

Perceived Ease of Use, Trust, and Satisfaction as Determinants of Loyalty in e-Auction Marketplace

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Abstract—Commercial online services have increased dramatically over the last decade, especially in the field of electronic commerce (EC). The rapid development of electronic commerce has allowed people to access information and interact with global businesses. This, in combination with the advent of economical and efficient electronic capabilities, has led to the rising popularity of online auctioning. The purpose of this study is to explore from customers' perspectives what attracts them to online auction sites, and keeps them coming back. Through the use of structural equation modeling (SEM), this article provides insight into online auction customer loyalty and online customer behavior. The ways in which consumer satisfaction interacts with auction website loyalty (the essence of the business-consumer relationship) are discussed. Furthermore, suggestions are made as to how online auction website managers can use these findings to implement and improve upon marketing strategies.

Index Terms—Online auction, Electronic commerce, Satisfaction, Loyalty

I. INTRODUCTION

Since the late 1990s, commercial online services have increased dramatically, especially in the field of electronic commerce (EC). Thanks to the rapid development of electronic commerce, people can access information and interact with global businesses [1]. Online auction websites in particular, have gained popularity with the advent of economical and efficient electronic capabilities.

According to a consumer-to-consumer (C2C) e-commerce meta-analysis, online auctioning is a growing area in e-commerce [2]. Prominent examples of online auction marketplaces include eBay and Amazon. With the popularity and success of online auction marketplaces growing at an unusual rate (IFEE 2003), many such websites have abounded and the online C2C auction market has skyrocketed in recent years [3]. Millions of globally dispersed consumers now engage in competitive exchange via bidding and price setting, reflecting real-time supply and demand as efficiently as a trading floor

[4]. Auctioneers and buyers both expect information technology (IT) enabled e-auctions to provide buyers with more detailed information. In addition, both can work from the comfort of their own offices or homes, simply accessing their computers in order to make purchases, orders, and sales [5].

There are 2,565 auction websites according to Internet Auction List reports [6]. According to a 2010 Market Intelligence Center (MIC) Business Development report, Taiwan online auction transactions reached NT\$153 billion in the year 2010 and were estimated to increase to NT\$183 billion in 2011. As a result of its popularity, e-Bay is one of the most powerful auction websites currently in existence, and has grown faster than Microsoft, Dell, and Wal-Mart. Millions of transactions are arranged over e-Bay every day, and it is considered to be the largest and most successful online auction house [7]. During 2004, there were approximately 105 million users, this number increasing to 200 million by the summer of 2006. According to e-Bay's 2005 financial results, it had approximately \$4.552 billion in that year, up 39 percent from 2004 [6-8].

In this paper, we are interested in examining whether e-auction consumers' behavior differs depending on their online counterparts. If so, how can these differences be captured? There have been various models developed to understand individual consumer behavior, such as consumers' purchase decision-making [9], customer resource life cycle (CRLC) [10], and transaction cost economics perspective [11, 12]. However, in this paper we will only focus on buyers' behavior in regards to online auction transaction intentions.

Understanding users' online auction intentions is necessary in order to better assess a website's chances of survival. In particular, there has been much research addressing how emotions influence decision making, for example, in regards to the "enjoyment" factor. Ding et al. [13] cited numerous psychological experiments demonstrating that behavior is affected by emotional states, with positive affects having been shown to influence risky decision-making.

In line with electronic commerce (EC), online auctions have experienced a growth matched by an increase in academic interest [14-16]. Online auction transaction intentions constitute the cornerstone of e-commerce research. Whilst most online auctions research emphasizes reputation feedback systems [3, 17, 18], bidding prices [19], auction design [20], and price premiums [21], online auction users' behavior is not monolithic. Thus, our goal is to investigate the factors that influence consumers' loyalty toward online auction websites. This study exclusively focuses on C2C auctioning and aims to examine the relationship between consumers' online auction behavior and trust.

II. THEORETICAL BACKGROUND

The earliest WWW-based trading sites date back to 1995, but the history of auctioning is much older [22]. Traditionally, sellers initiate an auction to attract interested buyers to openly bid on items for sale. Researchers have classified Internet auctions as business-to-business (B2B), wherein exchange relationships among organizations are facilitated, and business-to-consumer (B2C) and consumer-to-consumer (C2C), which facilitate transactions involving consumers [4, 16]. McAfee and McMillan [23] indicate that auction market institutions develop explicit sets of rules that determine resource allocation and prices on bids from market participants. However, Bapna et al. [24] observes, ".....*Online auctions, brought about by the synergetic combination of Internet technology and traditional auction mechanisms, present a significant new dimension for mercantile processes, many of which are not yet fully understood*".

A. The Role of Technology Acceptance in Online Auctioning

The technology acceptance model (TAM) is an adaptation of the theory of reasoned action (TRA) by Fishbein and Ajzen [25], and is mainly designed to account for users' acceptance of IT [26]. There are two belief variables that drive the use of technology: the perceived ease of use (PEOU) and perceived usefulness (PU) of the technology. Numerous empirical studies have found that the TAM consistently explains a substantial proportion of usage intentions and behavior [27]. Therefore, it is important to understand how people decide whether or not they will use a particular technology and their intentions to use the system [28].

Shih [29] used the TAM to predict users' acceptance of online shopping. The study's results showed that attitude was strongly and positively related to system acceptance. PEOU and PU significantly predicted individual attitudes towards the system. In addition, there are numerous empirical studies that have shown that the TAM is a parsimonious and robust model for understanding users' behavior [30, 31]. We hypothesized that online auction customers would be satisfied in regards to PU and PEOU. The measures of PU and PEOU were adapted from Venkatesh and Davis [32]. It was hypothesized that:

H1: PU will have a positive effect on customers' satisfaction in a C2C online auction website.

H2: PE will have a positive effect on customers' satisfaction in a C2C online auction website.

B. Trust in Online Auctioning

Most sellers in online auction markets have not established name recognition, nor have they formed long-term ongoing relationships with their customers [21]. Also, there are few well-established institutional rules and contracts governing online transactions, potentially giving rise to opportunism. An Internet Fraud Watch report (2005) indicated that online auction fraud has been growing rapidly in recent years. For example, the average loss per claim in instances of online auction fraud has jumped from \$895 in 2004 to \$1917 in 2005.

Francis Fukuyama, a former U.S. State Department analyst, claims that "trust is the expectation that arises within a community of regular, honest, and cooperative behavior, based on commonly shared norms, on the part of the members of community". Furthermore, trust is one's belief that the other party will behave in a dependable, ethical, and socially appropriate manner; in addition, the trusted party will fulfill its commitments in business relationships [30]. Trust is a catalyst in buyer-seller transactions and it provides buyers with high expectations in terms of satisfying exchange relationships [33].

Many researchers have argued that understanding trust is essential for understanding interpersonal behavior in economic exchanges, and benefits from the interaction [21, 34]. Pavlou and Gefen [16] mentioned that online institution-based trust is especially suited for online marketplaces where buyers predominantly transact with new and unknown sellers. From the above discussion, it appears as if trust is an important factor influencing consumers' satisfaction in online auctioning. In the context of online auctioning, items measuring trust were adapted from Flavián et al. [35] and Doney [34]. The ensuing two-item scale was as follows: *1. I believe that information offered by online auction websites is reliable, 2. I believe that the transaction systems utilized for online auctioning are safe. Hence, we hypothesized as below:*

H3: Trust in online auctioning will have a positive effect on customers' satisfaction towards a C2C online auction web site.

C. Shopping Enjoyment

Perceived enjoyment has garnered increasing interest from within the information system community due to the hedonic nature of Internet and Web-based technology [36]. There are several marketing studies which show that affective reactions, such as emotions or enjoyment [37], can facilitate the allocation of mental resources to the relevant task or to the interaction with the technologies of interest [38]. This, in turn, can be linked to intentions in e-auction transactions. Furthermore, flow research indicates that shopping enjoyment has a positive impact on the Web use [39]. We therefore predicted that

enjoyment as measured via a three-item scale adapted from Ghani et al. would have a positive impact on loyalty. The three-item scale is as follows: 1. When I visit my favorite auction website, I find my visit to be interesting, 2. When I visit my favorite auction website, I find my visit enjoyable, 3. When I visit my favorite auction website, I find my visit exciting. Thus, it was hypothesized that:

H4: Shopping enjoyment will have a positive effect on customers' loyalty towards a C2C online auction website.

D. Perceived Control

The fast growing popularity of the Internet, explosion of information, and increasing number of products available on the Web have provided utilitarian customers with more control in actions pertaining to online auctioning. Perceived control could reflect the actual control of online auction consumers in terms of their online transactions.

Perceived control is defined as the extent to which one has control over the environment and one's own actions. In the context of online auctioning, it can be thought of as an integrated measure of internal and external resource factors possessed by actors in online auctioning [40]. According to MIS literature, perceived control has a positive effect on computer-mediated environments [41]. A similar result can be expected in an e-auction marketplace. The more resources and opportunities one thinks they possess, the greater is their perceived control over their own behavior. In this study, we used a four-item scale adapted from Koufaris [42] in order to measure perceived control. In the context of online auctioning, three measuring items were adapted as followings: 1. I felt calm during my visit to online auction websites, 2. I felt in control during my visit to online auction websites, 3. I felt frustrated during my visit to online auction websites. We hypothesized as below:

H5: Perceived control will have a positive effect on customers' loyalty towards a C2C online auction website.

E. Customer Satisfaction

What attracts customers to online auction sites, and what keeps them coming back? In the mind of the consumer, satisfaction is the main driving force behind consumer loyalty and trust [41]. Customer satisfaction reflects how a customer feels towards a particular website; it is defined as the extent to which they are pleased with their experiences regarding a website. Therefore, customer satisfaction provides the best indication of a customer's willingness to return to the same website.

User satisfaction is the most widely used measure of success for an information system [43]. Indeed, customers' satisfaction reflects their attitudes towards website usage [44]. In addition, numerous research has identified consumer satisfaction as a critical determinant of repurchase intentions [45]. Therefore, we used it as an attitudinal measure. In the present study, three items were

used to measure online auction consumers' satisfaction [35]. These are as follows: 1. I am satisfied with the auction website I chose, 2. Compared to other auction websites, I find this website to be more satisfactory, 3. Compared to other auction websites, I am more satisfied with the services I have received from this online auction website. We hypothesized as below:

H6: Consumers satisfaction will have a positive effect on customers' loyalty towards a C2C online auction website.

As discussed above, Fig. 1 presents the proposed research model.

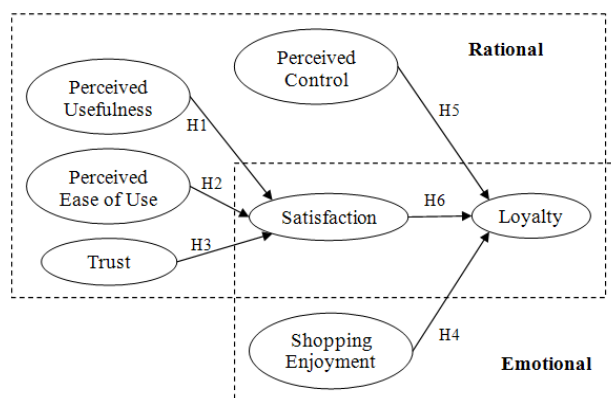


Figure 1. Research model

III. METHOD

A. Sample demographics and survey data

All data come from survey respondents who have online auction website experience. The data collection was conducted in two steps. First, a pilot test was performed to clarify the wording, content of the survey instrument. Second, the actual empirical test was performed.

Of the 800 questionnaires distributed, 316 users were replied with auction experience. After we deleted incomplete response, resulting in overall response rate was 39.5% (Table I). The structural equation modeling (SEM) was used to validate the research model with CFAs measurement to test the study model.

TABLE I. DEMOGRAPHIC DATA OF RESPONDENTS

Variable		Count	%
Gender	male	153	49.2%
	female	158	50.8%

TABLE I. (CONTINUED)
DEMOGRAPHIC DATA OF RESPONDENTS

Variable	Count	%
Online auction experience	less than 0.5 year	56 17.9%
	0.5 ~ 1 year (include)	64 20.5%
	1 ~ 1.5 year (include)	28 9.0%
	1.5 ~ 2 year (include)	56 17.9%
	more than 2 year	108 34.6%
Browse auction websites Freq. per month	less than 5 days	98 31.0%
	6 ~ 10 days	102 32.3%
	11 ~ 15 days	38 12.0%
	16 ~ 20 days	22 7.0%
	21 ~ 25 days	22 7.0%
	more than 26 days	34 10.8%
	Average browse auction websites time	less than 30 min
31 min ~ 1 hr (include)		146 46.2%
1 hr ~ 1.5 hr (include)		25 7.9%
1.5 hr ~ 2 hr (include)		18 5.7%
more than 2 hr		31 9.8%

B. Analysis and findings

The proposed model and hypothesis testing was conducted using LISREL to test the measurement model. First, the content validities are relatively acceptable because the various parts of questionnaire were all adapted from literature and have been carefully reviewed from pilot test. Next, the convergent validity was evaluated by examining the indicator loadings of statistical significance with assessing construct's reliability and variance extracted [46].

TABLE II.
MEASUREMENT MODEL FIT INDICES FOR CONVERGENT VALIDITY

Construct	Variable	Loading	t-value	Indicator reliability	Composite reliability	Variance extracted
Loyalty	LO1	0.698	—	0.487	0.766	0.522
	LO2	0.757	19.35	0.573		
	LO3	0.712	15.95	0.507		
Satisfaction	SA1	0.730	—	0.533	0.797	0.567
	SA2	0.787	13.53	0.619		
	SA3	0.740	12.72	0.548		
Trust	TR1	0.797	14.35	0.635	0.728	0.573
	TR2	0.715	14.1	0.511		

TABLE II. (CONTINUED)
MEASUREMENT MODEL FIT INDICES FOR CONVERGENT VALIDITY

Construct	Variable	Loading	t-value	Indicator reliability	Composite reliability	Variance extracted
Perceived Control	PC1	0.784	—	0.615	0.807	0.586
	PC2	0.851	18.46	0.724		
	PC3	0.647	16.93	0.419		
Shopping Enjoyment	EN1	0.721	—	0.520	0.755	0.508
	EN2	0.736	10.98	0.542		
	EN3	0.679	10.92	0.461		
Perceived Usefulness	PU1	0.793	15.44	0.629	0.781	0.640
	PU2	0.807	15.4	0.651		
Perceived Ease of Use	EU1	0.612	14.45	0.375	0.829	0.626
	EU2	0.975	17.12	0.951		
	EU3	0.743	14.63	0.552		

The indices for the measurement model indicate a good fit with convergent validity as shown in Table II. All measures satisfy the recommended values. Table III indicates the each construct's average variance extracted (AVE) range from 0.712 to 0.8. The AVE of each construct is all larger than its square correlation constructs. Therefore, this measurement model refers a high degree of reliability, convergent and discriminate validities.

TABLE III.
INTERNAL CONSISTENCIES AND CORRELATIONS OF CONSTRUCTS

	LO	SA	PC	EN	TR	PU	PE
LO	0.723						
SA	0.678	0.753					
PC	0.468	0.536	0.765				
EN	0.493	0.574	0.604	0.712			
TR	0.566	0.693	0.580	0.473	0.757		
PU	0.564	0.654	0.526	0.540	0.609	0.800	
PE	0.649	0.708	0.513	0.638	0.597	0.558	0.791

ps. Diagonal elements show the square of the AVE

Finally, as the measure of entire structural equation, an overall coefficient of determination (R^2) was calculated and similar to the multiple regression analysis. As shown in Table IV, the testing results of three indexes within accepted threshold: Comparative Fit Index (CFI) at 0.933, Normed Fit Index (NFI) at 0.919, Non-Normed Fit Index (NNFI) at 0.920. When GFI was only 0.804 which is

slightly below the 0.9 benchmark, but it exceeds the recommended value of 0.80 [47]. Even though the χ^2 and GFI are not goodness-of-fit, but the χ^2 is sensitive to large sample sizes, especially in case of the size exceed 200 respondents [46]. Therefore, it is necessary to complement the χ^2 with other goodness-of-fit measures [46]. Therefore, there is a reasonable overall fit in the research model and observed data.

TABLE IV. SUMMARY OF MODEL FIT INDICES

Model fit	Suggested value	Structural models
Chi-square(χ^2)	The less the better	731.18
Degree of freedom (df)	—	143
χ^2/df	<3	5.11
Goodness-of-Fit Index (GFI)	>0.90	0.804
Adjusted Goodness-of-Fit Index (AGFI)	>0.80	0.739
Comparative Fit Index (CFI)	>0.80	0.933
Normed Fit Index (NFI)	>0.90	0.919
Non-Normed Fit Index (NNFI)	>0.90	0.920

Since the primary interest of this study is to test the theoretical relationships hypothesized in this proposed model, the result of the structure model assessment is presented in Fig. 2. H2 was supporting, perceived ease of use trust had a significant positive effect on satisfaction. H3 were supporting, trust had a significant positive effect on satisfaction. Also H6 was supporting, satisfaction had a significant positive effect on loyalty.

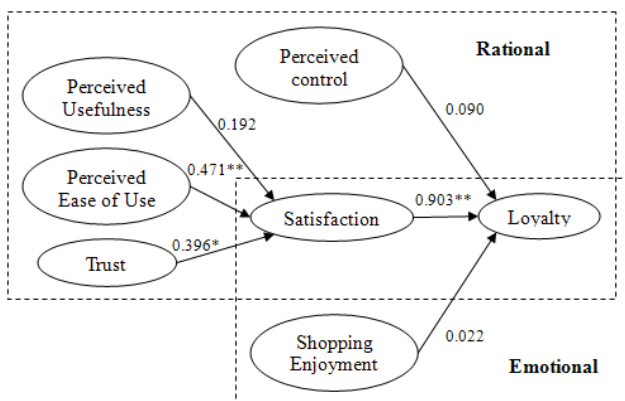


Figure 2. Standardized LISREL solution

Table V presents the indirect effect value of perceived ease of use on loyalty is 0.425. The indirect effect value of Trust on loyalty is 0.358. Therefore, on-line auction manager should stress the ease of use perception related features in the design of online auction sites. Promoting

customers' satisfaction the best way is to increase consumers' loyalty with ease of use and trust.

TABLE V. DIRECT, INDIRECT AND TOTAL EFFECT OF RESEARCH MODEL

Dependent Latent Variable	Independent Latent Variable (Hypothesis)	Direct effect	t-value	Accept	Indirect effect	Total effect
SA	PU (H1)	0.192	1.281	No	---	0
	EU (H2)	0.471	5.125	Yes	---	0.471
	TR (H3)	0.396	2.189	Yes	---	0.396
LO	PU	---	---	---	0	0
	EU	---	---	---	0.425	0.425
	TR	---	---	---	0.358	0.358
	SA (H4)	0.903	10.261	Yes	---	0.903
	PC (H5)	0.090	1.661	No	---	0
	EN (H6)	0.022	0.403	No	---	0

IV. DISSCUSSION AND CONCLUSIONS

This study attempts to investigate the factors that affect customer satisfaction and loyalty in online auctioning in Taiwan. It has demonstrated that user satisfaction has a crucial influence on consumer loyalty. The results of this study highlight the significant effect of trust and PEOU on customer satisfaction, which in turn influences customer loyalty in online auctioning. The results of the analyses showed that PEOU, trust, and satisfaction positively affect consumers' loyalty towards an online auction website (Hypotheses 2, 3, and 6), whilst perceived usefulness, perceived control, and shopping enjoyment, do not affect consumer loyalty (Hypotheses 1, 5, and 4). Specifically, PEOU was found to have a greater effect on customer satisfaction than trust. This implies that online auction customer satisfaction will be most significantly influenced by the degree of PEOU in regards to an online auction website. When customers find PEOU in online auctioning to be high, they will display a high degree of customer satisfaction towards the online auction website.

In this paper, we support the notion that user satisfaction is an important factor influencing online auction loyalty. The results are consistent with Flint et al.'s [48] finding that customer satisfaction has an effect on customer loyalty. Customers' behavioral loyalty can be the focus of targeted marketing actions [49] as it relates to customers' future purchases [50]. As suggested by our model, customer loyalty will develop via enhanced customer satisfaction if the PEOU and trust are well managed.

Previous studies have shown that PU and PEOU are two important factors influencing users' attitudes toward website usage. However, in our study, only PEOU had an influence on auction website consumers' satisfaction. The lack of a significant relationship between PU and

customer satisfaction in online auctioning is rather surprising. However, this result is consistent with Lin et al. [45] who asserted that users exhibit higher degrees of satisfaction for PEOU than PU in regards to Web-based business-to-consumer EC applications. Lin et al. propose a plausible explanation based on Taiwan's strong culture concerned with providing a plentiful and convenient shopping environment. Thus, consumers have many choices in regards to their shopping behaviors in Taiwan's shopping environment. Based on our study, online auction website designers should recognize the importance of creating websites that induce PEOU, thereby contributing to user satisfaction.

In our study, we found that trust was significantly related to consumer satisfaction. Zviran et al. [1] proposed that end-user trust in the system, presenting accurate information, and perceived ease of use, can be used to evaluate user satisfaction. Trust appears to be important for customer satisfaction and loyalty, which implies that, in order to attract more customers to use online auctioning, online auction owners must establish good customer relations and care about customers' needs, which can then enhance customers' behavioral loyalty. As such, satisfaction is also an important measure of an information system's success because it relates to system analysis and design. Accordingly, customers' satisfaction constitutes as a more effective advertising channel than mass media. Therefore, online auction website managers should stress trust, and ensure that the information provided on their website is believable, reliable, and up to date. Furthermore, online auction owners should know how to maintain and develop friendly relations with online auction customers because this is critically related to user loyalty and future intentions to repurchase products and services from the same auction website.

Some research findings suggest that customer satisfaction is a dynamic process in buyer-seller relationships, and that social dimensions such as meaning and emotion are integral facets of the phenomenon. As we know, customer satisfaction and loyalty are positively related to marketer profitability and market share. Furthermore, acquiring new customers costs market owners between five to ten times more than retaining current customers [51]. Thus, it is necessary to develop an expertise in, and understanding of, the competencies relevant to measuring customer satisfaction. Retaining online auction customers' commitment and enduring intent enables long-term relationships between customers and organizations to be maintained.

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