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Evaluation of China's B2C E-commerce Website: An Analysis of Factors that Influence Online Buying Decision

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Abstract

This paper adopts a qualitative method to study influencing factors, expands the field research, processes data based on factor analysis, and finally finds out primary factors that influence online buying decision. On the basis of primary factors, it builds up an evaluation system for B2C e-commerce websites to assess the representatives in each industry. The assessment results include current situation of China's B2C e-commerce websites and their advantages and disadvantages. In terms of those findings, targeted strategies and recommendations are proposed to promote the development of China's e-commerce websites.

Keywords*: buying decision, influencing factors, B2C e-commerce website, evaluation*

1. Introduction

Buying decision describes the decision-making process a customer goes through to meet their specific needs, including evaluation, selection, judgment and decision *etc.* Therefore, customer is critical in this process. Buying decision plays a vital role in consumer purchase behavior.

Recent years, scholars have studied factors that influence consumer buying decision in many ways and have formed some completed theoretical systems, for example, two-factor theory, three-factor theory and four-factor theory. However, as a new business model, the network consumption is very different from traditional business model. Therefore, factors influencing online buying decision are totally different from those in traditional shopping.

Reviewing the related literature on buying decision, scholars have done a lot of research of single factor by qualitative and quantitative analysis. However, the comprehensive study of multiple factors mainly depends on the qualitative analysis.

There is no research literature of an empirical study on online buying decision in domestic. Therefore, we adopt qualitative and quantitative analysis to study factors that influence online buying decision. On the basis of findings, an evaluation index system is built up to assess the China's B2C e-commerce websites. The assessment results would further enrich the research on influencing factors of customer buying decision and improve theories on B2C e-commerce websites. This paper also proposes some targeted strategies and recommendations from theoretical and practical perspectives.

2. Qualitative Analysis of Factors that Influence Online Buying Decisions

This paper adopts the EKB Model well known to describe consumer buying decision process: cognitive behavior depends on reflections and memories. The essence of this model is to divide buying decision process into five stages: problem recognition,

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information search, evaluation of alternatives, purchase decision and post-purchase behavior. Based on an assumption of customers demands for online shopping and the relatively minor significance of post-purchase in first buying decision process, this paper mainly studies influencing factors on information search, evaluation of alternatives and purchase decision.

Under the guidance of this theory, this paper analyzes links related with shopping online, and summarizes major factors that influencing three main stages of online buying decision process. The process of shopping online consists of logging in, information search, evaluation of alternatives, purchase decision and logistics. In this process, customer would contact with seller, website and products. Logistics and online payment would be carefully taken into account by customers, but they don't belong to traditional shopping. Therefore, five primary influencing factors (in Figure 1) could be extracted: website, seller, products, payment and logistics. By means of further analysis, literature review and expert interview on each main factor, secondary influencing factors can be found in Table 1.

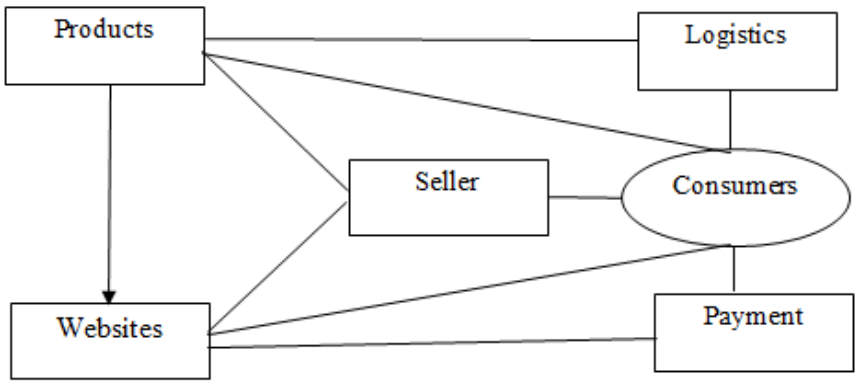

Figure 1. Related Subjects on Consumer Online Shopping

Table 1. Qualitative Analysis of Factors that Influencing Online Buying Decision from College Students

primary factors	secondary factors	Code
Website	popularity	W Z1
	attractive and distinctive web design	W Z2
	simplicity (efficient information retrieval functions, fast shopping procedures, *etc.*)	W Z3
	download speed and browsing speed of webpage and relevant documents,	W Z4
Logistics	low shipping price (express delivery, EMS, *etc.*)	W L1
	various approaches in logistics	W L2
	short delivery time after ordering	W L3
	sound products in logistics process	WL4
Seller	seller's credit	SJ1
	service attitude	SJ2
	instant buyer-seller massaging	SJ3
	a wide variety of products, one-stop shopping environment	SJ4

Products	lower price than that in traditional shopping	SP1
	other customer reviews	SP2
	rich and authentic description, images and other information	SP3
Payment	various approach to payment (cash on delivery, online banking, postal order, Paypal, *etc.*)	ZF1
	security of online payment	ZF2

3. Quantitative Analysis of Factors that Influencing Online Buying Decision

3.1. Questionnaire Design

The basic information involves age, gender, time spent online per week, previous experience of shopping online, products with high-frequency purchase. The main body of questionnaire is designed in terms of 5 primary factors and 17 secondary factories that are results of qualitative analysis in Part Ⅱ. Respondents should answer "Will the following factor affect your buying decision?" Each factor is related on a 5-point scale (1= not at all, 2=only a little, 3=somewhat, 4=quite a bit, 5= totally).

3.2. Research Method

The questionnaires were distributed randomly by QQ, Weixin, E-mail, and posts *etc.* Finally, 121 valid ones were sent back.

3.3. Sample Analysis

Analyzing the basic information by statistical analysis, we can get the basic characteristics of the sample (Table 2).

Table 2. The Basic Characteristics of Research Sample

Items		Number of People	Percentage
Sex	male	72	59.60%
	female	49	40.40%
Previous Experience of shopping online	yes	107	88.40%
	no	14	11.60%
Age	16-18	5	4.13%
	19-21	63	52.07%
	22-24	53	43.8 0%
Time spent online per week	0-20 hours	54	44.63%
	21-40 hours	41	33.88%
	41-60 hours	10	8.26%
	More than 60 hours	16	13.22%
	Total	121	100.00%

As can be seen, the percentage of male respondents is slightly higher compared to female respondents. Most respondents have previous experience of shopping online, accounting for 88.4% of the total. With a deeper understanding of online shopping, those respondents offered more objective answers. From age

distribution, the group of the 19-21 year olds has the largest proportion of 88.4%; the 22-24 year olds account for 43.80%; and only 4.13% of total is the16-18 year olds. 44.6% of respondents spend no more than 20 hours per week online, and 78.51% of total don't exceed 40 hours per week.

Products online with high-frequency of purchase involve books, electronic digital products, shoes, accessories, cosmetics, bags, virtual products, clothing *etc.*

3.4. Results

This paper uses factor analysis to process data. The componential analysis is used as main method to extract common factor. Principal component number whose eigenvalues greater than 1 is set as number of factors. Varimax rotation is used as method of factor rotation with SPSS 13.0.

3.4.1. KMO and Bartlett's Test of Sphericity

KMO value is 0.742, in the range of 0.5 to 1. There is no difference in the degree of relationship among variables. It is concluded that factor analysis is available. Bartlett value is 618.792, and result of significance test is 0. Therefore, we can reject the hypothesis of sphericit; correlation matrix is not an identity matrix. Indexes are not independent variables. It is concluded that factor analysis is also available here.

Table 3. Results of KMO and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.742
Bartlett's Test of Sphericity	Approx. Chi-Square	618.792
	df	136
	Sig.	.000

3.4.2.The Number of Factors

Table 4. Factors to Explain the Total Variance in Original Variables

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.433	26.074	26.074	4.433	26.074	26.074	2.245	13.204	13.204
2	1.841	10.831	36.905	1.841	10.831	36.905	2.179	12.820	26.024
3	1.667	9.804	46.709	1.667	9.804	46.709	2.169	12.761	38.785
4	1.405	8.265	54.973	1.405	8.265	54.973	2.008	11.814	50.600
5	1.286	7.568	62.541	1.286	7.568	62.541	1.528	8.990	59.590
6	1.007	5.925	68.466	1.007	5.925	68.466	1.509	8.876	68.466
7	.782	4.597	73.063						
8	.708	4.167	77.230						
9	.670	3.941	81.171						
10	.605	3.557	84.728						
11	.541	3.183	87.911						
12	.461	2.709	90.620						
13	.430	2.532	93.152						
14	.367	2.157	95.309						

15	.286	1.683	96.992
16	.260	1.530	98.521
17	.251	1.479	100.000

Extraction Method: Principal Component Analysis.

As shown in Table 4, the eigenvalues of first six factors are higher after factor rotation. These six factors explain 68.466% of the total variance in original variables. Generally speaking, information of original variables has little loss. Factor analysis results are basically satisfactory. Six factors are basically appropriate.

3.4.3. The Names of Factors

Table 5. Rotated Component Matrix

	Component					
	1	2	3	4	5	6
wz1			.603		.490	
wz2			.695			
wz3			.777			
wz4			.729			
wl1						.753
wl2		.781				
wl3		.825				
wl4		.743				
sj1					.743	
sj2	.668					
sj3	.727					
sj4	.842					
sp1						.855
sp2					.759	
sp3				.757		
zf1				.714		
zf2				.763		

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 6 iterations.

This paper analyzes factor loading matrix by varimax rotation, and a rotation converged in 6 iterations. The coefficients are greater than 0.3, which means that these factors can explain the original variables. Each factor can be explained and named according to the table.

Factor1: as a higher load factor, factor1 mainly explains the following variables: communication with sellers online at any time, a wide variety of products, one-stop shopping environment. Therefore, the factor1 could be named as Business Service Factor.

Factor2: As a higher load factor, factor2 mainly explains the following variables: various approaches in logistics, short delivery time after ordering and sound products in logistics process. Therefore, the factor2 could be named as Logistics Factor.

Factor3: As a higher load factor, factor3 mainly explains the following variables: popularity; attractive and distinctive web design; simplicity, and download speed and browsing speed. Therefore, the factor3 could be named as Website Factor.

Factor4: As a higher load factor, factor4 mainly explains the following variables: the rich and authentic description, images and related information of products; various

approaches to payment and security of online payment. Therefore, the factor4 could be named as Security Factor of Shopping Online.

Factor5: As a higher load factor, factor5 mainly explains the following variables: seller's credit and other customer reviews. Therefore, the factor5 could be named as Credit Factor.

Factor 6: As a higher load factor, factor6 mainly explains the following variables: low shipping price and lower price of products online. Therefore, the factor5 could be named as Spending Factor.

3.4.4. Results of Statistical Analysis

Table 6. Factor Score Coefficient Matrix

	Component					
	1	2	3	4	5	6
wz1	.052	-.115	.296	-.147	.315	-.001
wz2	-.158	.067	.356	-.080	-.015	-.030
wz3	.035	-.159	.378	.132	-.122	.097
wz4	.036	-.006	.341	.029	-.051	-.129
wl1	.006	.073	.047	-.090	-.078	.495
wl2	-.032	.447	-.041	-.082	-.152	-.032
wl3	-.146	.484	-.006	-.096	.035	-.045
wl4	-.020	.373	-.089	.000	.083	-.050
sj1	.083	.023	-.069	-.049	.509	-.150
sj2	.320	-.017	-.125	-.004	.097	-.037
sj3	.358	-.054	.034	-.049	-.024	.014
sj4	.480	-.133	.005	-.101	-.119	.135
sp1	.080	-.150	-.078	.053	-.013	.614
sp2	-.135	-.058	-.021	.067	.513	.092
sp3	-.196	-.057	.005	.465	.023	.069
zf1	.021	-.102	.019	.395	-.001	-.110
zf2	.041	-.052	-.082	.410	-.050	.026

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Component Scores.

Table 6 shows factor score coefficient matrix. We find that six new factors is a linear combination of the original indexes. Therefore, six functions of factor score are listed as followings:

$$F1 = 0.052wz1 - 0.158wz2 + 0.035wz3 + ... + 0.041zf2$$

$$F2 = -0.115wz1 + 0.067wz2 - 0.159wz3 + ... - 0.052zf2$$

$$F3 = 0.296wz1 + 0.356wz2 + 0.378wz3 + ... - 0.082zf2$$

$$F4 = -0.147wz1 - 0.080wz2 + 0.132wz3 + ... + 0.410zf2$$

$$F5 = 0.315wz1 - 0.015wz2 - 0.122wz3 + ... - 0.050zf2$$

$$F6 = -0.001wz1 - 0.030wz2 + 0.097wz3 + ... + 0.026zf2$$

As seenthese six functions, it can be conclude that: in service factor, the most influential factors are a wide variety of products and one-stop shopping environment, followed by instant buyer-seller massaging and service attitude. In logistics factor, the most influential one is short delivery time after ordering, followed by various approaches

in logistics and sound products in logistics process. In website factor, the most influential is simplicity, followed by pleasant and attractive web design. In safety factor of online shopping, the most influential one is the rich and authentic description, images and other information, followed by safety of online payment and a variety of payments. In logistics factors, the most influential one is lower price of products online, followed by low shipping rice.

Six primary factors explain 68.466% of the total variance of all 17 variables. The proportion of explained variance of each factor is different. The first factor is 13.204%, the second of 12.820%, the third of 12.761%, the fourth of 11.814%, the fifth of 8.990% and the sixth of 8.876%. Setting total variance explained as weight value in this part, it can be concluded that among influencing factors of online buying decision, the most important one is service attitude factor, followed by logistics factor, website factors, safety factor of online shopping, credit factor and spending factor.

4. Evaluation System of China's E-Commerce Website in Terms of Influencing Factors of Online Shopping Decisions

4.1 Evaluation Index System

In evaluation system, six primary factors obtained in Part III are defined as first-class index. The second-class index refers to result of factor analysis in Section 3.3.

Table 7. B2C Chinese E-Commerce Website Evaluation Index System

First-class index	Second-class index
Business Service	service attitude
	instant buyer-seller massaging
Logistics Service	a variety of products and one-stop shopping environment
	various approaches in logistics
	shortest delivery time after ordering
	intact package and sound products in logistics process
Website	popularity
	attractive and distinctive web design
	Simplicity (efficient information retrieval functions, fast shopping procedures, *etc.*)
	browsing speed and download speed
Security Factor of Online Shopping	a rich, authentic description, images and other information of products
	various approaches to payment
	security of online payment
Credit Factor	business credit
	other customer reviews
Spending Factor	low price than that in traditional shopping
	low shipping price

4.2. Weight Value of Evaluation Index

Part III concludes that six primary factors explain 68.466% of the total variance of all 17 variables, which is assumed for σ. The proportion of explained variance of each factor is assumed for $\sigma_{i,}$. They could be used as normalized to calculate the specific weight of

each factor. The calculation is as follows: suppose the weight of a factor is $W_{i,,}$ then the weight of each factor may be re-calculated according to Equation 1.

$W_i = \sigma_i * 100\% / \sigma$

Table 8. Weight Value of Evaluation Index

	Business Services	Logistics Services	Website	Security of Online Shopping	Credit	spending
Weights	0.193	0.187	0.186	0.173	0.131	0.130

4.3 Evaluation Criterion

In evaluation criteria system, each index is related on a 5-point scale (1= not at all, 2=only a little, 3=somewhat, 4=quite a bit, 5= totally).The details are as follows in Table 9.

Table 9. Evaluation Criterion

First-class Index	Second-class Index	Evaluation Criteria	5	4	3	2	1
Business Services	service attitude	excellent good moderate poor bad					
	instant buyer-seller massaging	very fast fast average slow very slow or no response at all					
	a variety of products and one-stop shopping environment	many some any a few few					
	various approaches in logistics	5 4 3 2 1					
Logistics Services	shortest delivery time after ordering	in 24 hours in 2 business days in 3 business days in 3-7 working days more than 7 business days					
	intact package and sound products in process of delivery	excellent good moderate poor bad					

Website	popularity	very famous quite famous average quite unknown totally unknown
	beautiful, attractive and distinctive web design	very beautiful, somewhat average not very beautiful not at all beautiful
	simplicity(efficient information retrieval functions, fast shopping procedures, *etc*.)	very convenient somewhat convenient average convenient not very convenient not convenient at all
	browsing speed and download speed	very fast fast average slow very slow
	a rich, authentic description, images and other information of products	many some any a few few
Security Factor of Shopping Online	various approaches to payment	5 4 3 2 1
	security of online payment	very safe somewhat safe average not very safe not at all safe
Credit Factor	business credit (genuine, quality, consistent degree for description and product)	very consistent somewhat consistent average not very consistent not consistent at all
	other customer reviews (number; truth; significant reference)	very helpful somewhat helpful average not very helpful not helpful at all
Spending Factor	price of products online compared to that in traditional shopping	much cheaper cheaper same price with some promotions same price with little

low shipping price	promotions more expensive unconditional free shipping free shipping on order under 100 yuan free shipping on order over 100 yuan no free shipping shipping price 5-10 yuan no free shipping shipping price over 10 yuan

4.4. Sample Selection

Firstly, samples should involve some B2C websites with unilateral market instead of ones with bilateral markets, such as Taobao and Tmall. Next, using Alex website which is specialized in ranking websites, some comprehensive B2C websites could be selected. Then, representatives of different industry should be picked out, especially industries with high-frequency of purchase. Finally, ten website are chosen including Amazon, Dangdang, Jingdong, Jumei, Vancl, VIP, YHD, Paixie, Jimei and Mbabao.

4.5. Evaluation Process

In this section, the questionnaires were still distributed randomly by QQ, Weixin, E-mail, and posts *etc.* Finally 125 valid ones were sent back.

4.6. Evaluation Results

In terms of scores of second-class index, each website got an average score. Then, we build some score functions based on factor score coefficient matrix (Table 6) to calculate score separately. Finally, we calculate final score for each site based on different weight.

Table 10. Evaluation Results

Name	Score (out of 5)
Dangdang	4.1039
Amazon	4.0854
Jingdong	4.0748
VIP	4.0636
Junmei	3.9855
Vancl	3.8000
Jimei	3.6993
Mbaobao	3.6734
Paixie	3.5871
YHD	3.5639
Average	3.8637

5. Analysis of Evaluation Results of China's B2C E-Commerce Websites

In terms of the previous 5-point scale, the scores are classified into five levels, 4-5 for excellent, 3-4 for good, 2-3 for acceptable, 1-2 for poor, and ＜1 for very poor.

5.1 Overall Analysis

In comprehensive ranking, 10 representatives are all in a good level, with average score of 3.8637. There still a gap with excellent level. The best one is Dangdang with highest score, followed by Amazon. The third is Jingdong and the fourth is VIP. These four websites are all at excellent level. The rest are at good level, and the worse is YHD with lowest score.

5.2 Factor Analysis in Terms of Industry

Table 11. Evaluation Results Ranks

	Overall ranking	Business Services	Logistics Services	Website	Security of Shopping Online	Credit	Spending
Dangdang	1	4.2963	3.7973	3.9670	4.9296	4.0827	2.9197
Amazon	2	3.9621	3.2683	4.1744	4.9781	4.6386	4.0236
Jingdong	3	4.0112	4.1332	4.3652	4.8848	4.0611	2.6543
VIP	4	4.2046	3.9809	3.7221	4.7829	3.7607	3.0956
Junmei	5	4.6117	2.6318	4.1365	4.8692	3.4748	2.8748
Vancl	6	4.4288	0.9564	3.9739	4.9774	3.9739	3.3185
Jimei	7	4.9914	0.7683	3.1454	4.9538	2.3235	4.0276
Mbaobao	8	4.1898	4.3981	3.0025	4.5573	1.7942	2.3529
Paixie	9	4.5057	0.9401	3.1884	4.9982	3.2339	3.0790
YHD	10	4.1612	0.5655	3.8170	4.9947	4.0651	2.2431
Average		4.3363	2.5440	3.7492	4.8926	3.5409	3.0589

5.2.1 Business Wervices Factor

Its average score is 4.3363, which means all websites are in excellent level, except Amazon. The best one is Jimei, and the worst is Amazon China. After analyzing, it is the lack of online communication that affects the Amazon customer's perception to its customer service. Therefore, it is suggested that instant massaging should be added in Amazon's website to answer customers' questions.

5.2.2 Logistics Service Factor

Its average score is 2.544, which means all websites are in acceptable level. The best ones are Mbaobao and Jingdong which is in excellent level. Amazon, Dangdang and VIP are in good level. Jumei is in fine level and the scores of Vancel, YHD and Paixie are less than 1, which means they are in very poor level. After analyzing the reasons, the main reason is limited options of shipping for customers, with only the self-run logistics or some third-part logistics. The second one is low speed of shipping. Products deliver by most logistics companies arrive in 3 business days or 3 to 7 business days instead of in 24 hours or 2 business days. Therefore, it is suggested that China's B2C websites should offer various option of shipping. The logistics industry should focus on increasing the speed of shipping.

5.2.3.Website Factor

Its average score is 3.7492, which means all websites are in good level. The best one is Jingdong, followed be Amazon and Junmei. All of them are in excellent level. The rest are in good level. The reasons are advanced web technology and excellent web design in domestic, which give strong technical support in time. Many high-level websites could be found in market. However, some are not as popular as the famous ones because of weak publicity. Therefore, it is suggested that excellent websites should put efforts in enhancing their popularity.

5.2.4.Security Factor of Shopping Online

Its average score is 4.8926, which means all websites are in excellent level. The score of each website is between 4.5 to 5 points. Each website can provide rich images and description for products and various options of payment. In addition, the safety of online payment could be guaranteed under current level of technology.

5.2.5 Credit Factor

Its average score is 3.5409, which means all websites are in good level.

Amazon is the best with highest score of 4.6386. Dangdang, Jingdong and YHD are also in excellent level with scores between 4 to 5 points. Vancl, VIP, Jumei and Paixie are in good level. Jumei is in an acceptable level. The worst one is Mbaobao. According to the analysis of questionnaire, business credit factor is in good level with Amazon in excellent level. In terms of other customer reviews, Amazon is in excellent level; Dangdang and Jingdong are in good level; Vancel and YHD are in an acceptable level; Jumei and Paixie are in poor level; Jimei and Mbaobao are in very poor level. The main reason is that the customer reviews have little reference significance because of limited number and low popularity.

5.2.6 Spending Factor

Its average score is 3.0589, which means all websites are in good level.

Jimei and Amazon are in excellent level. Vancel, VIP and Paixie are in good level. Dangdang, Jingdong, Jumei, Mbaobao and YHD are in an acceptable level. From the perspective of products prices, the prices of online products are much lower compared with traditional shopping. From the perspective of shipping price, it is only Jimei that offers free shipping unconditionally. Amazon provide free shipping on order less than 100 yuan (such as within RMB 40 or RMB 60). Jumei, Vancel, VIP and Paixie provide free shipping on order over 100 yuan. Dangdang, Jingdong and Mbaobao don’t provide free shipping and the shipping price is between 5 to 10 yuan. YHD doesn’t provide free shipping as well and its shipping price is over 10 yuan. Therefore, in respect of shipping price, B2C websites could not provide unconditional free shipping.

6. Summary

This paper adopts the qualitative analysis to study factors influencing online buying decisions. Then, the results are used to set an evaluation index system. By using factor analysis, we extract six primary influencing factors from valid questionnaire data, including business service factor, logistics factor, website factor, security factor of online shopping, credit factor and spending factor. Based on six primary influencing factors, we build up an evaluation system of China’s B2C e-commerce websites. Then, we evaluate ten Chinese B2C websites in terms of the evaluation system. After analyzing the results, some suggestions are given out to promote the development of China’s e-commerce market.

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