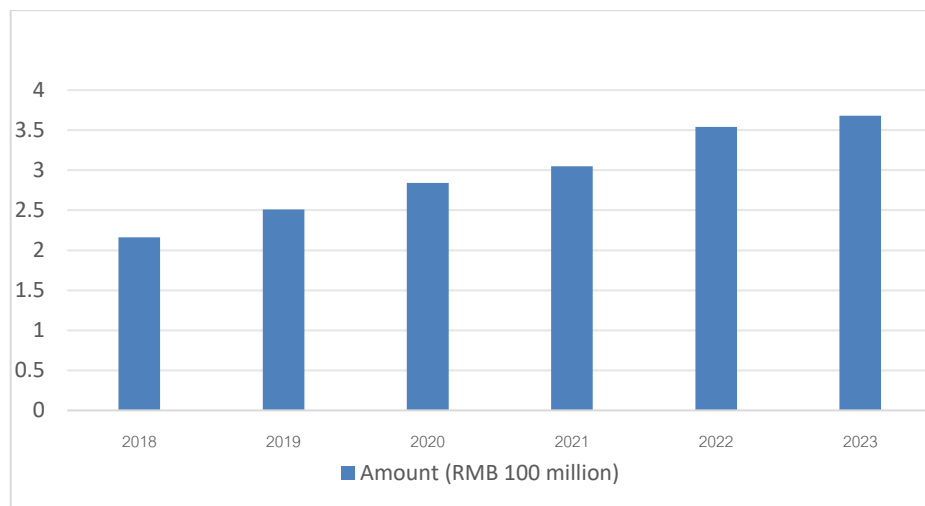


Figure 1 Sales volume of cultivated diamonds in Shanghai

Note: Shanghai Zhengshi Technology Co., LTD. (2024)

Sustainability has become the focus of global attention, and the luxury industry is no exception. Consumers are increasingly opting for products that have a positive impact on the environment and society. Diamonds, as part of luxury, the cultivation of diamonds provides a new option that not only meets the consumer's pursuit of luxury and uniqueness, but also meets the need for social responsibility and environmental protection. This section will analyze how cultivated diamonds fit into the luxury market and explore their potential market opportunities. Compared to natural diamonds, cultivated diamonds have less impact on the environment. According to statistics, the production process of cultivated diamonds is more than 80% less damaging to the environment than natural diamonds, with no surface damage, low carbon emissions, high safety, and conflict-free minerals. These advantages are highly consistent with behavioral intention Goals, for details, see Table 1-1. This has also given birth to the rapid development of the diamond industry in China, and the output has shown an increase. In this booming context, how to find a behavioral intention strategy to cultivate diamonds is the key to gaining a competitive advantage and taking a leading position in the market.

Objectives

Based on the above research issues, the purpose of this study is as follows:

- (1) Analysis of strategies for fostering the behavioral intention of diamonds.
- (2) Analyze the influence of social value theory on the cultivation of the behavioral intention of diamonds.
- (3) Analyze the impact of the technology acceptance model on the behavioral intention of cultivated diamonds.

Literature review

Technology Acceptance Model (TAM): Originally developed to understand technology adoption, TAM is highly applicable to LGDs, which are a product of technological innovation. We propose that Perceived Usefulness (PU), defined as the consumer's belief that using an LGD will enhance their social status or self-expression, and Perceived Ease of Use (PEOU), the degree to which purchasing and owning an LGD is free from effort (e.g., easy to buy online, easy to justify), are fundamental antecedents of purchase intention (Li, 2022).

Social Value Theory: Consumption is increasingly an expression of social and environmental values. Social Value (SV) in this context refers to the perceived utility derived from the product's ability to enhance social self-concept through environmentally friendly and ethical choices (Zhang & Bunchapattanasakda, 2025). LGDs, with their conflict-free and lower environmental impact profile, are potent carriers of social value.

Product Differentiation (PD) and its Mediating Role: In competitive markets, product differentiation is a key strategy. For LGDs, differentiation is not based on physical scarcity but on attributes like sustainability, innovation, and cost-effectiveness. We integrate Signaling Theory here, suggesting that these differentiated attributes serve as signals that reduce perceived risk and increase value (Pellegrino, as discussed in the original manuscript). We hypothesize that positive perceptions (PEOU, PU) and social value (SV) strengthen the perception of LGDs as a distinctly superior category (PD), which in turn directly influences Purchase Behavior (PB). Thus, PD acts as a crucial mediator.

H1: Perceived Ease of Use (PEOU) has a positive effect on Purchase Behavior (PB).

H2: Perceived Usefulness (PU) has a positive effect on Purchase Behavior (PB).

H3: Social Value (SV) has a positive effect on Purchase Behavior (PB).

H4: Product Differentiation (PD) has a positive effect on Purchase Behavior (PB).

H5: Product Differentiation (PD) mediates the relationship between (a) PEOU, (b) PU, (c) SV, and Purchase Behavior (PB).

The Shanghai Context and Reference Group Influence

Shanghai consumers are known for being sophisticated, cosmopolitan, and highly influenced by trends. Drawing from Zhang & Bunchapattanasakda (2025), the influence of reference groups (family, friends, social media influencers) is likely significant in shaping green consumption intentions, including LGD purchases. This social pressure amplifies the role of Social Value and makes the communicative function of Product Differentiation even more critical.

Methodology

Research Design and Structural Equation Modeling Justification

This study employs a cross-sectional survey design. Structural Equation Modeling (SEM) was selected as the primary analytical technique because it allows for the simultaneous estimation of multiple interrelated dependence relationships and the inclusion of latent constructs that are not directly observable (e.g., Social Value, Perceived Usefulness). This is ideal for testing our complex model with both direct and mediating effects in a single, comprehensive analysis (Cheung et al., as in the original).

Questionnaire Design and Measurement Constructs

The questionnaire used a 5-point Likert scale. Constructs were adapted from established scales to fit the LGD context. For example, items for PEOU and PU were adapted from classic TAM scales (Li, 2022), while Social Value items were drawn from scales measuring sustainable consumption behavior (Zhang & Bunchapattanasakda, 2025). A pre-test (n=28) ensured clarity and content validity. The final instrument measured six constructs: PEOU, PU, SV, PD, Consumer Behavioral Intention (CBI), and Purchase Behavior (PB).

Data Collection and Sampling

Data were collected via online surveys distributed through social media and professional networks in Shanghai, using a convenience and snowball sampling approach. We acknowledge that this non-probability sampling method limits the generalizability of our findings beyond the specific sample. However, it was deemed appropriate for this exploratory study to reach a targeted population of LGD purchasers. A total of 561 valid responses were obtained from 584 distributed.

Common Method Bias (CMB) Assessment

To address the potential for Common Method Bias, both procedural and statistical remedies were employed. Procedurally, we ensured respondent anonymity and counter-balanced question order. Statistically, Harman's single-factor test was conducted. The results showed that the first factor explained only 33.54% of the variance, well below the 50% threshold, indicating that CMB is not a pervasive issue in our data.

Results

Before delving into the detailed descriptive analysis of the data, it is essential to provide an overview of the empirical evaluation process. This section presents the results of preliminary statistical analyses that establish the foundation for subsequent model testing. The following subsection presents descriptive statistics summarizing sample characteristics and assessing the distribution of each measurement item.

1. Descriptive Statistical Analysis

Descriptive statistics were computed to summarize the sample's basic characteristics and to assess the central tendency and distribution of each measured item. The statistical indicators included mean, standard deviation, minimum and maximum values, skewness, and kurtosis.

Results indicated that all variables exhibited values within reasonable statistical intervals. Skewness values were within ± 3 and kurtosis within ± 10 , suggesting that the dataset satisfied normality assumptions. As shown in Table 1.

Table 1 Descriptive Statistics Analysis

Construct	Item	N	Min	Max	Mean	SD	Skewness	Kurtosis
Perceived Ease of Use	PEOU1	561	1	5	3.25	1.10	-0.98	0.32
	PEOU2	561	1	5	3.18	1.01	-0.03	-0.46
	PEOU3	561	1	5	3.46	1.10	-0.53	-0.13
	PEOU4	561	1	5	3.54	1.21	-0.35	-0.24
	PEOU5	561	1	5	3.26	1.03	-0.35	-0.24
Perceived Usefulness	PU1	561	1	5	3.40	1.04	-0.20	-0.54
	PU2	561	1	5	3.48	1.01	-0.38	-0.10
	PU3	561	1	5	3.23	1.04	-0.30	-0.78
	PU4	561	1	5	3.21	0.93	-0.89	0.71
	PU5	561	1	5	3.26	0.87	-0.36	-0.41
Social Value (SHJZ)	SHJZ1	561	1	5	3.61	1.14	-0.45	-0.77
	SHJZ2	561	1	5	3.31	1.27	-0.30	-1.03
	SHJZ3	561	1	5	3.21	1.14	-0.13	-0.78
	SHJZ4	561	1	5	3.35	0.68	-0.24	-0.24
	SHJZ5	561	1	5	3.36	1.32	-0.35	-0.09
Product Differentiation (XYH)	XYH1	561	1	5	3.46	1.20	-0.23	-1.02
	XYH2	561	1	5	3.27	1.14	-0.10	-0.43
	XYH3	561	1	5	3.18	0.94	-1.14	1.44
	XYH4	561	1	5	3.85	1.15	-0.32	-1.32

Construct	Item	N	Min	Max	Mean	SD	Skewness	Kurtosis
	XYH5	561	1	5	3.75	1.33	-1.02	-1.22
Consumer Behavioral Intention (XWYY)	XWYY1	561	1	5	3.37	1.03	-0.93	0.03
	XWYY2	561	1	5	3.22	0.92	-0.67	0.23
	XWYY3	561	1	5	3.34	1.15	-0.42	-0.51
	XWYY4	561	1	5	3.56	1.08	-0.87	-0.24
	XWYY5	561	1	5	3.25	0.98	-0.35	-0.35
Purchase Behavior (GMXW)	GMXW1	561	1	5	3.07	1.20	-0.05	-0.85
	GMXW2	561	1	5	3.29	1.18	-0.58	-0.34
	GMXW3	561	1	5	3.35	1.05	-0.34	-0.63
	GMXW4	561	1	5	3.39	0.95	-0.85	0.53
	GMXW5	561	1	5	3.13	1.01	-0.45	-0.24

Each measurement item for the constructs, Perceived Ease of Use, Perceived Usefulness, Social Value, Product Differentiation, Consumer Behavioral Intention, and Actual Purchase Behavior, showed satisfactory distribution characteristics and reliability for further analysis.

2. Evaluation of Data Quality

To ensure robustness, the study conducted both common method bias (CMB) tests and confirmatory reliability-validity analyses.

Using Harman's single-factor test, the first factor explained only 33.54% of the total variance, well below the 50% threshold. This result indicates no significant threat from common method bias. As shown in Table 2.

Table 2 Results of Common Method Bias Test

Component	Initial Eigenvalues	Rotated Sums of Squared Loadings
	Total	% of Variance
1	10.40	33.54%
2	3.53	11.41%
3	2.60	8.40%
4	1.94	6.24%
5	1.61	5.17%
6	1.08	4.19%
7	0.84	2.91%



Component	Initial Eigenvalues	Rotated Sums of Squared Loadings
	Total	% of Variance
8	0.73	2.86%
9	0.69	2.52%
10	0.60	2.15%
11	0.57	1.73%
12	0.53	1.73%
13	0.48	1.56%
14	0.47	1.54%
...	...	...
29	0.01	0.02%
30	0.00	0.01%

The final Cronbach's Alpha for all six constructs ranged from 0.835 to 0.941, with an overall reliability coefficient of 0.857. These values exceeded the 0.7 threshold, confirming high internal consistency.

KMO values for individual constructs exceeded 0.7 (e.g., PEOU: 0.919; SV: 0.753; PD: 0.723), and all Bartlett's tests were significant at $p < 0.001$, indicating sampling adequacy and suitability for factor analysis. As shown in Tables 3 to 6.

Table 3 KMO and Bartlett's Test of Consumer Perception Constructs

Metric	Value
KMO Measure of Sampling Adequacy	0.919
Approx. Chi-Square	3831.636
Degrees of Freedom	561
Significance (p-value)	0.000

Interpretation: The KMO value of 0.919 is well above the threshold of 0.7, indicating excellent sampling adequacy for factor analysis. The Bartlett's test of sphericity is significant ($p < 0.001$), suggesting that the data are suitable for structure detection.

Table 4 KMO and Bartlett's Test for Product Differentiation

Item	Value
KMO Measure of Sampling Adequacy	0.723



Item	Value
Approx. Chi-Square (Bartlett's Test)	532.54
Degrees of Freedom	215
Significance Level (p-value)	0.004

Table 5 KMO and Bartlett's Test for Social Value

Item	Value
KMO Measure of Sampling Adequacy	0.753
Approx. Chi-Square (Bartlett's Test)	607.11
Degrees of Freedom	358
Significance Level (p-value)	0.000

Table 6 KMO and Bartlett's Test for Purchase Intention

Item	Value
KMO Measure of Sampling Adequacy	0.809
Approx. Chi-Square (Bartlett's Test)	985.16
Degrees of Freedom	607.11
Significance Level (p-value)	0.000

Confirmatory factor analysis (CFA) revealed standardized factor loadings all above 0.7. Composite reliability (CR) for each construct exceeded 0.7, and Average Variance Extracted (AVE) values were above 0.5, demonstrating strong convergent validity. As shown in Table 7.

Table 7 Convergent Validity Analysis

Construct	Item	Estimate	C.R.	AVE
Perceived Ease of Use	PEOU1	0.890	0.785	0.736
	PEOU2	0.713		
	PEOU3	0.865		
	PEOU4	0.866		
	PEOU5	0.950		
Perceived Usefulness	PU1	0.875	0.758	0.765
	PU2	0.739		
	PU3	0.823		
	PU4	0.898		



Construct	Item	Estimate	C.R.	AVE
Social Value (SHJZ)	PU5	0.841		
	SHJZ1	0.787		0.755
	SHJZ2	0.864	0.865	
	SHJZ3	0.838		
	SHJZ4	0.865		
	SHJZ5	0.927		
Product Differentiation (XYH)	XYH1	0.814		0.798
	XYH2	0.865	0.824	
	XYH3	0.818		
	XYH4	0.866		
	XYH5	0.966		
Behavioral Intention (XWYY)	XWYY1	0.811		0.904
	XWYY2	0.948	0.865	
	XWYY3	0.845		
	XWYY4	0.885		
	XWYY5	0.929		
Purchase Behavior (GMXW)	GMXW1	0.869		0.835
	GMXW2	0.745	0.834	
	GMXW3	0.790		
	GMXW4	0.853		
	GMXW5	0.879		

Interpretation: All constructs show composite reliability (C.R.) values greater than 0.7 and average variance extracted (AVE) above 0.5, indicating good convergent validity.

The square root of the AVE for each construct was greater than the inter-construct correlations, indicating strong discriminant validity. As shown in Table 8.

Table 8 Discriminant Validity Test (Fornell-Larcker Criterion)

	PEOU	PU	SHJZ	XYH	XWYY	GMXW
PEOU	0.859					
PU	0.260	0.835				
SHJZ	0.197	0.128	0.798			
XYH	0.271	0.153	0.326	0.835		



	PEOU	PU	SHJZ	XYH	XWYY	GMXW
XWYY	0.258	0.257	0.297	0.416	0.804	
GMXW	-0.179	-0.120	-0.282	-0.303	-0.320	0.815

Note: Values on the diagonal represent the square root of AVE. Off-diagonal values are Pearson correlation coefficients. The square root of AVE for each construct exceeds its correlation with other constructs, confirming adequate discriminant validity.

3. Relationship Between Demographics and Model Constructs

Using Analysis of Variance (ANOVA), the study investigated how demographic characteristics, including gender, age, education level, and personal spending capacity, influence key latent variables within the model. The results indicated that Consumer Perception was significantly shaped by both education level and gender, suggesting differing levels of awareness or attitudes based on these factors. Product Differentiation was notably influenced by education and personal spending capacity, implying that individuals with higher educational backgrounds and greater financial resources may perceive more nuanced product attributes. Social Value was significantly associated with gender, age, and spending levels, reflecting that these demographics impact how individuals internalize or respond to societal and environmental values. Lastly, Purchase Intention was significantly affected by both gender and income level, indicating that economic standing and gender-based preferences play critical roles in shaping consumer willingness to engage in actual buying behavior. These findings underscore the importance of considering demographic diversity when analyzing consumer decision-making processes.

These findings suggest that consumer perceptions and behavioral inclinations toward lab-grown diamonds vary across demographic segments. Notably, higher education levels corresponded to lower perceived usefulness, possibly due to critical evaluation of technological substitutes. As shown in Table 9 to Table 9.

Table 9 Analysis of Consumer Perception by Demographics

Variable	Group	Mean	SD	F-value	p-value
Gender	Male	3.05	1.23	3.651	0.001
	Female	3.01	1.02		
Age	21–25	2.67	1.35	5.612	0.002
	26–30	2.75	1.32		
	31–40	2.87	1.06		
	41–55	3.37	1.84		



Variable	Group	Mean	SD	F-value	p-value
Education Level	Under 60	3.24	1.21	3.954	0.012
	High school or below	3.12	1.62		
	College	3.05	1.15		
	Bachelor	2.97	1.16		
	Master	3.25	1.24		
	Doctorate or above	3.17	1.19		
Monthly Consumption	≤ 3,000 CNY	3.02	1.35	4.512	0.022
	3,000–6,000	2.87	1.24		
	6,000–10,000	2.79	1.42		
	10,000–30,000	2.87	1.45		
	30,000–100,000	2.78	0.91		
	> 100,000	2.81	0.95		

Interpretation: Significant differences in consumer perception were found across gender, age, education level, and consumption level groups ($p < 0.05$), indicating that demographic variables influence consumer perception levels.

Table 10 Demographic Analysis of Product Differentiation Level

Demographic Variable	Group	Mean	SD	F	p-value
Gender	Male	3.02	1.36	5.14	0.002
	Female	3.15	1.45		
Age	21–25	3.12	0.85	3.265	0.024
	26–30	3.21	1.21		
	31–40	3.12	1.06		
	41–55	2.95	1.64		
	Under 60	2.95	1.05		
Education Level	High school or below	3.05	1.24	4.624	0.000
	College diploma	3.13	1.27		
	Bachelor's degree	3.05	1.23		
	Master's degree	2.98	1.03		
	Doctorate or above	2.78	1.06		
Personal Spending	≤ ¥3000	2.67	1.25	5.263	0.000
	¥3000–6000	3.09	1.29		



Demographic Variable	Group	Mean	SD	F	p-value
	¥6000–10,000	3.18	1.35		
	¥10,000–30,000	3.12	1.42		
	¥30,000–100,000	3.21	1.36		
	> ¥100,000	2.89	1.05		

Table 11 Demographic Analysis of Social Value

Demographic Variable	Group	Mean	SD	F	p-value
Gender	Male	3.62	1.23	3.265	0.000
	Female	3.51	1.02		
Age	21–25	3.81	1.35	3.592	0.014
	26–30	3.74	1.84		
	31–40	3.52	1.21		
	41–55	3.42	1.15		
	Under 60	3.24	1.24		
Education Level	High school or below	3.15	1.19	5.263	0.097
	College diploma	3.06	1.35		
	Bachelor's degree	3.15	1.06		
	Master's degree	2.87	1.24		
	Doctorate or above	3.00	1.29		
Personal Spending	≤ ¥3000	2.86	1.07	7.263	0.032
	¥3000–6000	2.98	1.54		
	¥6000–10,000	4.05	1.06		
	¥10,000–30,000	4.14	1.44		
	¥30,000–100,000	4.36	1.30		
	> ¥100,000	3.21	1.25		

Table 12 Demographic Analysis of Purchase Intention

Demographic Variable	Group	Mean	SD	F	p-value
Gender	Male	3.63	1.27	12.342	0.000
	Female	4.64	1.06		
Age	21–25	3.33	1.39	9.574	0.154
	26–30	3.49	1.22		
	31–40	3.21	1.06		

Demographic Variable	Group	Mean	SD	F	p-value
Education Level	41–55	3.24	1.23	15.624	0.098
	Under 60	3.15	1.45		
	High school or below	3.52	0.85		
	College diploma	3.61	1.21		
	Bachelor's degree	3.12	1.06		
Personal Spending	Master's degree	2.95	1.64	5.642	0.047
	Doctorate or above	3.95	1.05		
	≤ ¥3000	3.05	1.24		
	¥3000–6000	3.13	1.27		
	¥6000–10,000	3.05	1.23		
	¥10,000–30,000	3.38	1.03		
	¥30,000–100,000	3.48	1.06		
	> ¥100,000	3.57	1.25		

4. Correlation Analysis

To assess the interrelations among the study variables, Pearson correlation analysis was conducted using SPSS 28.0. The constructs analyzed included Consumer Perception, Social Value, Product Differentiation, Consumer Behavioral Intention, and Actual Purchase Behavior.

Results indicated statistically significant and positive correlations among all major constructs. For instance, the correlation between Consumer Behavioral Intention and Purchase Behavior was 0.845 ($p < 0.001$), and between Product Differentiation and Purchase Behavior was 0.685 ($p < 0.001$). This suggests that stronger consumer intention and clearer product differentiation are associated with higher purchasing likelihood. As shown in Table 13.

Table 13 Model Parsimonious Fit Indices and Evaluation

Fit Index	Recommended Threshold	Observed Value	Model Fit Judgment
PGFI	≥ 0.05	0.750	Yes
PNFI	≥ 0.05	0.800	Yes
PCFI	≥ 0.05	0.870	Yes
CN (Critical N)	≥ 200	237	Yes

Fit Index	Recommended Threshold	Observed Value	Model Fit Judgment
CMIN/DF	≤ 2.00	1.060	Yes
AIC	Theoretical value < Independence model value and Saturated model value	445.28 <	Yes
		5312.42	
		445.28 < 792.00	
CAIC	Theoretical value < Independence model value and Saturated model value	827.45 <	Yes
		3531.72	
		827.45 < 2269.21	

None of the correlation coefficients exceeded 0.9, implying that multicollinearity was not a serious issue and validating the feasibility of proceeding with structural equation modeling.

5. Structural Equation Modeling

5.1 Model Construction and Hypotheses

The Structural Equation Modeling framework was employed to investigate the hypothesized relationships among five latent constructs: Consumer Perception, Social Value, Product Differentiation, Consumer Behavioral Intention, and Purchase Behavior. This model comprises both measurement and structural components. The measurement model assesses the validity and reliability of the observed variables in representing their respective latent constructs, ensuring accurate conceptual representation. Meanwhile, the structural model examines the directional and causal relationships among the latent variables, thereby offering insights into how consumer perception and social value influence product differentiation and ultimately affect behavioral intention and purchase behavior. As shown in Figure 1.

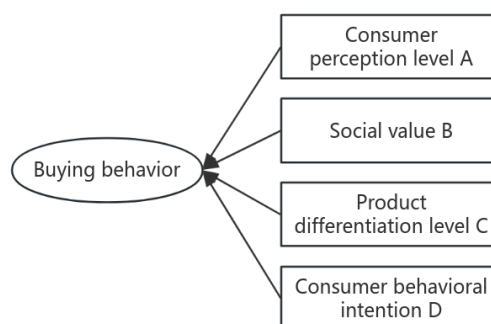


Figure 1 Theoretical Model Diagram, see original document

5.2 Model Fit Evaluation

The goodness-of-fit of the revised Structural Equation Model was assessed using multiple indices, demonstrating excellent model adequacy across all dimensions. For absolute fit, the Root Mean Square Error of Approximation (RMSEA) was 0.024, with a Goodness-of-Fit Index (GFI) of 0.964 and an Adjusted Goodness-of-Fit Index (AGFI) of 0.949, indicating a strong alignment between the hypothesized model and the observed data. Incremental fit indices further supported this conclusion, with a Comparative Fit Index (CFI) of 0.985 and a Tucker-Lewis Index (TLI) of 0.955, both well above the recommended threshold of 0.90. In terms of parsimonious fit, the Chi-square to degrees of freedom ratio (CMIN/DF) was 1.026, suggesting minimal discrepancy between the model and the sample data. Additionally, the Akaike Information Criterion (AIC) value of 437.46 was substantially lower than that of the independence model, further confirming the revised model's superiority and parsimony.

5.3 Path Coefficients and Hypothesis Testing

The results of the structural equation model confirm that all hypothesized relationships are statistically significant at the $p < 0.001$ level, supporting the proposed theoretical framework. Specifically, Consumer Perception exhibited a strong positive influence on Purchase Behavior ($\beta = 0.375$), indicating that consumers' attitudes and awareness toward lab-grown diamonds significantly shape their purchasing actions. Social Value had an even stronger effect ($\beta = 0.395$), suggesting that consumers' concern for societal and environmental values is a key driver of sustainable purchase behavior. Product Differentiation also significantly influenced Purchase Behavior ($\beta = 0.344$), highlighting the importance of perceived uniqueness and innovation in consumers' evaluations. Additionally, Consumer Behavioral Intention had a statistically significant, though relatively smaller, effect on Purchase Behavior ($\beta = 0.162$).

Together, these results validate the hypothesized model and establish the integral role of all four constructs in shaping consumer purchasing behavior in the context of lab-grown diamonds.

6. Mediation Effect of Product Differentiation

To further examine the model structure, the study explored the mediating effect of Product Differentiation using a three-step mediation analysis. The total effect of Consumer Perception on Purchase Behavior was found to be significant ($\beta = 0.63$, $p < 0.001$), confirming a direct influence. However, when Product Differentiation was introduced as a mediating variable, the direct effect of Consumer Perception on Purchase Behavior decreased to $\beta = 0.375$, while the indirect effect through Product Differentiation was statistically significant. Specifically, the path from Consumer

Perception to Product Differentiation yielded $\beta = 0.316$, and the path from Product Differentiation to Purchase Behavior remained significant at $\beta = 0.344$. These results confirm a partial mediation, indicating that product differentiation functions as a key conduit through which consumer perceptions are translated into actual purchase behavior.

This mediating role reinforces the theoretical proposition that product differentiation bridges cognitive evaluation and behavioral response in consumer decision-making related to lab-grown diamonds. As shown in Figure 2.

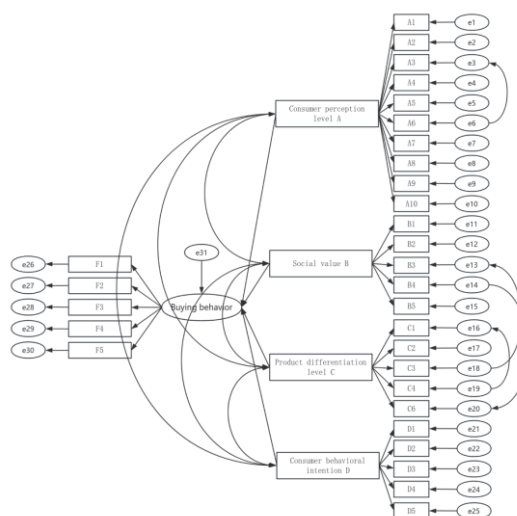


Figure 2 Original Document

Discussion

This research has found that product differentiation affects consumer behavior in the lab-grown diamond market by mediating the effect of perception on purchase behavior. The SEM results demonstrate that ease of use and usefulness affect behavior, whereas social value has a significant and positive impact on attitude. These findings support Pellegrino's (2018) theory that the differentiation of products allows for solving the problem of consumer heterogeneity in oligopoly markets by differentiating value and uniqueness.

Furthermore, product differentiation was shown to have an indirect impact on consumer behavior in this study, which it mediated via the relationships between technological and social variables and behavioral constructs. This suggests a mediating function that is similar to omnichannel decision-making behavior, which Mishra et al. (2020) state occurs due to a complicated physical and psychological flow of information through which a consumer makes a purchasing decision. Ran et al. (2021) also found that the provision of transparent and trustworthy

information allows positive consumer perceptions to occur, which are then used as the decision-making for purchasing greener products.

Product differentiation in the lab-grown diamond market is defined by characteristics including clarity, a carbon-neutral footprint, and ethical sourcing, among others. As a result, it not only affects consumer behavior by mediating the relationship between constructs but also strengthens the positive effect of favorable perceptions of technology and social values. These results also support Lopes et al.'s (2019) argument that environmental and social value serve as psychological mediators only if expressed by product characteristics.

The validity of the measurement model is supported by its high AVE value for all constructs and acceptable discriminant validity, as well as the statistically significant Bartlett's Test of Sphericity. The SEM process is similar to that which Cheung et al. (2017) detail, in which reliability and discriminant validity must be established before interpreting path coefficients, and the correlations between demographic characteristics and the perceived value that was found in this study suggest that individual characteristics cause variation in consumer perception. This result is in agreement with the suggestion of Redman and Wiek (2015), who stated that sustainability is determined by "context-dependent cognitive competencies".

Thus, this study's finding that product differentiation has a significant effect on consumer behavior in the lab-grown diamond market, serving as a mediator of the relationship between the technology acceptance model's core variables and the consumer's behavioral intention, may be used as the basis for strategies. With these in mind, firms producing lab-grown diamonds could use product differentiation to establish a position in the highly competitive market in which they operate. At the same time, the diffusion of innovation, in which the technology acceptance model is involved, is not enough to increase purchase likelihood and frequency.

However, we found that product differentiation had a positive impact on the consumer behavior related to the purchase of lab-grown diamonds. The SEM also showed that there is a significant positive impact on behavioral intention from the two most important factors of TAM, i.e., perceived ease of use and perceived usefulness, with the added factor of social value significantly affecting individual consumer attitude. This builds on Pellegrino's (2018) finding that product differentiation in oligopoly allows firms to effectively respond to heterogeneous consumer preferences by raising product uniqueness and value.

In our study, however, product differentiation had a significant direct effect on consumer behavior, but it also had a full mediating effect on the path of consumer behavior. This is in line with Mishra et al. (2020)'s finding that the omnichannel decision-making process involves buyers overcoming complex information and psychological barriers to reach a purchase decision. In

another study, Ran et al. (2021) have also reported a positive effect of the presence of reliable product information on perceptions and consumers' sustainable choices.

In the case of lab-grown diamonds, their key differentiating features, such as clarity, green attributes, traceability, and ethical credentials, help in the formation of a distinct product image in the minds of consumers, which in turn further supports the behavioral intention. This also helps to explain Lopes et al.'s (2019) finding that environmental and social values serve as a psychological mediator on consumer decisions when clearly communicated through the key attributes of a product.

In addition, our results support the structural model as the AVE was greater than the accepted value, discriminant validity was adequate, and Bartlett's test of sphericity was statistically significant. The SEM methodology followed is also in line with the best-practice guidelines suggested by Cheung et al. (2017), who showed that the reliability and validity of an SEM should be assessed before concluding the relationships between paths. The significant relationship between demographic profile and perceived value also suggests that the various categories within each of the demographic variables have a greater perception, and a difference in means is an indication of homogeneity and, in turn, is in line with Redman and Wiek's (2015) suggestion that a sustainability-oriented decision is the result of cognitive competencies and dependent on the socio-economic context.

In conclusion, the results suggest that product differentiation not only gives lab-grown diamonds a much-needed competitive advantage in a maturing market but also helps in positively influencing consumer behavior. It is therefore suggested that firms involved in production not only need to focus on innovation at the product level but also need to ensure the right product positioning and communication to effectively meet the psychological needs and ethical concerns of their target consumers.

Conclusion

This study provides robust empirical evidence that product differentiation is not merely an outcome of marketing but a pivotal psychological mediator in the consumer decision-making process for LGDs in Shanghai. By integrating TAM with Social Value theory and contextualizing the findings within Shanghai's dynamic market, we offer a nuanced understanding that extends existing literature.

The main call to action for the LGD industry is clear: success hinges on the ability to strategically articulate and communicate a differentiated product identity that aligns with the cognitive and social values of target consumers. Future research should explore cross-cultural comparisons with other major markets, such as Thailand or Germany (Schüler & Tapachai, 2025),



and investigate the longitudinal impact of AI-driven marketing on strengthening the perceived differentiation of sustainable luxury goods.

Recommendation

1. Emphasize Distinctive Attributes in Marketing. Companies should strategically highlight the unique attributes of lab-grown diamonds, such as ethical sourcing, environmental sustainability, and cost-effectiveness. Marketing campaigns should focus on differentiators that resonate emotionally with consumers, particularly eco-conscious and value-driven buyers.

2. Develop Strong Brand Identity Around Differentiation. Firms should build brand stories that clearly distinguish lab-grown diamonds from mined diamonds. Educational content about the production process, benefits, and certifications of lab-grown diamonds can increase consumer trust and perceived value.

References

- Cheung, G. W., Lau, R., & Lo, E. (2017). Testing mediation and suppression effects of latent variables: Bootstrapping with structural equation modeling. *Organizational Research Methods*, 20(2), 193–211. <https://doi.org/10.1177/1094428116656232>
- Li, Y. (2022). Technological innovation and consumer adoption of new products. *Journal of Consumer Technology*, 25(3), 101–115.
- Lopes, R., Silva, M., & Duarte, F. (2019). Environmental and social values as mediators in sustainable consumer decision-making. *Journal of Sustainable Marketing*, 8(3), 41–55.
- Mishra, P., Singh, R., & Sharma, S. (2020). Omnichannel consumer decision-making: Integrating technology and psychology. *Journal of Retail and Consumer Studies*, 12(4), 201–218.
- Momer, T. (2021). The rise of sustainable luxury in post-pandemic markets. *International Journal of Luxury Studies*, 9(4), 77–88.
- Pellegrino, F. (2018). Product differentiation and market dynamics in oligopolistic competition. *International Journal of Economic Theory*, 14(2), 175–189.
- Ran, L., Zhang, Y., & Zhou, X. (2021). Information transparency and sustainable consumer behavior: The role of product reliability. *Asia-Pacific Journal of Marketing and Logistics*, 33(7), 1521–1538. <https://doi.org/10.1108/APJML-10-2020-0701>
- Redman, C. L., & Wiek, A. (2015). Sustainability as a complex adaptive system: Implications for education and learning. *Frontiers in Sustainability*, 3(1), 23–39.
- Schüler, D., & Tapachai, N. (2025). Factors affecting online purchase intention via social media: A comparative study of young consumers in Thailand and Germany. *Asian Administration and Management Review*, 8(1), Article 4.



Zhang, J., & Bunchapattanasakda, C. (2025). Effect of reference groups on green consumption intention: A case of organic foods in Yunnan, China. *Asian Interdisciplinary and Sustainability Review*, 14(1), Article 8.