

# Acceptance of Internet-Based Services: A Comparison of Three Models

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## **Abstract**

*While more and more products and services are delivered on the Internet, why customers accept these online products and services has drawn considerable interests from the business practice and the research community. Previous research has approached this question from three different perspectives, i.e., transactional, relational and a mixed of the two. However, the relative explanatory power of these three different views in explaining online service acceptance is unknown. This study compares IS Continuance Model (ISCM), the Commitment Trust Theory (CTT), and an integrated model developed from ISCM and CTT. The integrated model, ISCM and CTT were compared using data collected from 185 customers of web hosting services. Results showed that CTT and the integrated model had similar explanatory power and that both the integrated model and CTT explained higher variances in acceptance of online services than ISCM did. The findings suggest that the relational view outweighs the transactional view in terms of explaining acceptance of online services and that relational factors have the ability to explain some variances not explained by transactional factors, but not vice versa. Implications for research and practices are discussed.*

**Keywords:** technology acceptance, transactional view, relational view, satisfaction, perceived usefulness, commitment, trust, web hosting services

## Introduction

The wide diffusion of the Internet has created many business initiatives and opportunities. Conventional brick-and-mortar businesses have utilized the Internet as an alternative channel to deliver their products and services online. Many virtual click businesses which only rely on the Internet have emerged to provide a diverse range of online products and services. Because of the difficulty of attracting and retaining customers on the Internet, why customers adopt and accept online services has drawn considerable attention from both the practice and the research community (e.g., Gefen et al. 2003).

Most previous studies have investigated adoption, acceptance, and use of online services from the *transactional* view, which considers the interaction between a customer or user and an e-vendor or service provider as a business transaction occurring at the interface of website (Benbasat and DeSanctis, 2001; Gefen et al 2003; Keen, 2001). The *transactional* view is focused on the economic benefits for both the customer and the online business, with an aim at improving business transactions through efficient and effective website design. Representative studies of this view have investigated Technology Acceptance Model (TAM) (Davis et al. 1989) and its core constructs, i.e., perceived usefulness (PU) and perceived ease of use (PEU), to explore the effect of technology features because the website is often considered as a type of information technologies (IT) (e.g., Klein 2007). Other transactional factors such as satisfaction are also widely investigated (e.g., Bhattacharjee 2001; Khalifa and Liu 2007; Liu and Khalifa 2003; Otim and Grover 2006).

The *relational* view has emerged in the theory of IS research and e-business practice (Benbasat and DeSanctis, 2001; Coviello et al. 2002; Keen, 2001). Different from the *transactional* view which emphasizes satisfaction and usefulness, a *relational* view of online customer relationships focuses on the social-psychological factors and humanistic aspects of the interactions, such

as trust and loyalty. This view values the increased engagement of human beings (business representatives and customers) in their interactions through computer-mediated communication technologies such as websites. Through the interactions between customers and the business on the Internet, the development of a relationship between the two could be expected (Benbasat and DeSanctis, 2001). Unlike the wide attention from the marketing literature (Agustin and Singh, 2005; Nijssen et al., 2003; Oliver, 1999; Singh and Sirdeshmukh, 2000; Sirdeshmukh et al., 2002), there is not much empirical research which is solely focused on the relational view of customer loyalty except for limited evidence from the information systems (IS) community (e.g., Li et al, 2006).

Instead, most IS studies adopt an integrated or mixed viewpoint of both the transactional view and the relational view (e.g., Gefen et al. 2003). In the studies with the integrated or mixed view, researchers often integrate one or two most widely investigated relational factor such as trust into a well-established theoretical framework such as TAM. For example, Gefen et al. (2003) developed an integrated model of trust and TAM and found that PU, PEU, and trust all had significant effects on an individual's behavioral intention to shop online. Van der Heijden et al. (2003) provided a balanced view of technological features and trust-oriented factors (trust and risk) in the examination of online purchase intention. Pennington et al. (2003) and Verhagen et al. (2006) examined the role of attitude, risk, and trust based on the fundamental framework of Theory of Reasoned Actions (TRA) (Fishbein and Ajzen, 1975) and Theory of Planned Behavior (TPB) (Ajzen 1991).

*How different are the transactional, the relational, and the mixed view in explaining acceptance of online services?* Getting an answer to this question, on one hand, gives us an empirical testing of the three theoretical models/frameworks, and thus advances our understanding of the explanatory power of each of them. On the other hand, the findings can provide Internet-based service

providers with practical guidance of what should be focused on enhancing the intention to continue using their services. This is especially important given the growing competition of the online services market. To our best knowledge, we have not found any literature reporting a comparison of these three different views. We aim to be one of the first to do so. We take the IS Continuance Model (ISCM) from the IS literature (Bhattacharjee 2001) as the example of the transactional view and the Commitment Trust Theory (CTT) from the marketing research (Morgan and Hunt 1994) as the example of the relational view. On the bases of these two models/theories, we build an integrated research model as the mixed view, which may better explain acceptance of online services. We believe that adopting a model comparison approach to examine ISCM (the transactional view), CTT (the relational view), and the integrated model (the mixed view) simultaneously will allow us to reveal the differences of the three views and strength of each view.

The rest of the paper is organized as follows. We first provide the background of the three perspectives of online business and user interactions. We then describe the research methodology and report the results of our data analyses. The paper concludes with potential implications for information systems research and practice.

## **Research Background**

In order to explain the acceptance of online services from both the transactional view and the relational view, it is important to choose exemplary models and theories of the two views. We argue (as shown below) that ISCM (Bhattacharjee 2001) is focused on the transactional view and CTT (Morgan and Hunt 1994) has the essence of the relational view. The two models/ theories are chosen because of two considerations. First, we believe it is more important to examine continuous usage than to examine initial adoption in the context of online services acceptance. Both ISCM and CTT are focused on long-term orientation between a business

and its customers, rather than initial encounters between the two parties which have been well-examined in previous studies using TAM. ISCM depicts continuance explicitly as the dependent variable in the model and is more tailored to a customer's continuous usage of online services. Continuous usage is a clear indicator and consequence of a customer's long-term relationship with the business. CTT is similar in this sense because the theory models propensity to leave the relationship as a dependent variable.

Second, we believe an investigation of ISCM and CTT will fill the clear gap in empirical IS research. Unlike TAM, TRA, and TPB, which have been widely compared and integrated in several studies that adopted model comparison approach (e.g., Chau and Hu, 2001; Davis et al., 1989), there is very limited empirical research that either integrates factors into ISCM or compares ISCM with other models. Our search of the literature found that several studies elaborated ISCM with the construct of habit or playfulness (Limayem et al., 2007; Lin et al., 2005; Khalifa and Liu, 2007). There were only two studies comparing ISCM with TAM in a model comparison approach (Hong et al., 2006; Hsieh and Wang, 2007) and the application of CTT in IS research is limited to the study by Li et al. (2006).

**IS Continuance Model (ISCM)** was first developed by Bhattacharjee (2001) to investigate a customer's continuous use of an IS. It is one of the first to focus on IS continuance, a post-adoption phenomenon. Based on TAM and the Expectation-Confirmation Theory (ECT) from consumer behavior research (Oliver, 1980), Bhattacharjee (2001) integrated satisfaction and PU jointly to explain a customer's behavioral intention to continue using online services. PU is one of the two technological factors accounting for technology use (Davis et al., 1989). Following the definition of PU (Davis et al., 1989), we define PU as the degree to which an individual user or customer believes that using a particular online system would enhance his or her

performances in using the online service. Satisfaction, on the other hand, is a post-purchase evaluation and judgment over a particular purchase. It is different from attitude because of its transient and experience-specific nature (Oliver, 1980). Both satisfaction and PU are focused on the economic outcomes of using an IS, emphasizing the efficiency and effectiveness of the IS in supporting an individual's business tasks (Van der Heijden et al., 2003). Thus, ISCM represents the transactional view of online customer relationships.

In ISCM, both satisfaction and PU were suggested to predict an end user's behavioral intention (Bhattacharjee, 2001). In addition, PU also had an indirect effect on behavioral intention, which was mediated by satisfaction. The results from the empirical study conducted by Bhattacharjee (2001) showed that satisfaction (coefficient=0.57) had higher power than PU (coefficient=0.29) in explaining behavioral intention to continue using an online banking. The indirect effect of PU was also significant in the study. The findings were consistent with previous IS literature, which has accumulated abundant

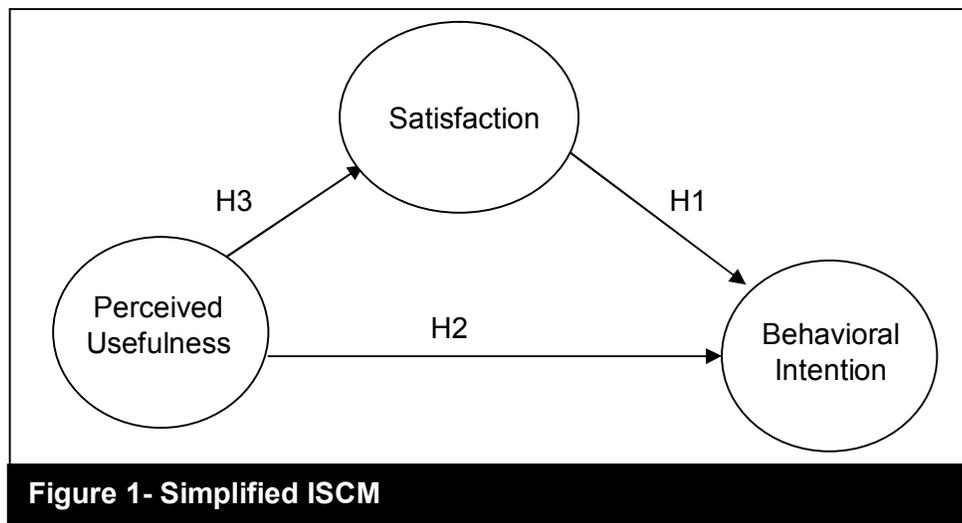
evidence for the effects of satisfaction and PU on the behavioral intention to adopt/accept/use an IS/IT (e.g., Venkatesh and Davis 2000). Several studies have either elaborated ISCM with the integration of other factors such as habit (Limayem et al. 2007; Khalifa and Liu 2007) and playfulness (Lin et al. 2005). Two other studies compared ISCM with TAM (Hong et al. 2006; Hsieh and Wang 2007).

It is noteworthy that our current study is focused on the determinants of acceptance of online services. According to ISCM, such determinants are satisfaction and PU. We do not consider the effect of confirmation on satisfaction because of such a focus of the current study. Figure 1 shows the model. Also, we posit the following hypotheses:

*H1: Satisfaction has a positive effect on behavioral intention.*

*H2: Perceived usefulness has a positive effect on behavioral intention.*

*H3: Perceived usefulness has a positive effect on satisfaction.*



**Commitment Trust Theory (CTT)** is a theory in relationship marketing (Morgan and Hunt, 1994), which predicts that a strong long-term relationship between the business and the customer is the main reason for the customer to stay with the business. Unlike the transactional view, the relational view suggests that satisfaction does not always predict continuous purchasing and that satisfaction is a necessary but not sufficient factor for customer retention (e.g., Jones and Sasser, 1995). Instead, repeated purchasing or patronage is just one of the many behavioral facets of the customer's commitment to and trust in the relationship with the business (Morgan and Hunt 1994).

Commitment and trust are the most prominent factors in the formation, development, and maintenance of relationships (Garbarino and Johnson 1999; Morgan and Hunt 1994). As Morgan and Hunt (1994) state, "the presence of relationship commitment and trust is central to successful relationship marketing." Relationship commitment is "an exchange partner believing that an ongoing relationship with another is so important as to warrant maximum efforts at maintaining it" (Morgan and Hunt, 1994). On the other hand, trust exists "when one party has confidence in an exchange partner's reliability and integrity" (Morgan and Hunt, 1994). Further, trust has a positive impact on and is a major determinant of relationship commitment.

Among the several outcomes of CTT, propensity to leave a relationship is relevant to the current study of online service acceptance. According to CTT (Morgan and Hunt, 1994), commitment and trust affect propensity to leave, which is the likelihood that a partner terminates a business relationship in the near future and thus describes the stability of such a relationship. Following this logic, we posit that commitment and trust affect online service acceptance. As mentioned above, the focus of this study is on the acceptance of online services, so that we do not consider other consequences of

commitment and trust. We do not examine the antecedent factors of commitment and trust either.

While trust has been widely investigated in the context of online services (e.g., Datta and Chatterjee, 2008; Gefen et al., 2003), the effect of commitment on an individual's continuous patronage of online service is not widely examined in the IS literature. However, previous studies in conventional marketing channels have found that commitment can (1) predict the future intention of consumers to subscribe consistently to a theater company (Garbarino and Johnson 1999), (2) improve membership retention and participation in professional associations (Gruen et al., 2000), (3) lower conflict levels between retailers and suppliers (Jap and Ganesan, 2000), (4) minimize opportunistic behavior in auditor-client relationships (De Ruyter and Wetzels, 1999), and (5) justify consumers' resistance to change business partners and thus improve the loyalty to the current business (Pritchard et al., 1999).

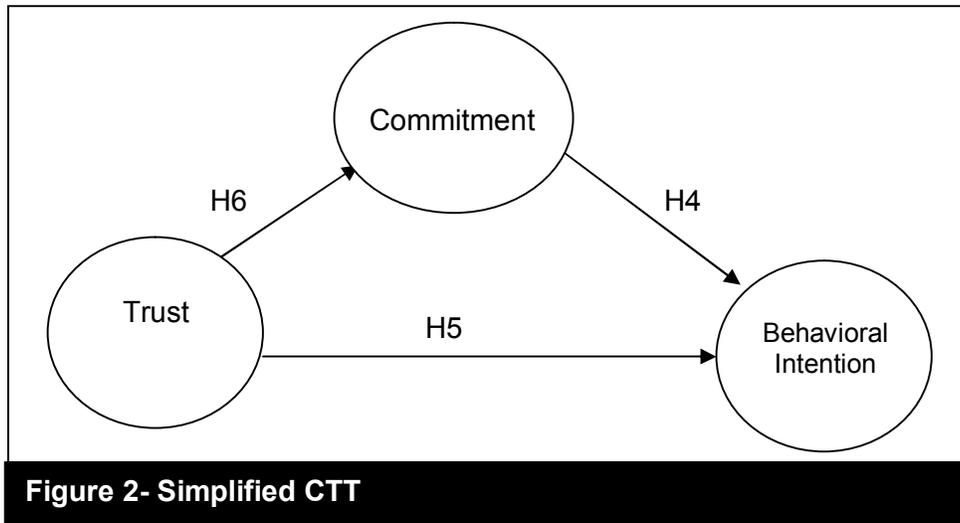
Recently, IS studies have examined the role of other relationship factors such as relationship investment in online consumer loyalty (Ranganathan et al., 2006). However, there is a scarcity of literature that tests CTT in the context of online shopping or online service acceptance. One of the exceptions is the study of Li et al. (2006), which found that an individual user's continuous usage of an online website was determined by both commitment and trust and that the effect of commitment was more significant than that of trust.

Figure 2 shows the model. Also, we posit the following hypotheses:

*H4: Commitment has a positive effect on behavioral intention.*

*H5: Trust has a positive effect on behavioral intention.*

*H6: Trust has a positive effect on commitment.*



**An Integrated Model.** As mentioned above, most IS literature on online service adoption/ acceptance/usage has followed an integrated view of transactional perspective and relational perspective (e.g., Gefen et al., 2003; Pennington et al. 2003). However, these integrated models seem to emphasize more on the core constructs of the theoretical background (TRA, TPB, and TAM) so that the relational factors (such as trust) being integrated into the models do not seem to play the same important role as those core constructs.

On the other hand, a similar integrative approach has emerged in the marketing literature (Singh and Sirdeshmukh, 2000), which seems to be unnoticed in the IS literature. Several studies in the marketing literature have investigated how the two views could be unified to explain consumer behavior and both transactional factors and relational factors are complementary in explaining customer loyalty (e.g., Agustin and Singh, 2005; Nijssen et al., 2003; Oliver, 1999; Singh and Sirdeshmukh, 2000; Sirdeshmukh et al., 2002).

One of the most salient models in the literature is the Satisfaction-Trust-Value-Loyalty (STVL) model (e.g., Agustin and Singh, 2005; Nijssen et al., 2003; Sirdeshmukh et al., 2002). The model provides a comprehensive perspective of how transactional factors and relational factors

work together to influence consumer behavior. In the STVL model, loyalty is determined directly and indirectly by satisfaction, trust, and value. Each antecedent factor has both direct effect and indirect effect mediated by the next factor. For example, satisfaction is hypothesized to have a direct effect on loyalty. In addition, an indirect effect of satisfaction on loyalty is mediated by trust, which is then mediated by value.

STVL provides a rationale for this current study to integrate ISCM and CTT by means of linking satisfaction in ISCM to commitment and trust in CTT. Regarding satisfaction, a direct effect of satisfaction on behavioral intention can be established according to ISCM. STVL also has a similar link from satisfaction to loyalty which is similar to behavioral intention in our study. In addition, STVL suggests that satisfaction has an indirect effect on loyalty mediated by trust and value respectively. Following the similar mediating propositions, we suggest an indirect effect of satisfaction on behavioral intention via trust and commitment respectively.

As mentioned above, satisfaction is an individual's positive affective state derived from calculating the rewards and costs from previous interaction experience. Its transient nature usually develops in the short run. However, consistent satisfying experience in the interaction process with online business

will enhance the individual's confidence that the online services can be trusted. Thus, satisfaction with past outcomes from using online services can gradually nurture trust, which usually develops in the long-run. Previous studies have found that satisfaction was an antecedent of customer's trust (Garbarino and Johnson, 1999; Singh and Sirdeshmukh, 2000). Therefore, the direct link from satisfaction to trust can be established. With this, we posit:

*H7: Satisfaction has a positive effect on trust.*

Following the same argument, we can develop the direct link from satisfaction to commitment. Satisfaction is a comparison between the results and prior expectations of transactions (Olive 1981). It is therefore a belief resulting from earlier experiences. If a

customer is not satisfied with a business from previous experiences, it is impossible to expect the customer to stay in the relationship with the business. On the other hand, if a customer experiences satisfactions from the interactions with the business, the commitment level to the relationship can be high. The mediated effect has been also conjectured by Oliver (1999) and empirically tested in several studies (e.g., Agustin and Singh, 2005; Garbarino and Johnson 1999; Nijssen et al., 2003; Singh and Sirdeshmukh, 2000; Sirdeshmukh et al. 2002). Therefore, we posit:

*H8: Satisfaction has a positive effect on commitment.*

Figure 3 depicts the integrated model.

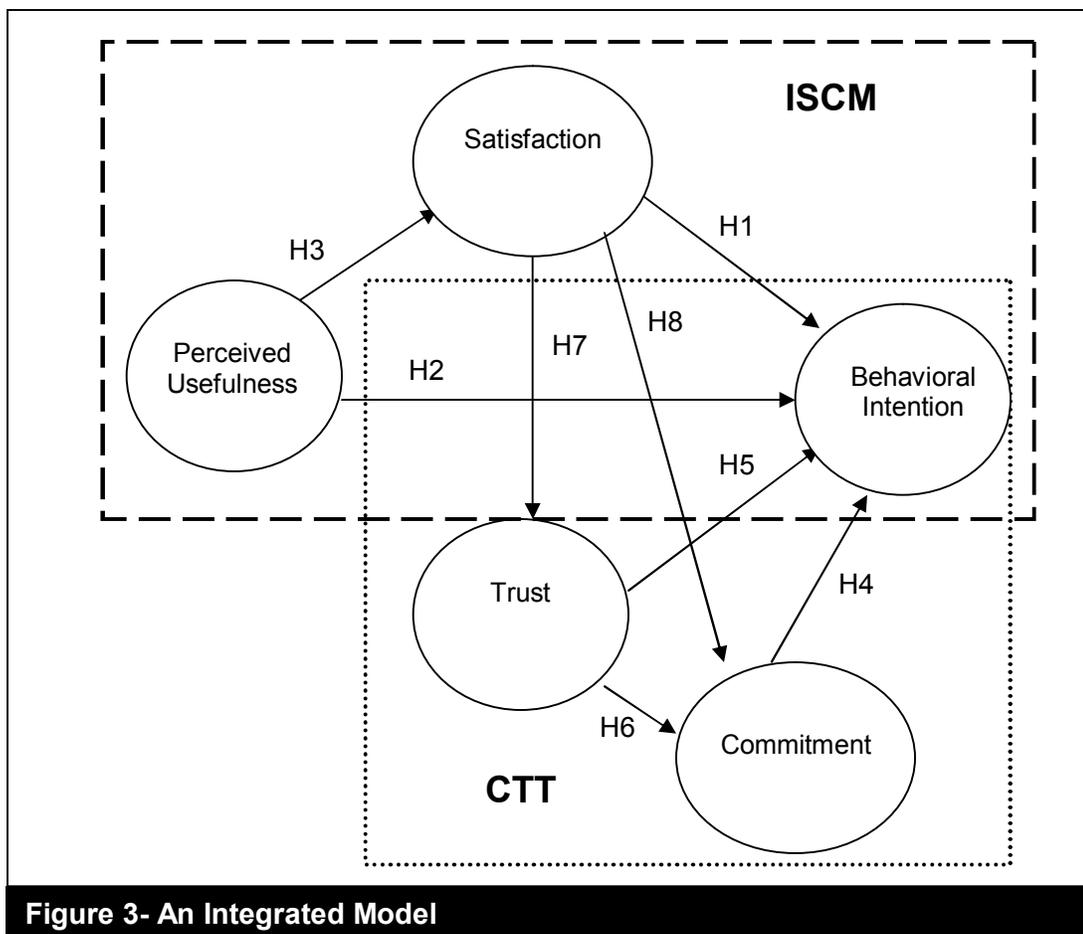


Figure 3- An Integrated Model

As a summary, we aim to compare three models, i.e., ISCM, CTT, and the integrated research model built upon ISCM and CTT, in the ability of predicting the behavioral intention to accept online services. The relative advantages of the transactional view, the relational view, and the mixed view of online customer relationships are expected to be revealed in the following empirical study.

## Research Method

In order to answer our research questions, i.e., *how different are the transactional, the relational, and the mixed view in explaining acceptance of online services? which one is more powerful?* we investigated web hosting service, which is an approach of hosting web applications such as web sites, data storage, and IT operations, on a web hosting service provider's servers (IEC, 2004). Web hosting users can either build and maintain all the applications by themselves or request the provider to manage and update the clients' applications on the servers. Gartner estimated that the web hosting market grew from \$5.5 billion in revenue in 2002 to \$17.8 billion in 2007 (Ewalt, 2003). IDC expected web hosting market to triple the corresponding market size of Application Service Providers (ASP) from 2003 to 2008 (Bednarz, 2004; Mears, 2004).

Regarding the driving factors of this rapidly changing market, IBM attributed to the success of acquiring customers who were concerned with the financial stability of IBM (Bednarz, 2004). Yankee Group believed that the difficulty of acquiring new customers and keeping existing customers was the major reason for the struggling web hosting market (Wallace, 2001). According to an IDC analysis (Mears 2004), the main reasons for customers to use web hosting services included cost saving, lack of skills to run their own websites, great performance of the service providers (e.g., security), and 24-7 support provided by the providers. These industry reports suggested that both technological features and

relationship building factors were important for a web hosting company to be successful in the industry, therefore providing the rationale for us to test our research questions in the context of web hosting services.

## Data Collection

Survey method was used for data collection. We surveyed web hosting customers' experiences with a web hosting provider. A web-based survey was developed and hosted in a dedicated server used for teaching and research purposes at the researchers' university. Web-based survey has become a powerful approach of data collection for online e-commerce and marketing research in the recent years, because of lower costs, quick response time, direct data entry from the respondents, minimum effect of the researchers' presence on the respondents (Grandcolas et al., 2003).

To identify customers, we first posted a message on a popular discussion forum for web hosting service providers. In the message, we invited web hosting companies to participate in the study if they were interested in conducting customer satisfaction survey. Several companies responded to our request. We did not select all of them because our research budget was limited, some companies had small customer bases, and we planned to minimize the variances among companies. Instead, we selected a privately held web hosting company located in a large mid-west city in the U.S. The company was targeted at the lower-cost market. For example, the hosting company provided budget hosting plan, which only cost \$7.95 per month with such features as 1500 MB storage space, 50 GB bandwidth, 500 e-mail accounts, server-side scripting, FTP, e-commerce shopping carts, etc. Distinguished from its many competitors, the company also offered a wide range of value-added services and products, which allowed a customer to customize his services based on his requirements. Shared

hosting, dedicated hosting, and collocated hosting were all available from the web hosting company.

The survey respondents were the clients of the web hosting company. A client was either individual user whose website hosted by the company was not for business purposes or business user whose website had clear domain name for doing businesses on the website. During the survey period, a hyperlink to the web-based survey was kept alive in the 'client' area of the web hosting company's website. The company's clients could see the link whenever they logged onto the dedicated customer page in the web hosting company's website. At the beginning of the survey, the company also sent out a notification email to all registered clients. A hyperlink in the notification email directed the customers to the web-based survey. The company also posted a message about the survey in its online discussion forum designated for all the clients to exchange information. The message was placed at the highest priority of all the discussion messages and was not deleted until the end of the data collection. The customers were asked to evaluate the web hosting company in terms of the technologies and services provided.

The clients responded to the online survey during a period of four weeks. The four-week period was shorter than that of the traditional survey. However, research has shown that over 90% of the responses for web-based survey are back in the first two weeks (Cobanoglu et al., 2001). Whenever a customer visited the online survey, the visiting time, the IP address of the computer where the customer logged on, and the customer's email address registered with the web hosting company were captured. The customer's email address was used as the unique ID of the respondent.

There were 780 registered customers before the survey started. A total of 250 unique respondents who were identified based on the IDs visited the survey web site.

214 filled out the survey. After removing 29 incomplete responses, a total of 185 responses were kept in the final sample for analysis. The response rate was 24%. We also checked non-response bias following Armstrong and Overton (1977). No differences were found between the early respondents and the late respondents, which suggested that non-response bias was unlikely to be present in our data.

### **Measures**

All the research variables in the models (Figure 1-3) were measured using multiple-item scales adapted from prior studies, with minor wording changes to tailor them to the target context in the study. 7-point Likert scales were used, anchored by "strongly disagree" and "strongly agree". The scale for behavioral intention was adapted from that of Agarwal and Karahanna (2000). Different from other behavioral intention measures, this scale indicated the intention to continue the use of the technology and service in the near future. For example, one question was "I plan to keep using the service provider's services in the future." The items for satisfaction were also derived from previous literature (e.g., Spreng et al. 1996), e.g., "I feel satisfied with this service provider." PU was measured using the scales from Davis (1989). The scales for commitment and trust were based on those from Morgan and Hunt (1994), e.g., "I want this service provider to be available for a long time," "The service provider could be counted on." Appendix 1 lists the final items used in the study.

### **Preliminary Investigations**

A series of pre-tests were conducted to examine and validate the survey instrument, ensuring that it encompassed construct reliability and validity at an acceptable level (Straub, 1989). First, personal interviews with a small group of students were conducted to check the face validity of the adapted measures. Changes concerning the format and wording of the questions were then made. Next, the questionnaire was sent to 60 graduate students. Reliability

and validity of the instrument were checked based on returned responses. The results of the pre-tests suggest that the instrument possessed adequate reliability and validity. Finally, the survey was converted to an online form. A group of undergraduate students were recruited to test the online survey. The font, format, color, and response time of the online survey were evaluated by these students. No major modifications or changes were made to the questionnaire after these preliminary investigations.

### Sample Characteristics

Sample statistics are shown in Table 1. 84% of the respondents were male, 70% were between 20 and 30, 65% had college or higher degree. On average, the respondents had 12.2 years experience with computer, 6.3 years with web, and 6.9 years with emails. There were also 64 business users and 121 individual users. No differences were found between business users and individual users regarding the variables investigated in the research model. Therefore, we pooled the two groups together.

Gender	Male	164	89%
	Female	21	11%
Age	<26	56	30%
	26-30	50	27%
	31-35	28	15%
	>35	51	28%
Education	High School	29	16%
	Tech. School	16	9%
	College	123	66%
	Others	17	9%
Experience with Computer (Years)	<3	1	1%
	3-6	19	10%
	7-12	69	37%
	>12	96	52%
Experience with WWW (Years)	<3	24	13%
	3-6	56	30%
	7-12	90	49%
	>12	15	8%
Experience with Email (Years)	<3	2	1%
	3-6	46	25%
	7-12	104	56%
	>12	33	18%
Experience with the Company (Months)	<3	76	41%
	3-6	66	36%
	7-12	37	20%
	>12	6	3%
User Type	Business user	64	35%
	Individual user	121	65%

## Data Analysis and Results

The research model was tested using LISREL 8.30, a structural equation modeling (SEM) software. SEM allows the simultaneous evaluation of the qualities of the measures (the measurement model) and the causal relations of the unobserved constructs (the structural model). To be specific, a two-step SEM analysis approach was adopted (Anderson and Gerbing 1988). Following this approach, the analysis of the measurement model was separate from that of the structural model. The validity and reliability of measures were analyzed before the structural model was tested. Such an approach provided confidence in the reliability and validity of the measures, and the relationships suggested by the structural model.

### Scale Validations

One unified measurement model including all the five research constructs (i.e., behavioral intention, perceived usefulness, satisfaction, commitment, and trust) was first assessed by a confirmatory factor analysis using LISREL.

The sample covariance matrix was the input file. The results of the measurement model were shown in Table 2. Compared to commonly accepted values suggested in the literature (e.g., Chau, 1996), all of these fit indices suggest a good fit of the measurement model.

The model was further assessed for construct reliability and validity. Reliability was assessed by both item reliability and composite reliability (Table 2). Item reliability indicates the amount of variance in an item explained by the underlying construct and is calculated as the square of the factor loading. Item reliabilities in our measurement model range from 0.66 to 0.94, all above the recommended value of 0.50 (Fornell and Larcker, 1981). Composite reliability was also calculated following  $\rho = (\sum \lambda_i)^2 / ((\sum \lambda_i)^2 + \sum \theta_i)$ , where  $\lambda_i$  refers to the *i*th factor loading and  $\theta_i$  to the *i*th error variance. Composite reliabilities in our measurement model range from 0.82 to 0.97, above the recommended value of 0.70.

**Table 2- Measurement Model**

Construct	Indicator	Mean	Standard Deviation	Std. Loading	Error Loading	Item Reliability	Composite Reliability	Average Variance Extracted
Behavioral Intention (INTEN)	INTEN1	6.03	1.15	0.97	0.24	0.94	0.97	0.92
	INTEN2	5.97	1.24	0.94	0.34	0.88		
	INTEN3	6.03	1.17	0.97	0.24	0.94		
Commitment (COMMT)	COMMT1	6.35	1.06	0.83	0.56	0.69	0.82	0.69
	COMMT2	5.71	1.21	0.83	0.56	0.69		
Trust (TRUST)	TRUST1	5.72	1.36	0.81	0.59	0.66	0.92	0.80
	TRUST2	5.85	1.20	0.96	0.28	0.92		
	TRUST3	5.74	1.20	0.91	0.41	0.83		
Satisfaction(SATIS)	SATIS1	6.09	1.12	0.96	0.28	0.92	0.95	0.91
	SATIS2	5.97	1.27	0.95	0.31	0.90		
Perceived Usefulness (PU)	PU1	4.48	1.54	0.88	0.47	0.77	0.96	0.87
	PU2	4.33	1.54	0.97	0.24	0.94		
	PU3	4.41	1.53	0.97	0.24	0.94		
	PU4	4.34	1.57	0.91	0.41	0.83		

**Fit Indices:** Chi-square=90.70 (d.f.=67, p < 0.01), GFI = 0.93, AGFI = 0.90, NFI = 0.97, NNFI = 0.99, CFI = 0.99, RMSR = 0.048, SRMSR = 0.028, RMSEA = 0.044.

Construct validity was evaluated by convergent validity and discriminant validity. Convergent validity can be assessed by factor loading and average variance extracted (AVE) (Fornell and Larcker, 1981). According to Fornell and Larcker (1981), factor loadings greater than 0.70 and AVE greater than 0.50 suggest the convergent validity of the construct is acceptable. As shown in Table 2, the minimum factor loading in this study was 0.81 and the minimum AVE was 0.69; thereby demonstrating adequate convergent validity.

Discriminant validity was assessed by comparing the shared variances between constructs with the average variance extracted of the individual constructs (Fornell and Larcker, 1981). Lower shared variances between constructs than the average variance extracted of the individual constructs suggest discriminant validity. Table 3 presents the correlations between constructs and the square roots of average variance extracted. The results provide positive support for the discriminant validity.

### **Model Testing**

After validating the measurement model, we ran three different structural models separately, i.e., ISCM, CTT, and the integrated model, to show the powers of the models in explaining the dependent variable, i.e., behavioral intention to continue using web hosting services. The results are shown in Table 4, Table 5 and Figure 4, Figure 5, and Figure 6.

**Model 1: ISCM** As shown in Table 4, all the fit indices for ISCM (GFI=0.96, AGFI=0.93, NFI=0.99, NNFI=0.99, CFI=0.99, RMSR=0.035, SRMSR=0.020, RMSEA=0.042) were well above the recommended levels (e.g., Chau, 1996). This suggests that ISCM had good fit with the data. As shown in Table 5 and Figure 4, ISCM explained 64% of the variance in behavioral intention. PU explained 14% of the variance in satisfaction. Examining the paths in ISCM (Table 5 and Figure 4), satisfaction had a significant effect on behavioral intention. PU also had significant effect on satisfaction.

However, the effect of PU on behavioral intention was not significant.

**Model 2: CTT** As shown in Table 4, all the fit indices for CTT (GFI=0.96, AGFI=0.92, NFI=0.98, NNFI=0.98, CFI=0.99, RMSR=0.028, SRMSR=0.018, RMSEA=0.06) were well above the recommended levels (e.g., Chau, 1996). This suggests that CTT had good fit with the data. As shown in Table 5 and Figure 5, commitment and trust explained 71% of the variance in behavioral intention. Trust explained 35% of the variance in commitment. Examining the paths in CTT (Table 5 and Figure 5), all the paths were significant.

**Model 3: Integrated Model** As shown in Table 4, all the fit indices for the integrated model (GFI=0.93, AGFI=0.90, NFI=0.97, NNFI=0.99, CFI=0.99, RMSR=0.062, SRMSR=0.035, RMSEA=0.043) were well above the recommended levels (e.g., Chau, 1996), suggesting that the integrated model had good fit with the data. As shown in Table 5 and Figure 6, the integrated model explained 73% of the variance in behavioral intention. PU explained 14% of the variance in satisfaction. Trust and satisfaction explained 60% of the variance in commitment. Satisfaction explained 61% of the variance in trust. Considering the paths in the integrated model (Table 5 and Figure 6), all the paths were significant except for the one from PU to behavioral intention and that from trust to commitment.

**Model Comparison** The fit indices in Table 4 suggest that all three models had good fit with data. ISCM, CTT, and the integrated model explained 64%, 71%, and 73% of the variance in behavioral intention respectively. The variances explained in both CTT and the integrated model were similar but higher than that explained in ISCM. Comparing the three models only based on  $R^2$  is not very intuitive because of different model complexity. The parsimony of a research model has to be considered.

Therefore, we examined three indices of model comparison, i.e., Akaike Information

Criterion (AIC) Consistent AIC (CAIC), and Expected Cross-Validation Index (ECVI). Widely adopted in previous studies (e.g., Hong et al., 2005), the three indices consider model parsimony in model evaluation. The general guideline is that the lower the three indices, the better the model. As shown in Table 5, CTT had the lowest and the integrated model had the highest AIC, CAIC,

and ECVI among those of the three models, suggesting CTT was the best model and the integrated model the worst. This is understandable because integrated model is more complex than both CTT and ISCM. Give the same parsimony of CTT and ISCM, both model indices and  $R^2$  suggest that CTT was better than ISCM.

**Table 3- Inter-construct Correlation and Discriminant Validity**

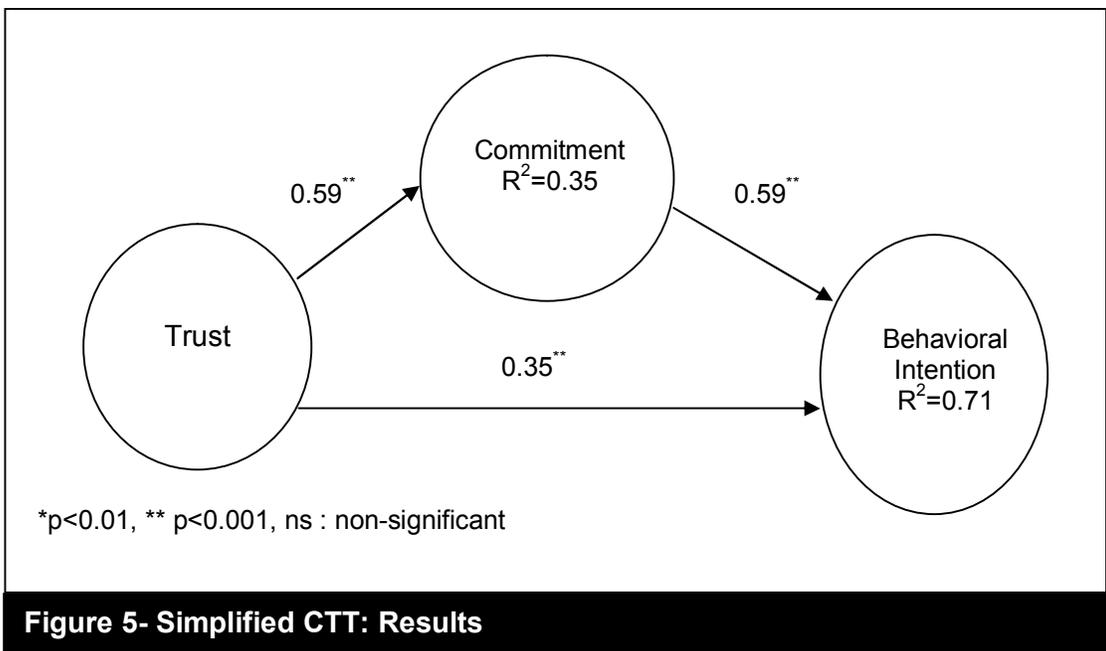
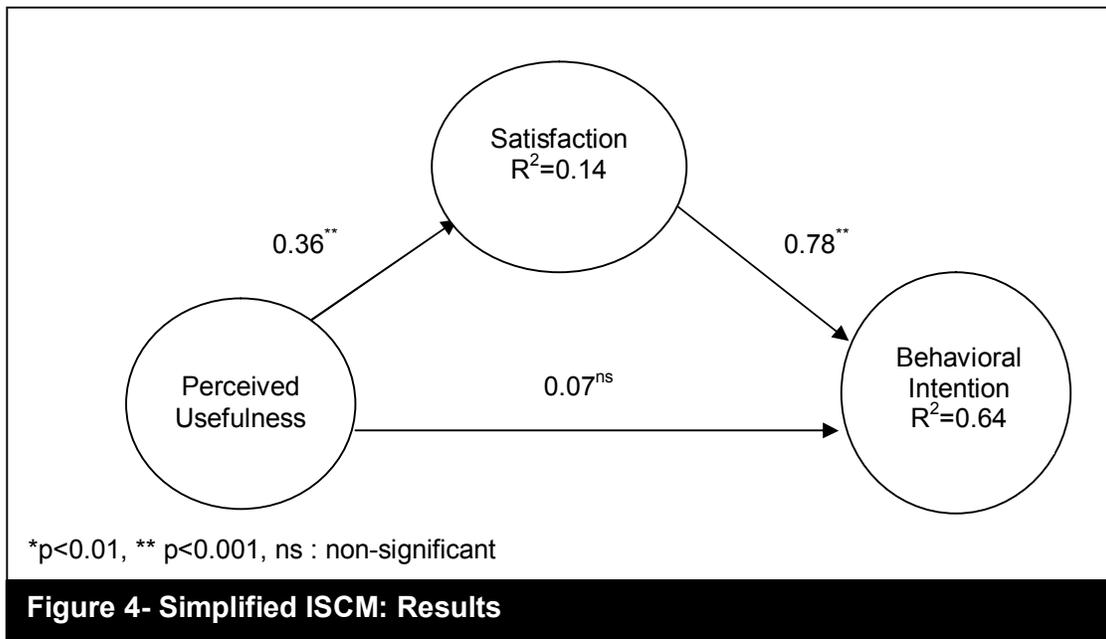
	INTEN	COMMT	TRUST	SATIS	PU
INTEN	0.96				
COMMT	0.80	0.83			
TRUST	0.70	0.59	0.90		
SATIS	0.80	0.77	0.78	0.96	
PU	0.35	0.36	0.29	0.36	0.93

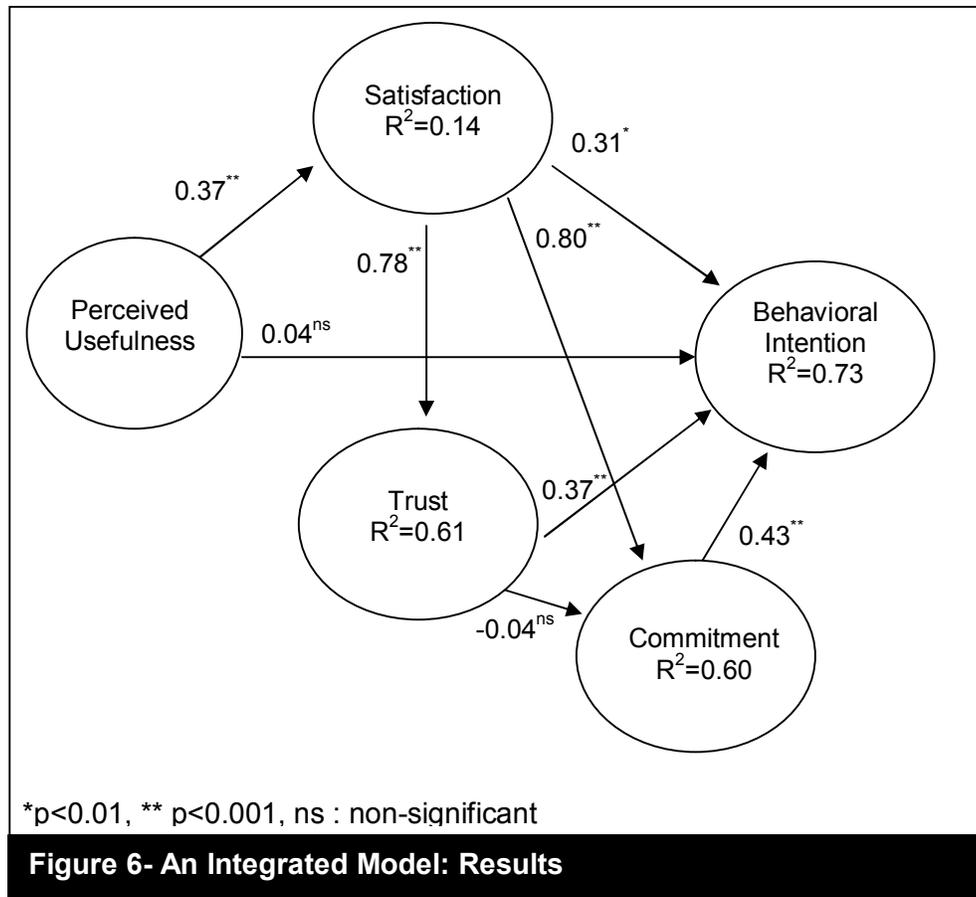
Square roots of AVE (average variance extracted) are shown on the diagonal of the correlation matrix.

**Table 4- Model Fit Indices**

	Recommended Value	ISCM	CTT	Integrated Model
<b>Fit Indices</b>				
Chi-Square/df	<=3.0	1.35	1.70	1.32
GFI	>=.90	0.96	0.96	0.93
AGFI	>=.80	0.93	0.92	0.90
NFI	>=.90	0.99	0.98	0.97
NNFI	>=.90	0.99	0.98	0.99
CFI	>=.90	0.99	0.99	0.99
RMSR	<=.10	0.035	0.028	0.062
SRMSR	<=.10	0.020	0.018	0.035
RMSEA	<=.10	0.042	0.06	0.043

<b>Table 5- Model Comparisons</b>			
	ISCM	CTT	Integrated Model
<b>R<sup>2</sup> explained in</b>			
Behavioral Intention	0.64	0.71	0.73
Perceived Usefulness			
Satisfaction	0.14		0.14
Commitment		0.35	0.60
Trust			0.61
<b>Model Comparison Indices</b>			
AIC	73.69	66.80	164.48
CAIC	162.32	146.99	316.41
ECVI	12.63	8.85	17.72
<b>Path</b>			
Satisfaction--> Behavioral Intention	0.78**		0.31*
Perceived Usefulness --> Behavioral Intention	0.07 <sup>ns</sup>		0.04 <sup>ns</sup>
Perceived Usefulness -->Satisfaction	0.36**		0.37**
Commitment--> Behavioral Intention		0.59**	0.43**
Trust--> Behavioral Intention		0.35**	0.20*
Trust-->Commitment		0.59**	-0.04 <sup>ns</sup>
Satisfaction→Commitment			0.80**
Satisfaction→Trust			0.78**
<b>Direct Effect on Behavioral Intention</b>			
Perceived Usefulness	ns		ns
Satisfaction	0.78		0.31
Commitment		0.59	0.43
Trust		0.35	0.20
<b>Indirect Effect on Behavioral Intention</b>			
Perceived Usefulness	0.28		0.19
Satisfaction			0.50
Trust		0.36	ns
<b>Total Effect on Behavioral Intention</b>			
Perceived Usefulness	0.28		0.19
Satisfaction	0.78		0.81
Commitment		0.59	0.43
Trust		0.71	0.20
*p<0.01, ** p<0.001, ns : non-significant			





## Discussion

There are several interesting findings when comparing the three views of online customer relationships based on ISCM, CTT, and the integrated model.

### ***The Relational View is Better than the Transactional View***

First, both CTT and the integrated model had similar power of explaining the variance in behavioral intention (73% and 71% respectively). However, CTT has better model parsimony because there are only two predictors of behavioral intention. The integrated model, on the other hand, has four predictors. Comparing the integrated model and CTT suggests that integrating transactional factors (satisfaction and PU) into CTT did not provide very significant improvement (2%) in  $R^2$  but increased model complexity. Transactional factors did not have the ability to explain additional variance

above the variance explained by the relational factors. In addition, after adding satisfaction and PU into CTT, the direct effect of commitment on behavioral intention decreased from 0.59 to 0.43 and that of trust decreased from 0.35 to 0.20. The effect of trust on commitment was not significant anymore.

Second, the integrated model explained higher variance in behavioral intention than ISCM did (73% and 64% respectively), suggesting that integrating relational factors into ISCM significantly improved  $R^2$  (9%), although model parsimony was sacrificed. Because of the significant direct effects of commitment and trust on behavioral intention in the integrated model, commitment and trust are believed to be the sources to provide the additional variance explained in behavioral intention.

Taking these two comparisons together, we conclude that relational factors have the

ability to explain some variances not explained by transactional factors, but not vice versa. We posit that the relational view of online customer relationships is as competent as, if not more important than, the transactional view. As mentioned above, CTT has been anchored as a marketing theory to explain marketing relationships. This study, however, found that CTT was a useful theory to explain online service acceptance. We posit that CTT may be helpful in explaining use acceptance of other types of online systems and services. This suggestion is especially meaningful when the IS artifact under study is a combination of technologies and services provided by the vendors. That is, when the IS is closely coupled with the service and the business providing the services, the business-to-consumer relationship is very important for accounting for an individual's use and acceptance of such an IS.

### **Customer Relationship Factors Outperform Technological Factors**

The strengths of the effects of the antecedent factors on behavioral intention were different. Satisfaction, commitment, and trust were significantly associated with behavioral intention, consistent with previous studies (e.g., Garbarino and Johnson 1999). However, perceived usefulness had no direct effect on intention. This suggests that the factors describing online customer relationships (i.e., commitment, trust, and satisfaction) are more important than the standard technology-related factors (PU) in explaining acceptance of online services, which is consistent with previous findings (e.g., Bhattacharjee 2001, Khalifa and Liu 2007).

To be specific, in ISCM and the integrated model, the significant effect of satisfaction on intention was consistent with previous studies on IS/IT use (e.g., Bhattacharjee, 2001). Online service users emphasized the positive feelings they experienced in their previous interactions with the service providers. PU was not significantly associated with intention. However, the positive association between

satisfaction and PU suggested that PU was important in explaining an individual's satisfaction with online services. The insignificant direct effect of PU on BI suggested the existence of the mediated effect of satisfaction in this study.

In CTT and the integrated model, the significant effect of commitment on behavioral intention suggested that online service users were likely to be bounded by their previous use of online services and past experience with the service provider. This is a very important finding, which suggests that these users behave consistently during their interactions with the service provider. The users' long term orientation toward the business relationship and their psychological attachments to the service provider clearly indicated the benefit of staying with the service provider (Ranganathan et al., 2006).

Consistent with previous studies (e.g., Gefen et al., 2003), trust was found to have a significant effect on behavioral intention. This suggested that online service users' perception of the service provider's ability, integrity, and benevolence played important role in their intention to accept the service. In the empirical study, web hosting service users may keep their critical business data or financial data in the web hosting servers. If a user has strong belief in the mechanisms supporting the operations of web hosting services and is confident about the service provider's future behavior, the user is more likely to accept and use the service.

### **Satisfaction had the Strongest Effect**

Finally, contrary to our hypothesis, the indirect of trust on commitment was not significant. However, satisfaction had significant effects on commitment and trust. We speculate that the insignificant effect of trust on commitment might result from the presence of satisfaction in the integrated model. As shown in the results about CTT, the effect of trust on commitment was still significant (coefficient=0.59) without the presence of satisfaction. Further, the presence of satisfaction might also be the reason explaining the coefficient changes of

the paths from commitment and trust to behavioral intention. Examining the path coefficients in the integrated model, commitment seemed to be the most important factor among all four determinants, followed by satisfaction and trust. However, after calculating the total effects of the antecedents factors (Table 5), the total effect of satisfaction (0.81) was the highest. The strong effect of satisfaction also existed in ISCM, suggesting satisfaction was the most important factor investigated in the research models.

## **Conclusions**

In this study, we have examined acceptance of online services through comparing two competing research models, i.e., ISCM and CTT, and an integrated research model based on the two. In comparing the three models, using the same respondents has helped us to minimize the variances of the measurement, which provide us with confidence to believe that the different power of the three models in predicting online service acceptance is due to the innate constructs of the models. However, we realize there are several limitations with the study.

### **Limitations**

Most of our research limitations are concerned with the external validity of the study. First, we investigated a special type of online services, i.e., the web hosting service. We realize that there are some unique features of web hosting services, which could be different from other online services. Second, being one of the first empirical studies investigating the acceptance of web hosting services, our study was based on the responses from a particular group of users of a particular company. Because the web hosting company was targeted at low-cost segment of the market, our respondents might be different from other user groups in the web hosting market. The company we selected might also be different from other web hosting companies. Thus, the generalizability of the discussions and

findings in this study may be limited and made with caution. The third limitation was related to our data collection method. While web-based survey has several advantages over paper-based survey, the limitations with web-based survey, i.e., lower response rate, narrower sampling frame, and coverage of the respondents (e.g., Grandcolas et al. 2003), also applied to our study. The fourth limitation was that we did not collect the usage data after data collection, so that the actual behavior was not observed. We believe these limitations could be addressed in future studies.

### **Implications for Research**

ISCM, CTT, and the integrated model are in correspondence with three perspectives adopted in e-commerce studies, i.e., transactional, relational and a mixed view. Through an integration of ISCM and CTT, we are able to compare the strength of each view in an empirical study, which has never been done in previous technology acceptance literature and e-commerce studies.

The findings suggested that both the integrated model and the relational view have advantage over the transactional view in explaining the acceptance of online services. The relational view, such as CTT, is capable of and useful for explaining online service acceptance where the technology and business support are closely linked to each other. Future studies could investigate the relational view and CTT in the contexts of other types of new technologies and services. To our knowledge, the effect of commitment has not been fully investigated in the technology acceptance literature except for very limited evidence (Keil, 1995; Li et al., 2006; Newman and Sabherwal, 1996). Future studies can explore this concept.

The integrated research model is different from previous studies which had the notion of the mixed viewpoint. Previous empirical studies of online service acceptance did not anticipate the importance of the relational view although the conceptual significance of this view has been laid out for some time (Benbasat and DeSanctis, 2001). Mostly

anchored in a well-established theory (such as TAM), previous models were developed eclectically by simply integrating a relational factor to the background theory and proposing the causal relationships between the relational factor and other core constructs in the theory. For example, realizing the importance of trust in online business operations, previous studies have mostly integrated trust into a background theory. The studies with the integrated view seldom compared the strength of each perspective because they might only have one relational factor (such as trust). Therefore, these studies did not investigate the differences of the transactional view and the relational view in their studies of online service adoption/acceptance/use.

The integrated research model, however, is built on two established theories from both the transactional view and the relational view and thus provides a unified view of two streams of IS research. The two existing theories based on which our model is developed have the same level of parsimony, i.e., there are two antecedent factors in each model respectively. After comparing our integrated model with ISCM and CTT, we have highlighted the relative power of the three models. Future studies could also adopt the model comparison approach to study the acceptance of other online services. Because previous studies have suggested that a multiple-theory approach has advantages over a single theory (e.g., Chau and Hu, 2001; Davis et al., 1989), comparing several theories as mentioned above in the context of online services may provide some insights for e-commerce research and online business.

### **Implications for Practice**

From a practical perspective, online business should emphasize the development and

maintenance of their customer relationships. Commitment, trust, and satisfaction are believed to be three dominant factors in building a healthy and lasting relationship with the customers. Service providers should try to develop strategies and design features of their technologies to cultivate a trusting relationship with their customers. Adoption and implementation of certain kinds of customer relationship management systems or programs may help in this aspect. Also, these technology and service providers should emphasize some typical determinants of customer trust, such as service providers' technology competence and integrity toward the customers, using some kind of third-party trust services such as WebTrust. In order to develop a committed relationship by the customers, service providers may also develop various customer locking strategies such as those loyalty/mileage programs adopted by many airlines.

On the other hand, because of the strong effects of transactional factors on the relational factors revealed in the empirical study, this study suggests that service providers should strive to provide high quality technologies and services to improve users' perception of the usefulness of online services in business operations. In addition, these companies need to make efforts to satisfy their customers in every aspect of their interactions with the customers. Although perceived usefulness is a major driver of customer's satisfaction, other facets of the online companies' interaction with the customers should be improved, so that these customers could have positive attitudinal feelings (satisfaction) toward the service provider, in addition to their cognitive evaluation of the usefulness of the services.

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## **Appendix 1: Measures and Scales**

### **Behavioral Intention (INTEN)** (adapted from Agarwal and Karahanna, 2000)

INTEN1. I plan to keep using \_\_\_\_\_'s web hosting services in the future

INTEN2. I intend to continue using \_\_\_\_\_'s web hosting services in the future

INTEN3. I expect my use of \_\_\_\_\_'s web hosting services to continue in the future

### **Commitment (COMMT)** (adapted from Morgan and Hunt 1994)

COMMT1. I want \_\_\_\_\_ to be available for a long time

COMMT2. I am oriented toward the long-term future of \_\_\_\_\_

### **Trust (TRUST)** (adapted from Morgan and Hunt 1994)

In your relationship with \_\_\_\_\_, the service provider

TRUST1. can be counted on

TRUST2. has my confidence

TRUST3. has high integrity

### **Satisfaction (SATIS)** (adapted from Spreng et al. 1996)

SATIS1. I feel satisfied with \_\_\_\_\_'s web hosting services

SATIS2. My experience with \_\_\_\_\_'s web hosting services is very pleasing

### **Perceived Usefulness (PU)** (adapted from Davis 1989)

PU1. Using \_\_\_\_\_'s web hosting services enables me to accomplish the tasks more quickly

PU2. Using \_\_\_\_\_'s web hosting services improves my performance

PU3. Using \_\_\_\_\_'s web hosting services enhances my productivity

PU4. Using \_\_\_\_\_'s web hosting services enhances my effectiveness

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