上海交通大学

硕士学位论文

STUDYING THE ROLES OF E-SATISFACTION AND E-TRUST ON E-LOYALTY DEVELOPMENT:

—— CHINESE YOUNG FEMALE ONLINE SHOPPERS IN SHANGHAI ON COSMETIC MARKET

Name: xxxxxxxxxxxxxxxxxxx
Student No.: 1141xxxxxxxxxx
School: Antai College of Economics and Management
Major: Business Administration(International Business)
Research interest: E-COMMERCE
Advisor: PROF. xxxxxxxxxxxx

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3.5.2 Confirmatory factor analysis (CFA)

When the desirable number of factors are extracted with an appropriate value of Cronbach, the KMO and Bartlett spherical test, the confirmatory factor analysis is ready to be conducted. Based on the extracted factors, a draft model should be created and conducted to see the values of an output.

Next, invariance test (a) and common method bias (b) test should be processed in order to refine the model. For invariance test, several groups of respondents by demographic information, such as age and gender, should be divided and conducted for the data of regression weight and critical ratio differences between each group. If *p-value* of such data for each factor is not significantly different from groups, then the model should be appropriate. This can be supported by Steenkamp and Baumgartner (1998), stating that latent means, correlations across groups, the factor loadings and intercepts should be equal to each other across groups. As a next step, common method bias test should be conducted because the data are reported individually and collected through the same questions; therefore, common method variance can be attributed to the measurement method rather than the constructs of interest, causing systematic measurement error and bias the relationship between each theoretical level of factors (Philip, Podsakoff and Lee, 2003).

a) Invariance test: comparison of critical ratio differences for different groups *p-value* for each factor should not be significantly different from groups
b) Common method bias: after constructing the latent value connected to each measured items, the factor loadings should be higher than 0.4

As a final step before constructing the models, I assessed convergent validity by means of: (a) Factor Loadings, which are given as regression weights in the AMOS; (b) reliability, (c) Construct Reliability (CR) and (d)Average Variance Extracted (AVE). Regarding to factor loadings, it is necessary that standardized regression weights obtained through the AMOS should be 0.7 or higher idyllically and should be statistically significant Hair, Anderson, Tatham and Black (2006); however, it also states that the value of standardized regression weights, equal to 0.5 or higher, is also fine for the model. Besides factor loadings, reliability implies whether a set of indicators in the model are consistent in their measurement or not. In order to check the reliability, Cronbach (1951) states it is

expected to use the Cronbach's alpha (α) and researchers generally believes that values above 0.7 represent that the model is internally consistent. In addition to this, Nunnally (1978) also states that values above 0.6 can be accepted; however, if the model's reliability is less than 0.5, it is hard to justify that the model is internally consistent because more than 50% of its variance would be errors. Then, Construct Reliability (CR) should be calculated to see whether the model has reliability that satisfies internal consistency. Fornell and Bookstein (1982) suggests that a value of 0.7 is ideally high enough to prove that the model has internal consistency; however, they also state that a value of 0.6 is also good enough. Lastly, Average Variance Extracted (AVE) should be estimated to check whether the model suggests adequate convergence and the value has distinct validity. Hair, Anderson, Tatham and Black (2006) states that a value of 0.5 or higher should be good enough to prove that the model has adequate convergence and shows that its values have high distinct validity.

a) Factor Loadings (Standardized regression weights in the AMOS)
   - Standardized regression weights should be 0.7 or higher
b) Reliability (Cronbach's alpha,α)
   - Values should be above 0.7 to represent that the model is internally consistent
c) Construct Reliability (CR)
   - Values should be above 0.7 or at least 0.6 to prove that the model has internal consistency
d) Average Variance Extracted (AVE)
   - Value should be 0.5 or higher to prove that the model has adequate convergence and shows that its values have high distinct validity

Next step is to build structural models after conducting (a) linearity test and (b) multicollinearity test to see two or more predictor variables are correlated to predict another variable with a high degree of accuracy. For linearity test, if the R squared value(γ^2) and F-test between independent and dependent variables are strong enough with a significant value less than 0.05 (*P-value* < 0.05), then the structural model is good enough to indicate that the proportion of variance in the dependent variable accounted for by the set of independent variables in the multiple regression equation (University of Texas, 2012). F-value For multicollinearity test, if the value of VIF between independent and dependent variables should be less than 3 with a significant value of 0.05 or less (*P-value* < 0.05),then the model

and data are good to build the research model (Arbuckle, 1997).

a) Linearity test: P-value for the R squared value(r^2) and F-test should be less than 0.05 (*P-value* < 0.05).
b) Mulitcollinearity test: Value of VIF should be less than 3 with *P-value* < 0.05

Finally, SEM model can be created based on the result of previous steps in order to see the relationship between extracted factors. As a final step, the R squared value,(r^2) between each factor can be evaluated whether there is a positive or negative relationship between them. To see whether the model is appropriate or not, there are several outputs to check as follows:

1) The value of RMSEA should be less 0.01
2) The value of GFI and CFI should be more than 0.09 and 0.95
3) Chi-value ($\chi 2/df$) should be less than 5
4) P-value should reach a 0.05 significance level (*P-value* ≤ 0.05)

IV. Result Discussion

4.1 Respondents' information

A total of 308 subjects participated in the survey questionnaire and 59 data were removed throughout data screening process, due to incomplete response, extreme outliers and non-targeting subjects, resulting in 249 as a sample size. The descriptive data for respondents are listed in Appendix 2.

4.2 Reliability and validity

In this study, there are 30 measured variables (survey questionnaires): 3 for delivery time, 5 for web design, 5 for online privacy, 5 for online security, 4 for E-satisfaction, 4 for E-trust and 4 for E-loyalty. Here after, each measured value will be described as below.