Research on the Influence of Personalized Recommendation on Consumers' Anticipated Regret under the Effect of "Information Cocoon"

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Abstract

In the face of huge attention bonus, the major e-commerce platforms use personalized recommendation system to stimulate consumer enthusiasm. In the long run, consumers unconsciously fall into the "information cocoon", which hinders the opportunity for consumers to understand different information. The narrowing of information causes consumers to worry about possible losses in the future and produce regret. This paper analyzes the objective passive and subjective perception by T test. It is found that the trapped degree and perception of "information cocoon" have different effects on consumers' anticipated regret, and different degrees of "information cocoon" have different effects on consumers. Therefore, users and related platforms should avoid high-level "information cocoon", and use low-level "information cocoon".

Keywords

Personalized recommendation; Information Cocoon; Anticipated regret

Introduction

During the epidemic, Internet visits in the first quarter of 2020 increased by 50% explosively compared with the end of 2019. This brings not only challenges but also opportunities to various Internet platforms. According to the report provided by the testing company SimilarWeb, during the epidemic, the cross-border retail platform AliExpress opened up potential markets by providing global epidemic prevention materials, and visits in Spain and Italy increased by 20% and 14% year-on-year. In order to increase the visits conversion rate, major e-commerce platforms will explore users' potential purchase needs through personalized recommendation systems, so that each user has a tailor-made platform, and then subtly change consumer behavior. From the perspective of information management, while technology brings convenience, it also shackles us in the "cocoon room" it creates for us. Scholar Wang Yicheng et al. (2019) believe that immature algorithms make users trapped in the "information cocoon" to varying degrees, and this brings

different feelings to users. In the economic field, consumers' buying behavior is divided into five stages: confirming demand, collecting information, evaluating choices, purchasing decision and evaluating the effect of post-purchase consumption. The most direct manifestation of the "information cocoon" is the narrowing of information requirements, retrieval, and analysis. Consumers hesitate or even doubt when making purchase decisions, and use counterfactual thinking in their minds to simulate the consequences of alternative options, which can easily trigger their regrets. At present, most scholars believe that the "information cocoon" will cause users to have a negative impact on ideology, politics and elections, and the public sphere. In the economic field, we have not found any research on the dialectical analysis of the influence of the "information cocoon house". Therefore, this article analyzes the differences in consumer psychology caused by different levels of "information cocoon houses" through empirical research.

Literature Review

In order to increase the click-through rate of users and enhance consumer experience and stickiness, relevant platforms or APPs use personalized recommendation systems to predict user preferences and actively push relevant information to users. At present, the most mainstream algorithm is a collaborative filtering algorithm based on users and content respectively. The common point of the two is to analyze the user's behavior data, and then predict the preferences of consumers and choose their preferences. However, it is unpredictable, and the personalized recommendation system cannot fully take into account the diverse needs of consumers, as well as many uncertain factors such as changes in interest preferences and psychological perception, which easily leads to negative effects. In the current research, many scholars believe that the current personalized recommendation system still has shortcomings, which can easily lead to narrowing of information, making the original rich content single, and destroying the overall information structure. In the process of information acquisition, information is the object, and the narrowing of information brought about by personalized recommendation is a passive behavior. As the main body of the information receiver, the degree of perception of information and the amount of information also affects the individual's acquisition of information to a certain extent. Wang Yicheng et al. (2019) divided the "information cocoon" into a shallow level and a deep level. He measured 12 factors that have a greater impact on the "information cocoon" and classified them into four dimensions: algorithm recommendation technology, user information literacy, system interaction and user behavior characteristics. Therefore, in terms of objective and passive aspects, this article uses these four dimensions to measure the extent to which consumers are trapped in the "information cocoon". At the same time, Peng Li and Hou Xiaorong (2017) research on perception of information narrowing is also cited at the level of subjective perception to measure consumers' perception of information narrowing.

Information is the basis for consumers to make decisions. In the case of insufficient information acquisition, it is easy to trigger users to make predictions about different future results, and simulate the consequences of alternative options in their minds through counterfactual thinking. Pierro (2008) pointed out people's common thinking, such as "if I choose another, what will happen" This is counterfactual thinking. If you simulate the results of alternative options more favorable than the options you have selected, it will cause expected regret. Sevdalis (2006) proposed to divide the expected regret into "anticipated inaction regret" and "anticipated regret". From this it appears that one of the important mechanisms of anticipated regret is counterfactual thinking. In many studies, some scholars also measure anticipated regret by introducing counterfactual

thinking. The research in this article adopts the situational feedback method, which informs the subjects of the results of the options they have selected before the test, triggers counterfactual thinking and allows the subjects to compare the results of their imaginations, thereby producing anticipated regrets.

Research Hypothesis

Based on the above summary, we study the expected regret of consumers from the objective passive level and the subjective perception level.

"Information cocoon" trapped degree

Wang Yicheng (2019) believes that lowly trapped users have higher information literacy because they can actively find the information they need, instead of being satisfied with the information pushed by the system that is in line with their own interests, and can quickly find solutions to the information with questions. Users with high information literacy have a wider range of information than users with low information literacy. The former compare and judge multi-level information when making decisions. Therefore, lowly trapped users are less likely to regret their decisions based on extensive information. In summary, we propose the following hypotheses:

H1A: Compared with lowly trapped users, highly trapped users are more likely to have anticipated regrets.

Highly trapped users seem to have extensive information, but these are actually homogeneous information. The longer you browse and the more you interact with the system, the more the system knows the information that users are interested in, so the more users are trapped in the "information cocoon". When faced with commodities that are in line with their own interests and the information is so single, consumers are prone to regret that "it would be the worst if I choose this one". Under such psychological effects, many consumers will instead make a decision not to buy to avoid feelings of regret in the future. Therefore, we propose the following hypotheses:

H1B: Compared with highly trapped users, lowly trapped users are more likely to have anticipated inaction regret.

Information narrowing perception

You Jing and Du Juan (2019) found that compared with users with low perception of information homogeneity, users with high perception have higher requirements for the type of information. However, the information of personalized push is similar, so when making a decision, users with high perception are likely to resist the personalized recommendation system. In this situation, users with high perceptions have a higher degree of information uncertainty, so they are more likely to have expected regrets than users with low perceptions, whether they act or omit. On the contrary, because the convenience and accuracy of personalized recommendation meet the needs of low perception users, they trust the products pushed by personalized

recommendation system, have a lower degree of uncertainty of information, and have lower regret than users with higher perception. In this case, lower perception is more conducive to making judgments. Therefore, the following assumptions are made:

H2A: Compared with users with low perception, users with high perception are more likely to have anticipated regrets.

H2B: Compared with low-perception users, high-perception users are more likely to have anticipated inaction regret.

Empirical Research

Questionnaire design and data collection

On the basis of reviewing the previous literature, this study adopts the method of situational questionnaire survey, and makes corresponding modifications according to the actual situation and expert opinions, and forms the final formal measurement scale. The questionnaire uses a Likert 5-level scale (1 means total non-conformity, 5 means complete conformity). Among them, variable user information literacy is reverse scoring; user behavior characteristics, algorithm promotion technology and system interaction are positive scores. The specific measurement contents and literature are shown in Table 1.

Table 1. Questionnaire index and literature basis

Variable	Item	Measurement topics	Index source
User behavior characteristics	UBC1	I often read personalized recommendations	Yuan Lin (2016)
	UBC2	I browse personalized recommendations for a long time each time	
	UBC3	I like that the app has personalized recommendations	
User information literacy	UIL1	The keywords I used when searching on the e-commerce platform can accurately match the information I need to find	Wang Xin (2007)
	UIL2	When I want to know some kind of information, I will actively look for the information I need	
	UIL3	When I have questions about information, I can quickly find answers	
Algorithm recommendation technology	ART1	Personalized recommendation push information satisfied me	Wang Yicheng et al. (2019)
	ART2	The personalized recommendation system can accurately recommend the information I am interested in	
	ART3	Personalized recommendations can meet my needs in real time	

System interactivity	UTI1	I will click the button to reduce certain types of information	You Jing, Du Juan (2019)
	UTI2	I will block information	
	UTI3	I will click the feedback spam button	
Information narrowing perception	INP1	Personalized recommendations information is single	Peng Li, Hou Xiaorong (2017)
	INP2	Personalized recommendation information has more similar content	
	INP3	Personalized recommendation system reduces my knowledge of uninteresting information	
Anticipated regrets	AAR	If you buy a product recommended by the platform, but this product is the worse one among the various products recommended by personalized recommendations, how much regret would you feel?	Zhao Qingfang (2018), Gu Zhe (2016)
	Anticipated inaction regret	If you did not buy the product recommended by the platform, and the product you chose was worse than the one recommended by your personalized recommendation, how much would you regret it?	

The questionnaire is filled out through both offline and online channels. From January 25 to February 25, 2019, a total of 170 questionnaires were returned in this survey. After excluding invalid questionnaires, there were 161 valid questionnaires, and the return rate of valid questionnaires was 94.71%. In the valid questionnaires, the ratio of males to females is close to 4:6. People under 18-25 account for 88.2%, and people over 26 account for 3.1%. Those with a college degree or above accounted for 85.75%, among which the population with a master's degree or above accounted for 7.45%. On the whole, the structure and characteristics of the sampled samples meet the research requirements.

Reliability and validity test

In this study, SPSS22.0 statistical software was used to analyze the reliability and validity of the questionnaire variables. It can be seen from Table 2 that the overall reliability of the questionnaire is 0.713, which is between 0.6 and 0.8, indicating that the questionnaire has good internal consistency. The Cronbach's α coefficient of the trapped degree and information narrowing perception are both greater than 0.8, which has good reliability. The CITC index of all measurement items is greater than 0.30. This shows that the questionnaire items have good internal consistency. Statistics show that the data meets the reliability requirements. The overall KMO value of the questionnaire is 0.871, the Bartlett sphere test value is 1205.313, the df is 105, and the Sig is 0.000, indicating that the questionnaire has good structural validity. The KMO values of both the user factor and the algorithm technology factor of the trapped degree are greater than 0.7, and the Bartlett test significance level is 0.000, which is suitable for factor analysis. The KMO value of the interactive factors of the trapped degree and the perception degree are both greater than 0.6 but less than 0.7. Although it does not meet the requirements of factor analysis, the significance probability of its Bartlett statistic is 0.000 and less than 0.001, which means that the data is considered to be very high The correlation is suitable for factor analysis.

Table 2. Reliability and validity test of each index

Variable	Item	CITC	Cronbach α coefficient	Factor loading	KMO
User behavior characteristics	UBC1	.779	.840	.845	.825
	UBC2	.690		.766	
	UBC3	.648		.752	
User information literacy	UIL1	.650	.804	.777	
	UIL2	.647		.761	
	UIL3	.656		.719	
Algorithm recommendation technology	ART1	.711	.852	.872	.733
	ART2	.731		.883	
	ART3	.728		.882	
System interactivity	UTI1	.585	.802	.802	.694
	UTI2	.702		.877	
	UTI3	.677		.861	
Information narrowing perception	INP1	.695	.817	.874	.695
	INP2	.719		.886	
	INP3	.595		.806	

Before performing the T test analysis, perform descriptive statistical analysis on the variables to determine whether the data obey the normal distribution. From the results of descriptive statistical analysis, it can be concluded that the difference between the average values of the variables is not large, and the standard deviation is hovering around 1, which means that the respondents have the same views on each measurement index. Moreover, the absolute value of the coefficient of skewness and the absolute value of the coefficient of kurtosis are both less than 1. Therefore, the data follow a normal distribution.

Since there are many test items for trapped degree and the discrimination degree is relatively large, this study calculates the total test score, and then arranges the total score in ascending order (Lower score means less trapped, higher score means more trapped), and select the front and back 27% as the high and low group.

The Levene test Sig values of the two sets of data are both greater than 0.05, which indicates that the variances of the two samples are homogeneous. It can be seen from Table 3 that, except that the P value of the trapped degree for the anticipated inaction regret is greater than 0.05, and the hypothesis H2A is not supported, the other three hypotheses all pass the test hypothesis.

Table 3. Independent sample T test of the influence of the trapped degree and perception on anticipated regret

Regret type	Variable	Low group		High group		T	P
		M	SD	M	SD		
Anticipated regrets	Trapped degree	3.76	0.908	4.19	0.762	-2.490	0.015
	Perception	3.80	0.827	4.15	0.694	-2.877	0.005

Anticipated inaction regret	Trapped degree	3.36	0.957	3.73	1.233	-1.625	0.108
	Perception	3.38	1.034	3.91	1.065	-3.147	0.002

Conclusion

The trapped degree has a significant difference in the impact of expected regret, and there is no significant difference in the impact of expected inaction regret.

The expectation of the trapped low group is the sample mean ML=3.76 for regret, and the sample mean MH=4.19 for the trapped high group. This shows that a high degree of being trapped in the "information cocoon" can arouse users' anticipated regrets compared to low degree. The substantial difference between the high group and the low group lies in the amount of information. Users with a high degree of trapping are in a state of relatively narrow information. Compared with users with a low degree of trapping, they are more uncertain about the future situation, so they are more likely to have the psychological expectation of "buy now, regret in the future" .

Therefore, relevant platforms should continuously optimize the algorithm of the personalized recommendation system to avoid users falling into a high degree of "information cocoon". First of all, for the way of user behavior data collection, the traditional information classification method can be appropriately retained. Collect consumer behavior habits through a variety of channels. Secondly, optimizing the current interactive design methods can give consumers more information choices and reduce consumers' expected regrets. But the process of information acquisition is a process of interaction between subject and object. Similarly, users should also actively take measures to avoid high levels of "information cocoon". The higher the degree, the easier it is for users to perceive the continuous narrowing of information and the continuous reduction of information reliability, which is not conducive to users' decision-making for a long time. Therefore, users with a high degree of trapping should first adopt breakthrough strategies to improve their information literacy and prevent themselves from falling into the "information cocoon" for a long time. Second, improve your ability to distinguish information, distinguish between reliable information, rumors, and one-sided information.

The reason why the trapped degree has little effect on the expected inaction regret may be that there are no stimulating factors in this measurement, such as promotional offers, time constraints, etc. These factors have a greater difference in the impact of anticipated inaction regret, indicating that the trapped degree is not the main factor that causes consumers to have the difference in anticipated inaction regret.

The level of perception has a significant difference in the impact of anticipated regret and anticipated inaction regret.

From an individual subjective level, by measuring the perception of information narrowing, we can more intuitively judge whether the user is under the effect of the "information cocoon". The sample mean values of

anticipated regret and anticipated inaction regret of the low perception group were 3.80 and 3.38, respectively, while the sample mean values of the trapped high group were 4.15 and 3.91, respectively. This means that users with high perception are more likely to have the expectation of regret than users with low perception, that is, the higher the perception, the easier it is for users to regret. For users with high perception, they can perceive the narrowing of information sensitively. Long-term narrowing of information will make them start to feel distrustful of the platform. At this time, the information on the platform is uncertain to them and cannot be used as a basis for judgment, so it is easy to produce regrets. On the contrary, for low-perception users, based on the trust in the platform, appropriate information narrowing is conducive to their decision-making.

Different levels of "information cocoon" have different effects on users. Therefore, users should avoid high-level "information cocoon" to reduce the generation of regret, and use low-level "information cocoon" to make decisions. The relevant platforms can also maintain an appropriate level of "information cocoon", but the most important thing is to strengthen users' trust in the platform. When the personalized recommendation system pushes a large amount of information that consumers are interested in, it only relies on the consumer's behavior and habits without managing or filtering the information, and also not controlling the information content that plagiarizes the quality content of others. The quality of information is not high, homogenized information emerges endlessly, and even content with incorrect values appears, which makes users' trust in the platform continue to decrease. In the long run, consumers are not only prone to fall into the "information cocoon" effect when browsing information, but also prone to expect regret when making decisions. Therefore, the platform should strengthen the management of information content quality and reduce the push of homogeneous content. First, the platform can adopt a semi-manual review method to screen high-quality information and improve content quality. Secondly, set strict requirements for the release of information, and reduce the source of information that does not conform to values or rules. Finally, the platform can appropriately improve the quality of service, thereby reducing the expected regret of consumers and promoting consumers to make purchasing decisions.

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