

Examining Intervening Variables Of The EC Consumer Behavior Model: The Powersellertm And Phenomenon Search Products


Robert J. Mills, Utah State University, USA
David H. Olsen, Utah State University, USA
Myles Powell, Utah State University, USA

ABSTRACT

The EC consumer behavioral model is an effort to describe the electronic commerce environment, which includes electronic auctions. The model identifies intervening variables that are related to vendors such as trustworthiness (merchant characteristic) and product brand and availability (product characteristics). In this paper, we have attempted to explore PowerSellersTM, a specific intermediary characteristic for electronic auctions. Specifically, we analyzed PowerSellersTM on products with limited availability and high demand. Linear regression models were used to analyze the intermediary characteristics and purchase price. Findings support the possibility that phenomenon search products attenuate the impact of a seller's rating on auctions prices. This paper serves as a specific investigation to better understand consumer online purchase intentions within the EC consumer behavior model.

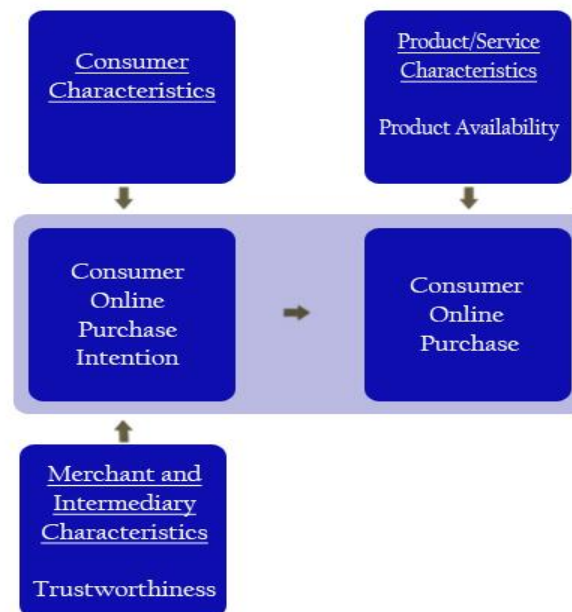
Keywords: EC Consumer Behavior Model, E-Auctions, Dynamic Pricing, E-Commerce

INTRODUCTION

 Electronic auctions are online market mechanisms where buyers make bids and sellers place offers and “characterized by the competitive and dynamic nature by which the final price is reached” (Turban, 2008, p. 473). The EC consumer behavioral model is an effort to describe the electronic commerce environment, which includes electronic auctions. The model identifies independent, intervening, and dependent variables. Figure 1 illustrates parts of the EC Consumer Behavior Model. The model specifically includes the intervening variables Product/Service Characteristics and Merchant and Intermediary Characteristics. An auction seller often has some control over intermediary characteristics such as trustworthiness and product availability (Turban, 2008, p. 158). For instance, the electronic auction corporation Ebay® recognizes PowerSellersTM, based on the quantity of items sold on e-bay, and having a positive feedback score of 98% or higher. We recognize a PowerSellerTM as a method for a seller to improve trustworthiness; a specific intervening variable in the EC consumer behavioral model. Trustworthiness is a variable that has been explored in several areas of information systems from technology acceptance to online auctions and is a key notion in this study. For example, the technology acceptance model (TAM) was examined in light of the theory of reasoned action (TRA) and determined that trust and risk were correlated with technology acceptance (Pavlou, 2003).

Along with trustworthiness, electronic auctions often have additional mechanisms in place to identify characteristics such as reputation. A reputation system “collects, distributes, and aggregates feedback about participants’ past behavior” (Resnick, Zeckhauser, & Friedman 2000). These reputation systems seek to inform buyers about trustworthiness of potential sellers (Resnick, et. Al. (2006).

Figure 1: Partial EC Consumer Behavior Model



Developing a positive reputation as a seller improves the intervening variable of trustworthiness. Over the past two decades, empirical studies of auctions have been limited by data availability (Lucking-Reiley, et al. 2007). However, prior research suggests a seller's rating has a measurable effect on auction prices (Ba & Pavlou, 2002; Melnik & Alm, 2005). Specifically, negative feedback ratings have a much greater effect than positive feedback ratings (Lucking-Reiley, et al 2000). Other studies have examined positive and negative seller ratings and sales price with similar results (Melnik, M. & Alm 2005; Ye, Li, Kiang, and Wu 2009).

Product availability is another intervening variable related to product/service characteristics in the EC Consumer Behavior Model. In the context of electronic auctions, limited product availability creates some interesting challenges. For instance, Hannah Montana concert tickets were being sold upwards of \$500 on the Internet (Simms, 2008). Basic economic principles of supply and demand help to explain the expensive ticket prices. However, the impact on PowerSellers™ of high demand products with limited availability is less clear.

Another variable that impacts online auctions is the product type. Prior research has delineated products into two specific categories: search products and experience products (Nelson 1970). It has been argued that experience goods may require a greater emphasis on the seller's reputation than search products since they have to rely on the seller's assessment of quality (Ba & Pavlou, 2002). Search products do not necessarily have this emphasis since the quality of the products are known before making the purchase. Our focus on high demand concert tickets would likely be considered search products, which may potentially reduce the importance of seller's reputation since the quality can be determined prior to purchase. We classify a high demand product like a Hannah Montana concert ticket as a phenomenon search product. This indicates the quality of the product is known because the venue and seat locations are printed on the tickets. However, the product is also classified as a high demand with limited quantity and limited time to purchase.

In this paper, we have examined PowerSellers™, a specific intermediary characteristic for electronic auctions in the context of products with limited availability. As part of an initial investigation, we selected Hannah Montana concert tickets which were high-demand items that had large quantities of similar items available for auction. We hypothesize high demand products with limited availability may attenuate the impact of a seller's rating on auctions prices. Specific hypotheses are provided below:

- H1:** Given a high demand product with limited availability, a positive association exists between purchase price and seller rating.
- H2:** Given a high demand product with limited availability, a positive association exists between purchase price and a PowerSeller_{TM}.

RESEARCH METHODOLOGY

Data were collected using the auction website E-bay between December '07 and January '08 for "Hannah Montana Concert Tickets." At the end of each auction, the following data was gathered: Feedback as a percentage, if the seller was a PowerSeller_{TM}, the number of bids placed, the location of the seller, the number of tickets, and the final purchase price. For Hannah Montana Tickets, seat location in the venue was also taken into consideration. The arena was divided into four areas, with the area closest to the stage being area one. In addition, only sellers with a positive ranking of over 90% were selected for the study.

"Seller rating" was defined as the product of the feedback percentage and seller feedback, which created a weighting of the seller feedback, adjusting potential inflated seller feedback scores with the respective feedback percentage score. For example, suppose two sellers have identical seller feedback scores, say X. Thus, it appears that the two sellers are equal par this Internet auction. However, suppose that the feedback percentage score for the second seller is one-half that of the first seller. Denote the percentage score for the first seller as Y. Hence, the seller rating for the first seller is $Z1 = X \cdot Y$, and the seller rating for the second seller is $Z2 = 0.5 \cdot X \cdot Y = 0.5 \cdot Z1$. Therefore, as defined, the seller rating presents a more appropriate measure of seller feedback.

Logarithmic transformations were made to several variables, for the following two reasons: HaL to help alleviate skewness for the respective variable distribution; and HbL to improve the model fits. The alpha level for the hypotheses was set a priori at the value 0.05. Where applicable, missing values were discarded from statistical analysis. Final models were based on the statistical significance of predictors (after adjusting for all other predictors of the model) as well as accounting for factors, which appeared to confound the primary relationships of interest.

RESULTS

Table I provides a description of the variables collected for this study. Overall, data was collected for 65 auction sellers. The average feedback percentage for sellers was about 96%, 40% of the sellers were classified as PowerSellers_{TM}, and the average seller feedbacks (log scale) were 4.45. Roughly 12 % of the tickets sold were for the closest proximity to the performer (proximity 1), 22 % were sold for proximity 2, 18 % for proximity 3, and 48 % for proximity 4. Finally, the average (log scale) purchase price per ticket was 5.01 (equals about \$150).

The summary entailing the variables seller rating and purchase price, unless otherwise specified, are given on the log scale. Table II shown below, summarizes the linear regression model for the first of the primary hypotheses of this study. After controlling for seat location, these data indicate that purchase price is not statistically significantly associated to seller rating ($p=0.21$). The data suggest, for a given seating location, the average purchase price (original scale) decreases about 3% for a one unit (log scale) increase in the seller rating. Also, after controlling for seller rating, these data indicate there is a statistically significant association between seating location and purchase price ($p<0.0001$). The data suggest, for a given seller rating, the average purchase price (original scale) decreases about 26% for every one unit increase in seating proximity.

Table III summarizes the linear regression model for the second of the primary hypotheses of this study. After controlling for seat location, these data indicate that purchase price is marginally statistically significantly associated to PowerSeller_{TM} ($p=0.07$). The data suggest, for a given seating location, the average purchase price (original scale) for a PowerSeller_{TM} is about 21% lower than that of the non- PowerSeller_{TM}. Moreover, after controlling for PowerSeller_{TM} status, these data indicate there is a statistically significant association between seating location and purchase price ($p<0.0001$). The data suggest, for a given PowerSeller_{TM} status, the average purchase price (original scale) decreases about 25% for every one unit increase in seating proximity.

TABLE I: DESCRIPTION OF STUDY VARIABLES - HANNAH MONTANA SALES (N = 65)

Feedback Percentage ^a (mean±SD)	96.2 ± 0.18
Powerseller (yes)(%)	40.0
Seller Feedbacks ^b (mean±SD)	4.45 ± 2.89
Seat Location (%)	
Closest to Presentation (proximity 1)	12.3
Closer to Presentation (proximity 2)	21.5
Close to Presentation (proximity 3)	18.5
Farthest from Presentation (proximity 4)	47.7
Purchase Price ^b (mean±SD)	5.01 ± 0.59

^aN=62, due to three missing values.

^bNatural logarithmic scale.

TABLE II: SUMMARY OF THE LINEAR REGRESSION MODEL FOR THE FIRST PRIMARY HYPOTHESIS[†]

Parameter	Maximum Likelihood Estimate	Standard Error	Test Statistic ^(c)	P-Value
Intercept	6.045	0.236	25.545	<0.0001
Seat Location ^(a)	-0.304	0.060	-5.093	<0.0001
Seller Rating ^(b)	-0.033	0.026	-1.275	p = 0.21

[†]Global ANOVA F-Statistic=13.21, Distributed by the F-Distribution with numerator degrees of freedom(df)=2 and denominator df=59 (p<0.0001); Multiple R²=0.31; N=62; Outcome (dependent variable) is natural logarithm of purchase price.

^(a)Coded by the respective proximity number; Variable treated as ordinal in model.

^(b)Seller Rating = log(Feedback Percentage * Seller Feedbacks).

^(c)Distributed by the Student's-t distribution with df=59.

TABLE III: SUMMARY OF THE LINEAR REGRESSION MODEL FOR THE SECOND PRIMARY HYPOTHESIS[†]

Parameter	Maximum Likelihood Estimate	Standard Error	Test Statistic ^(c)	P-Value
Intercept	5.956	0.189	31.487	<0.0001
Seat Location ^(a)	-0.294	0.056	-5.218	<0.0001
Power Seller ^(b)	-0.232	0.125	-1.855	p = 0.07

[†]Global ANOVA F-Statistic=14.92, Distributed by the F-Distribution with numerator degrees of freedom (df)=2 and denominator df=62 (p<0.0001); Multiple R²=0.33; N=65; Outcome (dependent variable) is natural logarithm of purchase price.

^(a)Coded by the respective proximity number; Variable treated as ordinal in model.

^(b)Reference group is the non-powersellers.

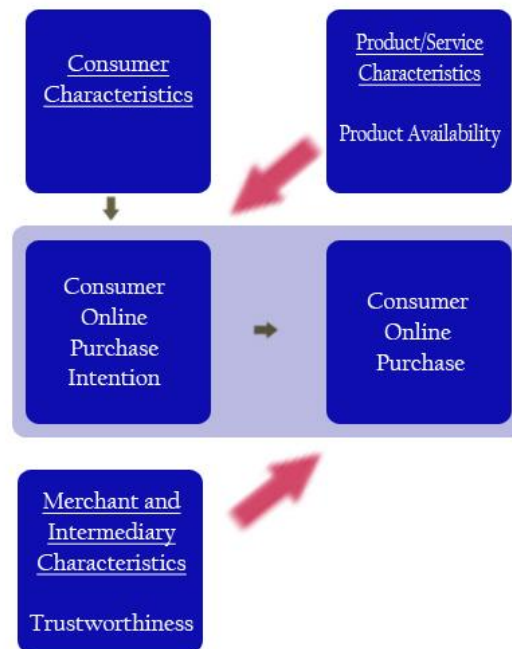
^(c)Distributed by the Student's-t distribution with df=62.

DISCUSSION

Based on our exploratory study, high demand products with limited availability may temporarily attenuate the impact of a seller's rating on auctions prices that is an anomaly not described in the EC Consumer Behavior Model. Figure 2 illustrates a possibility where limited product availability has a larger impact on a consumer's intention to purchase while the impact of trustworthiness is diminished.

This study does support common warnings that often accompany high demand products with limited availability. For instance, in an article entitled Hannah Montana Concert Tickets are Hot, fans are warned to “avoid buying from unknown or sellers on eBay® who have poor or very little feedback” (Simms, 2008). The concern may be that buyers are more focused on the product and product availability and less concerned about the intervening variable of trustworthiness. This opportunism can include a variety of misrepresentation including receiving payment without delivering a product and other fraud (Ba & Pavlou, 2002).

Figure 2: Potential Impact of High Demand Products with Limited Availability



Given the interesting finding in our study, we recognize the limitations of our sample size and collection methodologies. Future research would help provide additional insight into purchasing decisions of high demand products with limited availability. One recommendation is to include a much larger sample sizes using technologies such as the “spider” program used in the Pennies from eBay® study (Lucking-Reiley, et al., 2007). This would provide a more comprehensive analysis of the impact of high demand items such as popular concert tickets on trustworthiness. Our limited data set serves to frame the possibility that trustworthiness factors such as PowerSeller_{TM} does not necessarily lead to higher prices in all cases. It appears online buyers may be more willing to accept additional risk for these high demand items. By continuing to analyze merchant and intermediary characteristics such as the variable PowerSeller_{TM}, we hope to better understand consumer online purchase intentions within the EC consumer behavior model. Additionally, future research could seek to make greater distinctions between product type by including items that are both rare, and readily available as well as products where quality is known to be similar and where quality is a distinguishing factor.

REFERENCES

1. Ba, S. & Pavlou, P. (2002). Evidence of the effect of trust building technology in electronic markets: Price premiums and buyer behavior. *Management Information Systems Quarterly*, 26(3), 243-268.
2. Lucking-Reiley, D., Bryan, D., Prasad, N., & Reeves, D. (2007). Pennies from ebay: The determinants of price in online auctions. *The Journal of Industrial Economics*, 55(2), 223-233.

3. Melnik, M. & Alm, J. (2005). Seller reputation, information signals, and prices for heterogeneous coins on eBay. *Southern Economic Journal*, 72(2), 305-328.
4. Nelson, P. (1970). Information and consumer behavior. *Journal of Political Economy* 78(2), 311-329.
5. Resnick, P., Zeckhauser, R., & Friedman, E. (2000). Reputation Systems: Facilitating Trust in Internet Interactions. *Communications of the ACM*, 43(12), 45-48.
6. Pavlou, Paul A. (2003). Consumer Acceptance of Electronic Commerce: Integrating Trust and Risk with the Technology Acceptance Model. *International Journal of Electronic Commerce*, 7(3), 101-134.
7. Resnick, P., Zeckhauser, R., Swanson, J. and Lockwood, K. (2006). The value of reputation on eBay: A controlled experiment. *Experimental economics*, 9(2), 79-101.
8. Simms, M. (2008, January 10). Hannah Montana Concert Tickets are Hot. Retrieved March 25, 2009, from <http://ezinearticles.com/?Hannah-Montana-Concert-Tickets-are-Hot&id=921258>.
9. Turban, E., King, D., & Viehland, D., & Lee, J. (2006). *Electronic commerce 2008: A managerial perspective*, 5th edition, Pearson Education Inc, Upper Saddle River, New Jersey.
10. Ye, Q., Li, Y, Kiang, M, & Wu, W. (2009). The impact of seller reputation on the performance of online sales: Evidence from TaoBao buy-it-now (BIN) data. *The Data Base for Advances in Information Systems*, 40(1), 12-19.