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Research on Algorithm Consumers' Attitudes Toward the Use of Personal Information

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Abstract:A new type of customer, the algorithmic consumer, has evolved as a result of the combination of algorithms and the Internet. Enterprises provide different marketing strategies for algorithmic consumers based on collecting and using their personal information. This paper focuses on the attitudes of algorithmic consumers toward businesses gathering and using their personal information. This study analyzed the questionnaire data using SPSSAU software. The questionnaire was designed based on the ABC attitude model, and an empirical study was conducted to find that the overall attitude of algorithmic consumers toward the use of their personal information by companies is neutral, and there is some correlation between various aspects.

Keywords: big data; algorithm-based recommendations;ABC attitude model.

1. Introduction

The algorithmic consumer is a new type of consumer, which are consumers who purchase or use goods or receive services through online platforms such as the Internet. Online consumers then morph into algorithm consumers as a result of platform operators' employment of intelligent algorithms to intervene in consumption or service behavior. Therefore, the algorithmic consumer is a type of consumer born in the platform economy in the context of the digital economy, and is a product of the integration of algorithms and Internet embedding[1]. The essence of an algorithm consumer is "Internet + algorithm," which refers to a consumer who uses an intelligent algorithm to access the Internet and other information networks in order to make purchases or receive services for daily consumption.

With "algorithm consumer" as the keyword, 57 literature has been retrieved on CNKI as of June 15, 2022. In terms of the year of publication, algorithmic consumer research has only received attention from scholars since 2018, especially after 2020. In terms of content, Most of them analyze personal information protection measures from a legal standpoint, including Liu Ying (2022), Luo Lingyuan (2022), and Li Dan (2021). However, the marketing world has done little research on algorithmic consumers. In order to outline the existing research context and research progress, Chen Changdong et al. (2021) studied the application of algorithmic recommendation in the marketing field and consumer response, as well as its intermediary mechanism and boundary conditions. They also put forward some research topics worthy of attention in the future in this field.

Based on the ABC attitude model, this paper studies the attitude status of algorithm consumers toward the process of collecting and using algorithm consumers' personal information by enterprises and puts forward reasonable suggestions for enterprise marketing on this basis.

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2. Research Design

2.1 Theoretical Basis

The ABC attitude model, which belongs to the attitude composition model in consumer behavior, was first proposed by Rosenberg and Hovland. Rosenberg et al. Pointed out that attitude is composed of three components: cognition, affect and behavior. In this model, cognition is the perception of the attitude object, affect is the feeling of the attitude object, and behavior is the behavioral intention or actual behavior towards the attitude object, thus constructing the three-dimensional ABC attitude model of attitude [2] . In the ABC attitude model, cognition serves as the foundation for both affect and behavior, while affect serves as the core of attitude and the intermediary variable of cognition and behavior, and behavior is the result of cognition and affect.

2.2 Questionnaire Design and Data Analysis

2.2.1 Questionnaire Design

In order to better study the project questions, this project designed a questionnaire for algorithmic consumers based on the ABC attitude model. The questionnaire is divided into two parts, the first part is used to investigate the basic information of algorithmic consumers; the second part is the related measurement questions designed according to the ABC attitude model. A total of 13 measurement questions were designed for each of the three aspects of algorithmic consumers: cognitive, affective, and behavioral, with 2-4 survey questions. The contents of the questionnaire are shown in Table 1, and a 5-point Likert scale was used to investigate the current attitudes of algorithmic consumers toward the use of personal information.

2.2.2 Data sources

The questionnaire for this project was distributed in June 2022, and the data were distributed and collected online with the help of Wenjuan.com. During the two-week period, 336 questionnaires were collected, and 9 invalid questionnaires were removed to obtain 327 valid questionnaires, with an efficiency rate of 97%. The demographic variables of this research are shown in Table 2

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Table 1 Questionnaire Design Questions

Project	Question number	Question
Cognition	Q1	I carefully read the "Personal Information Protection Guidelines" when registering on online shopping platforms
	Q2	I carefully read the "Privacy Policy" when registering on the online shopping platform
	Q3	I know exactly what personal information the shopping platform has collected and used about me
	Q4	I clearly understand the personalized recommendation function of the shopping platform
Affect	Q5	I can accept that in the same situation, without my knowledge, when selling the same product, the shopping platform sets different prices for customers with different purchasing power (e.g. higher prices for Apple phone users)
	Q6	I can accept that the shopping platform has different prices for customers with different purchasing power when selling the same product in the same situation with my knowledge (e.g. higher prices for Apple phone users)
	Q7	I can accept that the shopping platform only sends a certain amount of coupons to new users without my knowledge
	Q8	I can accept that the shopping platform only issues a certain amount of coupons to new users with my knowledge
	Q9	I can accept that the shopping platform can determine my purchasing power by capturing my personal usage information, such as my shopping history, so that they can target higher prices to me
	Q10	I can accept that the shopping platform can capture my product browsing and other personal usage information to determine my preferences and thus target higher prices to me
Behavior	Q11	A shopping platform has the phenomenon of big data discriminatory pricing without my knowledge, and the price of the product sold to me in the same situation is higher than other customers, which will affect my evaluation of this shopping platform when I know
	Q12	A shopping platform has the phenomenon of big data discriminatory pricing without my knowledge, and the products sold to me in the same situation are priced higher than other customers, and I will still buy products or services on this shopping platform after I know
	Q13	A shopping platform has the phenomenon of big data discriminatory pricing with my knowledge, and the price of the product sold to me is higher than other customers in the same situation, I will still buy products or services on this shopping platform

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Table 2 Basic Characteristics of the Sample

Title	Option	Frequency	Percentage(%)
Gender	Female	229	70.03
	Male	98	29.97
Age	Under 18 years old	6	1.83
	18~24years old	247	75.54
	25~40years old	64	19.57
	41~60years old	8	2.45
	61 years old and above	2	0.61
Education	Junior high school education and below	2	0.61
	Junior college education	10	3.06
	Undergraduate	281	85.93
	Master's degree and above	27	8.26
	High school / Technical secondary school / Technical School	7	2.14
Occupation	Self-employed/contractor	11	3.36
	Employee of enterprises and institutions	61	18.65
	Other	58	17.74
	Agricultural, forestry, animal husbandry and fishery workers	1	0.31
	Enrolled students	196	59.94
Average monthly income	Less than 1500 RMB	83	25.38
	1500-3000 RMB	116	35.47
	3000--5000 RMB	61	18.65
	5000---10000 RMB	50	15.29
	Over 10000 RMB	17	5.2

3. Empirical analysis

3.1 Reliability and validity analysis

This study analyzed the questionnaire data using SPSSAU software, and in order to ensure the reliability of the empirical data in this paper, the data were first analyzed for reliability and validity, as shown in Table 3. Among them, the Cronbach α coefficient was 0.823 and the KMO value was 0.717, indicating that the research data had high quality of reliability and high quality of validity.

Table 3 Reliability analysis and validity analysis

Number of items	Sample size	Cronbach α coefficient	KMO value
13	327	0.823	0.717

3.2 Data analysis

3.2.1Attitude measurement

The current status of algorithmic consumers' attitudes toward the use of personal information is measured from three aspects: cognitive, affective and behavioral, respectively, according to the ABC attitude model, and the specific data are shown in Table 4. According to the data, it is found that the average value of the cognitive aspect of algorithmic consumers' attitudes toward the use of

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personal information is 2.537, the average value of the affective aspect is 2.594, and the average value of the behavioral aspect is 2.654. it can be seen that algorithmic consumers' overall attitude toward the behavior of enterprises using personal information is neutral, that is, they do not have a very clear understanding of how enterprises obtain and use their personal information; the acceptance of enterprises using personal information is also neutral; in terms of behavior, algorithmic consumers, such as knowing that they are conducted big data-enabled price discrimination, obviously affect their shopping evaluation and purchasing behavior.

3.2.2 Correlation analysis

SPSSAU software is used to conduct correlation analysis on the data, among which Q3, Q9, and q13 are correlated. See Table 5 for specific correlation coefficient and P-value The correlation coefficient between Q3 and Q9 is 0.158 and shows a significance of 0.01 level, which indicates that there is a significant positive correlation between Q3 and Q9. The correlation coefficient value between Q3 and Q13 was 0.287 and showed a 0.01 level of significance, thus indicating a significant positive correlation between Q3 and Q13. The correlation coefficient value between Q9 and Q13 was 0.221 and showed a 0.01 level of significance, thus indicating a significant positive correlation between Q9 and Q13.

Table 4 Attitude Measurement

		Sample size	Min.	Max.	Average	Combined average
Cognition	Q1	327	1	5	2.468	2.537
	Q2	327	1	5	2.425	
	Q3	327	1	5	2.498	
	Q4	327	1	5	2.758	
Affect	Q5	327	1	5	2.713	2.594
	Q6	327	1	5	2.651	
	Q7	327	1	5	2.431	
	Q8	327	1	5	2.498	
	Q9	327	1	5	2.679	
	Q10	327	1	5	2.59	
Behavior	Q11	327	1	5	3.407	2.654
	Q12	327	1	5	2.339	
	Q13	327	1	5	2.217	

Table 5 Pearson correlation measurement

Cognition and affect

	Q9	
Q3	Correlation coefficient	0.158**
	P-value	0.004

Cognition and behavior

	Q13	
Q3	Correlation coefficient	0.287**
	P-value	0

Affect and behavior

	Q13	
Q9	Correlation coefficient	0.221**
	P-value	0

4. Conclusions and recommendations

4.1 The overall low value of attitude measurements

According to the results of the measurements, the attitude measurement of algorithm consumers towards personal information use is neutral, and the measurement values from three aspects of attitude cognition, emotion and behavior are neutral. That is, algorithmic consumers do not know much about how companies collect and use their personal information, and the acceptance

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is not good, and the behavior and behavioral tendencies are naturally low according to the ABC attitude model theory explanation. For this reason, companies should improve the awareness of algorithmic consumers and improve their acceptance before or during the use of personal information.

4.2 The interrelationship between cognition, affect and behavior

According to correlation analysis, the more algorithm consumers "know clearly what personal information the shopping platform has collected and used about me", the more they can accept "the shopping platform judges my purchasing power by capturing my shopping records and other personal use information, so as to increase the selling price for me"; The more "I know clearly what my personal information have collected and used by the shopping platform", the more I can accept "I sill buy products or services on this shopping platform" even after knowing myself to "be algorithm"; The more acceptable "shopping platforms judge my purchasing power by capturing my shopping history and other personal use information, so that they can target higher prices to me", Even after knowing myself to be algorithm, I am more accepted "I still buy products or services on this shopping platform". From the perspective of improving sales performance and customer experience, companies should also target to improve the cognition and affect of algorithmic consumers on the use of personal information.

4.3 Influence of informed or uninformed

According to the measurement of affect in Table 4, it is easier for algorithm consumers when they are informed to accept some marketing activities launched by enterprises based on the algorithm, such as the issuance of one-time coupons. However, targeted pricing for capturing the purchasing power information of algorithm consumers, informed or not, the acceptance of algorithm consumers is low. From the perspective of customer experience and satisfaction, enterprises should be cautious in the application.

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