Association for Information Systems
AIS Electronic Library (AISeL)

ICIS 2002 Proceedings

International Conference on Information Systems (ICIS)

December 2002

Explaining Satisfaction at Different Stages of Adoption in the Context of Internet-Based Services

Mohamed Khalifa
City University of Hong Kong

Vanessa Liu
City University of Hong Kong

Follow this and additional works at: http://aisel.aisnet.org/icis2002

EXPLAINING SATISFACTION OF DIFFERENT STAGES OF ADOPTION IN THE CONTEXT OF INTERNET-BASED SERVICES

Mohamed Khalifa
City University of Hong Kong
Hong Kong
iskhal@is.cityu.edu.hk

Vanessa Liu
City University of Hong Kong
Hong Kong
isvan@is.cityu.edu.hk

Abstract

In this research we develop, operationalize, and empirically test a model for explaining/predicting the satisfaction of customers with Internet-based services at different stages of adoption. We argue and empirically demonstrate the need to consider the evolutionary nature of satisfaction and the variability of its determinants. Our model identifies desire disconfirmation, expectation disconfirmation, and perceived performance as the main determinants of satisfaction and differentiates between satisfaction at adoption of Internet-based services and satisfaction in the post-adoption stage. Our empirical results show that desires and expectations are both important comparison standards that need to be considered simultaneously in explaining satisfaction at adoption. The role of desires, however, diminishes significantly in the post-adoption stage. The results also show no significant relationship between post-adoption satisfaction and satisfaction at adoption. The paper presents the theoretical foundation of the proposed model and discusses the implications of the empirical results.

1 INTRODUCTION

We have witnessed in the last few years a substantial growth of Internet-based services. In addition to Internet businesses, traditional companies are also developing online services as an important customer relationship management (CRM) initiative. Internet-based services are believed to be superior to conventional services in many aspects. They are supposed to be more effective in enhancing customer satisfaction and ultimately retention with advantages such as better convenience, enhanced interactivity, and higher degree of customization/personalization. Furthermore, the online channel is expected to be cheaper to operate and maintain than the regular channels. The important CRM objective of channel optimization is, therefore, often perceived as achieving a higher rate of conversion from the regular channels to the online channel. The achievement of this objective, however, depends to a great extent on customer satisfaction with the online channel. Despite the importance of this issue, we still lack a good understanding of factors affecting customer satisfaction with Internet-based services. Although satisfaction has been studied extensively in information systems (IS), the scope was limited to end-user computing and the focus was on system characteristics (e.g., Doll and Torkzadeh 1988; McHaney et al. 2002), although some studies also included service quality (e.g., Pitt et al. 1995). The marketing literature, on the other hand, examined customer satisfaction and explained it in terms of product/service attributes and in some cases included the purchase process and after-sale service. More recent studies examined the process of satisfaction formation, focusing on the gap between expectations and perceived performance.

With e-commerce, the distinction between end-users and customers is blurred. Consequently, it becomes difficult to distinguish between customer satisfaction and end-user satisfaction (Kettinger and Lee 1995). The marketing models alone are no longer sufficient for explaining customer satisfaction. The determinants of satisfaction should not be restricted to product/service attributes. They should also include the support provided by the information system to the prepurchase, purchase, and post-purchase stages of the shopping cycle (Krishnan et al. 1999). Both product attributes (marketing models) and system characteristics (IS models) play an important role in satisfaction formation. Furthermore, the digital component of the product

has become more prominent (Bitner et al. 2000; Liechty 2001; Wilson 2001), stressing the importance of information quality (IS models). It is, therefore, imperative to integrate the marketing and IS models in order to account for the end user/customer total experience in explaining satisfaction. Such integration is especially important in the context of Internet-based services, which are information intensive by nature.

In the marketing literature and recently in IS studies as well, the disconfirmation theory emerges as the primary foundation for satisfaction models. According to this theory, satisfaction is determined by the discrepancy between the perceived actual performance and cognitive standards such as expectations and desires. Some early researchers proposed expectation disconfirmation (e.g., Churchill and Surprenant 1982; Oliver and DeSarbo 1988) as the main determinant of satisfaction. The expectation disconfirmation models were initially developed and validated in the context of physical products (mainly brand names) where customers were familiar with the attributes of the product and could develop expectations based on their prior experience/knowledge. With Internet-based services, however, the offerings are changing rapidly, introducing an important novelty element that limits the customer's ability to form accurate expectations. More recent studies proposed desire disconfirmation models (e.g., Spreng et al. 1996; Suh et al. 1994) as an alternative. Yet, it is not clear which cognitive standard (expectations or desires) provides a better explanation of satisfaction. The empirical results are not conclusive (Spreng and Page 2001) and vary depending on whether the service encounter is technology-based or interpersonal (Srijumpa et al. 2002). Some early researchers proposed expectations while more recent studies looked into desires (e.g., Spreng et al. 1996; Suh et al. 1994) Therefore, we develop a contingency theory that accounts for both desire disconfirmation and expectation disconfirmation. We argue that the relative importance of these two determinants varies over time, as the customer becomes more familiar with the products and services that are the object of evaluation. Most previous research relied on cross-sectional studies and hence overlooked the evolution of satisfaction and the dynamic nature of its determinants. To address this shortcoming, we follow a longitudinal approach in this study.

Our research presents important theoretical and practical contributions. On the theoretical side, we develop, operationalize, and empirically test a longitudinal model that is based on both desire disconfirmation and expectation disconfirmation to provide a better conceptualization of the formation of satisfaction and to examine its evolution and the variability of its determinants. On the practical side, our empirical results provide a better understanding of the respective roles and relative importance of the determinants of satisfaction at different stages of consumption of Internet-based services.

This paper is organized as follows. The next section presents the literature review on satisfaction. A discussion of the theoretical foundations of the research model follows. We then describe the research methodology. After interpreting the empirical results, we conclude the paper with a discussion of the implications and directions for future research.

2   LITERATURE REVIEW

Customer satisfaction is a collective outcome of the perception, evaluation, and psychological reactions to the consumption experience with a product/service (Yi 1990). It was explained by the expectation disconfirmation theory in the late 1980s. This theory suggests that satisfaction is determined by the intensity and direction of the gap between expectations and perceived performance. Expectations are shaped by personal experience and understanding of environment taking into account practical feasibility based on the expectancy theory (Tolman 1932). Perceived performance is a relatively less biased evaluation of performance based on objective judgments rather than emotional reactions (Swan and Combs 1976). Expectation disconfirmation occurs in three states: (1) positive disconfirmation where perceived performance exceeds expectations; (2) confirmation where perceived performance meets expectations; and (3) negative disconfirmation where perceived performance falls below expectations. An individual is more likely to be satisfied if the service performance meets (confirmation) or exceeds (positive disconfirmation) his/her expectations (Oliver and DeSarbo 1988). On the other hand, he/she is more likely to be dissatisfied if the service performance falls below his/her expectations (negative disconfirmation). By proposing expectation disconfirmation as the sole determinant of satisfaction, this theory does not account for the possibility that the confirmation of high expectations is more likely to lead to satisfaction than the confirmation of low expectations. To resolve this drawback, Tse and Wilton (1988) included perceived actual performance as an additional determinant of satisfaction, the rationale being that if actual perceived performance is expected and turns out to be low, it may still negatively affect satisfaction and override the impact of confirmation or positive disconfirmation to result in dissatisfaction. Tse and Wilton found perceived actual performance to be a direct and independent determinant of satisfaction.

More recent IS and marketing research (e.g., Spreng et al. 1996; Suh et al. 1994) proposed the use of desires rather than expectations as the comparison standard in the disconfirmation process. The formation of desires is not based on realistic

predictions of actual performance, but rather on inner emotional needs or wants that are not necessarily constrained by rational cognitive understanding of situation factors (such as practical feasibility). An individual may desire/want a certain service to be good but nevertheless expect it to be poor from his/her past experience and understanding of the actual environment. Under the desire disconfirmation theory, low performance, although it may meet the individual's expectations, can fall below the desired performance (negative disconfirmation) and is hence more likely to lead to dissatisfaction. Although promising, the desire disconfirmation model has not been properly operationalized and tested. For example, Suh et al. did not include any reflective items, but rather only borrowed formative items from previous end-user computing success literature without any validation, i.e., belief elicitation. It is also not clear which of expectation disconfirmation and desire disconfirmation is more dominant in determining satisfaction.

More recently, Chin and Lee (2000) and Khalifa and Liu (2002) developed models that include both expectations and desires in explaining end-user computing satisfaction, arguing that expectations and desires might have separate and independent effects over satisfaction. For example, an individual may be dissatisfied after all if the information content of a Website provides what is expected (i.e., expectation confirmation) but not what is wanted (i.e., negative desire disconfirmation). Conversely, he/she may have weak desires toward the information content (since he/she does not really want to visit the Website) but may have developed high expectations based on claims in the advertisements. Yet if the actual information content is perceived to fall below these expectations (i.e., negative expectation disconfirmation), he/she is still likely to be dissatisfied despite his/her initial low desires having been exceeded. Given the simultaneous effects of expectations and desires, it is important to include both notions in explaining/predicting satisfaction.

Most previous studies were cross-sectional, assuming satisfaction and its antecedents to be static concepts. Bhattacherjee (2001), however, suggested that changes of the cognitive standard in the disconfirmation process might occur along the increase of actual usage experience, hence leading to the evolution of satisfaction. In other words, initial comparison standards may be primarily formed based on inner wants while *post hoc* standards are more likely to be affected by the actual experience (Fazio and Zanna 1981). This is likely to produce different disconfirmation outcomes and to change the evaluation of satisfaction accordingly. However, no empirical studies have been conducted to verify the evolutionary nature of satisfaction.

3 THEORETICAL DEVELOPMENT AND RESEARCH MODEL

Our approach is based on the notion of disconfirmation, implying that satisfaction is viewed as being formed by the amount of gap between *post hoc* perceptions of Internet-based services and a prior standard. Previous studies (e.g., Spreng et al. 1996; Suh et al. 1994) argued for the superiority of desires over expectations as a comparison standard, but did not operationalize or empirically validate the proposed desire disconfirmation models. Furthermore, these studies suggested that desires should be used *instead of* expectations rather than *in addition to* expectations. However, expectations and desires are different concepts that can both play important roles in explaining satisfaction. The main argument used by the desire disconfirmation proponents is that services that exceed the expected levels, but not the desired levels, may still lead to feelings of dissatisfaction. One can also conversely argue that a customer's desires for a particular service may be lower than his/her expectations (i.e., the service is not really wanted by the customer). In such a case, meeting the customer's desired level of service while failing to meet his/her expected level (e.g., based on what the merchant promised to deliver) may also lead to dissatisfaction. The customer may still feel dissatisfied if his/her expectations are not fulfilled, independently of his/her desires. We, therefore, agree with Chin and Lee (2000) and with Khalifa and Liu (2002) on the need to include both desires and expectations as comparison standards for disconfirmation. Although desire disconfirmation, expectation disconfirmation, and perceived performance are all important determinants of satisfaction, their relative importance varies depending on the customer's experience (Tse and Wilton 1988). When the customer is familiar with the product (e.g., brand names), his/her expectations are well defined. In such a case, expectations are the dominant comparison standard. In the context of Internet-based services, however, there is a novelty element that may make it more difficult for the customer to form accurate expectations prior to the adoption of the services. In such a case, the customer may rely on his/her desires in addition to his/her expectations in performing the evaluation. After adoption, the direct experience gained by the customer may increase his/her confidence in his/her expectations (Spreng and Page 2001). This should strengthen the role of expectations as a comparison standard (Spreng and Page 2001). Therefore, we believe that the relative importance of expectations and desires varies considerably depending on the adoption stage (at-adoption versus post-adoption) for innovations such as Internet-based services. This is consistent with Bhattacherjee's (2001) argument for the evolution of satisfaction over time as a result of the dynamic nature of its determinants.

Based on the discussion above, our research model (see Figure 1) proposes the three constructs, expectation disconfirmation, desire disconfirmation and perceived performance, as the main determinants of satisfaction and differentiates between the adoption and post-adoption stages.
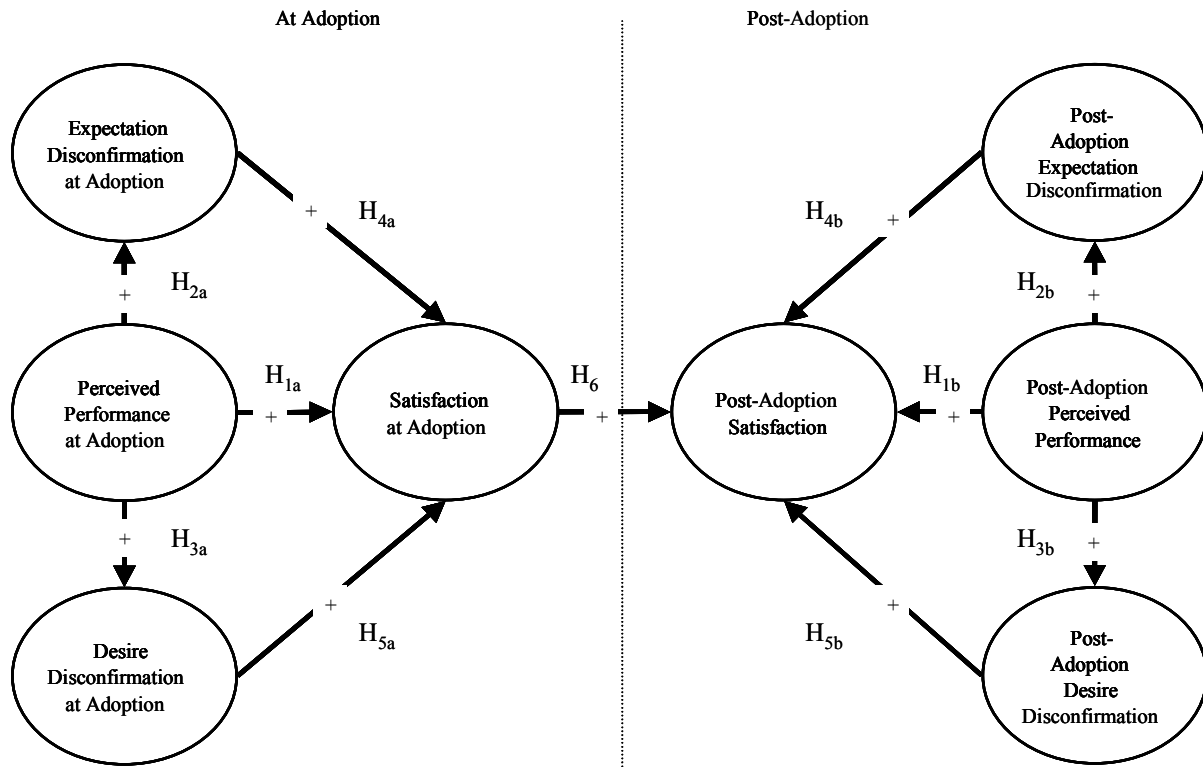
Figure 1. Research Model

Consistent with previous studies, we believe that perceived performance has both a direct positive effect on satisfaction (Patterson et al. 1997; Spreng et al. 1996; Tse and Wilton 1988) and mediated effect through expectation disconfirmation and desire disconfirmation (Oliver and DeSarbo 1988; Suh et al. 1994). Higher perceived performance is more likely to meet or even exceed the desired/expected level of performance (i.e., desires/expectations). The higher the perceived performance, the less negative/more positive is the disconfirmation and hence the higher the satisfaction.

More specifically, we hypothesize that:

$H_{1a(b)}$: Perceived performance at adoption (post-adoption) affects positively satisfaction at adoption (post-adoption).

$H_{2a(b)}$: Perceived performance at adoption (post-adoption) affects positively expectation disconfirmation at adoption (post-adoption).

$H_{3a(b)}$: Perceived performance at adoption (post-adoption) affects positively desire disconfirmation at adoption (post-adoption).

Earlier studies argued for using expectation disconfirmation as the main determinant of satisfaction (e.g., Oliver and DeSarbo 1988). More recent studies favored the use of desire disconfirmation instead of expectation disconfirmation (e.g., Suh et al. 1994). As explained earlier, we agree with Chin and Lee and with Khalifa and Liu that both expectation disconfirmation and desire disconfirmation are necessary for explaining satisfaction. Consequently, we hypothesize that:

$H_{4a(b)}$: Expectation disconfirmation at adoption (post-adoption) affects positively satisfaction at adoption (post-adoption).

$H_{5a(b)}$: Desire disconfirmation at adoption (post-adoption) affects positively satisfaction at adoption (post-adoption).

Several previous studies reported that subsequent judgment is likely to be affected by prior judgment, as one tends to reduce the cognitive effort required for performing the reevaluation (e.g., Fiske and Neuberg 1990; Mattila 1998). Accordingly, we hypothesize that subsequent satisfaction is directly affected by initial satisfaction.

H_6: Satisfaction at adoption affects positively the post-adoption satisfaction.

4   RESEARCH METHODOLOGY

The research model is validated through a longitudinal online survey study. Pitkow and Recker (1995) present the advantages of the online surveying method. The survey was administered to the new members of an online knowledge community for e-business practitioners. The community consists of over 1,200 members who are middle/senior managers sharing common interests in electronic commerce. The Internet-based services include online e-business seminars (e.g., videos, text files). The Website also provides access to case studies and reports synthesizing a large variety of e-business topics. Members can contribute feedback on the reports and interact with the authors. In addition, the site features online forums for members to exchange ideas and opinions. There is also a "news and events" section for informing members of major offline events (e.g., conferences). A loyalty program rewards members who participate frequently and regularly in online activities. By contributing articles or participating in discussion forums, members can earn points that they can redeem for discounts on courses and conference registration.

The study was conducted in two stages: at adoption and post-adoption. For a period of 8 weeks, every new member was invited to answer an online survey 3 days after the completion of the membership registration. This survey measured expectation/desire disconfirmation, perceived performance, and satisfaction with the Internet-based services at adoption. Discounts on upcoming community events (e.g., conferences) were offered to induce the new members to complete the survey. A total of 131 out of 356 new members completed the first survey, implying a response rate of 37 percent. Twelve weeks later, the respondents of the first survey were asked to complete the same survey again (post-adoption stage). Gift coupons from several retail stores and restaurants were offered to encourage the respondents to participate in the second survey. A total of 107 questionnaires were completed, representing a response rate of 82 percent.

4.1 Measurement Development

All constructs were measured with reflective items, developed based on the procedure proposed by Moore and Benbasat (1991) to verify the construct, face, and discriminant validity of the items. The surveys for the adoption and post-adoption stages were identical. The measurement of disconfirmation of desires (expectations) involved a comparison of the actual and the originally desired (expected) performance, e.g., a scale ranging from "much less adequate than what I *wanted (expected)*" to "much more adequate than what I *wanted (expected).*" Such measurement was validated by Spreng et al. (1996). A recent study verified that measuring disconfirmation using direct perception is superior to using the differential approach that obtains the disconfirmation scores by comparing the perceived performance scores with the expectation/desire scores (Dabholkar 2000). To further ensure that the respondents had a clear understanding of the concepts of desire/expectation disconfirmation, definitions of both constructs were stated at the beginning of the questionnaire. A practical example was also provided to illustrate and highlight the differences. A slider with a resolution ranging from 1 to 100 was used to record the respondents' answers (see Figure 2). Such a scale enhances the accuracy of measurement as compared to the usual types of semantic differential or Likert-type scales which consist of only a few intervals.

4.2 Data Analysis

The data analysis was done in a holistic manner according to the partial least squares (PLS) procedure (Wold 1989), using PLS graph (Chin 1994). PLS enables a simultaneous analysis of (1) how well the measures relate to each construct and (2) whether the hypothesized relationships at the theoretical level are empirically confirmed. Tests of significance for all paths were conducted using the bootstrap resampling procedure (Cotterman and Senn 1992). The standard approach for evaluation, requiring path loadings from construct to measures to exceed 0.70, was used. For checking internal consistency, we relied on composite reliability measures (ρ) as suggested by Chin (1998) and on the average variance extracted (AVE) as suggested by Fornell and Larcker (1981). We tested the discriminant validity by comparing the square root of the AVE for a particular construct to its correlations with the other constructs (Chin 1998).
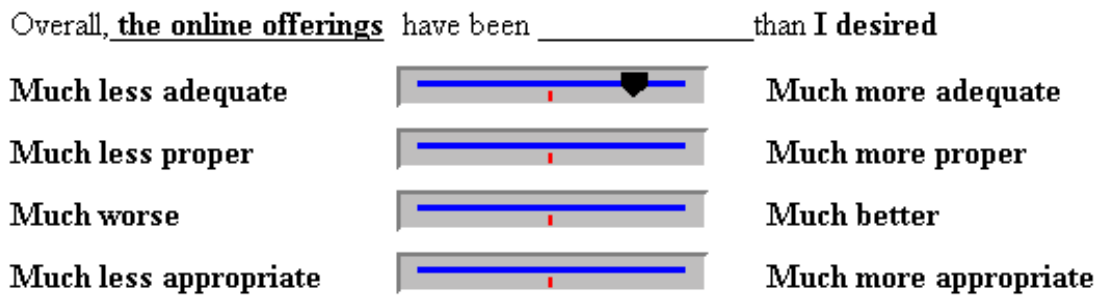
Figure 2. Sample Slider

5 RESULTS AND DISCUSSION

The results of the PLS analysis are illustrated in Figure 3. The test of each hypothesis can be mapped to each specific path in the structural model. The estimated path coefficients are given along with their respective t-statistics. The R^2 is indicated next to each dependent construct. All hypotheses are verified except for H_{5b} and H_6. The model explains 73 percent of the variance in satisfaction at adoption and 68 percent of the variance in post-adoption satisfaction, providing strong evidence of its explanatory power at both stages of adoption.
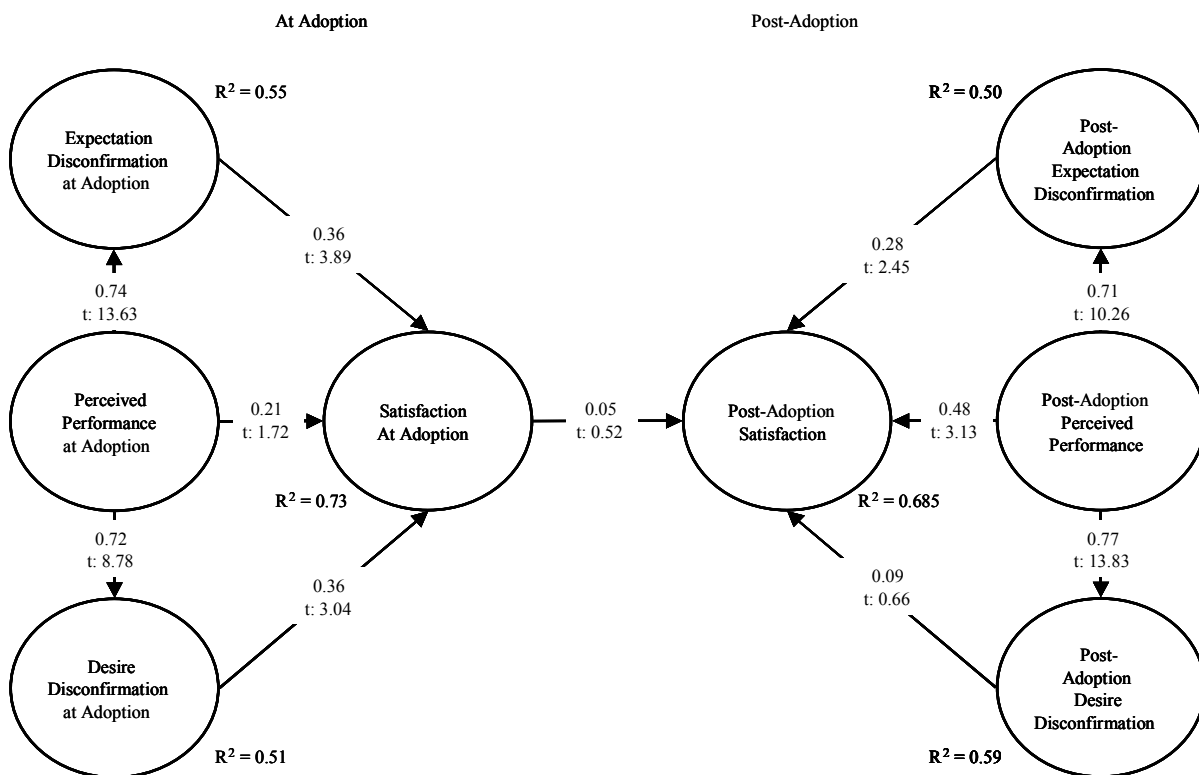

Figure 3. Results of PLS Analysis

Table 1 presents the loadings of the measures to their respective constructs along with composite reliability scores, standard errors, and t-statistics. All items are significant at the 0.01 level with high loadings (all above 0.80 and most above 0.90), demonstrating convergent validity. Furthermore, all AVE scores exceed 0.8. The composite reliability scores of all constructs are higher than the recommended value of 0.80 (Nunnally 1978), demonstrating internal consistency. Table 2 presents the discriminant validity statistics. The square roots of the AVE scores (diagonal elements of Table 2) are all higher than the correlations among the constructs, demonstrating discriminant validity.

Table 1. Measurement Model Statistics

Factors	Variables	Loadings	Std. Error	T - statistics
Satisfaction at Adoption (ρ = 0.97)	Item 1	0.9312	0.037	24.3069
	Item 2	0.9452	0.016	58.2883
	Item 3	0.9506	0.014	6709651
	Item 4	0.9614	0.011	86.7936
Desire Disconfirmation at Adoption (ρ = 0.97)	Item 1	0.9251	0.016	56.7441
	Item 2	0.9563	0.011	81.3636
	Item 3	0.9432	0.015	59.3302
	Item 4	0.9451	0.011	80.6303
Expectation Disconfirmation at Adoption (ρ = 0.97)	Item 1	0.9265	0.023	39.2306
	Item 2	0.9575	0.012	78.8441
	Item 3	0.9513	0.014	67.9339
	Item 4	0.9192	0.025	35.9943
Perceived Performance at Adoption (ρ = 0.95)	Item 1	0.8792	0.037	23.2369
	Item 2	0.9231	0.023	39.4960
	Item 3	0.9302	0.016	57.4242
	Item 4	0.8781	0.027	32.2186
Post-Adoption Satisfaction (ρ = 0.97)	Item 1	0.9533	0.009	105.0234
	Item 2	0.9370	0.015	61.0420
	Item 3	0.9196	0.042	21.4538
	Item 4	0.9318	0.020	46.1967
Post-Adoption Desire Disconfirmation (ρ = 0.95)	Item 1	0.9068	0.022	43.9545
	Item 2	0.9073	0.028	31.8833
	Item 3	0.9285	0.014	63.1606
	Item 4	0.9153	0.040	22.7391
Post-Adoption Expectation Disconfirmation (ρ = 0.97)	Item 1	0.9391	0.016	56.7232
	Item 2	0.9539	0.011	82.8697
	Item 3	0.9390	0.018	51.3078
	Item 4	0.9477	0.014	63.8419
Post-Adoption Perceived Performance (ρ= 0.95)	Item 1	0.9093	0.024	37.1797
	Item 2	0.8928	0.031	28.3622
	Item 3	0.9061	0.022	40.2565
	Item 4	0.8974	0.031	28.0922

Table 2. Discriminant Validity Statistics

	Reflective Item	Desire Disconfirmation at Adoption	Expectation Disconfirmation at Adoption	Perceived Performance at Adoption	Post-Adoption Satisfaction	Post-Adoption Desire Disconfirmation	Post-Adoption Expectation Disconfirmation	Post-Adoption Perceived Performance
Reflective Item	**0.94**							
Desire Disconfirmation at Adoption	0.80	**0.94**						
Expectation Disconfirmation at Adoption	0.80	0.81	**0.94**					
Perceived Performance at Adoption	0.73	0.72	0.74	**0.90**				
Post-Adoption Satisfaction	0.62	0.55	0.55	0.57	**0.94**			
Post-Adoption Desire Disconfirmation	0.64	0.68	0.62	0.60	0.73	**0.92**		
Post-Adoption Expectation Disconfirmation	0.65	0.63	0.65	0.55	0.73	0.82	**0.95**	
Post-Adoption Perceived Performance	0.70	0.60	0.56	0.68	0.79	0.77	0.77	**0.90**

The structural model (Figure 3) shows dissimilar results for the different stages of adoption. At adoption, all three determinants of satisfaction (i.e., desire disconfirmation, expectation disconfirmation and perceived performance) have significant positive effects on satisfaction with path coefficients that are similar in magnitude. This stresses the importance of considering all three determinants in explaining/predicting satisfaction at the adoption stage of an innovation. In the post-adoption stage, however, only expectation disconfirmation and perceived performance have significant effects on satisfaction. The respondents did not seem to rely on their desires as a comparison standard after gaining some experience with the Internet-based services.

The dissimilarity of results between the different adoption stages supports our earlier argument about the evolution of satisfaction and the variability of its determinants. Customers rely on desires in addition to expectations to evaluate their satisfaction when they have little experience with a novel service. The role of desires, however, diminishes as the customers acquire usage experience. Direct experience enables the customers to form more realistic expectations and to be more confident in these expectations (Spreng and Page 2001). In such a case, they tend to rely more on their expectations than on their desires in the evaluation of their satisfaction. This argument is consistent with the Chin and Lee's (2000) claim that expectation disconfirmation is likely to be more prominent in shaping satisfaction with known products/services. Another important result that is worth discussing is the insignificance of the link between satisfaction at adoption and post-adoption satisfaction. The initial judgment (satisfaction at adoption) does not seem to play an important role in subsequent judgments (e.g., post-adoption satisfaction). Although contradicting the *cognitive effort alleviation* argument made earlier, this outcome is not completely surprising. According to Mattila (1998), efficient information processors do not routinely and automatically consider prior judgments when they form new judgments. Instead, they tend to account for the consequences of their most recent usage experience. It is possible that the subjects of our study are more likely to fit the profile of efficient information processors than the average customer of traditional products/services.

6 CONCLUSION

Prior research did not provide conclusive results regarding what cognitive standard to use in explaining/predicting satisfaction. Some researchers argued for the superiority of desires over expectations, while others argued for the simultaneous use of both comparison standards. Furthermore, most previous studies ignored the evolutionary nature of satisfaction and the variability of its determinants. To address these problems, we developed a satisfaction model that includes expectation disconfirmation, desire disconfirmation, and perceived performance simultaneously as determinants of satisfaction and that differentiates between satisfaction at adoption and post-adoption satisfaction. Such a model is especially applicable for Internet-based services, which include a novelty element that prevents customers from forming accurate expectations at the initial stage of adoption. The model was then operationalized and tested empirically through a longitudinal survey study.

The empirical results provided strong evidence for the explanatory power of the proposed model. Furthermore, they demonstrated the evolutionary nature of satisfaction and the variability of its determinants. Satisfaction at adoption did not have a significant relationship with post-adoption satisfaction and the determinants of satisfaction changed depending on the adoption stage. More specifically, expectation disconfirmation, desire disconfirmation and perceived performance were found to be equally important in explaining satisfaction at adoption. In the post-adoption stage, on the other hand, only expectation disconfirmation and perceived performance had significant effects on satisfaction, undermining the role of desires.

Our results have important theoretical implications. First, desires are not superior to expectations in explaining satisfaction, as claimed by some researchers. Second, it is not always necessary to simultaneously consider expectations and desires. Third, it is essential to account for the customer's experience in explaining/predicting satisfaction. Although both desires and expectation are important, their significance and relative importance vary depending on the adoption stage. Future research should investigate further the role of experience in moderating the effects of expectation disconfirmation and desire disconfirmation on satisfaction. The effect of experience is probably not direct, but rather mediated through the customer's confidence in his/her expectations and desires. Our results also have important implications for practitioners. As we found no significant relationship between satisfaction at adoption and post-adoption satisfaction, companies should, therefore, constantly monitor customer satisfaction. This is especially needed for customers who are efficient information processors and do not rely heavily on their prior judgments in making subsequent judgments. Also, for novel products/services such as Internet-based services, customer desires should be taken into consideration in addition to customer expectations.

One of the limitations of this study is that the entire research was conducted in a specific context of a knowledge community. Future research should hence test the model in other contexts to provide more evidence for the generalizability of the results. Furthermore, we did not examine the formation of expectations and desires. Future research should investigate the evolution of expectations and desires over time and possible convergence of and interactions between the two comparison norms.

7 REFERENCES

Bhattacherjee, A. "Understanding Information Systems Continuance: An Expectation-Confirmation Model," *MIS Quarterly*, (25:3), 2001, pp. 351-370.

Bitner, M. J., Brown, S. W. and Meuter, M. L. "Technology Infusion in Service Encounters," *Academy of Marketing Science*, (28:1), 2000, pp. 138-149.

Chin, W. W. *PLS Graph Manual*, Unpublished Manuscript, 1994.

Chin, W. W. *The Partial Least Squares Approach for Structural Equation Modeling*. Mahwah, NJ: Lawrence Erlbaum Associates, 1998, pp. 295-336.

Chin, W. W., and Lee, M. K. O. "A Proposed Model and Measurement Instrument for the Formation of IS Satisfaction: The Case of End-User Computing Satisfaction,' in P. De and J. I. DeGross (eds.), *Proceedings of the Twenty-First International Conference on Information Systems,* Charlotte, NC, 2000.

Churchill, G. A., and Surprenant, C. "An Investigation Into the Determinants of Customer Satisfaction," *Journal of Marketing Research* (19), 1982, pp. 491-504.

Cotterman, W., and Senn, J. *Challenges and Strategies for Research in Information Systems Development*. Chichester: John Wiley & Sons, 1992.

Dabholkar, P. A., David, Shepherd C. D., and Thorpe, D. I. "A Comprehensive Framework for Service Quality: An Investigation of Critical Conceptual and Measurement Issues Through a Longitudinal Study," *Journal of Retailing* (76:2), 2000, pp. 139-173.

Doll, W. J., and Torkzadeh, G. "The Measurement of End-User Computing Satisfaction*," MIS Quarterly*, 1988, pp. 259-273.

Fazio, R. H., and Zanna, M. P. "Direct Experience and Attitude-Behavior Consistency," *Advances in Experimental Social Psychology* (13), 1981, pp. 161-202.

Fiske, S., and Neuberg, S. "A Continuum of Impression Formation from Category-Based to Individuating Processes: Influences of Information and Motivation on Attention and Interpretation," *Advances in Experimental Social Psychology* (23), 1990, pp. 1-74.

Fornell, C., and Larcker, D. F. "Structural Equation Models with Unobservable Variables and Measurement Error: Algebra and Statistics," *Journal of Marketing Research* (18: 3), 1981, pp. 382-388.

Kettinger, W. J., and Lee, C. C. "Perceived Service Quality and User Satisfaction with the Information Services Function," *Decision Sciences* (25:5/6), 1995,pp. 737-766.

Khalifa, M., and Liu, V. "Satisfaction with Internet-Based Services," in *Proceedings of the Thirty-Fifth Hawaii International Conference on System Sciences*. Los Alamitos, CA: IEEE Computer Society Press, 2002.

Krishnan, M. S., Ramaswamy, V., Meyer, M. C., and Damien, P. "Customer Satisfaction for Financial Services: The Role of Products, Services and Information Technology," *Management Science* (45:9), 1999, pp. 1194-1209.

Liechty, J. "Choice Menus for Mass Customization: An Experimental Approach for Analyzing Customer Demand with an Application to a Web-Based Information Service," *Journal of Marketing Research*, (38:2), 2001, pp. 183-196.

Mattila, A. "An Examination of Cconsumers' Use of Heuristic Cues in Making Satisfaction Judgments," *Psychology and Marketing* (15:5), 1998, pp. 477-501.

McHaney, R., Hightower, R., and Pearson, J. "A Validation of the End-User Computing Satisfaction Instrument in Taiwan," *Information & Management* (39:6), 2002, pp. 503-511.

Moore G. C., and Benbasat, I. "Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation," *Information Systems Research (*2:3), 1991, pp.192-222.

Nunnally, J. C. *Psychometric Theory*. New York: McGraw-Hill, 1978.

Oliver, R. L., and DeSarbo, W. S. "Response Determinants in Satisfaction Judgements," *Journal of Consumer Research*(14)*,* 1988, pp. 495-507.

Patterson, P. G., Johnson, L. W., and Spreng, R. A. "Modeling the Determinants of Customer Satisfaction for Business-to-Business Professional Services," *Journal of the Academy Marketing Science* (25:1), 1997, pp. 4-17.

Pitkow, J. E., and Recker, M. M. "Using the Web as a Survey Tool: Results from the Second WWW User Survey," *Computer Networks & ISDN Systems* (27:6), 1995, pp. 809-822.

Pitt, L. F., Watson, R. T., and Kavan, C. B. "Service Quality: A Measure of Information Effectiveness," *MIS Quarterly*, 1995, pp. 179-187.

Spreng, R. A., MacKenzie, S. B., and Olshavsky R. W. "A Reexamination of the Determinants of Consumer Satisfaction," *Journal of Marketing*, 1996.

Spreng, R. A., and Page, T. J. "The Impacts of Confidence in Expectations on Consumer Satisfaction," *Psychology & Marketing* (18: 11), 2001, pp. 1187-1204.

Srijumpa, R., Speece, M., and Paul, H. "Satisfaction Drivers for Internet Service Technology Among Stock Brokerage Customers in Thailand," *Journal of Financial Services Marketing* (6: 3), 2002, pp. 240-253.

Suh, K., Kim, S., and Lee, J. "End User's Disconfirmed Expectations and the Success of Information Systems," *Information Resources Management Journal*, 1994.

Swan, J. E., and Combs, L. J. "Product Performance and Consumer Satisfaction: A New Concept," *Journal of Marketing* (40), 1976, pp.25-33.

Tolman, E. C. *Purposive Behavior in Animals and Men*. New York: Appleton-Century, 1932.

Tse, D. K., and Wilton, P. C. "Models of Consumer Satisfaction Formation: An Extension," *Journal of Marketing Research* (25), 1988, pp. 202-212.

Wilson, A. M. "Mystery Shopping: Using Deception to Measure Service Performance," *Psychology & Marketing*, (18:7), 2001, pp. 721-734.

Wold, H. "Introduction to the Second Generation of Multivariate Analysis," in H. Wold (ed.), *Theoretical Empiricism*. New York: Paragon House, 1989, pp. vii–xl.

Yi, Y. "A Critical Review of Consumer Satisfaction," *Review of Marketing* (4), 1990, pp.68-123.