

# Customer Satisfaction of E-Commerce Websites

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**Abstract**—In the emerging global electronic market, the creation of customer centered websites will become increasingly important. Based on the previous studies and empirical research, this paper proposes a hypothetic model of factors of influence customer satisfaction for E-commerce websites, then, hypotheses are raised and tested by factor analysis. The result shows that website design, information quality, customer service, website security and website intelligence are the five factors which significant and positive effect on customer satisfaction. It thus puts forward the suggestions of designing practice on E-commerce websites. Therefore, the study on which factors affect customer satisfaction of E-commerce website has academic and practical meaning.

**Keywords**—E-commerce Website; Customer Satisfaction; Factor Analysis

## I. INTRODUCTION

The World Wide Web is one of the most important Internet services, and has been largely responsible for the phenomenal growth of the Internet in recent years. Now days, the competition among online retailers has become more intensive. Therefore, more and more businesses are trying to again competitive advantages by using E-commerce to interact with customers [1]. According to Yang et al. [2], it is much easier to compare the technical features and prices of products online than it is the through traditional channels. It is widely expected that E-commerce activity will continue to grow and that it will be a significant component of the global economy in the near future.

With the rapid development of E-commerce, a variety of websites have created on Internet. Website is becoming a very popular tool for customer convenience to look for and order products and services, and collect plenty of information to compare analogous products which are manufactured from the different companies. Through websites, the companies can break through time and space constraints, have an opportunity to put its best face forward globally, and highly beneficial in reducing business costs and in creating opportunities for new or improved customer services.

Since the website is so important, then, what does a successful or a good website look like? Many scholars have studied quality of websites from different perspectives, such as technology, content, aesthetic and information etc. Haldal indicated that a good website design must fulfill customers' needs for information or transaction capabilities [3]. DeLone

and McLean argued that the three quality dimensions (information quality, system quality, service quality) affect use and user satisfaction [4]. Szymanski and Hise suggested that convenience, product characteristics, site design and financial security were dominant factors in determining consumer satisfaction [5]. Statistics also showed that 80 percent of the highly satisfied online consumers would shop again within two months, and 90 percent would recommend the Internet retailers to others, and on the other hand, 87 percent dissatisfied consumers would permanently leave their Internet retailers without any complaints [6].

Despite the volumes of research dedicated to product or service customer satisfaction, little empirical research has focused on investigating the factors of E-commerce websites customer satisfaction. Some surveys show considerable dissatisfaction with current E-commerce and Web servers. Customers of E-commerce websites often have high expectations for the quality of service, and if those expectations are not met, the next website is only a click away. Due to the increasing significance and utilization of E-commerce websites and the lack of theoretical research in this area, it seems highly relevant to conduct an empirical study in this area.

## II. RELATED CONCEPTS

### A. Customer Satisfaction

Customer satisfaction is one of the most importance elements in company success, and it is a qualitative measure of performance as defined by customers. Oliver made a conceptual definition of consumer satisfaction: the consumer's fulfillment response [7]. It is a judgment that a product or service feature, or the product or service itself, providing a pleasurable level of consumption-related fulfillment, including level of under - or over fulfillment.

Today's companies have moved from a product-centric and sales-centric to a new customer-centric. Customer satisfaction is also defined as the result of a cognitive and affective evaluation, where some comparison standard is compared to the actually perceived performance. If the perceived performance is less than expected, customers will be dissatisfaction, and if the perceived performance reaches or exceeds expectation, customers will be satisfaction or delight.

### B. Website Customer Satisfaction

Online services, which can be processed over the Internet, such as online bookstore and online banking are the examples of such services. To emphasize the customer satisfaction of website for online products and services for E-commerce

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marketing, this study proposes the conceptual of Website Customer Satisfaction (WCS), to distinguish from the conceptual of customer satisfaction for traditional marketing. In other words, Website Customer Satisfaction refers herein to research customer satisfaction for E-commerce websites.

### C. Website Customer Satisfaction Measures

Though customer satisfaction is easy to perceive, it is difficult to define and sometimes even more difficult to measure. The fulfillment of customer expectations of services is valid indicators of customer satisfaction. The identification and measurement of service quality are critical factors which is responsible for customer satisfaction. It is why the research of measurement of customer satisfaction is very important. Traditional methods of measuring customer satisfaction seem conceptually and operationally inappropriate for researches involved in. In order to effectiveness measure of websites customer satisfaction, the company has to investigate the affecting factors of WCS.

The factors which might affect customer satisfaction with a website are contained in a parameter list. It is important that for each parameter in the list satisfaction should be quantifiable. These parameters relating to features of a website which will potentially affect customer satisfaction, then we seek various parameters of a website to measure customer satisfaction. In order to compare the customer satisfaction measured for different parameters, the quantifications must be mapped to a fixed scale. For instance, all measures could be mapped to a scale of 1 to 5. This mapping is what allows us can measure how different parameters affect website customer satisfaction.

## III. WEBSITE CUSTOMER SATISFACTION MODEL

### A. E-commerce Website Customer Satisfaction Model

From the above discussions, it is clear that we must pay careful attention to measurement of the customer satisfaction of E-commerce websites. This paper proposes a structural model of customer satisfaction of E-commerce websites as shown in Figure 1.

This model classified some of the major E-commerce website features into five factors, they are website design, information quality, customer service, website security and website intelligence, and each of factors consist of four or two parameters. We integrated all five factors consisting twenty parameters into the model, and we will focus on these five factors to analyze whether they have any influence to the customer satisfaction of E-commerce websites. The following hypotheses are presented:

H1: Website design has a significant and positive effect on customer satisfaction.

H2: Information quality has a significant and positive effect on customer satisfaction.

H3: Customer service has a significant and positive effect on customer satisfaction.

H4: Website security has a significant and positive effect on customer satisfaction.

H5: Website intelligence has a significant and positive effect on customer satisfaction.

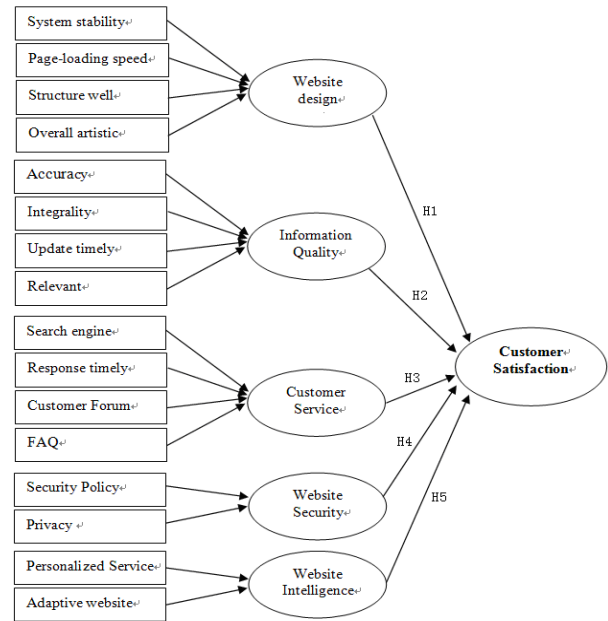


Figure 1. E-commerce Website Customer Satisfaction Model

### B. E-commerce Website Customer satisfaction factors

#### 1) Website Design

Poorly designed websites can lead to loss of Customers and potential customers, the question of how to improve the design of websites is thus of critical importance. The "Website Design" factor mainly applies to improve the system quality of a website. The following list of variables is used to evaluate it:

- System stability: Website's system includes hardware and software building in advanced technology, such as system's adaptability, availability, reliability and usability, etc.
- Page-loading speed: Customer doesn't like waiting a long time for Web pages to load, so page-loading speed is a very important criteria for evaluating the website. Therefore, a very large or very complicated page should be split into several simple pages; some large-bytes objects such as images and video should be compressed before these are released on the Internet.
- Structure well: Website system's structure and logical flow is clear, function design is well, such as front-end functions include products display, purchasing navigate, products order and payment, back-end functions include products and orders management etc. and the website system is ease to maintenance and update.
- Overall artistic: A pretty website is bound to attract more visitors. Most of visitors like a nice looking website, so, well-designed layout, beautiful pictures and interesting animation are important to website design.

### 2) *Information Quality*

Although information quality is a slippery subject, evaluating the information quality of a website based on four parameters—accuracy, integrality, relevant and update timely.

- Accuracy: Accuracy describes information that is factually irrefutable. The information published by website is true and accurate, not vague and even false.
- Integrality: The information published by website is a complete, not a partial picture of the subject.
- Update timely: The more website is updated, the more active organization will appear.
- Relevance: Accord to the website's goals, release relevant information rather than a number of unrelated spam.

### 3) *Customer Service*

Customer service in online environments has become recognized as an important factor as determining the success or failure of electronic commerce [8]. Increased customer service quality on the website can make companies electronic commerce more effective and appealing, and can help them to achieve higher levels of customer satisfaction. The "Customer Service" factor has uncovered four dimensions: respond quickly, ease of use, interactive and FQA. The descriptions of these parameters are as follow:

- Respond quickly: Respond quickly means that when customer voices and feedback delivered to website or customer centers, company should promptly respond to customer feedback quickly and accurately.
- Ease of use: It is related to well organized, well structured, and easy to follow catalogues, site navigability. The possibility of quickly finding exactly what he or she wants on the website is therefore very important, therefore, a popular website is expected to be equipped with an efficient and user-friendly search engine or search system, which is critical to increase the customer satisfaction. This group of website attributes includes website maps, image maps and sort system etc.
- Interactive operation: The best method of collecting and understanding customers' opinions is interactive between with company to customer or customer to customer, website can offers a variety of low-cost and efficient interaction such as the company's e-mail address, toll-free number and fax number, other real-time communication software, such as online chat, QQ customer service, online forum, BBS, etc.
- FQA: FAQ is an acronym for Frequently Asked Questions, website often released some of the common questions in FAQ pages, it helps customers to solve problems conveniently and improves the efficiency of Web services.

### 4) *Website Security*

Website security factor mainly include two parameters: one is security policy and another is privacy. It includes security of personal information and minimal online purchase risk.

- Security policy: Security policy means that there is security policy statement on the website.
- Privacy: Privacy means that the website must be committed to the protection of personal privacy.

### 5) *Website Intelligence*

Web intelligence is one of the most important as well as promising IT research fields in the era of Web and intelligence. Website intelligence is an important area of Web intelligence research, and it can provide company with great benefits. Website intelligence factor also mainly include two parameters, personalized service and adaptive website.

- Personalized Service: Web personalization is increasingly becoming important service for Web users. Through collected customer data automatically, such as customer's interesting and behavior, website can mining and analysis of some important information of customer by intelligence technology, provide one-to-one service for customer, and realization of product or service customization.
- Adaptive website: An adaptive website can automatically adjust its structure and representation so to meet different user's visit requirements through using web data mining technique to find the useful information of users.

## IV. DATA ANALYSIS

### A. *Data collection*

A survey study was carried out to test the proposed structural model. The survey was conducted both online and offline. Subjects were asked to evaluate 10 online bookstores. We selected 5 experts and 20 college students for in-depth interviews in a university, based on the results of the research and literature combined to form the initial questionnaire. The pilot study generated 106 responses. After data cleansing, 94 usable observations were kept, which is 88.7% of 106.

We carried out Exploratory Factor Analysis (EFA), principal factor analysis with varimax rotation was done to check the convergent and discriminate validity of the instrument ( $n=94$ ). Correlation coefficients were examined for all pairs of parameters. In each pair where the correlation coefficient exceeded 0.5 and was significant at  $p < .001$ , two parameters within the pair were considered to be eliminated, the EFA result is satisfactory. Therefore, the remaining 20 parameters were considered adequate for further investigation. To assess the reliability of the questionnaire in this research, Cronbach's Alpha ( $\alpha$ ) was used, and the result of reliability test for the whole questionnaire is 0.93, which is above the recommended threshold [9].

After the pilot study, necessary adjustments to the questionnaire were made. For the main study, students from the

same university were used and the main survey generated 1185 responses online, 1012 records were retained, about 85.4% of 1185.

## B. Model Measurement

In order to reduce the possibility of getting wrong answers, pay attention to reliability and validity in designing the research is essential. Factor Analysis (FA) is a statistical technology that is applied extensively in social sciences. Factor analysis consists of four steps: first is preparation of correlation matrix, second is factor extraction, third is selection and rotation of factors and fourth is interpretation. The purpose of the factor analysis in this research was to perform the reliability and validity and to verify the model fit. We use the SPSS 13.0 and AMOS 7.0 software to analyze the results of the model, AMOS is one of the Structural Equation Modeling (SEM) techniques.

### 1) Factor Reliability of Model

Reliability was evaluated by assessing the internal consistency of the items representing each factor using Cronbach's Alpha. Exploratory Factor Analysis (EFA) is a statistical approach used to examine the internal reliability of a measure [10]. In this study, the result of EFA has been presented in table I. All the parameter's loadings value is greater than 0.7, satisfying a minimum requirement of 0.5[11]. All factor's KMO numbers are bigger than 0.6 and significant Bartlett's test is smaller than significant level which is 0.05, that indicate correlation matrix possessing significant information. According to Jamal and Naser a tool with Cronbach's Alpha greater than the minimum quantity level 0.7 suggested by Nunnally is considered reasonable from reliability aspect[12]. All the factor's Cronbach's Alpha value is above 0.7. These numbers show that the data are reasonable for execution of factor analysis for website design, information quality, customer service, website security and website intelligence, and the reliability of proposed model is high and it is suitable.

TABLE I. THE RESULT OF EXPLORATORY FACTOR ANALYSIS

Factors	Parameters	Loadings	KMO	Cronbach's $\alpha$
Website design	System stability	0.884	0.778	0.764
	Page-loading speed	0.886		
	Structure well	0.812		
	Overall artistic	0.750		
Information quality	Accuracy	0.876	0.785	0.786
	Integrity	0.876		
	Update timely	0.924		
	Relevant	0.728		
Customer service	Search engine	0.920	0.824	0.829
	Response timely	0.899		
	Customer Forum	0.863		
	FAQ	0.845		
Website security	Security Policy	0.887	0.872	0.856
	Privacy	0.890		
Website intelligence	Personalized Service	0.901	0.881	0.817
	Adaptive website	0.823		

### 2) Factor Validity of Model

After doing EFA and calculating parameter's loadings for all the research factors, we should be sure about the factor validity of model by using Confirmatory Factor Analysis (CFA) technique. Factor validity includes content validity, construct validity, and criterion validity. Factor validity is a construct to assess the validity of model in this research. The confirmatory factor analysis is adopted to indicate the number of factors and investigate the prospective relationship existed between the factors and observed variables [13]. The result of CFA has been presented in table II.

TABLE II. THE RESULT OF CONFIRMATORY FACTOR ANALYSIS

Fit Index	$\chi^2/df$	RMSEA	AGFI	CFI	NFI	GFI
Value	1.738	0.047	0.931	0.964	0.921	0.948

The Result of CFA shows that, the Average Variance Extracted (AVE) for each factor excel 0.5, the minimum AVE is 0.598, and these five factors could explain 72.5% of the total variance. Absolute fit index, such as RMSEA is 0.047, which is smaller than significant level which is 0.05. The value of  $\chi^2/df$  is 1.738, which is lower than 3, AGFI is 0.931 and GFI is 0.948. Comparative fit index, such as CFI is 0.964 and NFI=0.948, are all more than 0.9 minimum standards. The results show that the hypothetical model has a goodness of fit measurements and it is a reliable and suitable model.

## C. Hypotheses Discuss

The results from empirical study show that E-commerce website customer satisfaction is significantly affected by customer service and website intelligence, such as perceived ease of use, user-friendly and speedy website navigation, customization service etc., website design, website security and information quality also show significant influence on customer satisfaction. Thereby, we can state that all of the hypotheses of research model are confirmed. That is:

H1: There is a significant and positive effect between the website design and customer satisfaction.

H2: There is a significant and positive effect between the information quality design and customer satisfaction.

H3: There is a significant and positive effect between the customer service and customer satisfaction.

H4: There is a significant and positive effect between the website security and customer satisfaction.

H5: There is a significant and positive effect between the website intelligence and customer satisfaction.

## V. CONCLUSION AND FUTURE WORK

### A. Conclusion and suggestion

The purpose of this paper is to research customer satisfaction of E-commerce websites, proposed a five factor structural model of influence website customer satisfaction, then hypotheses are raised and the tested using factor analysis. From the result of factor analysis (include EFA and CFA), we

may conclude that all these five hypotheses are supported. The factors of website design, information quality, customer service, website security and website intelligence are a significant and positive effect customer satisfaction of E-commerce websites.

The results of our empirical study for online bookstores support our idea, and the analysis also show that there exist a strong relationship between customer satisfaction and the five factor model of E-commerce websites. It provided evidence for the validity of the structural model.

By taking a close look at the results, we suggest that: 1. The strategic design of website is an open topic that needs further attention. In order to achieve customer satisfaction, companies should act with customer satisfaction as the central focus of website designs. That is, a website should take perspective of customer, customer-centric while making any decision of design rather than being product-centric or technology-centric. 2. It is a mistake for the company to attempt to fit everything into one screen or build a complicated website----consumers cherish simplicity and efficiency. Since the first thing for a consumer wandering into a website is to quickly find what he or she wants, a user-friendly and speedy website navigation system is crucial. Otherwise, the visitor will instantly leave without giving the website a second chance. 3. Website intelligence is one of the most important factors for improve customer satisfaction in the era of intelligence. Through collected customer information automatically by intelligence technology, website can better feeling of customer feelings and more understanding customer needs, then can provide one-to-one service for customer, realization customization service, thus can provide optimum services exceeding customer expectations. A pleasant little surprise delights the customer greatly and boosts his or her satisfaction to a high level, and then wins his or her repeat visit and repeat purchases and word-of mouse and loyalty at the end.

#### *B. Limitations and Future Work*

Like most empirical researches, this study has limitations. First, this research only looked at website of bookstore online, thus it is possible that the results are not generalizable for other online websites. Second, the convenience nature of the sample may limit the results. The sample used was composed of college students, and they could be different from other

customers. As noted above, future research should investigate other areas of E-commerce website, and select a wider group of customers as a sample data collection object, then, adjustment to the structural model again. This will serve to make customer satisfaction model of E-commerce website more adaptable, and help to guide practice of E-commerce websites.

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