

The mechanism of the role of online servicescapes on customer engagement in gaming communities - mediated by customer psychological ownership

Shike He^{1, a}

¹Business School, City University of Macau, Macau

^a B21091101705@cityu.mo

Abstract. In recent years, the virtual brand community has become a platform for customer communication based on the Internet. This paper uses the base of the research results on online servicescapes, customer engagement, customer psychological ownership and customer service appropriation. It builds a theoretical model of online service scenario on customer engagement based on the game community. The results of the study show that: online service scenarios positively influence customer engagement; customer psychological ownership mediates the path of aesthetic appeal and financial security of online service scenarios on customer engagement; and customer service appropriation moderates the relationship between aesthetic appeal, financial security, customer psychological ownership and customer engagement. The results of this study will help academics and industry to understand better the utility of the dimensions of online servicescapes on customer engagement and provide managers with some ways to improve their communities.

Keywords: Online servicescapes; Customer engagement; Customer psychological ownership; Virtual brand communities

1. Introduction

With an iterative marketing paradigm and relationship-driven logic, engagement marketing has been proposed and evolved as the key to online marketing empowerment. Customer engagement is the core vehicle of the engagement marketing paradigm and has become the key to the development of virtual brand communities. Virtual brand communities are brand and product-centric online platforms that serve as a bridge between brands and customers [1]. Users of virtual brand communities have become an important source of "hidden employees" and community content, and more and more companies are choosing to use customers as an important asset to gain sustainable competitive advantage, so companies tend to build virtual brand communities to provide a platform for customers to generate word-of-mouth recommendations, online reviews and other behaviors, so that the marketing objectives of companies can shift from the goal of marketing shifts from developing transactional behaviour to building lasting and stable relationships with customers.

The concept of customer engagement in virtual brand communities extends to the extra-role behaviour of individuals in traditional groups, means individuals invest in the group and its platform beyond the act of buying [2], which has become an important factor for companies to gain a core advantage in the competitive market [3]. The Online servicescapes refer to all environmental factors in network delivery [4], which permeates every aspect of the customer's use of the community, so the fineness of the network service scene will affect the customer's overall impression of the community and the feeling of using it. After that, customers will not only be more loyal to the gaming community, but will also gradually develop a sense of belonging and ownership, thus becoming more active in interacting with the company and creating value together.

2. Theoretical basis and hypothesis

2.1 The direct effect of online service scenarios on customer engagement

Online servicescapes scenes have three dimensions: aesthetic appeal, layout functionality and financial security [4]. Companies in modern market competition intend to consolidate the connection with customers and aim to create shared value with them [5]. There is no unified understanding of the concept of customer engagement in academic circles, and it is difficult to get a complete picture of a single dimension in gaming communities, so this paper favors a three-dimensional division between cognitive, affective, and behavioral dimensions. In the game community service scenario, the cognitive dimension of customer engagement emphasizes on the positive thoughts that individuals give to the things they fit, which in turn promotes the emergence of positive cognition, and the community constructs the cognitive dimension of customers by satisfying the needs of individuals' outward expression. The affective dimension focuses on customer satisfaction and trust in the community, which leads to ownership and loyalty, and the community creates trust in the community through the functional construction of service scenarios. The behavioral dimension considers the cognitive and behavioral influences of the community through high-quality services, resulting in value co-creation behaviors between customers and the community, such as more frequent participation in community activities and active recommendations to others.

When customers browse a gaming community, the sophisticated design of the gaming community will create a positive impression of the community, which in turn will lead to customers understanding and using the community's functional layout, thus enhancing customers' overall perception of the community, and positively influencing customer engagement. Therefore, in the process of customer engagement analysis, the level of sophistication of the service scene may influence customer perceptions, emotions, and behaviors, so the following hypothesis is proposed.

H₁ Service scenarios have a positive impact on customer engagement.

H_{1a} Aesthetic appeals can positively influence customer engagement.

H_{1b} Layout functionality can positively influence customer engagement.

H_{1c} Financial security can positively influence customer engagement.

2.2 The utility of customer psychological ownership for customer engagement

The term ownership is derived from a legal concept [6], and the psychology of possession extends it from the legal to the psychological, i.e. the combination of control, the sense of possession and ownership. Psychological ownership is not just about tangible objects but also about intangibles [7]. Customer psychological ownership emphasises the individual's psychological perception of ownership, which creates a sense of ownership and thus influences their behaviour. The higher the level of customer psychological ownership, the stronger the sense of ownership of the community, and the more likely it is that the customer will change his or her role from that of viewer to that of owner, immersing him or herself in the role of ownership of the community. A customer's 'sense of ownership of a product deepens the relationship between the customer and the company [8], strengthening the relationship and leading to a state of engagement. Studies of customer participation in virtual communities have found that individuals who participate in virtual communities gain the value they expect and develop a sense of ownership of the community, and that deepening this sense of ownership leads to a sense of possession of the community, which leads to recommending the community to others, actively participating in community activities, and sharing the information and knowledge they have within the community [9].

Based on the above analysis, the hypothesis that customers' sense of psychological ownership deepens individuals' perceptions of the community, evokes customer emotions, and in turn influences customers' extra-role behaviour, is formulated as follows.

H₂ Customer psychological ownership plays a mediating role in the role of service scenarios on customer engagement.

H_{2a} Customer psychological ownership plays a mediating role in the role of aesthetic appeal on customer engagement.

H_{2b} Customer psychological ownership mediates the role of layout functionality in customer engagement.

H_{2c} Customer psychological ownership's role in mediating financial security's role on customer engagement.

2.3 The utility of customer psychological ownership for customer engagement

The term appropriation is of philosophical origin and means to turn into one's possession [10]. Scholars have combined the concept of appropriation with sociology, suggesting that appropriation is the process of achieving occupancy. With the introduction of the idea of appropriation in environmental psychology to explore the relationship between individuals and their physical environment, the marketing field began to study the behaviour of appropriation in the relationship between customers and the external physical environment in the physical retail environment and argued that this behavior emphasized the individual's sense of possession of the physical service environment [11]. The basis for the development of customer service appropriation to date is the trust of individuals in the network. With the foundation of trust, customers are willing to carry out transaction behaviour, gradually reaching a state of fit with the company. In a gaming community, the self-servicing of customers is more focused on regulating their own consumption patterns according to the degree of manipulation of the services they perceive. Controlling some of their services or attributes may lead to psychological ownership of the customer that has an impact on customer engagement.

In summary, the following hypothesis is formulated.

H₃ Customer service appropriation positively moderates the effect of online service scenarios on customer engagement.

H_{3a} The effect of customer service appropriation in positively regulating aesthetic appeal on customer engagement.

H_{3b} The effect of customer service appropriation in positively regulating layout functionality on customer engagement.

H_{3c} The effect of customer service appropriation in positively regulating financial security on customer engagement.

H₄ The effect of customer service appropriation on customer engagement by positively regulating customer psychological ownership.

Based on the above analysis, this study uses customer psychological ownership as a mediating variable and customer service appropriation as a moderating variable to investigate the effectiveness of aesthetic appeal, layout functionality and financial security on customer engagement in online service scenarios in gaming communities.

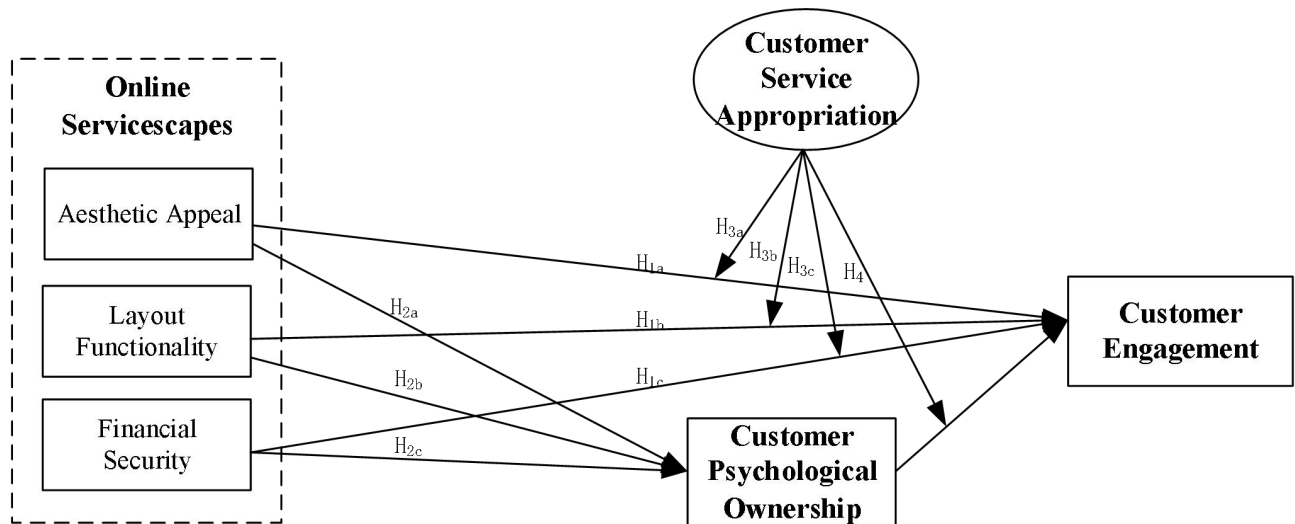


Fig. 1 Theoretical models

3. Data analysis and hypothesis testing

3.1 Variable measurements and sample descriptions

This study adopts a questionnaire research method. To ensure the reliability and validity of the questionnaire measurement, all the questions in the questionnaire research are from the mature scale. In particular, the service scenario was based on Harris et al.'s [4] scale, with a total of 11 questions; customer engagement was based on Tu Jianbo et al.'s [12] scale, with a total of 9 questions; customer psychological ownership was based on Linn Van Dyne et al [13]. and adapted the scale with five items; the customer service scale was adapted from Zhou Tianshu et al [14]. with 9 items. In this study, 283 questionnaires were collected by online questionnaire distribution, and 215 valid questionnaires were obtained by excluding questionnaires that were obviously not answered seriously, failed to pass the screening questions and were inconsistent, with a reasonable return rate of 75.97%.

3.2 Common method deviation tests

This study curbed common method bias at both subjective and objective levels. The subjective level informing respondents in the questionnaire that this study was for academic research only was completely anonymous and would not result in information leakage to prevent subjective completion bias. At the objective level, exploratory factor analysis was conducted on all question items and the cumulative variance explained by the resulting characteristic roots more significant than 1 was 67.422%, and the variance explained by the first factor was 24.262%, which is less than 50%. Therefore, the absence of common method bias was confirmed at the subjective and objective levels.

3.3 Reliability and validity tests

The results of the reliability and convergent validity analyses are shown in Table 1. The Cronbach's α coefficients of all latent variables are greater than 0.700, indicating that the measurement scale of this study has good reliability; in terms of validity testing, the factor loading values of all the measurement questions are greater than 0.600 and the average extracted variance (AVE) of each variable is greater than 0.500, indicating that the measurement scale of this study has good convergent validity. One of the questions in the Customer service appropriation had low reliability, so this item was removed.

Table 1. Results of reliability and convergent validity analysis

Variables		Cronbach's α	AVE
Online servicescapes	Aesthetic Appeal	0.821	0.605
	Layout Functionality	0.862	0.557
	Financial Security	0.787	0.559
Customer psychological ownership		0.850	0.531
Customer engagement		0.901	0.510
Customer service appropriation		0.899	0.523

3.4 Examining the path of the role of online service scenarios on customer engagement

The direct relationship between the variables was tested by regression equation and the data analysis is shown in Table 2, Aesthetic appeal has a positive effect on customer engagement ($\beta=0.379$, $p<0.001$) and hypothesis H_{1a} is supported, which indicates that a beautiful community appearance can promote customer engagement. There is a positive effect of layout functionality on customer engagement ($\beta=0.394$, $p<0.001$) and hypothesis H_{1b} is supported, suggesting that a rational layout functionality can positively influence customer engagement. There is a positive effect of financial security on customer engagement ($\beta=0.259$, $p<0.001$) and hypothesis H_{1c} is supported, suggesting that a secure payment system can facilitate customer engagement. Therefore, the Online servicescapes can positively influence customer engagement, and hypothesis H_1 is supported.

Table 2.Regression model test results

Paths	Standard regression coefficients	t-values
Aesthetic Appeal → Customer engagement	0.236**	5.969
Functional layout → Customer engagement	0.253**	6.249
Financial security → Customer engagement	0.145**	3.915

3.5 A test of the mediating effect of customer psychological ownership

In this study, the Bootstrap method was used to verify the mediating effect of customer psychological ownership with a sample size of 5,000 and a confidence level of 95%, with a confidence interval not containing 0 indicating a significant mediating effect and vice versa. The results of the mediation effect test are shown in Table 3.

Table 3.Intermediary effect test results

Paths	Effect value	Lower limits	Upper limits
Aesthetic appeal → customer psychological ownership → customer engagement	0.035	0.017	0.106
Layout functionality → Customer psychological ownership → Customer engagement	0.044	-0.004	0.146
Financial security → Customer psychological ownership → Customer engagement	0.051	0.027	0.161

As can be seen from Table 3, the confidence interval of [0.017, 0.106] for aesthetic appeals influencing customer engagement through customer psychological ownership in the web service scenario, with no confidence interval containing 0, indicates that customer psychological ownership can play a mediating role between aesthetic appeals and customer engagement, and hypothesis H_{2a}

is supported. The confidence interval of $[-0.003, 0.149]$ for the web service scenario in which layout functionality influences customer engagement through customer psychological ownership, with a confidence interval of 0, indicates that customer psychological ownership cannot mediate between layout functionality and customer engagement, and hypothesis H2b cannot be supported. The confidence interval of $[0.027, 0.161]$ for financial security influencing customer engagement through customer psychological ownership in the web service scenario does not contain 0, indicating that customer psychological ownership can mediate between financial security and customer engagement, and hypothesis H2c is supported. Therefore, customer psychological ownership can mediate between aesthetic appeal and financial security and customer engagement in online service scenarios, and hypothesis H2 cannot be supported in its entirety.

3.6 A test of the moderating effect of customer service appropriation

This study used the Bootstrap method to verify the moderating effect of customer service appropriation, and If the interaction term is significant, then the moderating effect is proven to exist, and the test results of each path interaction term are shown in Table 4.

Table 4.A test of the moderating effect of customer service appropriation

Categories	Aesthetic appeal* Customer service appropriation	Layout functionality * Customer service appropriation	Financial security* Customer service appropriation	Customer psychological ownership* Customer service appropriation
t-values	-2.005	-0.297	2.241	2.157
β	-0.129	-0.019	0.148	0.141
R2	0.160	0.157	0.089	0.109
F-values	13.385**	13.111**	6.904**	8.557**

As can be seen from Table 4, after the model introduces the interaction term between aesthetic appeals and customer service appropriation, aesthetic appeals*customer service appropriation moderates customer engagement ($\beta=-0.129$, $p=0.046^*$, $p<0.050$), i.e., the difference in the level of customer service appropriation significantly moderates the positive effect of aesthetic appeals on customer engagement. Therefore, the H3a hypothesis is supported. After introducing the interaction term between layout functionality and customer service assimilation into the model, functional layout*customer service assimilation moderates customer engagement ($\beta=-0.019$, $p=0.767$, $p<0.050$), i.e., customer service assimilation does not significantly moderate the effect of layout functionality on customer engagement. Therefore, H3b could not be supported. After introducing the interaction term of financial security and customer service appropriation into the model, financial security*customer service appropriation moderates customer engagement ($\beta=0.148$, $p=0.026^*$, $p<0.050$), i.e., the difference in the level of customer service appropriation significantly moderates the positive effect of financial security on customer engagement. Therefore, the H3c hypothesis was supported. After the model introduces the interaction term between customer psychological ownership pair and customer service appropriation, customer psychological ownership pair*customer service appropriation moderates customer engagement ($\beta=0.136$, $p=0.032^*$, $p<0.050$), i.e., the difference in the level of customer service appropriation significantly moderates the positive utility of customer psychological ownership on customer engagement. Therefore, hypothesis H3 cannot be fully supported and hypothesis H4 is supported.

4. Conclusion and discussion

4.1 Conclusion

This paper builds a model of the influence of online servicescapes on customer engagement based on the Taptap community, verifying the influence of online service scenarios on customer engagement, the mediating role of customer psychological ownership and the moderating role of

customer service appropriation, and concludes the following: (1) Aesthetic appeal, layout functionality and financial security dimensions all have a significant positive influence on customer engagement. Layout functionality has the most significant impact on customer engagement, indicating that a reasonable and convenient layout functionality in a gaming community has a higher effect on customer engagement than aesthetic appeal and financial security. (2) Customer psychological ownership has a significant mediating effect in the paths of "aesthetic appeal → customer engagement" and "financial security → customer engagement"; customer psychological ownership has no significant mediating effect in the path of "layout functionality → customer engagement." This indicates that regardless of the level of customer psychological ownership and the tendency of customer self-service, customers will still use the virtual brand community because of the reasonable layout functionality of the community. The "layout functionality → customer engagement" mediated influence path is invalid. (3) The moderating effect of customer service appropriation between aesthetic appeal, financial security and customer psychological ownership and customer engagement suggests that when the tendency of customer service appropriation is high, aesthetic appeal, financial security dimensions and customer psychological ownership will promote customer engagement. In addition, the moderating effect of customer service appropriation on the "functional layout → customer engagement" path was not verified, suggesting that the effect of layout functionality on customer engagement is not influenced by customer service appropriation.

4.2 Practical insights

This study also offers new management strategies for virtual brand communities: (1) managers should focus on the scientific layout of web service functions, which can also be used as an essential marketing direction. (2) Managers should improve the appearance of the community and the payment process to increase consumers' affection and trust, and thus their willingness to use the community repeatedly. (3) Managers should operate communities from the customer's perspective to provide a better service experience and deepen the level of customer ownership. (4) Communities should focus on personalizing customer services and providing personalized features for customers, thereby strengthening the relationship between customers and the community.

4.3 Limitations and future prospects

There are still certain shortcomings and limitations in this study. (1) The target group has not been segmented yet. In the future, the user group can be segmented, and a combination of online and offline methods can be used for data collection to enhance the relevance and usefulness of the results. (2) Customer engagement is a dynamic and comprehensive concept [15]. In subsequent studies, this study intends to investigate the relationship between virtual brand communities and customer engagement in more depth from a time-scale perspective. (3) The game community has certain specificities, and the validity of this model in other virtual brand communities remains to be verified. Future research could consider other types of communities to test the generalizability of the results of this study.

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