An Evaluation of the User Experience on C2C Online Short-Term Rentals

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Abstract. With the rapid development of internet and the gradually-spreading sharing economy, online short-term rentals can make full use of the idle resources in the industry of house rent which gradually comes into our sight. In the form of e-commerce websites, online short-term rent platforms provide various services for landlords and tenants so as to realise short-term house tenancy. In this paper, the author tries to evaluate the user experience of online short-term rent through oriented research and by means of analytic hierarchy process, this paper attempts to construct the hierarchical structure model of user experience, establish dimensional indexes, carry out empirical analysis and work out the weight of key factors influencing user experience through verification. To a certain extent, this research provides a wide scope of thinking for follow-up studies in relevant fields, which is of certain theoretical significance. By applying theoretical research into practice, this can provide some references for online short-term rent platforms so as to better enhance their service ability and increase consumers' actual perception.

1.Introduction

With the continuous development of information technology and e-commerce, sharing economy has enjoyed popular support in consumers' daily life, who have started to do the rental business of their possessions especially houses and vehicles through the internet platforms. As a typical example, the online short-term rent platform centring on C2C mode makes full use of the idle resources. As a result, more and more users are willing to accept this kind of experience mode, which is achieving rapid progress in China.

It can be seen that Chinese market scale in online short-term rent is rising year by year, which shows a quite good prospect. However, the chain growth rate has shown a declining trend since 2015. By analysing the causes, it is not difficult to find that in the market competition from 2012 to 2015 among numerous online short-term rent platforms, the phenomenon of "survival of the fittest" already started in the market selection. Therefore, in order to better improve competitiveness and obtain wider development space, online short-term rent platforms should pay great attention to users to meet their real demands, emphasize user experience, and provide excellent and valuable service.

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2.Literature review

In the mid-1990s, Designer Donald Norman put forward "user experience" for the first time, and later, it was gradually accepted by the public. As technology develops constantly, user experience has already obtained more meanings in more levels. Apart from evaluating the accessibility of basic products, it also involves users' subjective experience and the products' interactive environment etc. International Standard Organization (ISO 9241-210) defines user experience as "people's cognition and response towards products, systems or relevant services in use or expected to be used". At the same time, it also stresses that "user experience should run through users' whole feelings of products in the complete usage phase, including physiology, mentality and behaviour etc."

Online short-term rent originally started in America, and typical companies are Home Away established in 2005 and Airbnb established in 2008. Scholars have done certain research in the business model of online short-term platforms. Desmet and Hekkert (2007) ever defined user experience with three levels: aesthetic experience, significance experience and emotional experience. Ert et al. (2016) published an article to have a detailed discussion about online short-term rent platforms and sharing economy. There have been rich studies on the online short-term rent business mode based on sharing economy. However, research connecting user experience with online short-term rent is relevantly lacking. Wiles and Crawford (2017) expounded the influence of user experience and share-based accommodation under the environment of sharing economy. Cheng and Foley (2018) took Airbnb as an example and made a detailed data analysis.

In China, internet house rent intermediary platforms and applications are still in the stage of exploration and development. Under the influence of the internet, profound changes are taking place in the house rent market, intermediary market as well as users' rental experience. In 2011, the online short-term rent industry achieved rapid development, and many online short-term rent platforms were released successively, such as Airizu, Mayi short-term rent, Tujia, Youtianxia and Xiaozhu short-term rent. Currently, domestic online short-term rent platforms are different in housing resources and transaction modes. In B2C mode, the housing resources are mainly controlled by the short-term rent enterprises, and the rental income is divided by the short-term enterprises and the landlords according to certain proportion; C2C mode mainly provides a platform for information release and transaction for personal house owners and tenants, which mainly makes profits by collecting commission or advertising expense from landlords.

Compared to foreign countries, the development of online short-term rent platforms in China is still in the stage of exploration and growth. Ling and Zhang (2014) studied the feasible paths of online short-term rent in China. Besides, Zhao (2016) made a detailed analysis of the competitive structure of Chinese online short-term platforms by means of Michael Porter's Five Forces. It is not difficult to find that relevant scholars at home don't mechanically apply the existing modes abroad, but instead, Chinese characteristic environment is taken into account, having deep research on the development prospect of online short-term rent based on sharing economy. However, similar to the overseas study situation, the domestic research on the user experience of online short-term rent platforms is also quite limited. Sui (2017) ever published an article on Times Finance, in which it mentioned the feasible countermeasures and development prospect of online short-term rent from the angle of user experience.

3.Construction of Evaluation Index System

3.1 Selection of Evaluation Methods

Analytic Hierarchy Process (AHP) is an approach to decision-making analysis of hierarchy weights, which is suitable to study the user experience evaluation system of online short-term platform. Through AHP, it is helpful to define specific evaluation index system and the weight of indexes of different levels, guaranteeing the objectivity and justice of the evaluation results.

3.2 Construction of Hierarchical Structure Model

To construct hierarchical structure model, firstly, clarify the target layer (T), i.e. user experience of C2C online short-term rent platforms; secondly, divide the three sub-criterion layer (S), i.e. basic experience (S1), accessibility experience (S2), emotional experience (S3); finally, subdivide 13 index layers (P), including 5 specific subdivided indexes under basic experience (S1), 4 specific subdivided indexes under accessibility experience (S2) and 4 specific subdivided indexes under emotional experience (S3). All is specifically shown in Figure 3.1. According to the requirements of the general objective, several influencing factors are divided, and starting from the interactive relationship and impact between different factors, through comparison between any two factors, the importance of every factor is worked out.

3.3 Establishment of Judgment Matrix

After constructing the basic evaluation hierarchical structure, every layer is ranked according to the relative priority of factors of the same level. According to relative importance, the judgment matrix is set up. Before constructing the judgment matrix, the scale has to be established first, thus offering the basic grading reference. In this thesis, the scale strategy ranging from 1 to 9 is adopted, which is specifically shown in Table 1.

Table 1. Scale and Meaning of User Experience Evaluation Factors

Relative Importance	Meaning
1	With pairwise comparison, they are of the equal importance
3	With pairwise comparison, the former is a little more important than the latter
5	With pairwise comparison, the former is significantly more important than the latter
7	With pairwise comparison, the former is strongly more important than the latter
9	With pairwise comparison, the former is extremely more important than the latter
2,4,6,8	The median of the adjacent judgment above
Reciprocal	If the importance ratio between factor i and factor j is a_{ij}, the importance ratio between actor i and factor j is $a_{ji} = \dfrac{1}{a_{ij}}$.

After the establishment of the judgment matrix, feature vectors of the judgment matrix are obtained. Then, standardized processing is made, and specific judgment matrix is shown as follows.

(1) Judgment matrix of the sub-criterion layer (T-S) is shown in Table 2:

Table 2. Judgment Matrix of the Sub-Criterion Layer

T	S1	S2	S3
S1	1	2	7
S2	1/2	1	6
S3	1/7	1/6	1

(2) Judgment matrix of basic experience in the sub-criterion layer (S1-P) is shown in Table 3:

Table 3. Judgment Matrix of Basic Experience

S1	**P1**	**P2**	**P3**	**P4**	**P5**
P1	1	1/7	1/2	1/3	4
P2	7	1	6	6	8
P3	2	1/6	1	1/2	5
P4	3	1/6	2	1	6
P5	1/4	1/8	1/5	1/6	1

(3) Judgment matrix of accessibility experience in the sub-criterion layer (S2-P) is shown in Table 4:

Table 4. Judgment Matrix of Accessibility Experience

S2	**P6**	**P7**	**P8**	**P9**
P6	1	1/5	1/3	5
P7	5	1	4	8
P8	3	1/4	1	6
P9	1/5	1/8	1/6	1

(4) Judgment matrix of emotional experience in the sub-criterion layer(S3-P) is shown in Table 5:

Table 5. Judgment Matrix of Emotional Experience

S3	**P10**	**P11**	**P12**	**P13**
P10	1	3	5	2
P11	1/3	1	2	1/2
P12	1/5	1/2	1	1/3
P13	1/2	2	3	1

4.Empirical Analysis

4.1 Descriptive Statistical Analysis

In this paper, 400 questionnaires in total are sent out, which is mainly done through expert interviews, RUC Economic Forum and SO JUMP platform. 376 questionnaires are collected, and by getting rid of invalid questionnaires with incomplete filling or contradictory response, 325 valid questionnaires are collected in total, and the valid recovery rate is 81.25%.

Table 6. Order of Importance Survey Results

	Unimportant	Less Important	Important	More Important	Very Important
Basic Experience	0	4.75%	16.5%	53.5%	25.25%
Accessibility Experience	1.35%	11.15%	19.75%	31.5%	36.25%
Emotional Experience	2.25%	6.5%	30.25%	38.5%	22.5%

It is shown in Table 6: tenants have high requirements for the completeness of the basic experience on the platform, and more than half of the interviewees think basic experience "relatively important", and no one chooses "unimportant". Thus, it can be seen that the basic experience and accessibility of the platform account for a higher position in users' mind.

Table 7. The Proportion of the Importance
of Basic Experience

Sub-criterion Layer (S)	Index Layer (P)	Importance
Basic Experience (S1)	Integrating Degree Of Website Design And The Brand (P1)	16.75%
	Guest Room's Comfort (P2)	39.75%
	Environment And Cleanliness (P3)	17.25%
	Safety And Reliability (P4)	22.25%
	Price Rationality (P5)	4%

It is shown in Table 7: what's the most important is the guest room's comfort level, reaching 39.75%, which shows users pursue high-quality life and wish to get better user experience; what is the least important is price rationality, accounting for 4%, which shows users have higher requirements for short-term rent and wish to have improved overall condition while their basic experience can be satisfied.

Table 8. The Proportion of Importance of
Ease of Use Experience

Sub-Criterion Layer (S)	Index Layer (P)	Importance
Accessibility Experience (S2)	Check-In Convenience (P6)	14.75%
	Location Convenience (P7)	62.85%
	Dining Convenience (P8)	18.25%
	Entertainment Convenience (P9)	4.15%

It is shown in Table 8: After users' basic experience is satisfied by the short-term rent, users wish to obtain accessibility experience, and they think more of usability and practicability. Users choose online short-term rent because they are considerate more about the convenience of location, whose importance reaches 62.85%, showing users wish to get convenience experience and save time cost.

Table 9. The Proportion of the Importance
of Emotional Experience

Sub-criterion Layer (S)	Index Layer (P)	Importance
Emotional Experience (S3)	Communication Convenience (P10)	38.75%
	Individuality Degree (P11)	23.65%
	Localization Degree (P12)	17.05%
	Empathy Degree (P13)	20.55%

It is shown in Table 9: The proportion of importance degree is restively even without significant deviation. What's the most important is the communication degree, which reaches 38.75%, showing that users wish the landlord has a good service attitude, and a strong communication and expression ability so as to realise cordial relationship during the short-term rent.

4.2 Weight Calculation

4.2.1 Model Assumption
Assumption 1: Good surroundings for short-term rent;
Assumption 2: The housing resources are continuous and stable;
Assumption 3: Users can check in immediately after their reservation;

Assumption 4: Users have stable income during their residence.

4.2.2 Solution Method for Model

In this thesis, the commonly used feature vector method is chosen in the calculation. The judgment matrix is $A = (a_{ij})_{n \times n}$, in which I refers to the row, j refers to the column, and n refers to the order of matrix. The specific calculation steps are as follows.

(1) Multiply the weight vector w with the judgment matrix A to the right, and that is

$$AW = \lambda_{\max} W$$

(1)

In this formula, $\lambda_{\max}$ is the single maximum eigenvalue of judgment matrix A and W is the feature vector.

(2) Based on the obtained $\lambda_{\max}$, consistency check is made. When the inspection result <0.1, it is valid.

(3) Standardized processing is made on feature vector W, and that is

$$W = \frac{a_{i1}}{\sum\limits_{k=1}^{n} a_{k1}}, \quad i = 1, 2, \cdots, n$$

(2)

4.2.3 Consistency Check

After the weight value of the factor is worked out, constancy check should be made on the matrix. If the consistency check satisfies requirements, the weight of the factor is valid, and finally, the result is obtained.

Table 10. Random Uniformity Index Dimension Table

Dimension	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.68	1.80	1.22	1.14	1.35	1.40	1.42	1.48

Under the circumstances of multi-stage judgment, it is easy to cause conflicts. Under other circumstances, there is difference in inconsistency. Therefore, only when the result passes the consistency check can the finally obtained weight of the judgment matrix be truly valid and feasible. The specific calculation formula is as follows:

In the three formulas above, n refers to matrix order, CI refers to the general consistency index of the judgment matrix, RI is the matrix of the random consistency dimension table, and CR refers to the random consistency ratio of the judgment matrix. When $CR = \dfrac{CI}{RI} < 0.1$, it shows the judgment matrix is of consistency; if not, the check fails, and it is necessary to reconstruct the judgment matrix. The consistency check of the judgment matrix is shown in Table 11:

Table 11. The Consistency Check of the
Judgment Matrix

Judgment Matrix	Parameter CI	Judgment Matrix CR
Criterion Layer	0.0164	0.0311
Basic Experience	0.0857	0.0749
Accessibility Experience	0.0869	0.0982
Emotional Experience	0.0045	0.0056

Weight coefficient of different factors in the experience evaluation formula for online short-term

rent users is shown in Table 12:

Table 12. Weight Coefficient of Different Factors

Target Layer	Sub-criterion Layer S	Index Layer P	Final distribution
users' experience T	Basic Experience S1 (0.57)	Integrating degree of website design and brand P1(0.08) Guest room's comfort P2(0.59) Environment and cleanliness P3(0.12) Safety and reliability P4(0.18) Price rationality P5(0.03)	0.15 0.24 0.08 0.09 0.03
	Accessibility experience S2 (0.36)	Check-in convenience P6(0.13) Location convenience P7(0.59) Dining convenience P8(0.24) Entertainment convenience P9(0.04)	0.04 0.24 0.05 0.01
	Emotional experience S3 (0.07)	Communication convenience P10(0.48) Individuality degree P11(0.16) Localization degree P12(0.09) Empathy degree P13(0.27)	0.02 0.02 0.01 0.02

4.3 Definition of Critical Point in the Evaluation System

Before defining the critical value, it is necessary to work out a set of basic stage structure that can reflect the experience level of online short-term rent users, the elementary stage, the mature stage, and the excellent stage. Based on the stage structure and combined with the questionnaire results, offers the critical point division table shown in Table 13.

Table 13. Critical Point Definition
Of Evaluation System

S	P	Condition Description	Score
S1	P1	Very complete and have an excellent integrating degree Relatively complete and have a good integrating degree Ordinary complete and integrating degree	0.9 0.7 0.2
	P2	Complete and high quality Basically complete and good quality Lack of some basic facilities	0.9 0.6 0.2
	P3	Quite clean and tidy Basically clean and tidy Generally ordinary and some in disorder	0.9 0.7 0.2
	P4	Mature and complete, excellent reliability Clear and complete, good reliability With bugs, ordinary reliability	0.9 0.6 0.1
	P5	Completely in conformity with mental expectations, excellent cost Basically in conformity with mental expectations, good cost Below mental expectations, ordinary cost performance	0.9 0.8 0.3
S2	P6	Fast, efficient and convenient Relatively convenient as a whole Low in efficiency and slightly tedious	0.9 0.7 0.2
	P7	Very convenient Relatively convenient Slightly inconvenient	0.9 0.5 0.1
	P8	High-quality as a whole, very convenient Fair in amount, good quality and relatively convenient Limited amount, ordinary quality and	0.9 0.6 0.1

		relatively inconvenient	
	P9	Complete and diverse	0.7
		Limited in amount, ordinary in integral level	0.6
		Lacking in facilities	0.5
	P10	Very patient and considerate, easy to communicate	0.9
		Basically good and have little	0.5
		communication barriers	0.1
		Ordinary as a whole, have occasional barriers in communication	
S3	P11	Distinct characteristics and differentiation	0.9
		Several individualised points and certain features	0.7
		Have no significant bright spots, only satisfy basic living conditions	0.2
	P12	High degree, have distinct features	0.8
		Relatively good as a whole, have certain features	0.6
		Have no significant features and only satisfy basic living conditions	0.2
	P13	Rich atmosphere, have distinct features	0.9
		Relatively good as a whole, have certain features	0.5
		Only satisfy basic living conditions	0.1

In the table above, the taking value interval of "obtained score" is [0.1] which is accurate to one decimal place. According to the following formula: Total scores of user experience on the short-term rent platform=weight x obtained score. Thus, we can get the critical point of online short-term rent user experience.

After calculation, the critical score in the elementary stage is 0.161, the critical score in the mature stage is 0.595, and the critical score in the excellent stage is 0.897.

4.4 Result Analysis

Based on the analysis and calculation above, the weight value of online short-term rent user experience and the layer index of the evaluation system are worked out successively, whose specific evaluation formula Z is as follows: $P_1, P_2, \cdots P_{13}$ are specific weight values, and $k_1, k_2, \cdots k_{13}$ are user experience scores of online short-term rent platforms, in which k is the independent variable and the weight value of P_n is shown in Table 14.

Table 14. Weights Of Indexes

Index (P)	Weights
Integrating Degree of Website Design and the Brand (P1)	0.15
Guest Room's Comfort (P2)	0.24
Environment and Cleanliness (P3)	0.08
Safety and Reliability (P4)	0.09
Price Rationality (P5)	0.03
Check-In Convenience (P6)	0.04
Location Convenience (P7)	0.24
Dining Convenience (P8)	0.05
Entertainment Convenience (P9)	0.01
Communication Convenience (P10)	0.02
Individuality Degree (P11)	0.02
Localization Degree (P12)	0.01
Empathy Degree (P13)	0.02

5.Conclusion

In this paper, by quantifying the relatively vague user experience concept, we propose an exclusive

complete user experience evaluation method for C2C online short-term rent, which is aimed to provide development directions and improvements for online short-term rent from the angle of users. Firstly, according to practical questionnaire investigation and online short-term rent cases, the thesis sets up the stage model of platform user experience to realise the basic grading of user experience level. Secondly, by means of AHP, the basic framework is established, and by virtue of the stage model, finally, the online short-term rent user experience evaluation method is completed, thus better attracting users and making more and more guests get free and comfortable residence experience.

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