Consumer Features and Their Influences on Online Shopping in China

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Abstract

It has been well established that individuals' buying behaviors are shaped by multiple features dependently and independently. In theory, external environmental, demographics, personal characteristics, vender/service/product characteristics, attitude towards online shopping, intention to shop online, online shopping decision making, online purchasing, and consumer satisfaction are worldwide accepted influencing factors. This paper documents what key customer features and how they are influencing individuals' online shopping activities in China, a rapidly developing country, about which far less—compared to the western world—is known on this topic. Based on recent consumption data and nationally representative surveys, we find distinct customer features in two dimensions of impersonal conditions and mental states and their strong and, in some cases, complex effects on online shopping payment. We also find that the effects vary by residency, gender, education and marriage. Further, we explore the moderating effects of these demographics on functions of customer features by cross analysis. These patterns highlight the above-average payment for online shopping of those with more discretionary time and stronger self-confidence, and also, high sensitivity of those with bachelor's degree or higher and no fixed spouse. Accordingly, we suggest the importance of precise marketing for e-merchants and rational understanding for consumer behaviors.

Keywords

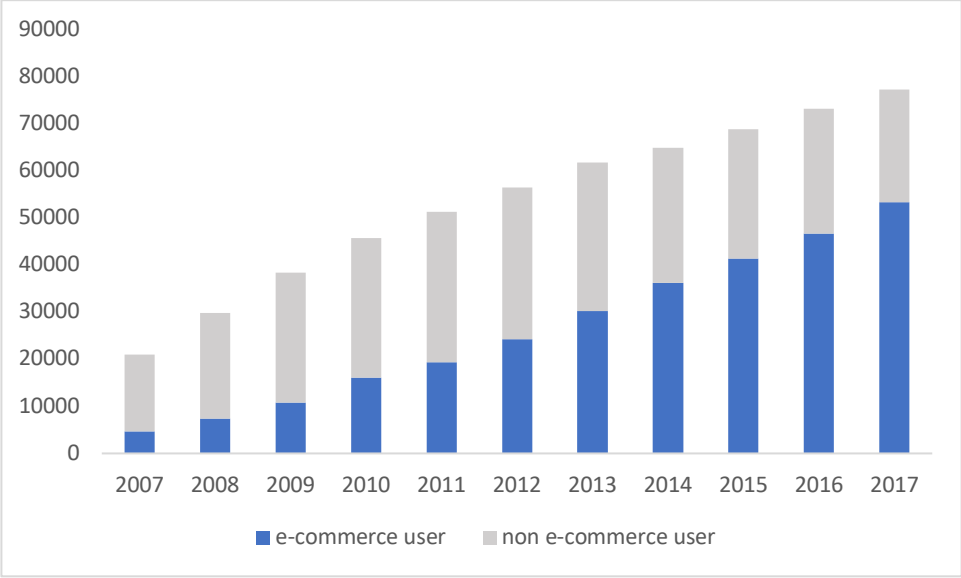
China, online shopping, time, self-confidence, residency, gender

1 Introduction and conceptual framework

Shopping online and Chinese background

Internet-based e-commerce environment makes it possible for consumers to search for information and purchase products or services through direct interaction with online stores. This trend with great prospects enables people to live a much more convenient life. Among 802 million internet users in China, 70.9 per cent of which are e-commerce users[1]. This large user base brings opportunities along with challenges to both domestic and international marketers and retailers operating in the e-commerce space. In order to achieve sustainable development, e-marketers should design strategies based on the factors that drive Chinese consumers to shop online. Individuals also need to keep an eye on these influential factors so that they can understand or even control their behaviors in a rational structure.

Figure 1 The percentage of e-commerce users in netizens (CNNIC)



High population density, therefore strong demand, and great investment in e-commerce contribute to the rapid growth of logistics and supply-chain management system in all. Chinese enthusiasm for online shopping sees no fall in the short future. However, the distinct effects set by hukou system and China's 40 years of reform and opening-up renders noticeable differentiations on online shopping behaviors among population groups. Residency identity, officially identifies a person as a resident of an area and includes identifying information such as name, parents, spouse, and date of birth, depicts people's political status, which is strictly connected with social programs

[1] CNNIC 2018

provided by the government. Consequently, residency status serves as a big divider in population concerning online shopping. Meanwhile, rapid economic development leads to self-consciousness of young people and women with their entrance to labor market, pounding conventional structures of Chinese family, and of course, buying behaviors of the whole population. Assuming continuous economic development and no huge abolishment of hukou system in the foreseeable future, the differences of online shopping shaped by consumer features will remain, or even be deepened.

Since most of the existing studies that explore consumers' online shopping behaviors are conducted in Western context, far less is known in other parts of the world.[2] Given that it is unknown whether these theories have universality or not, we need to conduct researches specially in Chinese context. This passage intends to fill this knowledge gap to some extent by empirically investigating the determinants of Chinese consumers' online-shopping payments.

This article is organized as follows. We first review factors which have already been identified in the existing literature as well as the Chinese online retail market. Next, we present a series of hypotheses derived from an assumed model. Following that, we describe our methodology and present the results of our survey. By further discussing the implications and limitations of these results, we tender some recommendations for future researches.

Literature review

A lot of thorough studies of online shopping attitudes and behaviors have appeared with objective to understand what influences consumers' online shopping decisions since a mid-1990s' boom in online shopping. Synthesizing studies in this area from 1998 to 2002, a total of ten interrelated factors were identified, for which the empirical evidences show significant relationships.[3] They are external environmental, demographics, personal characteristics, vender/service/product characteristics, attitude towards online shopping, intention to shop online, online shopping decision making, online purchasing, and consumer satisfaction, among which the first five are commonly regarded as independent and the last five as dependent variables. In this research, we are concerned about consumers' online purchasing, which is considered as the most substantial step in online shopping activities. In most previous empirical studies, online purchasing was measured by frequency and value of online purchases. For instance, Lee and colleagues used total amount spent and online purchasing frequency in the last 6 months as measures in their study in 2001.[4]

[2] Stafford et al. 2004
[3] Li et al. 2002
[4] Lee and colleagues 2001

In terms of independent variables, this study mainly focuses on the features of customers themselves, on which, unlike external conditions, few researches have entirely studied. Demographic variables mostly include elements such as gender, residency, age, marital status, level of education and income. In this area, Bellmen, Lohse and Johnson reported that "Internet surveys agree that the online population is relatively younger, more educated, wealthier, although the gaps are gradually closing".[5] However, conflicts existed in results about the influence of age on online purchasing. Some found a positive relationship[6] while others reported a negative one[7] or even no relationship[8]. Similarly, conflicts also existed in marital status. Morganosky and Cude proposed that young mothers with children were more likely to buy online[9]. It was also mentioned that the number of children in household had a significant influence on consumers' online shopping intentions of clothing.[10] Conversely, Bhatnagar et al. and Liebermann and Stashevsky have found marital status insignificant.[11] For other demographic variables, Sultan and Henrichs in their study concluded that the consumers' willingness to shop online and the consumers' online shopping payment were positively related to income and household size.[12] Some other researchers suggested that young, professional males with higher educational levels and higher incomes tended to shop online.[13] Nevertheless, Bellmen et al. pointed out that once people were online, demographics did not seem to be key predictors of online buying behaviors.[14] Then more evidences were provided by Bhatnagar and his colleagues, which supported that the demographic variables were not decisive influencing factors of consumers choosing online stores over physical stores and how much to spend.[15] Namely, it is acknowledged that demographics have a relationship with consumers' online shopping to some extent, but the connection is less strong.

Personal characteristics mainly refer to a group of consumers' specific features which can influence their online buying behaviors and payments. Bellmen et al. first found that a typical online buyer had a "wired" lifestyle[16], which meant that such people had been on the Internet for years and used it as a routine tool for work, news reading, information searching, mail correspondence, and recreational purposes. It was also mentioned that the amount of discretionary time consumers had was an influential factor of consumers' online buying decision.[17] Besides, Li and colleagues manifested

[5] Bellmen, Lohse and Johnson 1999
[6] Bhatnagar et al. 2000; Donthu and Garcia 1999; Doolin et al. 2005; Liebermann and Stashevsky 2009
[7] Joines et al. 2003; Swinyard and Smith 2003
[8] Li et al. 1999; Rohm and Swaminathan 2004
[9] Morganosky and Cude 2000
[10] Kim and Kim 2004
[11] Bhatnagar et al. 2000; Liebermann and Stashevsky 2009
[12] Sultan and Henrichs 2000
[13] Mahajan, Muller & Bass 1990; Ernst & Young 2001
[14] Bellmen et al. 1999
[15] Bhatnagar 2000
[16] Bellmen et al. 1999
[17] Bellmen et al. 1999

the online shopping tendency of consumers who are more convenience-oriented and less experience-oriented.[18] According to Monsuwe, people who did not favor using computers would spend less on online shopping[19]. Consumers' mental factors also played a role in the process of online purchasing as Koufaris et al. stated that disposition to trust impacted consumers' online shopping payment.[20]

Chinese consumers' consumption power has risen substantially during the last three decades along with China's boost in economy.[21] In the meantime, growing affordability and availability of Internet access increase Chinese consumers' frequency of using Internet. A crucial advantage of online shopping, the climbing transparency and convenience of its environment due to expanding investments by companies, has also became increasingly obvious. All these elements contribute to more netizens prone to online shopping and more online shopping payment. Lots of data have witnessed this leap in China's online shopping market. For example, China's online shopping penetration rate has reached 71 percent[22] and the average spending online has reached RMB1,600 (USD 234.3) in 2008[23]. Moreover, like their Western counterparts, the online shopping lists of Chinese consumers have expanded a great deal from the initial simple selection of books, music and video products to a more extensive array of product categories including apparel, housewares, digital products and many others[24]. However, some specific traits of Chinese e-market need to be aware of; such as competition structure, demographic differentiation, and shopping festivals.

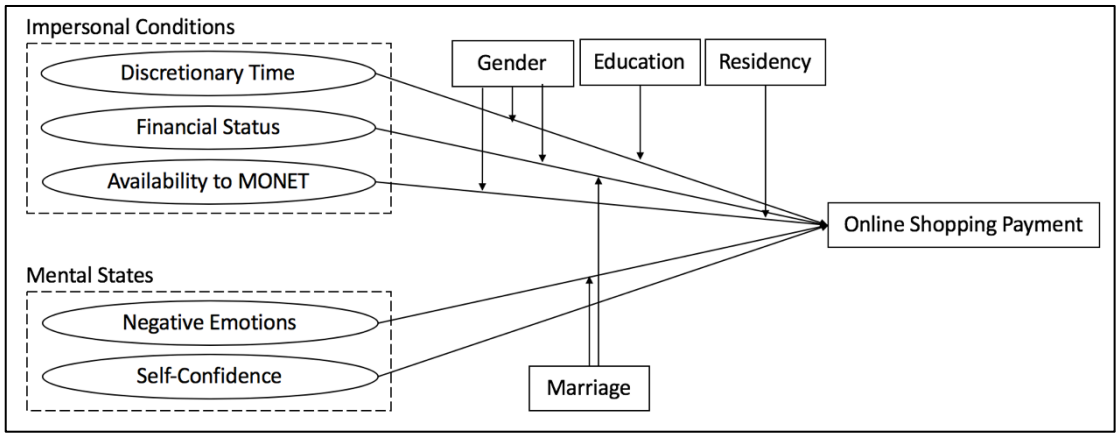
Given intensive researches on this topic, many divergences on the mode of factors influencing still existed, resulting in no consensus on the theoretical model which can perfectly interpret and predict consumers' online shopping behaviors. In addition, e-commerce in China nowadays is completely different from what it was in the past and has its current characteristics so that some factors proposed by predecessors may be ineffective at present. Let alone the inter-national distinctions that have been constantly shaping Chinese and western e-markets. Therefore, there exists an imminent need for a comprehensive research in China's current context. Based on the awareness and reflection of previous studies and taking the current Chinese situation into account, we propose our hypotheses.

[18] Li 1999
[19] Monsuwe 2004
[20] Koufaris et al. 2002
[21] Zhao et al. 2008
[22] CNNIC 2018
[23] IResearch 2009; Lee 2009
[24] Wen Gong, Rodney L. Stump, Lynda M. Maddox 2013

Conceptual model and hypotheses

Two dimensions are concurrently identified as significant determinants of consumers' online behaviors, namely impersonal conditions and mental states. Specifically, our dependent variable is annual online shopping payment that is defined as the amount of money an individual spent on online shopping (including online payment) in the past 12 months. The independent variables consist of financial status, discretionary time, and availability to mobile network, as aspects of impersonal conditions; self-confidence and negative emotions, as aspects of mental states; gender, age, marital status, residency, and education, as moderators.

Figure 2 Research Model



*MONET = mobile network

Impersonal conditions

Among the abundant historical researches about the relationships between impersonal conditions and online shopping behaviors, most focused on consumer demographics (Liebermann and Stashevsky, 2009; Zhou et al., 2007 etc.) but lacked specific objective standards depicting consumers' life conditions. Taking into account the blank in this area, we synthesized these factors and conducted a more complete research.

Discretionary time. We define discretionary time as the duration people can manage according to their personal willingness and measure it by workweek (negatively related), access to network through computer, frequency of using the Internet for work, and frequency of using the Internet for business. As Steven Bellman (1999) suggested, the online buyers tended to spend more time working on the Internet in their offices. Hence, we predict:

H1. There is a positive relationship between one's annual online shopping payment and discretionary time.

Financial status. Financial status stands for an individual's credit rating, payment

capacity and current financial situation (Olive M. Mugenda et al., 1990). Historical researchers tended to use one's annual income to measure his/her financial situation. However, as a special field, online shopping should be correlated with not only annual income but also one's expense on network-related service. In this research, we measured the financial status by annual income and monthly phone bill. Sultan and Henrich (2000) proposed that the consumers' willingness to shop online and the consumers' online shopping payment were positively related to their income. Referring to the theory of classic economics, consumption is positively related to income with a diminishing marginal propensity. (Keynes) Based on the discussion above, we posit:

H2. There is a positive relationship with diminishing marginal propensity between one's annual online shopping payments and financial status.

Availability to mobile network. In our study, the availability to mobile network is measured by access to network through mobile devices and hours online in spare time. The number of netizens who use mobile phone to surf the Internet accounts for 98.3 per cent of total. (CNNIC, 2018) Hence, mobile devices are playing an more and more critical role in the e-commerce industry. The higher degree of exposure to the Internet increase the possibility of an individual to make online purchase. In light of this, we propose:

H3. There is a positive relationship between one's annual online shopping payments and availability to mobile network.

Mental states

Purchasing is an extremely subjective behavior that can be easily influenced by the consumers' personal mental states. Individuals tend to exert their own attitudes and feelings on online purchases due to its comparative privacy, besides external factors. From this stand, we introduce subjective factors in the dimension of mental states to remedy the shortcomings of the ignorance in historical researches.

Negative emotions. Spending money is considered as an effective method to relieve negative emotions. In our research, the degree of negative emotions is measured by frequency of sadness, depression, strenuousness, loneliness, desperation, and bad sleep. We assume that people attain higher level of satisfaction through online shopping because their demands are met. In such case, people are prone to increase the frequency of online shopping when they are under negative emotions. Hence, we assume:

H4. There is a positive relationship between one's annual online shopping payments and negative emotions.

Self-confidence. The degree of self-confidence is measured by social status level,

relative income level, rating of satisfaction with life and confidence in the future. A number of studies have demonstrated that the online shopping payment is positively influenced by self-confidence that consumers have in their ability to perform behavior (Conner and Abraham, 2001; Taylor and Todd, 1995 etc.) We incline to take the assumptions as below provisionally:

H5. There is a positive relationship between one's annual online shopping payments and self-confidence.

Demographic variables as moderator

On the basis of existing theories and researches, some factors mentioned above showed conflicting results about the effects in predicting online shopping payment. Recall that it is often useful to look for moderators when there are unexpectedly weak or inconsistent relations between a predictor and an outcome across studies, we take the demographic variables as possible moderators.

In the dimension of impersonal conditions, we explore the moderating effects of demographic variables on three factors by conducting cross analysis.

We first discuss the impact of education and gender on the relationship between discretionary time and the dependent variable. The two demographic variables divide the sample into six interested groups. Given that the discretionary time is a necessary precondition for online shopping, we assume that moderators will not have significant influence on people with lower discretionary time. However, people with more discretionary time may have different performances due to their education levels and genders. For instance, Bellman et al. (1999) mentioned that the online population were more educated women. Thus we assume:

H6. The positive relationship between online shopping payments and discretionary time varies among people with distinct education level and gender.

Gender and marital status are added to the model of financial status as moderators. It is commonly believed that men and women have different consumption habits under the same circumstance, which may further vary due to the changes in their marital status. Based on the analysis, we propose:

H7. The positive relationship between online shopping payments and financial status varies among people with distinct gender and marital status.

The last factor of this part is the availability to mobile network. To build a complete assumption, residency and gender serve as a pair of moderate variables in interpreting the positive relationship that has been mentioned in H3. At lower availability to mobile

network, people's inclinations to online shopping are primarily influenced by enthusiasms, while major determinants turned to a large scale, like readiness for a new shopping mode, at high availability. In light of this, the hypothesis is as below:

H8. The positive relationship between online shopping payments and availability to mobile network varies among people with distinct residency and gender.

In the part of mental states, we introduce the marital status as a moderator to analyze its impact on the correlation between negative emotions and online shopping payments. Bhatnagar et al. (2000) and Liebermann and Stashevsky (2009) have reported an insignificant direct effect of marital status. It was mainly because that whether people have fixed spouse would influence the relationship between their online shopping payments and negative emotions. For people with fixed spouse, they can turn to families for comfort instead of relying on the online purchase when under negative emotions. In contrast, people without fixed spouse consider the online shopping as an rudimentary approach to relieve the pressure. Based on the analysis, we posit:

H9. People with fixed spouse and people without fixed spouse have inconsistent tendency of online shopping payments from weak to strong negative emotions.

2 Data and methodology

Subjects and data collection

The unit of analysis in the study is the individual consumer who has experience with purchasing products at online stores. In China, the number of Chinese e-commerce users has been growing sharply to 569 million, with a continuous climbing over the last ten years.

As our data base, China Family Panel Studies (CFPS) is conducted by Institution of Social Science Survey (ISSS) of Peking University, aiming to provide a data base for academic research and public policy analysis by tracking data collected at the individual, family and community levels. It reflects the changes in China's society, economy, population, education, and health. The sample of CFPS covers 25 provinces/municipalities/autonomous regions with a target sample size of 16,000 households and includes all family members in the sample households. The questionnaires consist of four main types: community, family, adult and children.

In order to achieve the basic aim of this study as to explore the effects of impersonal

conditions and mental status on consumers' annual online shopping payment, two main sets of questions are selected for further operationalization.

Sample size and profile

Data for this study were collected from the 2016 adult questionnaires of CFPS. After thorough data washing, the finalized data, in accordance with fundamental demographic structure of China, covers 1616 individuals, whose demographic characteristics are depicted in Table 1.

Measure	Items	Frequency	Percentage
Gender	Male=1	791	48.95%
	Female=0	825	51.05%
Age	25+=1	876	54.21%
	18-25=0	740	45.79%
Marital status	have fixed spouse=1	867	53.65%
	no fixed spouse=0	749	46.35%
Residency	urban=1	1063	65.78%
	rural=0	553	34.22%
Education	junior high school or lower = 0 0	750	46.41%
	high school to junior college =1 0	704	43.56%
	bachelor's degree or higher = 0 1	162	10.02%

Table 1 Sample demographics

Operationalization of variables

Our dependent variable was defined as the natural logarithm of annual online shopping payment (here after ln(AOP)) to reach normal distribution.

Moderators

Control variables like gender, age, marital status and residency were measured with several single dichotomous items and included as single dummy variables in the analysis.

Education was measured with a single ordinal item with eight response categories. Through combining, 3 categories were represented by two dummy variables in the analysis.

Impersonal conditions

Access to Internet through mobile devices and access to Internet through computer

served as dummy variables. Other variables were measured as continuous numbers.

Mental status

In the questionnaire, multiple-item method was used and each item was measured based on a four-point scale from “strongly disagree” to “strongly agree”.

All operational definitions of the constructs and instrument items are shown in Table 2.

Table 2 Operational definitions of variables

Measure	Items	Frequency	Percentage
Frequency of using internet for study	never=0	431	26.67%
	once a few months = 1	95	5.88%
	once a month = 2	100	6.19%
	two or three times a month = 3	158	9.78%
	once or twice a week =4	281	17.39%
	three or four times a week =5	151	9.34%
	almost everyday = 6	400	24.75%
Frequency of using internet for work	never=0	530	32.80%
	once a few months = 1	36	2.23%
	once a month = 2	25	1.55%
	two or three times a month = 3	46	2.85%
	once or twice a week =4	94	5.82%
	three or four times a week =5	102	6.31%
	almost everyday = 6	783	48.45%
Frequency of using internet for social	never=0	53	3.28%
	once a few months = 1	11	0.68%
	once a month = 2	12	0.74%
	two or three times a month = 3	24	1.49%
	once or twice a week =4	100	6.19%
	three or four times a week =5	145	8.97%
	almost everyday = 6	1271	78.65%
Frequency of using internet for entertainment	never=0	70	4.33%
	once a few months = 1	18	1.11%
	once a month = 2	24	1.49%
	two or three times a month = 3	64	3.96%
	once or twice a week =4	235	14.54%
	three or four times a week =5	236	14.60%
	almost everyday = 6	969	59.96%
Frequency of using internet for business	never=0	0	0.00%
	once a few months = 1	218	13.49%
	once a month = 2	223	13.80%
	two or three times a month = 3	506	31.31%

	once or twice a week =4	384	23.76%
	three or four times a week =5	137	8.48%
	almost everyday = 6	148	9.16%
Access to network through mobile devices	yes=1	1576	97.52%
	no=0	40	2.48%
Access to network through computer	yes=1	1088	67.33%
	no=0	528	32.67%
Feel most people obliging or selfish	obliging=1	1201	74.32%
	selfish=0	415	25.68%
Disposition to trust	trust=1	1013	62.69%
	distrust=0	603	37.31%
Relative income level (in your local area)	very low=1	230	14.23%
	low=2	458	28.34%
	medium=3	804	49.75%
	high=4	95	5.88%
	very high=5	29	1.79%
Social status level	very low=1	231	14.29%
	low=2	401	24.81%
	medium=3	819	50.68%
	high=4	121	7.49%
	very high=5	44	2.72%
Rating of satisfaction with life	very low=1	68	4.21%
	low=2	178	11.01%
	medium=3	624	38.61%
	high=4	514	31.81%
	very high=5	232	14.36%
Rating of confidence in the future	very low=1	13	0.80%
	low=2	48	2.97%
	medium=3	349	21.60%
	high=4	587	36.32%
	very high=5	619	38.30%
Frequency of depression	seldom=1	643	39.79%
	sometimes=2	835	51.67%
	often=3	99	6.13%
	always=4	39	2.41%
Frequency of strenuousness	seldom=1	856	52.97%
	sometimes=2	658	40.72%
	often=3	75	4.64%
	always=4	27	1.67%
Frequency of bad sleep	seldom=1	841	52.04%
	sometimes=2	553	34.22%

	often=3	169	10.46%
	always=4	53	3.28%
Frequency of loneliness	seldom=1	1017	62.93%
	sometimes=2	506	31.31%
	often=3	65	4.02%
	always=4	28	1.73%
Frequency of sadness	seldom=1	856	52.97%
	sometimes=2	693	42.88%
	often=3	51	3.16%
	always=4	16	0.99%
Frequency of desperation	seldom=1	1448	89.60%
	sometimes=2	152	9.41%
	often=3	9	0.56%
	always=4	7	0.43%

3 Analysis and Result

3.1 Dimension of impersonal conditions

Factor Analysis of impersonal conditions

In order to demonstrate effects of two separate dimensions—impersonal conditions and mental status—and the hidden factors accounting for the variables in the model, principle factor analysis with Varimax rotation was conducted. According to the factor analysis results for the impersonal conditions, Kaiser-Meyer-Olkin test of sampling adequacy was 0,66 and the results of the Bartlett's Test of Sphericity were significant (p=0.000) pointing out the adequacy of the sample and the data for conducting factor analysis (df=28, Approx Chi-Square=690.429). Some items were eliminated due to weak relation with dependent variable and low factor loadings (<0.50).

Three factors were revealed which were discretionary time, financial situation, and availability to mobile network. The dimension explained 51 per cent of the total variance. The results of the factor analysis are summarized in Table 3.

Table 3 Factor Analysis for Impersonal Conditions

Prob=0,000	**Factor Standardized Loadings**	**ss Loading**	**% of var. Expl.**	**Cum% of Var. Expl.**
Factor1: Discretionary Time		1,69	0,21	0,21

D1:work week	-0,54			
D2:access to network through computer	0,75			
D3:frequency of using Internet for work	0,7			
D4:frequency of using Internet for entertainment	0,58			
Factor2: Financial Status		1,28	0,16	0,37
F1:annual income	0,69			
F2:monthly phone bill	0,78			
Factor3: Availability to Mobile Network		1,1	0,14	0,51
A1:access to network through mobile devices	0,72			
A2: time online after work	0,67			

Effects of impersonal conditions on annual online payment

To reveal the effects of impersonal conditions on consumers' online shopping payment, multiple regression analysis was conducted. From Table 4, all the impersonal condition factors had an effect on annual online payment. In the linear regression containing only the first degree of variables, all regressors had standardized positive coefficients (0.556, 0.417, 0.227 respectively) and were significant at conventional .05 level, meaning significant positive relation between discretionary time, financial status, and availability to mobile network—three factors depicting impersonal conditions—and annual online shopping payment. R^2 of the model was 0.2875, pointing out that this model explained approximately 29 per cent of the variation in annual online shopping payment.

Furthermore, we added the second degree of variables to demonstrate possible non-linear effects, depending on the relative position of the three regressors. While the positive relations described above remained significant, the second degree of discretionary time had a standardized coefficient 0.77 ($p<0.01$), standing for a little negative effect at the middle, or a U-shape curve, in the relation. Meanwhile, the second degree of financial status presented a standardized coefficient -0.038 ($p<0.001$), suggesting a diminishing marginal return in the positive effect of financial status. However, there was no clear evidence on the effect of the second degree of availability to mobile network ($p=0.42$). According to R^2 of the second model (0.3068), the combination of first degree and second degree of regressors better explained the variation in online shopping payment. The relatively lower AIC (5007.246 to 5045.706) also justified the improvement of regression model.

Depending on the results, hypothesis H1 was partially accepted, and H2 and H3 were totally accepted.

Table 4 Results of Multiple Regression Analysis-1

Dependent variable: **ln(annual online shopping payment)**		
Regressor		
discretionary time	0,556***	0,590***
	(0,030)	(0,301)
financial status	0,417***	0,530***
	(0,029)	(0,034)
availability to mobile network	0,227***	0,236***
	(0,029)	(0,033)
intercept	7,536***	7,490***
	(0,029)	(0,039)
discretionary time^2		0,077**
		(0,025)
financial situation^2		-0,038***
		(0,007)
availability to mobile network^2		0,007
		(0,009)
R^2	0,2875	0,3068
Adjusted R^2	0,2862	0,3043
RSE	1,152 on 1611 DF	1,137 on 1608 DF
F-statistic	216,7 on 3 and 1611 DF	118,6 on 6 and 1608 DF
p-value	<2,2e-16	<2,2e-16
AIC	5045,706	5007,246

Moderating effects on impersonal condition factors

By introducing the interactions terms consisting of different pairs of demographic variables and principle factors, this study discussed the moderating effects of demographic variables to relationships between factors and the dependent variable. Dividing the sample into different groups by demographic variables, the functions of three impersonal condition factors and ln(AOP) for each group were modified accordingly, and thus proving the existence of moderating effects.

To understand more details of interaction, we explored it further by plotting predicted values for the outcome variable ln(AOP) for each representative group. The common practice we used (recommended by Cohen et al., 2003) was to choose groups at the mean and at low (-1 SD from the mean) and high (1 SD from the mean) values of the continuous variable. The results are summarized in Figure1, Figure2 and Figure3.

Moderating effect on discretionary time

Two demographic variables education and gender separated the total sample into six independent groups—male/female with junior high school or lower education degree, male/female with high school to junior college education degree, and male/female with bachelor's degree or higher. The plot was shown in Figure 3, and equations were shown in Table 5.

Figure 3 Plot of Discretionary Time × Education × Gender interaction

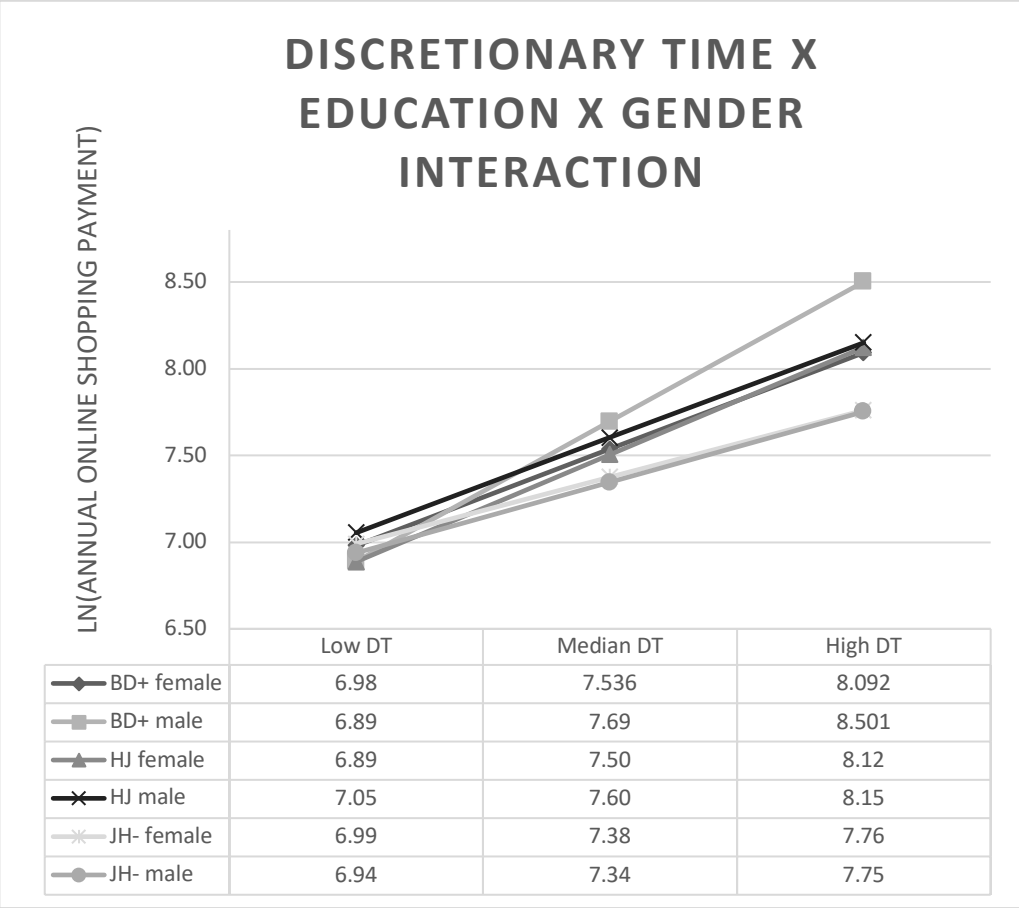


Table 5 Equations for Education x Gender

Education x Gender	Equations
Bachelor's degree or higher female	Y=7,536+0,556DT (0,031) (0,031)
Bachelor's degree or higher male	Y=7,695+0,806DT (0,229) (0,240)
High school to junior college female	Y=7,505+0,618DT (0,070) (0,078)
High school to junior college male	Y=7,602+0,548DT (0,070) (0,073)
Junior high school or lower female	Y=7,375+0,385DT

Junior high school or lower male	(0,069) (0,065) Y=7,345+0,407DT (0,071) (0,065)

All the six groups proved a positive relationship between discretionary time and ln (AOP). However, their performances vary in different respects. First, as was shown in Figure1, performance between groups was similar at a low level of discretionary time, proved by the very close predicted ln(AOP) values between groups (6.98, 6.89, 6.89, 7.05, 6.99 and 6.94 respectively), among which the value of female with bachelor's degree or higher was relatively lower (6.94). Second, people with higher education degree held steeper slope than other groups no matter what the gender. An exclusion was female with bachelor's degree or higher, whose line started at the lowest and had the sharpest slope. It intersected the lines of people with junior high school and lower education at approximately 7.35 in predicted ln(AOP), and the lines of people with high school to junior college degree at about 7.6 in predicted ln(AOP). When discretionary time was at a high level for individuals, female with bachelor's degree or higher degree presented the highest predicted ln (AOP), and gaps between groups grew significantly wider, with range in predicted ln (AOP) extended from 0.16 to 0.75.

The interaction term (discretionary time*education*gender) in this three-dimensional cross analysis was proven to be significantly nonzero (-0.106), indicating strong support for the analysis above.

Moderating effect on financial status

Similarly, demographic variables of gender and marriage status divided the sample into four groups—male/female without fixed spouse and male/female with fixed spouse. The plot was shown in Figure 4, and equations were summarized in Table 6.

Figure 4 Plot of Financial Status × Gender × Marriage interaction

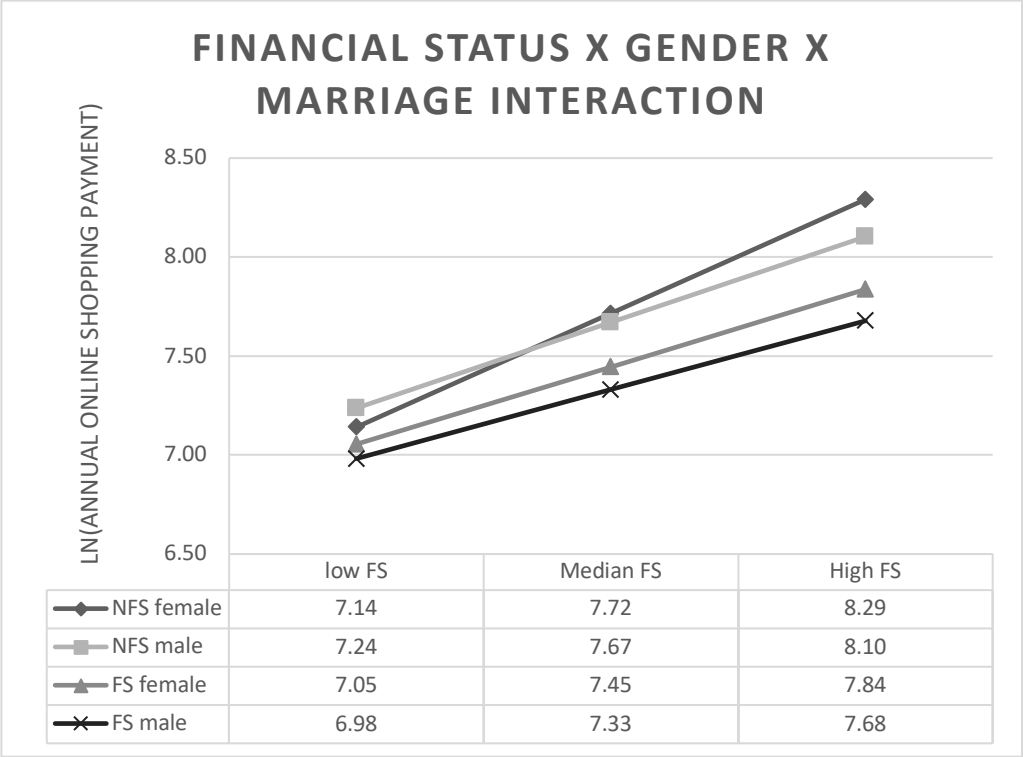


Table 6 Equations for Gender × Marriage

Gender × Marriage	Equations
No fixed spouse female	Y=7,716+0,575FS (0,061) (0,070)
No fixed spouse male	Y=7,670+0,433DT (0,063) (0,065)
Have fixed spouse female	Y=7,446+0,391DT (0,064) (0,072)
Have fixed spouse male	Y=7,330+0,348DT (0,066) (0,055)

Given the positive relation between financial status and the dependent variable (0.575, 0.433, 0.391 and 0.348 respectively), the scope of female with no fixed spouse (0.575) was distinctly steeper than the other three groups (0.433, 0.391 and 0.348). The line of female with no fixed spouse also crossed the line of male with fixed spouse at round to 7.7 in predicted ln(AOP) and reached the highest when her financial status was high. The other three groups were rather homogeneous in slope, and only different in intercept, showing various endowment. It was fair to say that people without fixed spouse performed greater ln(AOP), and female in either case had a relatively higher ln(AOP).

Statistically, the slope of interaction term (financial status*gender*marriage) was shown significantly nonzero, at -0.127.

Moderating effect on availability to mobile network

Another interested pair of demographic variables was residency and gender. In accordance to H3, four different groups showed positive relations between availability to mobile network and ln(AOP). The plot was shown in Figure 5, and equations were summarized in Table 7.

Figure 5 Plot of Availability to Mobile Network × Residency × Gender interaction

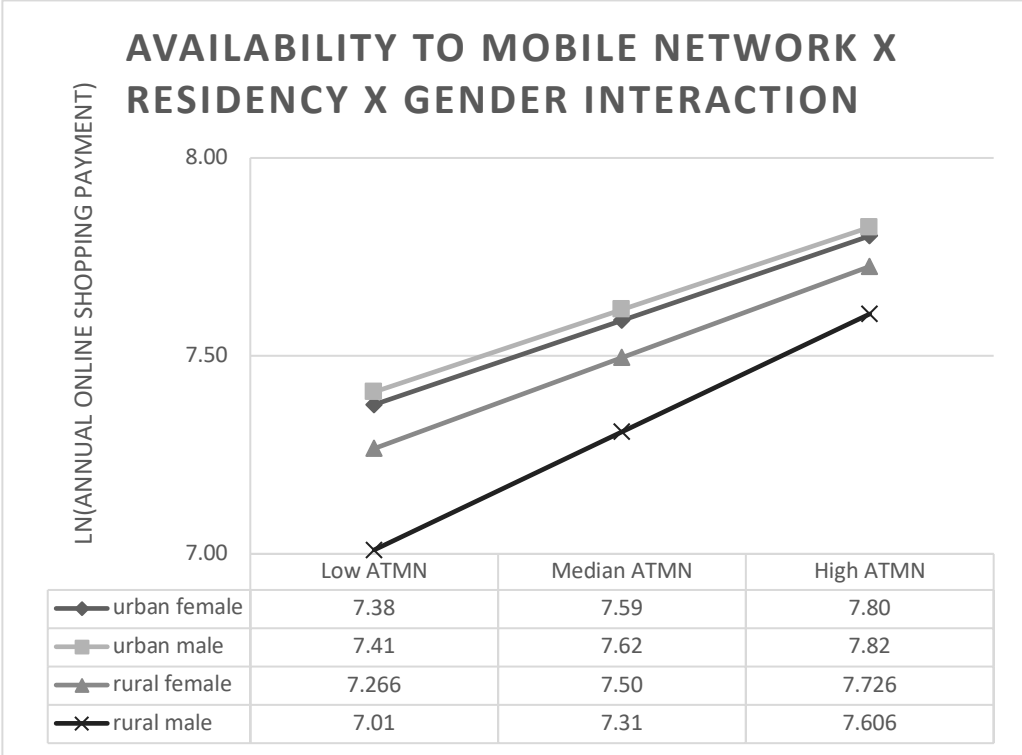


Table 7 Equations for Residency × Gender

Residency × Gender	Equations
Urban female	Y=7,590+0,213FS (0,058) (0,063)
Urban male	Y=7,617+0,208FS (0,060) (0,055)
Rural female	Y=7,496+0,230FS (0,079) (0,077)
Rural male	Y=7,308+0,298FS (0,079) (0,085)

A dissimilar group in Figure 3 was identified to be rural male, who, given a low level of availability to mobile network, had the lowest predicted ln(AOP) (7.01), and then had a sharper increasing, with a slope of 0.298, than other three groups as availability to mobile network grew higher. Meanwhile, given any level of availability to mobile

network, the relative rank in predicted ln(AOP) remained the same: urban male ranked the first, urban female and rural female followed as second and third, and rural male held the lowest.

By testing the slope of interaction term (-0.103 for availability to mobile network*residency*gender), the validity of this analysis was confirmed.

Based on analysis above, H6, H7, and H8 are certainly supported.

3.2 Dimension of mental states

Factor Analysis of mental states

Using principle factor analysis with Varimax rotation, we also revealed 2 hidden factors accounting for the 8 variables in the dimension of mental states.

In this factor analysis model, variables were all strongly related to the hidden factors with factor loadings above 0.50. R output of the Exploratory Factor Analysis extracted two factors exhibiting a Kaiser-Meyer-Olkin of 0.77 and a significant Bartlett's Test of Sphericity (p=0,000), pointing out the adequacy of the sample and the data for conducting factor analysis (df=45, Approx. Chi-Square=3313,035). The two factors revealed were negative emotions and self-confidence. They explained 68 per cent of the total variance.

Due to the use of questionnaires in measuring mental states, reliability test was conducted to ensure that results were reliable. Cronbach's alpha was calculated for each latent construct and all the resulting alpha values were higher than 0.65. Considering the fact that less than 6 variables were in each construct, we concluded that there was a fair internal consistency among the items. Further, CR values were calculated to enhance the conclusion and they were higher than 0.60. More details of this factor analysis model were summarized in Table 8.

Table 8 Factor Analysis for Impersonal Conditions

Prob<4.8e-252	**Factor Standardized Loadings**	**ss Loading**	**% of var. Expl.**	**Cum% of Var. Expl.**	**CR-Value**	**Cronbach's Alpha**
Factor1: Negative Emotions		2,75	0,28	0,28	0,75	0,74
N1:frequency of sadness	0,76					
N2:frequency of depression	0,71					
N3:frequency of strenuousness	0,70					
N4:frequency of loneliness	0,67					

N5:frequency of desperation	0,58					
N6:frequency of bad sleep	0,53					
Factor2: Self-confidence		2,05	0,20	0,48	0,68	0,68
S1:self-evaluated income level	0,75					
S2:self-evaluated social level	0,81					
S3:satisfaction with life	0,72					
S4:confidence in the future	0,52					

Effects of different mental states on annual online payment

Again, multiple regression analysis was conducted to demonstrate the effects of different mental states on consumers' online shopping payment.

As summarized in the left column of Table 9, all the mental state factors' effects on annual online payment were significant. Detailly, in linear regression with only one degree of variables, two regressors had standardized positive coefficients (0,063, 0.090 respectively) and were significant at conventional .05 level, indicating the significant positive relations between the two factors measuring mental states—the degree of negative emotions and self-confidence—and our dependent variable, annual online shopping payment.

R^2 of this linear model was 0.09264, showing that this model explained approximately 9.3 per cent of the variation in annual online shopping payment.
To further explore, second degree of variables were added into the model to reveal the possible non-linear effects. While the first-degree relations described above remained positive and significant, the second degree of negative emotions had a negative coefficient of -0.054 ($p<0.01$), standing for a slight negative effect at the middle, or a U-shape curve, in its relation with the dependent variable. However, there was no clear evidence on the effect of the second-degree of self-confidence ($p=0.46$). The latter regression model involving second-degree items proved to be an improvement of the first regression model, with an R^2 of 0.0976, higher than that of the former model (0.0926). Also, the relatively lower AIC (5408,119 to 5412,921) justified the improvement.
Depending on the results, hypothesis H4 was partially supported, and hypothesis H5 was totally supported.

Table 9 Results of Multiple Regression Analysis-2

Dependent variable:
ln(annual online shopping payment)
Regressor

Negative Emotions	0,063*	0,124***
	(0,032)	(0,038)
Self-confidence	0,090**	0,083***
	(0,032)	(0,032)
Intercept	7,241***	7,307***
	(0,085)	(0,089)
Negative Emotions^2		-0,054**
		(0,025)
Self-confidence^2		-0,016
		(0,021)
R^2	0,0926	0,0976
Adjusted R^2	0,0881	0,09194
RSE	1,29 on 1605 DF	1,287 on 1603 DF
F-statistic	20,48 on 8 and 1605 DF	17,33 on 10 and 1603 DF
p-value	<2,2e-16	<2,2e-16
AIC	5412,921	5408,119

Moderating effects on mental state factors

In this part, we conducted a hierarchical regression analysis, indicating that marital status moderated the link between negative emotions and ln(AOP). To test hypotheses H9. Table 10 presented the results of the hierarchical regression analysis.

Table 10 Hierarchical Multiple Regression Predicting Annual Online payment

Model	Source of variation	Estimate	Std. Error	t-value	p-value	VIF	R^2
Function1: $Y=b_0+b_1NE+b_2MS+b_3MS*NE+\varepsilon$	intercept	7,711	0,049	157,159	<2E-16***		0,016
	marital status	-0,313	0,067	-4,669	3,27E-06***	2,3	
	negative emotions	0,114	0,051	2,255	0,0243*	1	
	marital status × negative emotions	-0,144	0,067	-2,134	0,033*	2,3	
Function2: $Y=b_0+b_1NE+b_2MS+\varepsilon$	intercept	7,708	0,049	156,990	<2E-16***		0,014
	marital status	-0,312	0,067	-4,649	3,6E-06***	1	
	negative emotions	0,033	0,033	0,986	0,324	1	

As shown, the marital status and negative emotions interaction term was significant (p=0.033). Therefore, H9 was supported. Change in R^2 associated with involvement of this interaction term was .002. In other words, the interaction between negative emotions and marital status explained an additional 0.2 per cent of the variance in ln(AOP), above the 1.4 per cent explained by the first-order effects of negative emotions and marital status alone.

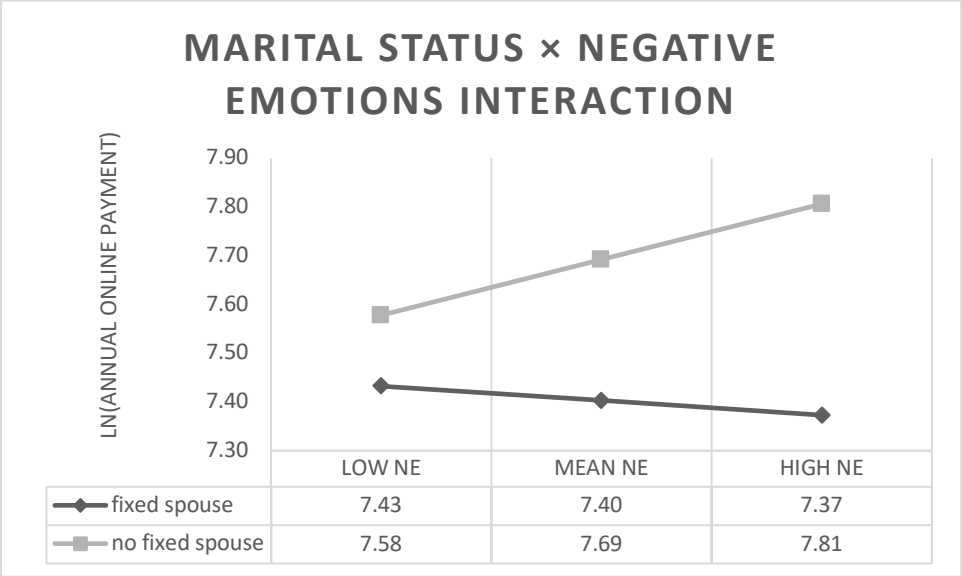
Considering the distinct values of people with different marital status, we extracted two functions for the two groups—people with fixed spouse and people without. The details of the two functions were shown in Table 11 below.

Table 11 Linear Regression Functions

Marital status	Equations
Fixed spouse	Ln (AOP)=7,398-0,070*NE+ε
No fixed spouse	Ln (AOP)=7,711+0,051*NE+ε

To further demonstrate the moderating effect, again, we chose three groups at the mean and at low (-1 SD from the mean) and high (1 SD from the mean) values of the continuous variable, negative emotions. Then the predicted ln (AOP) values for people with different marital status were respectively calculated according to functions listed in Table 11. In view of the calculations above, we plotted the predicted outcome variable for each representative group. The results were shown in Figure 6, which was also called simple slope plot.

Figure 6 Plot of Marital Status × Negative Emotions interaction



With the marital status set as a dummy and people without fixed spouse coded as 0, the regression coefficient for NE (0.051) represented the relation between degree of NE and ln(AOP) for people without fixed spouse. While, the regression coefficient for NE plus the coefficient for the interaction term MS×NE (-0.070) was the relation between NE and ln(AOP) for people with fixed spouse. Also, we found that the relation mentioned above was positive (0.051) in people without fixed spouse. However, the relation turned negative (-0.070) in people with fixed spouse under the strong moderating effects of marriage status. Because of the different signs of the coefficients of NE and that of MS×NE, we called it interference interaction. According to the slopes,

for people without fixed spouse, the more they were in a negative mood, they tended to purchase more online. On the opposite, for people with fixed spouse, higher degree of negative emotions could only lead to less online buying.

After analysis of simple slopes, the difference between the intercepts could be the next focus. In the group of people without fixed spouse, the intercept was much higher than that of the group of people with fixed spouse, standing for a difference in endowment. We could further make the conclusion that for people without fixed spouse, though having the same degree of negative emotions, tended to have more online payment.

4 Key findings

Discussion and implication

We explore several possible personal gradients in online purchases in china based on CFPS 2016, which is acknowledged as nationally representative data. We have a number of findings in this area. To summarize our results, Table 12 is listed below.

Table 12 Hypotheses Summarization

Hypothesis	Result
H1	Partially Supported
H2	Supported
H3	Supported
H4	Partially Supported
H5	Supported
H6	Supported
H7	Supported
H8	Supported
H9	Supported

Above all, we find that both impersonal conditions and mental states have significant effects on online purchases. Detailedly, the impersonal conditions are people's objective status and are depicted in three dimensions—discretionary time, financial status and availability to mobile network. Each of the three dimensions is measured by several independent variables that were directly assessed in the CPFS questionnaire by EFA. Similarly, mental states are related to people's self-concepts and general subjective attitudes, consisting of two dimensions, negative emotions and self-confidence. Those two dimensions are also gained by EFA using the direct items from the CFPS questionnaire.

For impersonal conditions, we notice that there is a significant positive relationship between discretionary time and ln(AOP) generally. The result reflect the fact that

people would have more time for online shopping when given more free time, though this effect may be partly offset by the possibility of simply going to a physical store.

While this is primarily true for all, high education status moderates people's online shopping behaviors to a higher level, since educated people are prone to embrace the technology trend and may not have enough time for physical stores. Differentiations between genders are not evident except for highly educated people. Women with bachelor's degree are more inclined to consume online than their male counterpart, given more discretionary time. With all the evidence, retailers who target at customers with higher than average education level, especially women, should take advantage of online sales.

In accordance with existing research, the effect of financial abundance shapes as a U curve. People with less money have lower online shopping payment, and online consumption increases as the whole income and consumption increase. However, after reaching a vertex, people's online shopping payment goes downhill as their financial status keep improving. This represents a consumption shift in wealthy class for better experience, service and customized goods. Moreover, female show higher interest in online shopping than men no matter they have fixed spouse or not. Single people, especially women, tend to have more enthusiasm in online shopping, which may come from more leisure time and unchained attention for other things. So we suggest high-end retailers take online market cautiously—from the perspective of both attracting new customers and keeping old patron stick to brand—and encourage e-merchants to focus on various mass market.

Availability to mobile network is definitely an important part in people's online consumption. In regard of not only mobile devices like cellphone, but also time for people to use these smart devices, the more convenient it is for online shopping, the more the payment will be. But given the same level of availability, urban people still shop online more than rural residency. We think of it as a manifestion of long-time habit, and also the openness to technical way of shopping. Although effects of gender differ at rural area, there is little to concern about in urban cities. Therefore, e-marketers who focus more on urban demand regardless of gender have a better chance to boost sales.

For mental states, negative emotions and ln(AOP) have a generally concaved relationship. When people are in a relatively low level of negative mood, an increase in the degree of negative emotions leads to more online buying. There may be a simple mechanism behind this – when an individual feels lonely and upset, chances are that his or her self-esteem is challenged or damaged due to various kinds of pressure. Since buying online is such a convenient way to create a safe zone for everyone to make his or her decision without being interfered, people in negative mood are likely to rely on

online purchasing to recover from frustration and regain self-fulfillment. This theory was proved by professor Nathan C. Pettit from Cornell University (2010). However, when people's negative emotions exceed a certain level, they are more of being buried in depression and thus losing the desire to carry on any activities including online buying. Unfortunately, this mechanism hasn't been proved and awaits further exploration.

The interaction term of marital status and negative emotions describes the different effects of negative emotions on annual online payment of two groups. People with fixed spouse, when under pressure, can turn to family for comfort or companion, and thus relying less on buying online to recover from negative emotions and retain calm. In the meantime, people in family are prone to buy more daily essentials, which render them to be more cautious and rational rather than be driven by negative emotions and make temperamental purchasing decisions. After all, these processes, combined together, lead negative emotions to an evident negative effect on annual online payment.

Self-confidence positively affects people's annual online payment. This psychological variable is highly related to people's self-evaluated income and social status. These mindsets make people feel confident about their ability to earn money and boost their willingness to purchase. Also, with self-confidence being enhanced, people tend not to be frustrated from cyber frauds and may increases online payment instead.

Limitations and scope for future research

Based on results of the CFPS questionnaire conducted in 2016, this study discusses individual factors and their influence on people's online payment. The framework used in this study can also serve as the basis of further research with a better understanding and sorting technique of the impersonal elements, mental state variables and demographic factors. However, Our study suffers from several limitations.

This research pertains to online shopping behaviors of people randomly selected nationwide in China. However, due to calculation of taking natural logarithm of annual online shopping payment to enable this dependent variable to reach a normal distribution, the sample selected in this research are a group of people who at least pay online to a certain extent (with a no zero annual online payment). Therefore, they are naturally younger, having more Internet access, more technologically savvy and don't have objection to online shopping. In other words, this research doesn't include people who have some exposure to but are not participating in online shopping, thus limiting the sample diversity and influencing the coefficient of determination in impersonal variables dimension.

Also, for mental state variables, this study covers 2 limited factors (self-confidence and negative emotions) with 12 different variables, leaving other influential mental

determinants of people's online buying behaviors out of account. Therefore, the coefficient of determination of mental states variables are inevitably lower. Furthermore, the limited number of variables partly lead to a relatively low value of Cronbach's alpha. Ideally, we shall change the numbers of independent variables for a higher Cronbach's alpha which means all the independent variables can be reasonably compressed into those two different RCs. However, we have to face the limits caused by the chosen database because CFPS only has those items and we finally leave out some RCs in mental states' part whose Cronbach's alphas are relatively lower, such as degree of openness.

Finally, apart from the chosen variables depicting consumers' objective conditions, Web experience is also an important part in the function process. Unfortunately, however, no data that could combine all the personal characteristic variables and their online buying interactions are available. In this respect, further research can take more variables, like Web design, into account, by which a comprehensive theory on online buying behavior will be developed.

5 Conclusion

The Internet-based commerce in China has been booming so far. Our research made an attempt to find out predictors that influence online payment. The review of literature gave insights into some factors that were proved to have an influence on people's online buying behaviors and guided us to divide factors into three dimensions—impersonal conditions, mental states and demographic variables. Using R, the research analyzed results of samples from CFPS to understand the constructs influencing online payment.

The Exploratory Factor Analysis was used respectively in dimensions of impersonal conditions and mental states. The EFA concluded in 5 factors, namely discretionary time, financial status, availability to mobile network, negative emotions and self-confidence as the determinants of shoppers' online buying behaviors. Afterwards, moderating effects of demographic variables were explored. By conducting double and triple cross analysis, gender, residency, education and marital status were concluded to moderate the effects of those variables mentioned above on annual online payment. Both analyses concerning general people and specific interested groups shed great light on traits and inclinations of online shoppers. Besides, online retailers can reconsider their target consumer groups and promote strategies accordingly.

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