The Behavioral Factors of '11.11' Shopping Festival: A Structural Equation Model

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Abstract: Based on the theory of shopping festival atmosphere, herding effect, social interaction and impulse consumption behavior, we use Structural Equation Model to construct a consumer purchase behavior model with online shopping atmosphere, social interaction, realistic psychology, incomplete information and rational consumption as latent variables, and puts forward relevant research hypotheses. The results show that shopping atmosphere and social interaction have a significant positive impact on each other, shopping festival atmosphere does have a significant effect on the relationship between large-scale promotion and social interaction on participants' satisfaction due to trust. Shopping atmosphere has a significant positive impact on realistic psychology, social interaction has a significant positive impact on incomplete information. Finally, we provide guidance for the reasonable development of shopping festival.

Keywords- Structural Equation Model; E-commerce; '11.11' Shopping Festival; Online Consumption of College Students

1 INTRODUCTION

With the development of information technology and e-commerce, online shopping has become a new trend for consumers to purchase goods. Taobao's '11.11' online shopping festival in 2009 has become an important marketing phenomenon in the field of e-commerce in China.

Taobao '11.11' turnover is also rising year by year, more and more people involved.The shopping festival has played an important catalytic role in the development of e-commerce economy. From a marketing point of view, in 2013, Cai Yiheng [1] believed that the main reason for Tianmao combines sales and entertainment with precision marketing and innovative marketing as the breakthrough point. In 2015, Lu Chang[2] believed that festival marketing of e-commerce was largely a marketing model based on consumers' psychology. In 2017, Zong Kewen [3] analyzed the relationship between marketing strategy and marketing effect of e-commerce enterprises in detail, and took Tianmao 's '11.11' marketing model as an example to study the advantages and disadvantages of its development, and put forward targeted suggestions. In 2020, Zhang Jing and Chen Di [4] put forward the corresponding improvement strategies according to the existing '11.11' online marketing problems. In summary, most of the

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current studies on '11.11' are qualitative research from the perspec- tives of marketing strategies and communication studies, while the technical background and logic of shopping festival are slightly less concerned.

Technology Acceptance Model (TAM) [6] studies the determinants of user acceptance of information systems and is applied to the study of user acceptance of various information technologies and Internet online applications. Therefore, this paper establishes the Structural Equation Model (SEM) based on the technology acceptance model, and analyzes the influencing factors and mechanism of consumer purchase intention and behavior under the background of shopping festival from a new perspective under the background of information technology.

2 MODELS AND ASSUMPTIONS

2.1 The proposition of hypothesis

Consumers' rational consumption and impulse consump- tion are two opposite events. Consumers' impulse shop- ping behavior is affected by many factors such as internal, external and consumer personal characteristics. The online shopping festival has greatly promoted consumers to conduct online shopping. At the same time, consumers are also affected by the herding effect, social influence and online shopping atmosphere, which is prone to impulse shopping. Therefore, this paper sets the score set of irrational degree as the following four factors: shopping festival atmosphere, herding effect, social influence, im- pulse shopping, aiming to analyze the shopping behavior of consumers under the background of shopping festival.

2.1.1 Shopping festival atmosphere.

The study of consumer behavior from the perspective of shopping atmosphere mainly includes two angles: the influence of shopping atmosphere in physical stores on consumer behavior, and the influence of online shopping atmosphere on consumer behavior. As the online shopping festival, the shopping atmosphere of '11.11' is the behavior of online marketing to consciously create an online shopping environment, so as to positively affect the emotion and cognition consumed. In reference [7], the final analysis of the impact of online shopping atmosphere on its shopping are as follows.

- Online shopping atmosphere is composed of festival atmosphere, convenient atmosphere, preferential atmosphere, shopping atmosphere and safety atmos- phere.
- Online shopping atmosphere has a significant positive impact on consumer sentiment .
- Consumers' pleasure has a significant positive im- pact on both planned and impulsive buying behavior, and consumers' arousal perception has a positive im- pact on impulsive online shopping behavior.

Based on this, this study proposes the following assump- tions :

H1: Shopping atmosphere positively significantly affects social activities;

H2: Shopping atmosphere positively significantly affects realism;

H3: Shopping atmosphere positively significantly affects incomplete information.

2.1.2 Herding effect : incomplete personal confidence

In the study of consumer behavior, herding effect mainly refers to the behavior that consumers choose to follow other consumers because of the influence of other people's shopping decisions in the shopping process due to the lack of personal confidence. Herding effect mainly refers to the phenomenon that people imitate others in the process of behavior decision making and make decisions not exactly the same as their initial intention [12].

2.13 Social impact

Social impact mainly comes from others who are on the same social online and important to themselves, such as friends, partners and family members, or leaders who are sought after and respected by others, such as stars and fashion leaders. According to McKinsey's 2015 report, Chinese consumers spend about 78 minutes a day on social commerce, and nearly 50% of Chinese consumers are willing to make their shopping decisions according to their relatives and friends. Many studies have confirmed that users' attitudes, willingness and using behavior in information technology adoption, social networking and online shopping are significantly affected by those who are important to themselves[15]. Based on this, the paper proposes the following assumptions :

H4: Social interaction positively affects shopping atmos- phere;

H5: Social interaction positively significantly affects in- complete information;

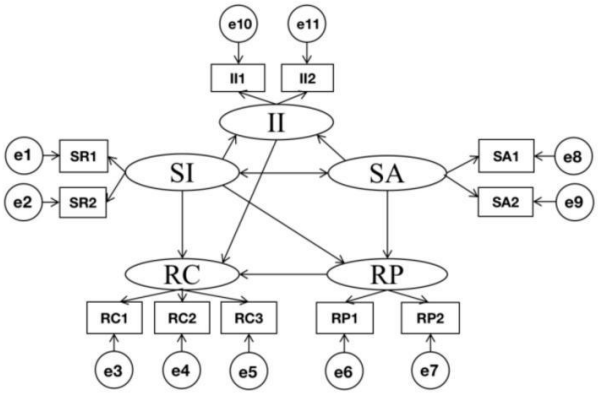
H6: Social interaction positively significantly affects ratio- nal consumption.

2.1.4 Impulse shopping

Impulsive shopping generally occurs in daily behavior, which is considered to be non-planned shopping. When consumers are more rational about commodity consumption, they will also consider more about commodities, but when consumers have strong emotions and positive attitudes towards commodities, they tend to have impulse consump- tion intentions. In this paper, the above influencing factors can affect impulse consumption. Therefore, when we need to describe impulse consumption quantitatively, we need to add the quantitative indicators. In this issue, we believe that the goods purchased are impulse consumption when the goods are purchased according to the original plan before the '11.11' activities.

2.2 Construction of Structural Equation Model

Structural Equation Model (SEM) is a statistical method to analyze the causal relationship between latent variables by studying the relationship between measurement variables [17]. A series of research hypotheses can be constructed into a meaningful hypothetical model at the same time, and then the hypothetical model is tested by statistical procedures. According to the above analysis and assumptions, this study establishes a structural equation model including shopping festival atmosphere, social interaction, real psychology, incomplete information and rational consumption, and the path diagram is shown below.



*Social interaction(SI)； Rational consumption(RC);Realistic psychology(RP)
Shopping atmosphere(SA);Incomplete information(II)

Figure 1. Hypothesis model

2.2.1 Variables design

The model of this study includes potential variables such as shopping festival atmosphere, social interaction, realistic psychology, incomplete information and rational consump- tion. Referring to the scales used by scholars in China and abroad on trust, time-limited promotion, purchase intention and other related literature, and combining with the characteristics of the current shopping festival, the measure- ment scales of each variable are used for reference and correction to meet the purpose of this study. The operational definition and measurement items of each variable are detailed in the table below.

TABLE I. QUESTIONNAIRE DESIGN

Variable	Number	Item Setting
Social interaction	SR1	I am willing to shop with people around.
	SR2	People around me will share preferential goods with me.
Rational consumption	RC1	What I bought was the same as I expected when I got there.
	RC2	I didn 't buy anything I didn 't think about before.
	RC3	Huabai (or Jingdong Baitiao, etc.) used in '11.11'.
Realistic psychology	RM1	I participated in this '11.11' because I found that what I wanted to buy was cheaper than before.
	RM2	I think the order and the coupon shopping are very favorable.
Shopping atmosphere	SP1	I I will be more enthusiastic about shopping during the '11.11' than usual.
	SP2	I think '11.11' has festival atmosphere.
Incomplete information	NE1	In the process of online shopping, I will buy things that I do not intend to buy before being planned.
	NE2	My refund process is smooth, and the final refund received was the same as what I intended.

In order to ensure the authenticity of the questionnaire and take into account the causes of the epidemic, this study adopts the network survey method, through the question- naire survey website 'questionnaire star' for network re- search. In order to ensure the quality of the research, the questionnaire first eliminates the questionnaire that has no contact with online shopping and e-commerce shopping experience, and then eliminates most of the questionnaires that have the same option, the obvious regularity of the topic options and the short response time. Finally, a total of 398 valid questionnaires are collected. The Structural Equation Model generally requires that the number of survey samples is not less than 200, and the ratio of the number of samples to the number of observed variables is at least 10:1-15:1 [18], so the sample size of this survey meets the require- ments.

3 DATA ANALYSIS AND RESULTS

3.1 Descriptive statistical analysis of samples

A total of 398 valid questionnaires were received, 52.26% of males and 47.74% of females. Among them, 79.9% of the respondents participated in the '11.11' shop- ping festival, 49.75% of the respondents did not use Huabei or Jingdong Baitiao, 44.72% of the respondents used Huabei but could bear it, 3.02% of the respondents used Huabei and repayment was difficult, 2.51% of the respondents used Huabei and repayment was very difficult.

3.2 Reliability and validity test

3.2.1 Reliability analysis

Reliability test is to analyze the accuracy of the question- naire measurement results. In this study, Cronbach' s α[19] is used to test the reliability of the scale. When Cronbach's $\alpha>0.6$, the reliability is within an acceptable range. By SPSS 24.0 analysis, the total scale Cronbach's $\alpha=0.688$, indicating that the scale designed in this study has good reliability and high data reliability.

3.2.2 Validity analysis

Validity refers to the matching degree between the obtained data results and the target to be studied [20], which is mainly checked by KMO value and Bartlett spherical test. Some scholars believe that if the value of KMO>0.5, Bartlett spherical test significance probability $P<0.05$, the structure model is effective. Through analysis, the KMO values of each variable in this study are all greater than 0.5, and the Bartlett spherical test Sig. level is less than 0.001. The overall KMO value of the scale was 0.84, which was much larger than 0.5. The Bartlett spherical test was significant at 0.05 level. The results showed that the validity between variables was good.

3.3 Test of research hypotheses

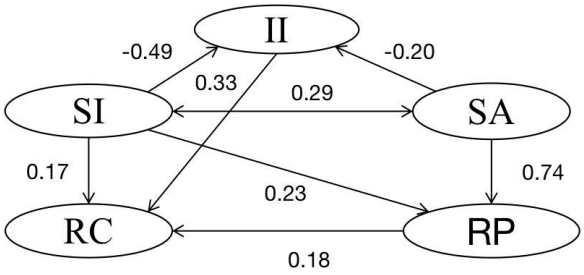
3.3.1 Model fitting test

In order to verify the rationality and effectiveness of the model, this study uses AMOS 24.0 software to test the fitness of the Structural Equation Model. According to the modification indexes of the Structural Equation Model, the modified model is modified, and the evaluation indexes of $\chi 2$/df, GFI, IFI, PGFI, PNFI and other adaptation statistics are selected for model

fitting test [21]. The model fitting results are shown in Table 2. According to the results, the fitting degree of the structural model is good, and the next hypothesis test can be carried out. Finally, the corresponding coefficients of the model are shown in Figure 2.

TABLE II. MODEL FITTING EVALUATION INDEX

Index	$\chi 2/df$	GFI	IFI	PGFI	PNFI
Fitting value	2.485	0.925	0.917	0.505	0.568
Judgment standard	>2	>0.9	>0.9	>0.5	>0.5



*Social interaction(SI)；Rational consumption(RC);Realistic psychology(RP)
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Figure 2. Path coefficient of Structural Equation Model

3.3.2 Model hypothesis test

Table 3 is the research hypothesis of Structural Equation Model. The results of the model show that four of the six direct effect hypotheses have passed the test and two have not passed the test.

TABLE III. HYPOTHESIS TEST RESULTS

Research Hypothesis	Estimate	S.E.	C.R.	P
H1: Shopping atmosphere positively significantly affects social activities.	0.286	0.56	5.082	***
H2: Shopping atmosphere positively significantly affects realism.	0.736	0.152	4.825	***
H3: Shopping atmosphere positively significantly affects incomplete in- formation.	-0.203	0.114	-1.78	0.075
H4: Social interaction positively significantly affects shopping atmos- phere.	0.286	0.56	5.082	***
H5: Social interaction positively aff- ects incomplete information	-0.491	0.156	-3.143	***
H6: Social interaction positively aff- ects rational consumption	0.167	0.176	0.947	0.344

* * * Significant at 0.05.

Shopping atmosphere and social interaction have a significant positive impact on each other, assumption H1 and H4 are verified. Shopping festival atmosphere does play a significant role in the relationship between large-scale promotion and social interaction on participants' satisfaction due to trust. On the one hand, festival atmosphere, preferen- tial atmosphere and safety atmosphere can make consumers satisfied, on the other hand, they can also make consumers feel excited and stimulated, which can positively affect consumers' pleasure.

Shopping atmosphere has a significant positive impact on realistic psychology, assumption H2 is verified. Through the parameter test results of Structural Equation Model, it is found that shopping atmosphere has a significant impact on consumer behavior under realistic psychology. It can be concluded that consumers' desire for shopping in an affordable and convenient shopping atmosphere can not only encourage consumers to plan shopping, but also stimulate additional shopping activities, which has a positive impact.

Social interaction has a significant positive impact on incomplete information, assumption H5 is verified. As a popular event, '11.11' online shopping festival offers participants social opportunities. Social shopping, as a collective activity, 'pays attention to people's altruism, cohesion, and seeks acceptance and affection in inter- personal communication' [22], at this time people tend to transfer most of the channels of acceptance of information sources from their calm identification of the value of goods to the value description of social interaction. At this time, the phenomenon of ignoring the information of some commodities will occur, resulting in incomplete possession of information.

4 CONCLUSIONS AND IMPLICATIONS

Based on the Structural Equation Model, on the basis of previous scholars' research on shopping behavior, this paper establishes the relationship model between online shopping atmosphere, social interaction, realistic psychology, in- complete information and rational consumption based on the '11.11' shopping festival. This paper analyzes the relation- ship between variables through the model, and detects the overall path coefficient and the model fitting degree.The results obtained by data analysis are basically consistent with those proposed in this paper, and individual assump- tions are not supported. By studying the relationship between online shopping atmosphere, social interaction, realistic psychology and online shopping behavior, this paper puts forward the following suggestions：

4.1 Create a good online shopping atmosphere, enhance user experience.

E-commerce creates different online shopping atmos- phere in online shopping activities, which has an important impact on social interaction and realistic psychology of final shopping behavior. Through the response speed of the website, convenient payment and optional delivery methods to create a convenient shopping atmosphere, and create a festival atmosphere to make consumers more pleasant in shopping. Consumers generally consider that online shop- ping has more preferential characteristics than offline shopping. Through the receipt of coupons and large dis- counts, creating a favorable atmosphere can also stimulate their pleasure so as to attract a large number of consumers to shop.

4.2 Enhance social interaction and increase user participation.

From the conclusion of this paper, social interaction has a significant positive impact on shopping festival atmos- phere and information possession. The setting of shopping festival activities can enhance the atmosphere of shopping festival, information transmission and user participation by enhancing the interaction between users. However, it is not economical to spend more cost in improving shopping festival atmosphere to increase the trust and satisfaction of high-perceived participants. For low-perceived festival atmosphere participants, it will be more effective at the same level of shopping festival atmosphere. Or, by im- proving the quality of '11.11' Online Shopping Festival to improve the trust and satisfaction of participants is also a good business strategy, including bringing more oppor- tunities and interests to participants, and providing more channels for their social interaction.

4.3 Ensure the transparency of information and create a safe and convenient shopping atmosphere.

Through time-limited shopping, limited shopping and other activities can make consumers in shopping will appear more excited. Consumers tend to buy more under these circumstances. Timely disclosure of transaction information, improve the return process and other security atmosphere is the basic guarantee for consumers to online shopping. When consumers feel safe, they will do the next shopping activities. Therefore, e-commerce should ensure the authenticity and reliability of commodities, ensure the personal information and property safety of consumers, and transmit commodities and business characteristics to consumers in time.

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