

# The Impact of Recommendation Sources on Online Purchase Intentions: The Moderating Effects of Gender and Perceived Risk

Chiao-Chen Chang, and Yang-Chieh Chin

**Abstract**—This study examines the issue of recommendation sources from the perspectives of gender and consumers' perceived risk, and validates a model for the antecedents of consumer online purchases. The method of obtaining quantitative data was that of the instrument of a survey questionnaire. Data were collected via questionnaires from 396 undergraduate students aged 18-24, and a multiple regression analysis was conducted to identify causal relationships. Empirical findings established the link between recommendation sources (word-of-mouth, advertising, and recommendation systems) and the likelihood of making online purchases and demonstrated the role of gender and perceived risk as moderators in this context. The results showed that the effects of word-of-mouth on online purchase intentions were stronger than those of advertising and recommendation systems. In addition, female consumers have less experience with online purchases, so they may be more likely than males to refer to recommendations during the decision-making process. The findings of the study will help marketers to address the recommendation factor which influences consumers' intention to purchase and to improve firm performances to meet consumer needs.

**Keywords**—Recommendation sources, Online purchase intentions, Gender differences, Perceived risk.

## I. INTRODUCTION

IN a computer-media environment, consumers' online purchase intention is influenced by various recommendation sources as a way to gain the confidence and reduce perceived risks typically associated with cognitively demanding tasks. More effective recommendations will lead to the greater motivation to purchase a product or service online. Following past literature [1], information sources include: (1) consumer-dominated sources (e.g., friends, acquaintances), also called word-of-mouth (WOM), which refer to interpersonal informational channels over which the marketer has little control, (2) marketer-dominated sources (e.g. advertising), which were controlled by the marketer, and (3) neutral sources (e.g. recommendation systems), which are not controlled by the consumer or by the market. All of these recommendation sources affect consumers' willingness to

purchase individually or simultaneously [2]-[3]. Thus, consumers can consult WOM, advertisements and ratings from the recommendation systems before making an online purchase.

Previous studies pertaining to the feeling and the efficacy of communicating on the Internet have confirmed the effect of gender differences on Internet usage [4]-[5]. Female consumers are more likely than male consumers to perceived risk over online purchases [6]. Furthermore, the interactions of gender and perceived risk have found significant effects on the consumer decisions [7], this study attempts to fill the void in the literature by proposing a general conceptual framework with which to articulate how various recommendation sources influence consumer's online product choices and are moderated by gender and perception of risk.

## II. THEORETICAL BACKGROUND AND HYPOTHESES

Past research has pointed out that WOM, advertising, and recommendation systems provide vital information about a firm to consumers, which information often helps consumers decide whether to patronize a firm [8]-[10]. That is, positive WOM, effective advertising, and active recommendation systems will increase intentions to purchase online:

H1. Positive WOM is positively related to intentions to purchase online.

H2. Effective advertising will have a significantly positive causal relationship to intentions to purchase online.

H3. Active recommendation systems will have a significantly positive causal relationship to intention to purchase online.

In addition, female consumers' risk perception toward online purchases tends to be greater than that of male consumers [4], [11], thus we hypothesized that:

H4. The interaction of gender and perceived risk will positively affect the relationship between (1) WOM (2) advertising (3) recommendation systems and online purchase intentions. Specifically, the effect of (1) WOM (2) advertising (3) recommendation systems on online purchase intentions will be greater in female consumers who perceive higher risks in purchasing.

## III. MATERIALS AND METHODS

### A. Research Design and Procedures

We designed a scenario about buying a 10-inch

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mini-notebook online to query the participants' evaluation of the three recommendation sources (WOM, advertising and recommendation systems). We chose a mini-notebook because they are popular as an essential mobile accessory (worldwide mini-notebook shipments are forecast to total 21 million units in 2009, up from 2008 shipments of 11.7 million units [12].

### B. Data Collection

A convenience sample of university students ( $N = 396$ ) was recruited. The students were asked to navigate to buy.yahoo.com.tw, inquire about mini-notebooks, and go through the procedure of purchasing the mini-notebook without actually submitting the purchase transaction. Yahoo.com is among the most widely used e-commerce sites on the Web in Taiwan (Institute for Information Industry, Taiwan). Then research assistants briefed participants about the survey to ensure each questionnaire was completed fully. Of the respondents, just over half of the sample (54%) was female, the age range was 18-24 years, and all used the Web on a regular basis for both entertainment and research.

### C. Questionnaire Design and Measures

In order to ensure measurement reliability in the operationalization of the constructs, we used items that had been validated in prior studies; the study measures all constructs through multi-item scales adapted from the literature. The instruments for measuring perceived risk and intention to purchase online showed satisfactory internal consistency (all Cronbach's alphas  $> 0.70$ ).

The development of the recommendation sources was based on measures reported in prior research [13], [14]. The sources the participants typically consulted for recommendations were WOM (reviews by family, friends and colleagues), advertising, and recommendation systems. The degree of influence of each source on product choices was measured on a five-point Likert-type scale, where 1 = not very important and 5 = very important.

In the survey, the subjects evaluated the product based on their perceived risk. Based on the measurement method of past research [15], a list of five risk components was used to measure the degree of perceived risk when purchasing a mini-notebook online: performance, financial, time, social and privacy risks. Thus, the perceived risk construct was measured by five items on a 5-point Likert-type scale, ranging from 1 (not very important) to 5 (very important). Responses were averaged to create an index of perceived risk ( $= 0.90$ ). High Cronbach's alpha coefficients showed that the measures had a good level of internal reliability [16].

The online purchase intention construct was adapted with slight modification from past research [17] to fit the current context. The online purchase intention construct was also measured on a five-point Likert-type scale, with anchors ranging from strongly disagree (1) to strongly agree (5). The higher scores represented higher intention to purchase online. The average score of respondents was calculated, and the internal reliability of the scale, assessed by Cronbach's alpha,

was .87 for this study.

## IV. RESULTS

The moderators of gender and perceived risk on the online purchase intention were conducted in a multiple regression analysis, indicating that the explanatory power of the model may be considered satisfactory ( $= 0.83$ ) and that the model fits the data and is appropriate to test the hypotheses (Table 1). Equation (1) was applied to test the hypotheses

$$Y = \beta_0 + \beta_1 R_1 + \beta_2 R_2 + \beta_3 R_3 + \beta_4 GPR_1 + \beta_5 GPR_2 + \beta_6 GPR_3 + e \quad (1)$$

where  $Y$  is the online purchase intentions,  $R_1$  is the WOM,  $R_2$  is the advertising,  $R_3$  is the recommendation system,  $G$  is the gender,  $P$  is the perceived risk,  $GPR_1$ ,  $GPR_2$ ,  $GPR_3$  are the interaction terms, and  $e$  is the error term. The measure for gender is dummy-coded as 1 = female and 0 = male. Data for other constructs were rated on a 5-point Likert-type scale ranging from 1 to 5.

TABLE I  
REGRESSION ANALYSIS: RECOMMENDATION SOURCES AND  
ONLINE PURCHASE INTENTIONS: THE MODERATING EFFECTS OF  
GENDER AND PERCEIVED RISK

Independent variable	Coefficient	Dependent variable Purchase intention	
		$\beta$	$p$ Value
Intercept	$\beta_0$	0.31	0.000***
WOM	$\beta_1$	0.37	0.000***
Advertising	$\beta_2$	0.23	0.000***
Recommendation systems	$\beta_3$	0.24	0.000***
WOM * Gender * Perceived risk	$\beta_4$	0.69	0.000***
Advertising * Gender * Perceived risk	$\beta_5$	0.45	0.023*
Recommendation systems * Gender *	$\beta_6$	0.32	0.043*
Perceived risk			
F-value		4273.85	0.000***
$R^2$			0.83
Adjusted- $R^2$			0.81

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

The regression results showed that the significant coefficients of  $\beta_1$ ,  $\beta_2$  and  $\beta_3$  supported the hypothesized influence of WOM, advertising and recommendation systems on online purchase intentions, supporting H1, H2 and H3. The effects of WOM ( $\beta = 0.37$ ,  $p < 0.001$ ) on online purchase intentions were stronger than those of advertising ( $\beta = 0.23$ ,  $p < 0.001$ ) and recommendation systems ( $\beta = 0.24$ ,  $p < 0.001$ ).

Then we tested the hypothesized gender differences in terms of the influence of recommendation sources on the intent to purchase online. To this end, we looked for the interaction terms of recommendation sources, gender and perceived risk on online purchases. The positive coefficient for  $\beta_4$ ,  $\beta_5$  and  $\beta_6$  showed that the relationship between recommendation sources and online purchase intentions will be robust by gender

and perceived risk, supporting H4. The interaction effects are robust the positive relationship between recommendation sources and online purchase intentions.

## V. CONCLUSION

Our results showed that various recommendation sources affect the intent to purchase online differently. A positive recommendation by WOM leads to a stronger increase in willingness to purchase online than do advertising and recommendation systems. Recognizing the significant value of consumer product reviews as a source of information and an avenue to trusting a web site, marketers enable and encourage consumers to post product reviews and opinions on their e-retail sites [18]-[19]. In other words, consumer reviews play an important role in online purchases. This result is congruent with the theory of reasoned action [20]-[21] and the theory of planned behavior [22], which proposed the construct of subjective norms and explained human intentions and behaviors as a result of the subjective evaluation of events that occur in the environment.

In addition, gender and perceived risk play important roles while the interaction of gender and perceived risk simultaneously moderates the relationship between recommendation sources and the intention to purchase online. Our findings were that men and women differ in their perceptions of the risks associated with shopping online if they receive a recommendation from WOM, if they see advertising and or if they use recommendation systems. One reason could be that men and women perceive, handle and relate to new technologies differently [23], so the effects of recommendation sources on the intention to purchase online are manifest differently. These results are in accord with past research [7], which found that, even when controlling for differences in Internet usage, women perceive a higher level of risk in online purchasing than do men. It is possible that the interaction of gender and perceived risk is significant and can be extended to other consumer behavior contexts. Gender differences are similar to the findings of prior research in technology-based environments, which has demonstrated that national/ethnic and gender differences simultaneously influence perceptions and behaviors [24]. Thus, cross-cultural differences may be found significant in terms of how recommendation sources affect online purchases.

Based on our findings, a first implication for marketing is that recommendations directly affect consumers' choices. The effect of WOM on intentions to purchase online is greater than that of other kinds of recommendations (advertising and recommendation systems). For online marketers, consumer reviews and feedback are extremely important; the consumer's decision will depend on the recommendation from family, friends, colleagues, and other consumers, especially when purchasing online goods and services. Furthermore, online marketers should take into account their need for reduction in risk perception by encouraging customers to share their purchasing experience with others; they can even give a

discount coupon or gift to a recommender, although care must be taken not to "buy" good reviews, as credibility of reviews is essential. Online marketers must also be aware of what kind of advertising and media (television ads, radio ads, print ads, and website ads) can be most effective in increasing consumer's acceptance of online purchases.

The second implication is that how to motivate female consumers to purchase online is also an important issue for online marketers. In general, female consumers have less experience with online purchases<sup>5</sup> and have more online risks toward online shopping such as credit card misuse [7], so they may be more likely than males to refer to recommendations during the decision-making process. With the help of business intelligence, online marketers hold amounts of their customers' transaction data. It is beneficial for online marketers to consider setting up a demographic-based recommendation system that uses demographic data, including gender, to recommend a suitable product for the client. In addition, online marketers who provide female products may consider enhancing their online storefronts via allowing greater interactivity, ability to rotate pictures and view three dimensional images, as well as other mechanisms to enhance female consumers' comfort level in terms of risk issues.

## REFERENCES

- [1] D. F. Cox, *Risk handling in consumer behavior – An intensive study of two cases*. In Cox DF, ed. *Risk taking and information handling in consumer behavior*. Boston, MA: Harvard University Press, 1967, pp. 34–81.
- [2] J. G. Maxham III, "Service recovery's influence on consumer satisfaction, positive word-of-mouth, and purchase intentions," *J. Bus. Res.*, vol. 54, pp. 11–24, 2001.
- [3] S. Senecal and J. Nantel, "The influence of online product recommendations on consumers' online choices," *J. Retail.*, vol. 80, pp.159–169, 2004.
- [4] S. H. Akhter, "Digital divide and purchase intention: why demographic psychology matters," *J. Econ. Psy.*, vol. 24, pp. 321–327, 2003.
- [5] S. Janda, "Does gender moderate the effect of online concerns on purchase likelihood?" *J. Int. Com.*, vol. 7, pp. 339–358, 2008.
- [6] P. Schumacher and J. Morahan-Martin, "Gender, Internet and computer attitudes and experiences," *Comp. Hum. Beh.*, vol. 17, pp. 95–110, 2001.
- [7] E. Garbarino and M. Strahilevitz, "Gender differences in the perceived risk of buying online and the effects of receiving a site recommendation," *J. Bus. Res.*, vol. 57, pp. 768–775, 2004.
- [8] C. Borgs, J. T. Chayes, N. Immerlica, K. Jain, O. Etesami and M. Mahdian "Dynamics of bid optimization in online advertisement auctions" in *Proc. 16th Int. Conf. World Wide Web*, Canada, 2007, pp. 531–540.
- [9] H. K. Lundeen, L. C. Harmon and K. M. McKenna-Harmon, "Service recovery in commercial real estate management," *J. Prop. Man.*, vol. 60, pp. 30–32, 1995.
- [10] M. Godse, R. Sonar and A. Jadhav, "A hybrid approach for knowledge-based product recommendation," In Prasad SK, Routray S, Khurana R, Sahni S, eds. *3<sup>rd</sup> Int. Conf. on Information Systems Technology and Management (ICISTM 2009)*, India, 2009, pp. 268–279.
- [11] L. A. Jackson, Y. Zhao, E. A. Witt and H. E. Fitzgerald, A. von Eye and R. Harold, "Self-concept, self-esteem, gender, race, and information technology use," *CyberPsy. & Beh.*, vol.12, pp.437–440, 2009.
- [12] Gartner Research, *Gartner says PC industry will suffer sharpest unit decline in history in 2009*, March, 2009.
- [13] D. F. Duhan, S. D. Johnson, J. B. Wilcox and G. D. Harell, "Influences on consumer use of word-of-mouth recommendation sources," *J. Acad. Mark. Sci.*, vol. 25, 283–295, 1997.
- [14] K. W. King and J. E. Haefner, "An investigation of the external physician search process," *J. Heal. Care Mark.* vol. 8, pp. 4–13, 1988.

- [15] J. Jacoby and L. Kaplan, "The components of perceived risk," *In Venkatesan M, ed. Proceedings from third annual conference*. Chicago, IL: Association for Consumer Research, pp. 382–339, 1972.
- [16] G. A. Churchill Jr., "A paradigm for developing better measures of marketing constructs," *J. Mark.*, vol.16, pp. 64–73, 1979.
- [17] D. B. Whitlark, M. D. Geurts and M. J. Swenson, "New product forecasting with a purchase intention survey," *The J. Bus. Fore. Meth. Sys. Sys.*, vol. 12, pp. 1-18, 1993.
- [18] Y. Bart, V. Shankar, F. Sultan and G. Urban, "Are the drivers and role of online trust the same for all web sites and consumers? A large scale exploratory and empirical study," *J. Mark.*, vol. 69, pp.133–152, 2005.
- [19] D. Mayzlin, "Promotional chat on the Internet," *Mark. Sci.*, vol. 25, pp. 155-164, 2006.
- [20] I. Ajzen and M. Fishbein, *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall, 1980.
- [21] M. Fishbein and I. Ajzen, *Belief, attitude, intention, and behavior: an introduction to theory and research*. Boston, Reading, MA: Addison-Wesley, 1975.
- [22] I. Ajzen, *From intentions to actions: a theory of planned behavior*. In Kuhl J, Beckman J, eds. Action control: from cognition to behavior. Heidelberg, Germany: Springer, 1985, pp. 11–39.
- [23] S. Turkle, *The Second Self: Computers and the Human Spirit*. New York, NY: Simon and Schuster, 1984.
- [24] D. Gefen and D. W. Straub, "Gender differences in the perception and use of e-mail: an extension to the technology acceptance model," *MIS Quar.*, vol. 21, pp.289-400, 1997.

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