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# Consumer-to-Consumer Electronic Commerce: Is There a Need for Specific Studies?

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## ABSTRACT

Four main areas were identified in a meta-analysis of critical themes of electronic commerce (e-commerce): business-to-business (B2B), business-to-consumer (B2C), strategy, and technology adoption (Wareham, Zheng, and Straub, 2005). Consumer-to-consumer e-commerce was only mentioned in the realm of online auctions. However, C2C e-commerce can encompass much more than just auctions. The question then becomes, “is C2C e-commerce a different research area that deserves its own stream of research?” This study adapts constructs from a B2C e-commerce study (Devaraj, Fan, and Kohli, 2002) to determine what, if any, the differences are in the C2C e-commerce arena. The constructs included elements of the technology acceptance model, transaction cost analysis, and service quality. Reliability, responsiveness, and empathy (each areas of service quality) were found to influence C2C e-commerce satisfaction; they were not found to be an influence in the B2C study. These findings warrant further research in the C2C e-commerce arena.

## Keywords

C2C, Electronic Commerce, Online Shopping, Technology Acceptance Model, Transaction Cost Analysis, Service Quality.

## INTRODUCTION

Electronic commerce (e-commerce) is a continuously evolving phenomenon. While media attention of e-commerce has declined in focus, academic research of e-commerce appears to have increased. This can be seen in the amount of e-commerce specific journals as well as the number of e-commerce related articles published in the information systems' main stream journals.

In a meta-analysis of the critical themes of e-commerce research, Wareham, Zheng and Straub (2005) found, at a top level, there are four main areas: business-to-business (B2B), business-to-consumer (B2C), strategy, and technology adoption. They further refined these broad areas into 17 different themes found in e-commerce research. Of the 17, consumer-to-consumer (C2C) research was not listed. Some may argue that “Auctions” (one of the 17 areas) covers the C2C realm of e-commerce. However, C2C e-commerce can encompass much more than just auctions. This brings the question, “is C2C e-commerce a different research area that deserves its own stream of research?” If so, how should that research be structured? Anecdotal evidence leads us to believe that C2C e-commerce is its own research stream. By modifying previous research focused on B2C e-commerce, this research addresses the first question.

## SATISFACTION OF C2C

Since the C2C area does not have foundation studies at this point, this study builds on the work of Devaraj, Fan and Kohli (2002), who empirically researched consumers' preference for the B2C e-commerce channel over the traditional brick-and-mortar channel. Their study measured consumer satisfaction utilizing three different frameworks: Technology Acceptance Model (TAM), Transaction Cost Analysis (TCA), and Service Quality (SERVQUAL). The results of the study indicate that the TAM components have a significant impact on the consumer's satisfaction with the e-commerce channel. In addition, the authors found significant support regarding the TCA components. Partial support for the SERVQUAL components was also found.

While Devaraj, et al. (2002 ) reference B2C e-commerce, no distinction is made between B2C and C2C e-commerce. The researchers make reference to B2B e-commerce in the future research section and they encourage researchers to explore their model in this area. However, C2C e-commerce is never mentioned. With the increase in C2C business, it is worth exploring whether or not their model will still hold the same results. Our study attempts to do this. Utilizing the same three

frameworks, we alter their model to reflect satisfaction of the C2C e-commerce channel (see figure 1). Below is a discussion of the three frameworks to be used in the model.

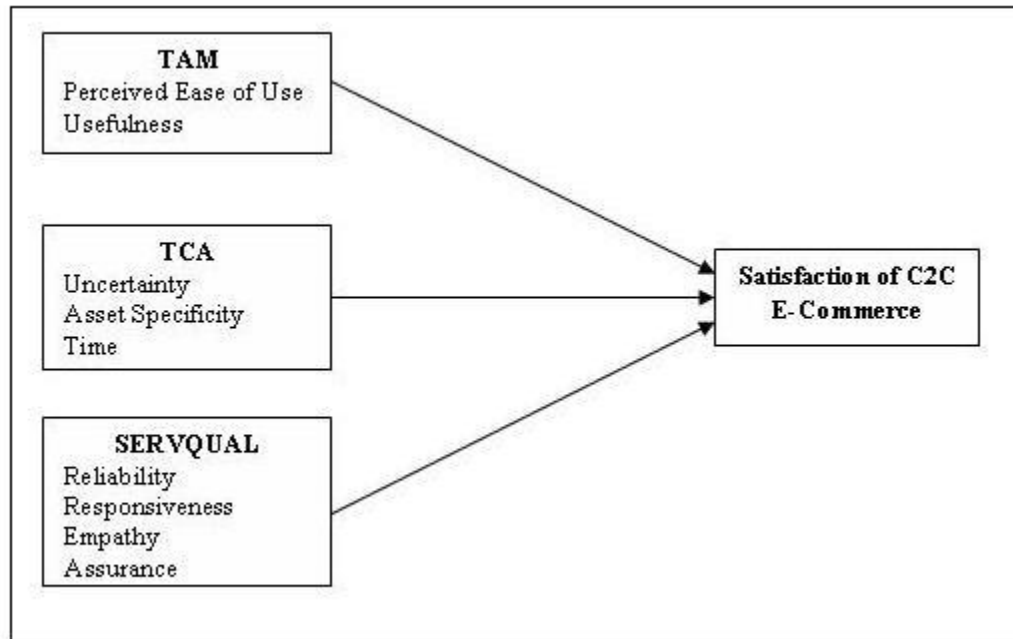


Figure 1. Predictors of Satisfaction of C2C Electronic Commerce

### TECHNOLOGY ACCEPTANCE MODEL (TAM)

TAM is one of the most used and referenced models for predicting an individual's use and acceptance of information technology (Venkatesh, 1999). In particular, TAM has been used in several empirical studies regarding B2C e-commerce (e.g., Devaraj, et al., 2002; Gefen, Karahanna and Straub, 2003; Gefen and Straub, 2000; Pavlou, 2003). This model indicates that there are two determinants of computer acceptance behaviors: perceived usefulness (PU) and perceived ease of use (PEOU) (Davis, 1989; Davis, Bagozzi and Warshaw, 1989). PU is described as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989). In other words, PU reflects the users' belief that the IT will help him/her achieve specific task-related objectives (Gefen and Straub, 2000). PEOU is described as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989). Gefen and Straub (2000) state that PEOU is related to the assessment of intrinsic characteristics of IT (e.g., "ease of use, ease of learning, flexibility, and clarity"). Gefen et al. (2003) found that PU of a given website played an important role in determining a repeat customer's intention to purchase on that website. Conversely, it was not significant for potential customers. This supports prior research findings that indicate social factors initially affect intention to use. Another study found that PEOU did not affect a consumer's intention to use a website for purchasing; however, PU did have a significant affect on intention (Gefen and Straub, 2000). They found that for inquiry based tasks, however, both PEOU and PU were significant predictors. These studies support the original conclusion that extrinsic motivation is more important than intrinsic motivation. Pavlou's (2003) study also supports the above findings. PU was found to be a significant predictor of intention to use; while PEOU only found weak support. These studies were based on B2C e-commerce. Since there are no studies utilizing the TAM constructs in a C2C e-commerce setting, it is important to determine if the TAM findings are consistent in this setting.

### TRANSACTION COST ANALYSIS (TCA)

TCA is a framework belonging to the New Institutional Economics paradigm. The framework is based on two main assumptions of human behavior (i.e., bounded rationality and opportunism) and their interplay of the two key dimensions of transactions (i.e., asset specificity and uncertainty) (Rindfleisch and Heide, 1997). Bounded rationality refers to the

constraints and limitations of individuals on their cognitive capabilities and rationality. Simon (1977) states that individuals' limited information processing and communication abilities may impede their ability to act rationally. In uncertain environments, these constraints and limitations can become problematic (Rindfleisch and Heide, 1997). Opportunism refers to an individual's quest to serve their own self-interests. In uncertain environments, opportunism can increase transaction costs in the form of incomplete or inaccurate information (Devaraj, et al., 2002). Asset specificity refers to any additional investments which have been made to support a relationship. These investments can make it difficult for the buyer and/or seller to switch. However, opportunism may cause the buyer/seller to exploit the relationship in his/her favor (Rindfleisch and Heide, 1997). Liang and Huang (1998) did an empirical study utilizing 86 Internet users to determine their purchasing intentions of different products in a B2C e-commerce environment. They found support for their hypothesis that the higher the perceived transaction costs (determined by uncertainty and asset specificity), the less likely a product would be purchased electronically. Once again, this needs to be tested in a C2C e-commerce environment to determine if these findings hold true.

## **SERVQUAL**

SERVQUAL was developed to assess general service quality. It measures the difference between the individual's expected level of service and the perceived level of service. This difference is referred to as the gap score. A gap score is calculated on five different dimensions: tangibles (appearance of facilities (or Web site), equipment, and personnel), reliability (ability to perform the promised service dependably and accurately), responsiveness (willingness to help customers and provide prompt service), assurance (knowledge and courtesy of employees and their ability to inspire trust and confidence), and empathy (providing caring and individualized attention to customers) (Jiang, Klein and Carr, 2002). The use of SERVQUAL in the IS field has been debated (Jiang, et al., 2002; Kettinger and Lee, 1997; Van Dyke, Kappelman and Prybutok, 1997; Watson, Pitt and Kavan, 1998). Van Dyke, et al. (1997) found there were both conceptual (using the gap score as the operationalized perceived service quality, using the ambiguous expectations construct, using a single measure of service quality across industries) and empirical (reduced reliability, poor convergent validity, unstable dimensionality) obscurities. Other researchers surveyed various populations of users to address pieces of these problems such as the reduced reliability (Pitt, Watson and Kavan, 1997) and dimensionality (Kettinger and Lee, 1997). Jiang, et al. (2002) used data from a total of 168 matched sets (IS professionals and IS users) to determine whether or not the problems indicated in the SERVQUAL method were big enough to discredit its use in IS. Their research agreed with previous research that the indicated problems are not substantial enough to lose the capabilities found within the measure. Some research has been done in the area of SERVQUAL and B2C e-commerce (Cao, Zhang and Seydel, 2005; Gounaris and Dimitriadis, 2003; Lee and Lin, 2005). Varying results indicate that future research is needed to determine additional mediating factors which may be present. SERVQUAL has not been tested in the C2C e-commerce environment. This needs to be tested to determine where, if any, the differences lie between the two areas of e-commerce.

## **METHOD AND SAMPLE**

Undergraduate students located in a Southwestern university were used for this study. They were solicited based on their enrollment in an introduction to management information systems course. Drennan, Mort and Previte (2006) argue that University students are "representative of a dominant cohort of online users" (p.6). College students represent the most connected (online) segment of the U.S. population, shopping online and spending online. Therefore, they are experienced and frequent users of the Internet.

Participants were given a modified version of the instruments created by Devaraj, et al. (2002) used to collect data regarding the TAM, TCA, and SERVQUAL components (see individual statements listed in Tables 1, 2, 3 and 4). Participants were asked to indicate on a seven-point Likert scale the degree to which they agreed with the C2C e-commerce statements. The participants were told the survey was completely voluntary and their responses would be kept anonymous and only reported in the aggregate. They were asked to answer the questions regarding their experiences with C2C e-commerce. In addition to these questions, participants were asked to fill out a brief demographics survey. Out of a total of 104 potential respondents, 83 chose to participate (80%).

A majority of the respondents (70%) had participated in C2C e-commerce (such as online auctions, email groups, web-based discussion forums, and/or chat rooms) as either the buyer or seller. Seventy-two percent had never been the seller of a C2C e-commerce transaction. A majority of the respondents (63%) have purchased an item using this channel more than once. Sixty-nine percent of them have done so in the past 12 months. Online auctions were the method of choice for 76% of those who have participated in C2C e-commerce. The respondents' ages ranged from 19 to 41 with the largest majority (59%) between the ages of 20 and 30.

## DATA ANALYSIS AND RESULTS

### Validity and Reliability of Measures

Self-reported data on two or more variables collected from the same source has the potential to lead to common method variance. Therefore, Harman's single-factor test was used in this study to test for this bias (Harman, 1967). This test assumes that if a high level of common method variance is present, then when all of the variables are entered together, all will load on one factor accounting for all of the variance or one factor will account for a majority of the variance. In this study, an exploratory factor analysis (EFA) was performed and seven factors with an Eigenvalue greater than one emerged. The variance explained ranged from 3% to 44% of the total variance. This result provides evidence that common method variance should not be a concern in this study.

The multi-item constructs used in the model were tested for construct validity and reliability. Factors were extracted using principal component analysis (PCA). Each of the TAM constructs' items loaded on one factor. The perceived ease of use construct yielded a Cronbach's alpha score of .77. The percent of variation explained was 60.66%. The usefulness construct generated a Cronbach's alpha score of .81 with 64.78% of the variation explained. Table 1 shows the results of the factor analysis for the TAM constructs. Variables for each of the TAM constructs (PEOU and PU) were calculated for each subject as the average of those items.

PERCEIVED EASE OF USE	LOADINGS
Overall, I believe that C2C e-commerce is easier than other forms of commerce.	.50
It is easy for me to buy/sell using C2C e-commerce.	.83
My interactions during C2C e-commerce were clear and understandable.	.89
I believe that it is easy to do what I want to do while conducting C2C e-commerce.	.84
Cronbach's alpha	.77
Eigenvalue	2.43
Variance Explained	60.66%
PERCEIVED USEFULNESS	
C2C e-commerce gives me greater control over my buying/selling experience.	.78
C2C e-commerce improves the quality of my decision making.	.92
C2C e-commerce is a more effective way to buy/sell products and services.	.87
Overall, I find C2C e-commerce very useful.	.62
Cronbach's alpha	.81
Eigenvalue	2.60
Variance Explained	64.78%

**Table 1. TAM Constructs Factor Analysis**

The TCA construct items also loaded on one factor for each construct. The Cronbach's alpha scores for these constructs were calculated as .83, .74, and .75 for uncertainty, asset specificity, and time, respectively. The percent of variation explained was 67.18%, 57.15%, and 69.09%, respectively. Table 2 shows the results of the factor analysis for the TCA constructs. Variables for each of the TCA constructs (UNC, ASSE, and TIME) were calculated for each subject as the average of those items.

The SERVQUAL construct items had similar results to the TAM and TCA constructs. The Cronbach's alpha scores for these constructs were found to be .83, .88, .60, and .84 for reliability, responsiveness, empathy, and assurance, respectively. The percent of variation explained was 66.01%, 81.14%, 56.27%, and 75.95%, respectively. Table 3 shows the results of the factor analysis for the SERVQUAL constructs. Variables for each of the SERVQUAL constructs (REL, RESP, EMP, and ASSU) were calculated for each subject as the average of those items.

UNCERTAINTY	LOADINGS
It was easy for me to get/provide relevant quantitative (price, taxes, etc.) information using C2C e-commerce.	.83
I believe that it was possible for me to evaluate the various alternative products using C2C e-commerce.	.72
The C2C e-commerce environment provided adequate information.	.90
The C2C e-commerce environment provided sufficient information about the buyer/seller.	.82
<b>Cronbach's alpha</b>	<b>.83</b>
<b>Eigenvalue</b>	<b>2.69</b>
<b>Variance Explained</b>	<b>67.18%</b>
ASSET SPECIFICITY	
There are many Web sites for which the products I have bought/sold are available.	.72
I was satisfied with the number of environments where I could buy/sell products.	.77
C2C e-commerce gives me a wider choice of different sellers/buyers compared to traditional commerce methods.	.79
C2C e-commerce gives me more opportunities compared to traditional commerce methods.	.75
<b>Cronbach's alpha</b>	<b>.74</b>
<b>Eigenvalue</b>	<b>2.29</b>
<b>Variance Explained</b>	<b>57.15%</b>
TIME	
C2C e-commerce helps me accomplish tasks more quickly.	.69
I did not have to spend too much time to complete the transaction using C2C e-commerce.	.86
I did not have to spend too much effort to complete the transaction using C2C e-commerce.	.93
<b>Cronbach's alpha</b>	<b>.75</b>
<b>Eigenvalue</b>	<b>2.07</b>
<b>Variance Explained</b>	<b>69.09%</b>

Table 2. TCA Constructs Factor Analysis

RELIABILITY	LOADINGS
I believe that C2C e-commerce is reliable.	.84
I believe that what I ask for is what I get in C2C e-commerce.	.82
I think that the C2C e-commerce seller/buyer with whom I transacted acted in accordance to our agreement.	.74
I trust the C2C e-commerce seller/buyer to complete the transaction on time.	.85
Cronbach's alpha	.83
Eigenvalue	2.64
Variance Explained	66.01%
RESPONSIVENESS	
I believe that the C2C e-commerce seller/buyer is responsive to my needs.	.90
In the case of any problem, I think the C2C e-commerce seller/buyer will respond promptly.	.90
The C2C e-commerce seller/buyer will address any concerns that I have.	.91
Cronbach's alpha	.88
Eigenvalue	2.43
Variance Explained	81.14%
EMPATHY	
The C2C e-commerce seller/buyer remembers or recognizes me as a repeat customer/seller (after the first time).	.78
I think C2C e-commerce can address the specific needs of each buyer/seller.	.81
I was satisfied with the payment options (e.g., money order, different credit cards) available with C2C e-commerce.	.65
Cronbach's alpha	.60
Eigenvalue	1.69
Variance Explained	56.27%
ASSURANCE	
I felt confident about the C2C e-commerce transaction decision.	.89
I feel safe in my transactions with the C2C e-commerce environment.	.84
The C2C e-commerce seller/buyer had answers to all my questions regarding the transaction.	.88
Cronbach's alpha	.84
Eigenvalue	2.28
Variance Explained	75.95%

**Table 3. SERVQUAL Constructs Factor Analysis**

The multi-item construct for satisfaction was also tested. A Cronbach's alpha score was found to be .85 with 77.64% of the variation explained. Table 4 shows the results of the factor analysis for the satisfaction construct. A variable for the satisfaction construct (SAT) was calculated as the average of the items. Each of the constructs in the model exceeded the recommended Cronbach's alpha threshold score of .50 (Nunnally, 1967).

SATISFACTION	LOADINGS
Overall, I was satisfied with my C2C e-commerce experience.	.87
The C2C e-commerce environment provided information content which met my needs.	.89
It was possible for me to buy the product of my choice easily using C2C e-commerce.	.88
Cronbach's alpha	.85
Eigenvalue	2.33
Variance Explained	77.64%

**Table 4. Satisfaction Construct Factor Analysis**

**Model Testing**

Regression analysis was performed to test the relationships between the construct variables and satisfaction. Residual plots were reviewed for non-random scatter about the zero line. No heteroscedasticity was found in the data. Variance inflation factors (VIF) were examined for each of the independent variables in the model. All values were small (below 10) suggesting there is no problem with multicollinearity in the data.

Table 5 shows the regression results using the TAM variables. Both perceived ease of use and usefulness are positively significant at the .001 level. This indicates respondents are more satisfied with C2C e-commerce when they find the process easy to do and effective.

Dependent Variable: SAT					
Independent Variable	Parameter Estimate	Standard Error	t	p	VIF
PEOU	.56	.10	5.60	.000***	2.47
PU	.42	.10	4.03	.000***	2.47
***p<.001					

**Table 5. Regression on Satisfaction: TAM Variables**

Table 6 shows the regression results using the TCA variables. Uncertainty is shown to be positive and significantly associated with satisfaction at the .001 level. Both asset specificity and time are positively significant at the .05 level. This indicates that a respondent is satisfied with C2C e-commerce when information was readily available, there was a variety of choices (both with places to buy/sell and products to buy/sell), and the process can be done quickly.

Dependent Variable: SAT					
Independent Variable	Parameter Estimate	Standard Error	t	p	VIF
UNC	.54	.11	4.73	.000***	1.43
ASSE	.26	.13	2.02	.048*	1.33
TIME	.40	.11	3.73	.000*	1.36
***p<.001; *p<.05					

**Table 6. Regression on Satisfaction: TCA Variables**



Table 7 shows the regression results using the SERVQUAL variables. Reliability, responsiveness, and empathy are all positively significant at the .01 level. Assurance was shown to be positively significant at the .001 level. This indicates that respondents are more satisfied with C2C e-commerce when the process is reliable (including receiving the correct products/payment in the agreed upon timeframe), the buyer/seller is responsive to the needs, questions and concerns of the seller/buyer, the buyer/seller recognizes each seller's/buyer's specific needs (including possible payment options), and the buyer/seller provides assurances that the online purchase is correct.

Dependent Variable: SAT					
Independent Variable	Parameter Estimate	Standard Error	t	p	VIF
REL	.45	.13	3.39	.002**	3.73
RESP	.36	.11	3.35	.001**	3.59
EMP	.48	.15	3.21	.002**	1.97
ASSU	.42	.11	3.90	.000***	2.54
***p<.001; **p<.01					

**Table 7. Regression on Satisfaction: SERVQUAL Variables**

## DISCUSSION AND CONCLUSIONS

The study findings indicate that many individuals are choosing to participate in C2C e-commerce, both buying and selling. In order to understand this movement to online C2C e-commerce, this study sought to determine factors affecting consumer satisfaction in that channel.

All model variables were found to be significant influencers on satisfaction. More specifically, the ease of use and usefulness of the C2C online environment; the amount of information provided to eliminate uncertainty; the additional avenues provided for buying and selling (asset specificity); the time saved when accomplishing buying/selling; and the service quality being reliable, and buyers/sellers being responsive, assuring and empathetic were found to predict satisfaction.

When comparing these findings to those completed by Devaraj et al. (2002) for B2C e-commerce, there are distinct differences. Devaraj et al. found the same variables to be significant in the B2C online arena except reliability, responsiveness, and empathy (three components of service quality). With C2C e-commerce, this study found an individual's satisfaction to depend on all four aspects of service quality. The reliability that the consumer felt toward another consumer predicted his/her satisfaction. This difference seems apparent given that logically consumers trust businesses more than consumers. Therefore, one would expect reliability to influence satisfaction in C2C e-commerce where as not in B2C e-commerce. The responsiveness of one consumer to another predicted his/her satisfaction in C2C e-commerce. Again, in a B2C online environment, responsiveness would not be as large of a concern; consumers expect businesses to respond to their needs. Finally, the empathy of a consumer to another consumer predicts his/her satisfaction in C2C e-commerce. In a B2C online environment, payment options and recognition as a repeat customer (refer to Table 3 for the specific survey questions) would be expected and therefore do not impact satisfaction.

Differences do exist in the C2C and B2C online realms. Therefore, further investigation is warranted in C2C e-commerce, which has been given little attention up to this point. In addition, differences should be investigated between C2C online auctions and the other forms of C2C e-commerce. This study gathered data regarding all forms of C2C e-commerce, but it did not test for differences between the C2C e-commerce types. Finally, researchers may want to consider adding mediating factors to the present research model, as well as any interactions between the constructs.

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