

# Differences in the Decision-Making Process Between Sellers Using Yahoo!Kimo Auction Site and Barter Sites

Completed Research

**Pei-Hsuan Hsieh**

National Chengchi University  
hsiehph@nccu.edu.tw

**Teng-Chieh Hu**

National Cheng Kung University  
xnettorick@gmail.com

## ABSTRACT

Prior studies of consumer behavior have focused more on purchasing intention than selling intention. However, sellers do form different values or economic views (utilitarian or hedonic) when selling the same second-hand product on different platforms (auction vs. barter sites). The purpose of this study is to investigate the factors that determined which platform an online seller uses for second-hand products: an auction site or a barter site. Based on the Engel-Kollat-Blackwell (EKB) model, the study used a validated questionnaire to explore several internal and external factors. The factors supporting both the intention and actual behavior of using auction sites are product condition, reference group, word of mouth, and reference price; the factors for using barter sites are personal value and reference group. Functional magnetic resonance imaging (fMRI) technology was used to further observe the influence that different values have on sellers' brain activities and decision-making behaviors regarding site choice.

## Keywords

Consumer behavior, EKB, online auction, barter, fMRI

## INTRODUCTION

Consumer behavior is affected by the external environment, internal personal differences, and different decision-making processes (Davis et al., 1989). Internal factors are psychology, lifestyle, personality, attitude, self-concept, cognition, and perception (Hawkins et al., 2008). Consumers' (buyers') personal values are important internal factors (Martín-Ruiz and Rondán-Cataluña, 2008).

Consumer behavioral intentions and decisions are not only affected by internal individual differences but also by the external environment, e.g., reference group, social class, and family factors (Engel, Kollat and Black, 1968). The values and opinions coming from a cohesive virtual community or reference group will significantly affect an individual's attitude and intentions (Koo, Chung and Nam, 2015; McFerran et al., 2010).

This research includes both external and internal factors. This research also considered utilitarian and hedonic values as a basis for seller and exchanger decision-making

(Ryu, Han and Jang, 2010). Overall, the purpose of this study is to investigate the factors that determined which platform an online seller or exchanger uses for second-hand products: an auction site or a barter site.

## CONSUMER BEHAVIORS

In the field of consumer behavior, many consumer behavior models have been proposed, but the Engel-Kollat-Black (EKB) model (Engel, Kollat and Black, 1968), after a series of modifications, has become more systematic and complete than the others. In the EKB model, consumer behavior is a continuous, rather than intermittent, process. The components of the model include both internal and external factors that constitute the decision-making process.

The EKB model combines many scholars' views of consumer behaviors, so the consumer behavior process can be fully explained. In addition, this model has been modified several times and is considered a more complete consumer behavior model (Hawkins et al., 2008; Lin et al., 2012; Mowen and Minor, 2001). Therefore, this research is based on the EKB model. A pair of research hypotheses was developed with the sellers' behavioral intention and actual behavior in mind (H1):

H1-1: The sellers' intention to choose an online auction site has a positive impact on their actual behavior.

H1-2: The exchangers' intention to choose a barter site has a positive impact on their actual behavior.

## INTERNAL FACTORS

People have different values that influence their behaviors through their attitudes. Personal values are widely recognized as factors of decision-making behaviors and have been studied in depth in the last decade (Durvasula et al., 2011). This research proposes the following pair of hypotheses (H2).

H2-1: Second-hand electronic product sellers' personal values regarding environmental protection have a positive impact on their use of online auction websites.

H2-2: Second-hand electronic product exchangers' personal values of environmental protection have a positive impact on their use of barter sites.

Buyers treat reviews, price, product condition provided by sellers as important references (Melnika, Richardsonb and Tompkinsb, 2011). Regarding the behavioral intention of sellers, they are more likely to place older second-hand products on a barter website and enter newer products in an online auction. Thus, this research proposes the following pair of hypotheses (H3).

H3-1: The second-hand electronic product sellers' perceived product condition has a positive impact on their use of online auction websites.

H3-2: The second-hand electronic product sellers' perceived product condition has a positive impact on their use of barter sites.

The brand affects the consumers' subjective perception such that their cognitive processes become positive (Kotler and Keller, 2006). The brand represents the emotional and functional benefits, the consumer impression, and the internalization that follows. Thus, this research proposes the following pair of hypotheses (H4).

H4-1: The brand image of a seller's second-hand electronic products has a positive impact on their use of online auction websites.

H4-2: The brand image of an exchanger's second-hand electronic products has a positive impact on their use of barter sites.

#### EXTERNAL FACTORS

The literature of marketing management shows that a reference group affects a person's behavior through lifestyle, self-awareness, and attitude (Hawkins et al., 2008). The behaviors of the reference group affect the individual's behavioral intention (Koo, Chung and Nam, 2015). Thus, this research proposes the following pair of hypotheses (H5).

H5-1: The reference group of second-hand electronic product sellers has a positive impact on their use of online auction websites.

H5-2: The reference group of second-hand electronic product exchangers has a positive impact on their use of barter sites.

In marketing, word of mouth means a direct verbal exchange of information between a spreader and a receiver (Stern, 1994). Word of mouth helps consumers understand product features and services, thus significantly affects their attitudes and behavioral intentions (Trusov et al., 2009). Therefore, this research proposes the following pair of hypotheses (H6).

H6-1: Online word of mouth has a positive impact on second-hand electronic product sellers' use of online auction websites.

H6-2: Online word of mouth has a positive impact on second-hand electronic product exchangers' use of barter sites.

Sellers and exchangers can use a reference price to estimate and determine product value (Zhou, 2012). Previous research also found that reference price has a significant effect on consumer behavior (Putler, 1992). Reference price can be categorized as internal or external. The former is the price based on a consumer's accumulative purchase experience. An external reference price is the product price information available through advertising, catalogs, and other media (Mazumdar, Raj and Sinha, 2005). This research proposes the following pair of hypotheses (H7).

H7-1: Reference price has a positive impact on second-hand electronic product sellers' use of online auction websites.

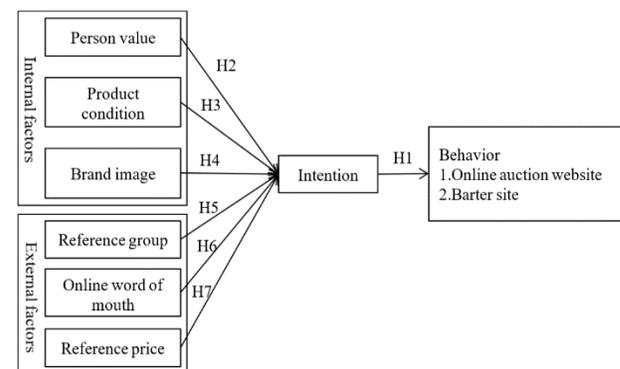
H7-2: Reference price has a positive impact on second-hand electronic product exchangers' use of barter sites.

#### UTILITARIAN VALUE AND HEDONIC VALUE OF BEHAVIORAL DECISION

When consumers are viewing a product, activation of the nucleus accumbens (NAcc) can be used to predict later purchase decisions (Knutson et al., 2007). Even though NAcc and insula activation can predict financial decisions, research has confirmed that they can also guide the decision-making process, while the medial prefrontal cortex (MPFC) is associated with product price (Sanfey et al., 2003). In addition, classic clinical evidence and recent research have pointed out that orbitofrontal cortex (OFC) activation represents reward, decision-making, and all kinds of behaviors that prompt us to decide (Diekhof, Falkai and Gruber, 2011). Wallis (2007) believes that the OFC region, which is located in the upper forehead area, evaluates whether a behavior or a decision (including various decisions in life) can satisfy one's needs.

#### METHODOLOGIES

This research is based on the EKB model and explores the levels of impact of certain factors on sellers/exchanges' intention on selling/exchanging second-hand products on an auction/barter site. The internal and external factors affecting their behaviors are explored. Also, this research uses fMRI to explore consumers' brain activities in specific regions when facing a site choice. Figure 1 contains the research model. Table 1 lists the operational definition of each variable.



**Figure 1. Research Model****Research Participants**

The research invited two groups of research participants to take two different sets of the questionnaires separately. In one group were Yahoo!Kimo auction sellers, and in the other, barter site exchangers. The participants completing the questionnaire and leaving contact information had the opportunity for a merchandise voucher lottery. Ten merchandise vouchers (200NTD/7USD each) were given out based on a lottery drawing. In addition, this research recruited the participants from auction sites entering the fMRI experiment. Each participant received another merchandise voucher (500NTD/17USD) and was invited to participate in a short interview.

**Questionnaire Development**

The questionnaire was designed and developed based on the literature and the hypotheses. It contains two parts. The first part was designed to verify each of the constructs in the proposed research model. A seven-point Likert scale (from “strongly agree” to “strongly disagree”) was adopted to assess the statement in each item and ultimately test the research model. The second part of the questionnaire collects the background information of the research respondents. All questions were validated by three experts in the field of e-commerce and information management. Then, a pilot study was carried out by inviting consumers who have used both auction and barter sites to confirm the ease and the logic of the questions.

**Design of fMRI Experiment**

This research uses fMRI as a tool to explore the brain regions’ activities of sellers/exchangers and further explore their behavioral intentions and actual behavior when they are stimulated by the experimental materials, i.e., real auction/exchange websites. The experimental procedures are: (1) Ask the participants to fill out basic personal information and the consent form. (2) Enter the fMRI experiment site. (3) Explain the experiment content to the participants and ensure consent is given. (4) Scan the participants’ brains before the experimental stimulus. (5) Show the participant the stimuli sequentially and scan the brain image at the same time.

After the fMRI experiment, participants obtain the rewards and are invited to participate in a short interview to understand more what other factors they consider when using auction or barter sites. The interview questions are: What is your view of second-hand electronic products? Please share your experiences of using auction and/or barter sites? Under what circumstances will you choose to use the barter site instead of the auction site? What do you expect from those websites? Finally, researchers confirm the participants’ contact information, and the participants can ask questions about the research.

**Data Collection Methods**

This research recorded data from the auction website Yahoo!Kimo and the barter site e1515.com.tw every day for a month to track the successful bidding or exchanging product items. After a month, the researcher is able to store the links to make further contact with sellers/exchangers for participating in this research. All participants were issued a pseudo name to protect their identity.

To collect the brain imaging data from the fMRI experiment, the fMRI research equipment at the NCKU Mind Research and Imaging Center was used. A GE Discovery MR750 3T scanner along with a 32-channel head array coil was used to scan the structural and functional images of the brain.

**Data Analysis Methods**

SPSS 17.0, AMOS 20 and Mplus were used to analyze the data collected from the questionnaire. To analyze the brain imaging data, this research adopted BrainVoyager QX.

**RESULTS**

A total of 325 auction questionnaires were collected, and 262 were found to be valid, yielding a response rate of 80.9%; a total of 278 barter website questionnaires were collected, and 222 of these were valid, resulting in a valid response rate of 79.8% (Table 1).

| Demographics  | Attribute / number (%) | Auction    | Barter     |
|---|------------------------|------------|------------|
| Gender  | Female                 | 134 (51.1) | 100 (45.0) |
|   | Male                   | 128 (48.9) | 122 (55.0) |
| Age   | <20                    | 44 (16.8)  | 7 (3.2)    |
|   | 21-30                  | 114 (43.5) | 61 (27.5)  |
|   | 31-40                  | 78 (29.8)  | 83 (37.4)  |
|   | > 41                   | 26 (9.9)   | 71 (31.9)  |
| Education   | High school            | 38 (14.5)  | 7 (3.1)    |
|   | College degree         | 181 (69.1) | 124 (55.9) |
|   | Graduate degree        | 43 (16.4)  | 91 (41.0)  |
| The frequency of auction/barter website logins                      | Several times a day    | 72 (27.5)  | 15 (6.8)   |
|   | Several times a week   | 16 (6.1)   | 48 (21.6)  |
|   | Several times a month  | 76 (29.0)  | 84 (37.8)  |
|   | A few times a year     | 65 (24.8)  | 43 (19.4)  |
|   | I'm not really sure    | 33 (12.6)  | 32 (14.4)  |
| The frequency of selling/exchanging electronic second-hand products | Several times a day    | 18 (6.9)   | 14 (6.4)   |
|   | Several times a week   | 67 (25.6)  | 36 (16.2)  |
|   | Several times a month  | 64 (24.4)  | 88 (39.6)  |
|   | A few times a year     | 65 (24.8)  | 46 (20.7)  |
|   | I'm not really sure    | 48 (18.3)  | 38 (17.1)  |
| Product browsing time   | Half an hour           | 95 (36.3)  | 111 (50.0) |
|   | An hour                | 89 (34.0)  | 71 (32.0)  |
|   | One to two hours       | 63 (24.0)  | 29 (13.1)  |
|   | More than three hours  | 15 (5.7)   | 11 (4.9)   |

**Table 1. Demographics of Participants**

A homogeneity test was carried out for each of the two groups (auction/barter) by using the Levene’s test in a one-way ANOVA. Harman’s one-factor test was also conducted for each group to confirm that there was no issue with common method variance (Podsakoff et al., 2003).

After carrying out the measurement analysis and then the structural analysis, a path analysis was carried out to test

the relationships among the constructs of the research model. As shown in Figure 2 and 3, the *t*-test results and *p*-values indicate that hypotheses H2 and H4 were not supported for the auction group; hypotheses H3, H4, H6, and H7 were not supported for the barter group.

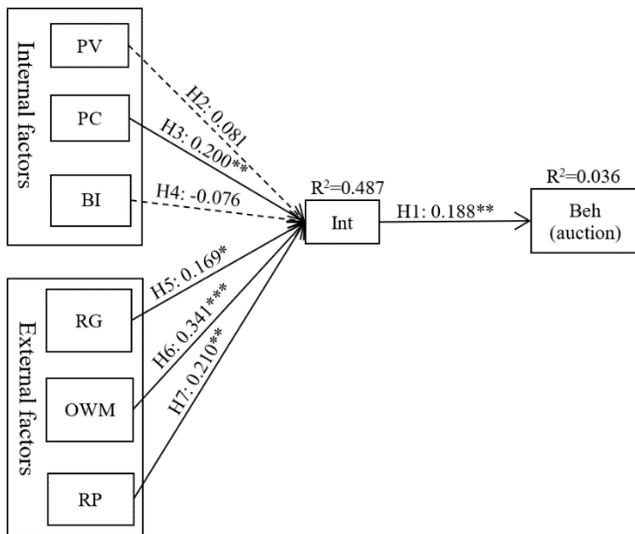


Figure 2. Auction - Path Diagram of Theoretical Model

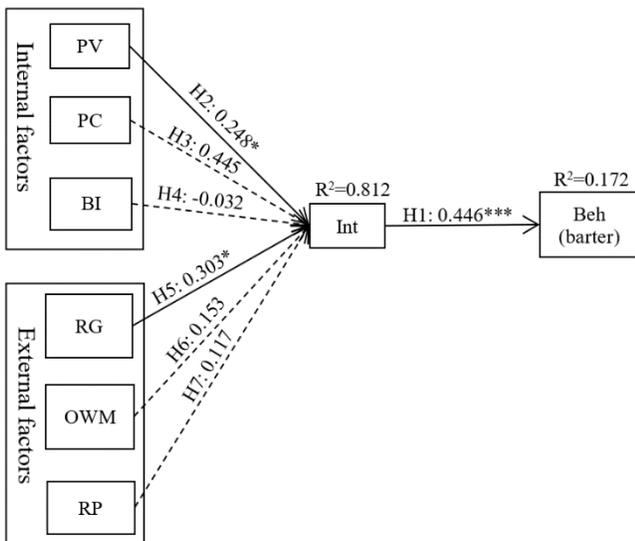


Figure 3. Barter - Path Diagram of Theoretical Model

**fMRI Experiment Results**

This research recruited 14 participants (6 females and 8 males; ages 21-35; 12 with college degrees and 2 with graduate degrees) who completed the questionnaire to participate in the fMRI experiment and a short semi-structured interview. The MPFC was first investigated to determine if it contributes to price measurement. Finally, as illustrated in Figure 4, MPFC activation increased significantly when the participants observed the price gap between two products. The OFC was also investigated to determine whether it contributes to the individual need regarding hedonic value. As expected (Figure 5), the OFC

activation increased when the participants observed the pictures of some daily products.

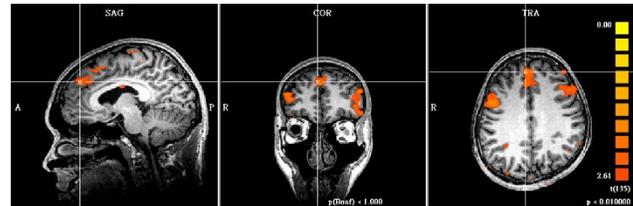


Figure 4. Significant Activation in the MPFC

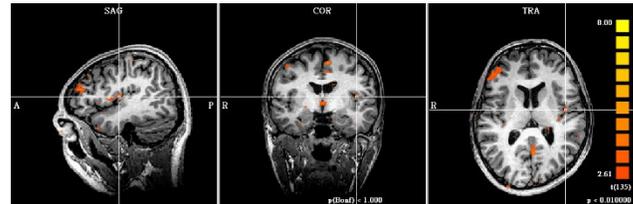


Figure 5. Significant Activation in the OFC

After the fMRI experiment, all 14 sellers participated in a semi-structured interview. The participants included eight men and six women, aged between 21 and 35. Twelve had a college degree, and two had a master’s degree.

**CONCLUSION AND DISCUSSIONS**

In the sellers’ intention model, all the external factors have a positive and significant impact on the sellers’ intention to sell second-hand products and further influence their actual behavior. In the exchangers’ intention model, personal value—an internal factor—has a positive and significant impact on sellers’ intention to sell second-hand products and further influences their actual behavior.

This research tested the participants using a second-hand auction platform or barter website by giving them choices that involved price. It can be assumed that MPFC would show a stronger activation reaction (Knutson et al., 2007). It is known that the OFC region is related to decision-making (Wallis, 2007); however, the current study reveals that in addition to decision-making, the OFC also reacts to hedonic values. Finally, this research suggests that sellers on online websites should provide thorough product descriptions. From the exchangers’ viewpoint, personal value and reference group have an influence on behavior on a barter website platform.

Future research can determine whether there might be other relevant factors that affect auction website sellers’ switching intentions in addition to personal value, product condition, brand, reference group, online word of mouth, and reference price, which were examined in this research. Future research could also use other platforms to verify the findings of this work.

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## REFERENCES

1. Davis, F. D. (1989) Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology, *MIS Quarterly*, 13, 3, 319-339.
2. Diekhof, E. K., Falkai, P. and Gruber, O. (2011) The Orbitofrontal Cortex and Its Role in the Assignment of Behavioural Significance, *Neuropsychologia*, 49, 5, 984-991.
3. Durvasula, S., Lysonski, S. and Madhavi, A. D. (2011) Beyond service attributes: Do personal values matter? *Journal of Services Marketing*, 25, 1, 33-46.
4. Engel, J. F., Kollat, D. T. and Blackwell, R. D. (1968) Consumer behavior, Holt, Rinehart and Winston, NY.
5. Hawkins, D. I., Mothersbaugh, D. L. and Best, R. J. (2008) Consumer behavior building marketing strategy (10th ed.), McGraw Hill, Boston.
6. Knutson, B. and Bossaerts, P. (2007) Neural Antecedents of Financial Decisions, *The Journal of Neuroscience*, 27, 31, 8174-8177.
7. Kotler, P. and Keller, K. L. (2006) Marketing management (12th ed.), Pearson/Prentice Hall, Upper Saddle River, NJ.
8. Koo, C., Chung, N. and Nam, K. (2015). Assessing the Impact of Intrinsic and Extrinsic Motivators on Smart Green IT Device Use: Reference Group Perspectives. *International Journal of Information Management*, 35, 1, 64-79.
9. Lin, T. C., Cheng, H. K., Wang, F. S. and Chang, G. R. (2012) A Study of Online Auction Sellers' Intention to Switch Platform: The Case of Yahoo!Kimo vs. Ruten\_eBay, *Decision Sciences*, 43, 2, 241-272.
10. Martín-Ruiz, D. and Rondán-Cataluña, F. J. (2008) The Nature and Consequences of Price Unfairness in Services: A Comparison to Tangible Goods, *International Journal of Service Industry and Management*, 19, 3, 325-352.
11. Mazumdar, T., Raj, S. P. and Sinha, I. (2005) Reference Price Research: Review and Propositions, *The Journal of Marketing*, 69, 4, 84-102.
12. McFerran, B., Dahl, D. W., Fitzsimons, G. J. and Morales, A. C. (2010) I'll Have what She's Having: Effects of Social Influence and Body Type on the Food Choices of Others, *Journal of Consumer Research*, 36, 6, 915-929.
13. Melnika, M. I., Richardsonb, P. and Tompkinsb, D. (2011) How Seller and Product Characteristics Impact Promotion on eBay, *Journal of Promotion Management*, 17, 4, 426-437.
14. Meng, J. G. (2011) Understanding Cultural Influence on Price Perception: Empirical Insights from a SEM Application, *Journal of Product & Brand Management*, 20, 7, 526-540.
15. Mogenson G. J., Jones D. L. and Yim C. Y. (1980) From Motivation to Action: Functional Interface between the Limbic System and the Motor System, *Progress in Neurobiology*, 14, 2, 69-97.
16. Mowen, J.C. and Minor, M. S. (2001). Consumer Behavior: A Framework. NJ: Prentice Hall.
17. Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y. and Podsakoff, N. P. (2003) Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies, *Journal of Applied Psychology*, 88, 5, 879-903.
18. Putler, D. S. (1992) Incorporating Reference Price Effects into a Theory of Consumer Choice, *Marketing Science*, 11, 3, 287-309.
19. Ryu, K., Han, H. and Jang, S. (2010) Relationships among Hedonic and Utilitarian Values, Satisfaction and Behavioral Intentions in the Fast-Casual Restaurant Industry, *International Journal of Contemporary Hospitality Management*, 22, 3, 416-432.
20. Sanfey, A. G., Leowenstein, G., McClure, S. M. and Cohen, J. D. (2006) Neuroeconomics: Cross-Currents in Research on Decision-Making, *Trends in Cognitive Sciences*, 10, 3, 108-116.
21. Stern, B. (1994) A Revised Model for Advertising: Multiple Dimensions of the Source, the Message, and the Recipient, *Journal of Advertising*, 23, 2, 5-16.
22. Trusov, M., Bucklin, R.E. and Pauwels, K. (2009), Effects of Word-of-Mouth versus Traditional Marketing, Findings from an Internet Social Networking Site, *Journal of Marketing*, 73, 9, 90-102.
23. Wallis, J. D. (2007) Orbitofrontal Cortex and its Contribution to Decision-Making, *Annual Review of Neuroscience*, 30, 31-56.
24. Zhou, M. (2012) Reference Price Effect and Its Implications for Decision Making in Online Auctions: An Empirical Study, *Decision Support Systems*, 54, 1, 381-389.