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Consumer Behavior in the Otome Game Merchandise Market: An Empirical Analysis of Engagement, Aesthetics, and Spending Patterns

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Abstract. Rising educational attainment and changing cultural preferences have substantially altered consumer demand in China's interactive entertainment sector. The success of the otome game Love and Deepspace reflects this broader transformation: its advanced 3D rendering, customizable character features, and personalized interaction design have established new standards for female-oriented digital media. Building on this momentum, the developer has expanded into an integrated merchandise ecosystem and deployed cumulative recharge mechanisms to strengthen user engagement and increase monetization. This study conducts an empirical analysis of consumer behavior in the otome game merchandise market using survey data from 100 respondents. A series of statistical tests is applied to evaluate how demographic, behavioral, and perceptual factors shape merchandise consumption. The findings show that demographic characteristics provide limited explanatory power for spending variation, whereas engagement intensity, prior gameplay experience, and aesthetic evaluations of merchandise are the primary determinants of purchase behavior. These results highlight the importance of emotional involvement and visual design in driving otome-related consumption and contribute to a growing body of research on game-based merchandising and fandom-driven markets. The study further offers managerial implications for firms seeking to refine monetization strategies within rapidly expanding female-oriented game ecosystems.

Keywords: otome game, consumer attitude, marketing strategy, market competitiveness

1. Introduction

Otome game is a type of Female-Oriented Game originally from Japan, by using walkthroughs to increase favorability with the various male characters. Meanwhile, the company behind the game also sells CDs, merchandise, manga, and even hosts CV fan meetings. Now, the female-oriented gaming market is rapidly expanding. China's otome game sector has evolved significantly from its early "Big Four" — Love and Producer, Light and Night, Tears of Themis, and Time Traveler's Love Story — to the 2024 huge change of Love and Deepspace, the industry's first fully 3D otome game [1,2].

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The birth of this game has enabled many people to discover business opportunities. First, there is the sale of accounts. When players who join later want to view the card faces that are not available, they can choose to purchase complete accounts on second-hand websites. The more popular the game becomes, the higher the selling price of second-hand accounts. Secondly, there is the sale of peripheral products. The peripheral products of Love and Deepspace are sold on a dedicated Taobao store. The sales period for the first issue of peripheral products is usually one week to four weeks, and they will be taken off the shelves after the expiration date. This has also led to a shortage of supply on second-hand platforms, with second-hand prices continuously rising [1,3].

As feminism grows increasingly influential, the image of women has also evolved. Women can be company bosses, athletes (as seen with Love and Deepspace officially honoring Olympic athletes), or anyone they aspire to be. We see the world from a woman's perspective, where everyone has their own thoughts and opinions. The topic of romance is always fraught with debate. In school, puppy love is frowned upon, while in the workplace, married and unmarried women are treated differently during job interviews — for instance, when the topic of children comes up. Otome games solve about 80% of these issues. Take Love and Deepspace, for example: all five male protagonists are drawn to you, allowing you to follow your heart and choose whoever you desire. The rapid development of AI has made these games even more realistic — you can have conversations with the male leads, and they will even say your name. More and more women are turning to these games to avoid unnecessary complications in real-life relationships, such as disputes over finances, housing, cars, children, or even more serious issues like infidelity and domestic violence [4].

Many gaming companies and major shopping centers choose Shanghai as the primary location for collaboration events because it is not only a top-tier Chinese metropolis but also the country's most economically vibrant city. During holidays and festive seasons, areas like West Nanjing Road, Lujiazui, and Huaihai Middle Road attract people from all over the world. By establishing a presence or launching co-branded campaigns and pop-up events here, these companies can not only tap into the massive existing flow of visitors but also draw in families who originally had no travel plans for the holiday. For instance, Shanghai's Jingan Joy City and Bailian ZX have fully transformed into anime shopping hubs, inspiring other malls to follow suit by embracing large-screen tributes — such as birthday celebrations for animated characters. Another example is the China Resources Mixc Mall in Pudong New Area, which struggled with low foot traffic after the pandemic. However, through partnerships, it revitalized interest by placing standees, hanging banners, and displaying various posters both inside and outside the mall. It is also worth noting that visitors who wish to receive free promotional items — typically including three-inch photo cards, badges, postcards, and similar collectibles — are often required to complete certain tasks. These may involve following the mall's Xiaohongshu (Little Red Book) account, sharing check-in photos online, or spending a specified amount in the mall to receive the free gifts in exchange for a proof of purchase receipt. The recent Fuxing Island anime-gaming event "REDLAND," hosted by Xiaohongshu, transformed 80,000 square meters and featured more than 50 anime/game IPs [5].

Moreover, government support plays a crucial role. The Shanghai municipal government has thrown its full weight behind promoting check-in events, anime conventions, and even developing the city's only downtown island into the world's [5]. That said, product design must be distinctive enough to attract buyers. For example, ordinary paper coasters are often reimagined as acrylic ones in merchandise collections. These acrylic coasters are typically bundled with freshly made beverages — even if the drink itself is mediocre, many are willing to pay a premium just to get the coaster. This kind of bundled sales strategy is common in many collaborations. For instance, in the

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partnership between Love and Deepspace and Japan's Animate, customers who buy character-themed drinks can also purchase additional items like character-decorated sugar cookies. Similarly, in a collaboration with Sweetie Paradise, buying a meal set comes with a special meal card, while ordering a drink includes a coaster and a cup hanger [1].

2. Framework

This section utilizes a discrete choice model to analyze the purchasing behavior of consumers in the market of game-related merchandise. The goal of this framework is to capture how prior experience with the game, demographic characteristics, and market conditions shape the likelihood that an individual chooses to purchase the merchandise.

2.1. Choice environment

Individuals are indexed by $i = 1, \ldots, N$. Events are indexed by $t = 1, \ldots, T$. The choice set is binary: $y_{it} \in \{0,1\}$, where $y_{it} = 1$ denotes individual i purchases at event t , 0 otherwise. p_t denotes the price of the merchandise. G_i is the prior game experience, where $G_i = 1$ means played the game before, 0 otherwise. D_i is a vector of Demographics which includes individuals' gender, age and income. δ_t denotes the event fixed effect.

2.2. Utility specification

Let each alternative $k \in \{0,1\}$ have utility:

$$U_{it}^{(k)} = V_{it}^{(k)} + \epsilon_{it}^{(k)}$$

Where $k = 1$ is purchase and $k = 0$ is not purchase; $V_{it}^{(k)}$ is the systematic utility, $\epsilon_{it}^{(k)}$ is an idiosyncratic shock which is a Type I extreme value shock.

I model the systematic utility of the two alternatives as follows:

Purchase option:

$$V_{it}^{(1)} = \beta_0 - \alpha p_t + \theta_G G_i + \theta_D^T D_i + \delta_t$$

Non-purchase option:

$$V_{it}^{(0)} = \gamma_0 + \phi_G G_i + \phi_D^T D_i + \delta_t$$

$\beta_0, \alpha, \theta_G, \theta_D$ are parameters associated with the purchase option, while γ_0, ϕ_G, ϕ_D are parameters associated with the non-purchase option.

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2.3. Choice probability

From the distribution of $\epsilon_{it}^{(k)}$, the probability that individual i purchases in event t is given by the logit formula:

$$P_{it} = Pr\left(y_{it} = 1\right) = \frac{exp\left(V_{it}^{(1)}\right)}{exp\left(V_{it}^{(1)}\right) + exp\left(V_{it}^{(0)}\right)}$$

The utility difference can be denoted as:

$$\Delta V_{it} = V_{it}^{(1)} - V_{it}^{(0)}$$

Then the purchase probability can be simplified to:

$$P_{it} = \frac{1}{1 + e^{-\Delta V_{it}}}$$

These parameters can be estimated by maximum likelihood estimator where the log likelihood is:

$$L\left(\theta\right) = \sum_{i,t} \left[y_{it} log P_{it} + \left(1 - y_{it}\right) log(1 - P_{it})\right]$$

2.4. Elasticity

From the purchase probability, the price elasticity can be calculated as:

$$\varepsilon_P\left(i,t\right) = \frac{\partial P_{it}}{\partial p_{it}} * \frac{p_t}{P_{it}} = -\alpha p_t \left(1 - P_{it}\right)$$

The price elasticity captures the consumer's price sensitivity.
The demographic sensitivity can be calculated as:

$$\varepsilon_{D_k}\left(i,t\right) = (\theta_{D,k} - \phi_{D,k}) D_{I,k} (1 - P_{it})$$

Taken together, these demand patterns—income sensitivity, price elasticity, and character-specific preference heterogeneity—inform the structural choice environment faced by players. In the subsequent empirical sections, I model consumers' decision to purchase versus abstain as arising

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from heterogeneous latent utility, shaped jointly by gameplay engagement, demographic traits, and idiosyncratic character affinity. This provides a coherent microeconomic foundation for the estimation strategy that follows.

3. Methodology

This study uses a quantitative survey design to analyze consumer behavior toward otome game merchandise. Data were collected through Wenjuanxing, one of China's major online survey platforms, producing 100 valid responses. The questionnaire captured demographic characteristics such as gender, age, education, and income; gameplay engagement including play frequency and spending; and perceptions of merchandise attributes such as price, style, pattern, and practicality.

After cleaning and coding the responses, I applied several statistical techniques to examine how behavioral, demographic, and perceptual factors relate to merchandise consumption. I use t-tests to compare differences between two groups, ANOVA to assess variation across multiple groups, correlation analysis to evaluate associations between key variables, and Ordinary Least Squares regression to estimate how multiple factors jointly influence spending and purchase intentions.All analyses were conducted in Python, providing a reproducible and rigorous framework for understanding the drivers of purchasing behavior and engagement in the otome game merchandise market.

4. Result

Table 1 displays the result of the two-sample t-tests. It shows that gender doesn't matter for merchandise spending. The t value is 0.122, with p-value=0.9039 means average annual merchandise spending is statistically indistinguishable between females and males. In contrast, players vs non-players are very different in several outcomes. Players have much higher annual game budgets (t=5.926, p=1.413e-07), which suggests that active engagement drives in game spending capacity. Players also give higher weights on price (t=2.846, p= 0.005), suggesting that they may be more tolerant of price for preferred content.

Respondents who follow merchandise information have higher perceived happiness (t=4.734, p= 1.0e-5) when playing games, consistent with the theory where fandom correlates with affective benefits from the game. People who are more interested in the merchandise have more intensity to follow various channels (t=, p-value). This pattern suggests that broader exposure to merchandise content across multiple platforms increases consumer engagement: the more frequently individuals encounter product information, the more attention they devote to it, which in turn heightens their willingness to participate in related events and ultimately make purchases.

Table 1. Two sample T-tests

Dependent variable	Grouping (levels)	t	p-value
annual_merch_spend_mid	gender (female vs male)	0.122	0.9039
annual_game_budget_mid	is_player (1.0 vs 0.0)	5.926	1.413e-07
q17_price	is_player (1.0 vs 0.0)	2.846	0.005539
agree_relax_share	follows_merch (1.0 vs 0.0)	4.734	1.048e-05
channels_count	follows_merch (1.0 vs 0.0)	5.641	1.767e-07

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Table 2 shows the result of the ANOVA test. Age does not predict merchandise spending with F=0.954, p-value = 0.450, suggesting that average annual merchandise spend is flat across age groups. In contrast, education levels differ in price importance ratings when purchasing (F= 4.438, p-value=0.002). This implies that different educational groups have different considerations on price as an attribute when purchase the merchandise.

Channels count differs by age (F=3.756, p-value=0.0038), which suggests that older and younger cohorts may reply to different mixes of discovery channels, which is useful for targeting potential customers. Meanwhile, happiness perception in game are not significantly different across age group (F= 1.954, p-value=0.0927), Overall, the pattern shows that age is not related to spending behavior and in game experience.

Table 2. One-way ANOVA

Dependent variable	Factor	df_between	df_within	F	p-value
annual_merch_spend_mid	age_group	5	94	0.953914	0.450227
q17_price	education	4	95	4.437716	0.00248
channels_count	age_group	5	94	3.756254	0.003817
agree_relax_share	age_group	5	94	1.953816	0.09274

Table 3 shows the correlations result which examines the relationship between characteristics of the merchandise and spending behaviors. Merchandise spending is most strongly associated with channels' counts (ρ = 0.571, p=5.6e-10), which shows that people exposed to more channels spending more, which is consistent with the above result. The result shows that style (ρ =0.413) and pattern design (ρ =0.409) of the merchandise are moderate positive correlates with spending where both p-value < 0.001. This suggests that visual appeal is a key purchase driver for the consumers.

By contrast, price rating (ρ =0.192) is weakly correlated with spending and practical characteristics of the merchandise is not correlated with purchasing behavior (ρ =-0.025). Together, these results indicate that price sensitivity and utilitarian value play a limited role in shaping consumer decisions within the otome merchandise market. Instead, aesthetic and emotional factors dominate, reflecting that purchases are guided more by design appeal and personal attachment than by functional considerations.

Table 3. Correlations result

Variable X	Variable Y	n	ρ (Spearman r)	p-value
q17_price	annual_merch_spend_mid	100	0.192	0.05521
q17_practicality	annual_merch_spend_mid	100	-0.025	0.8061
q17_style	annual_merch_spend_mid	100	0.413	1.905e-05
q17_pattern	annual_merch_spend_mid	100	0.409	2.36e-05
channels_count	annual_merch_spend_mid	100	0.571	5.613e-10

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Table 4. Regression result on annual game budget

Dep. Variable:	annual_game_budget_mid			R-squared:		0.671
Model:	OLS			Adj. R-squared:		0.598
Method:	Least Squares			F-statistic:		8.101
Prob (F-statistic):						1.04e-11
Log-Likelihood:						-699.18
No. Observations:	100			AIC:		1436.
Df Residuals:	81			BIC:		1486.
Df Model:						18
Covariance Type:						HC3
Variables	coefficient	SE	z	P>|z|	[0.025	0.975]
const	-18.9804	61.645	-0.308	0.758	-139.803	101.842
is_player	-5.8386	73.314	-0.080	0.937	-149.531	137.853
has_paid_game	622.8244	107.246	5.807	0.000	412.626	833.023
pay_after_20pct	137.8901	138.608	0.995	0.320	-133.776	409.556
q17_price	-2.0532	15.873	-0.129	0.897	-33.163	29.057
q17_style	-3.9039	21.206	-0.184	0.854	-45.466	37.658
q17_pattern	29.2940	22.707	1.290	0.197	-15.210	73.798
q17_practicality	-11.9837	15.208	-0.788	0.431	-41.791	17.824
agree_relax_share	197.0688	142.114	1.387	0.166	-81.470	475.607
age_group_18	25.4837	182.639	0.140	0.889	-332.482	383.449
age_group_26_30	-111.9902	129.630	-0.864	0.388	-366.061	142.081
age_group_31_40	36.9126	133.500	0.276	0.782	-224.742	298.567
age_group_41_50	-69.5080	154.619	-0.450	0.653	-372.556	233.540
age_group_50	60.0981	140.228	0.429	0.668	-214.745	334.941
education	-427.6162	203.069	-2.106	0.035	-825.625	-29.607
education__1	-130.5320	134.530	-0.970	0.332	-394.206	133.143
education__2	82.0915	148.051	0.554	0.579	-208.084	372.267
education__3	-217.5627	176.257	-1.234	0.217	-563.021	127.895
gender_male	-66.1522	100.091	-0.661	0.509	-262.327	130.023
Omnibus:	0.402		Durbin-Watson:			2.274
Prob(Omnibus):	0.818		Jarque-Bera (JB):			0.168
Skew:	-0.092		Prob(JB):			0.919
Kurtosis:	3.080		Cond. No.			165.

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Notes:

[1] Standard Errors are heteroscedasticity robust (HC3).

Table 4 displays the regression result of a model explaining the budget in game. This model explains a large portion of the variance in respondents' annual game budget. The R^2 is 0.671, which indicates that roughly 67% of the variability in annual game spending can be explained by the included predictors.

Among predictors, having paid in game stands out with a large, positive and highly significant coefficient (β =622.8, p=0.000). Controlling for other independent variables constant, respondents who have previously paid in game are willing to allocate 600 RMB more annually compared to those who haven't. Therefore, the potential first purchase intention and behavior are extremely important. Once there is a first purchase, there will be a subsequent purchase because people have a good experience and feeling after their first purchase. Usually, games also set "first recharge" rewards to encourage people to spend, and after consumption, they set multiple benefits such as "cumulative recharge" and "time-limited recharge" to keep people consuming continuously.

Education also shows significant negative effect (β =-427.6, p=0.035): higher educational attainment corresponds to lower intended game budgets, perhaps reflecting alternative spending priorities or less engagement with otome games. Different marketing strategies are adopted based on different educational levels. As nowadays people's educational levels are getting higher and higher, the quality of games is also improving, such as technology, copywriting, and plot. Otherwise, they will lack market competitiveness.

Other demographic variables like age and gender are individually insignificant, implying that economic engagement with otome games depends more on behavior and experience other than age or gender. Therefore, the design and innovation of the game have significantly enhanced people's level of participation.

5. Management implications

The empirical findings of this study yield several implications for marketing strategy and managerial decision-making in the otome game industry.

First, the empirical results show that monetization success depends critically on behavioral conversion rather than demographic targeting. Firms should prioritize strategies that stimulate the first purchase and sustain repeat engagement—For instance, time-limited recharge, special offers, cumulative recharge, etc. are used to stimulate people's continuous consumption. Monthly and annual cards increase the stickiness of consumers because they need to log in every day to receive rewards.

Second, the negative association between education level and spending suggests heterogeneous preference structures across consumer subgroups. This finding suggests that differentiated product positioning is essential. Firms could offer premium, personalized experiences targeted at time-constrained yet high-income consumers, while tailoring communication strategies and marketing channels to suit varying education and occupation profiles.

Third, exposure intensity and visual design play central roles in shaping merchandise demand. The strong correlation between the number of channels and merchandise spending underscores the value of multi-channel marketing ecosystems. Investments in influencer collaborations, social media campaigns, and interactive offline events can amplify brand visibility, enhance emotional connection, and ultimately increase sales. For fans who actively participate in community activities,

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product design, visual aesthetics, and merchandising quality form an integrated experience—improvements in any of these dimensions can significantly boost purchasing willingness.

Overall, managerial attention should focus on user engagement, psychographic and behavioral segmentation, emphasizing motivation, fandom intensity and emotional identification. Integrating behavioral analytics with design driven marketing could sustain long-term consumer engagement and loyalty.

6. Conclusion

This study adopts a quantitative, survey-based approach to analyze consumer behavior in the otome game merchandise market. The empirical strategy integrates descriptive summaries with inferential statistical techniques, drawing on group comparison tests, correlation measures, and regression models to evaluate how demographic, behavioral, and perceptual factors relate to consumption outcomes.

The findings indicate that demographic variables, including gender and age, contribute minimally to explaining variation in purchasing behavior. Instead, indicators of engagement intensity and prior gameplay or payment experience is strongly associated with higher spending. Respondents assign considerable importance to the stylistic and aesthetic qualities of merchandise, whereas utilitarian attributes play a comparatively marginal role in shaping purchase decisions.

Taken together, the evidence depicts otome game consumers as driven primarily by emotional involvement, visual preference, and heterogeneous behavioral patterns rather than by demographic segmentation. This analysis advances the emerging literature on game-related consumption by providing rare empirical evidence specific to the otome market and its monetization mechanisms. Future work could extend these insights by broadening the sample size, incorporating longitudinal or experimental designs to better identify causal effects, and conducting cross-cultural studies to assess how cultural environments influence motivations and purchasing behavior.

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