Measuring The User Experience And Its Importance To Customer Satisfaction: An Empirical Stusy For Telecom e-Service Websites

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MEASURING THE USER EXPERIENCE AND ITS IMPORTANCE TO CUSTOMER SATISFACTION: AN EMPIRICAL STUDY FOR TELECOM E-SERVICE WEBSITES

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ABSTRACT

In telecom settings, using e-service website has become an increasingly common activity among mobile users. As an important channel, website users experience that quality plays a key role for e-service or business successes. With the use of an online structured questionnaire, a total of 20,040 were surveyed to answer the questions in thirty-one provinces in China. With methods of Principal Component Analysis, a five-factor e-service website user experience questionnaire was examined, and the factors of perceived functional completion, perceived websites performance, quality of interface and interaction, quality of content and information, and quality of online customer support or service were found effectively to measure e-service website user experience quality. In addition, all of these five aspects in e-service website user experience were found to be significant in predicting overall customer satisfaction.

Keywords: e-service websites, user experience, customer satisfaction

INTRODUCTION

E-service or commerce may refer to the conduct of service or business transactions or managerial activities using the Internet through websites or mobile applications. For individual telecom businesses, more and more people tend to select electronic channels to complete service or commerce, and this has become an increasingly common activity among mobile users. As an important channel or medium, websites play a key role for e-service or business's success. There has been a considerable amount of research examining how to improve websites user experience, and a lot of studies recently began to focus on the e-service quality affecting customer satisfactions. However, few studies specialize in measuring user experience of e-service website in telecom field. In addition, the contribution of user experience factors to customer satisfaction when using websites to conduct individual services or commerce is not very clear, especially among telecom users in China. Combining with previous research and practical needs, this study aims to use a reliable and valid scale to measure the e-service website user experience, along with investigating its impact on customer satisfaction.

In the field of user experience, most of the studies are focused on understanding or measuring user experience in terms of dimensions and investigating how much degree does it have an impact on users' perception on the quality of products. For example, by focusing on product perception and acceptance, Shackel in [9] defined usability or user experience in terms of effectiveness (level of interaction in terms of speed and errors), learnability (level of learning needed to accomplish a task), flexibility (level of adaptation to various tasks) and attitude (level of user satisfaction with a system); Nielsen described it as 'the measure of the quality of the user experience when interacting with something whether a Web site, a traditional software application, or any other device the user can operate in some way or another' [8]. With respect to user experience measuring, self-reported based survey is one of most common and useful methods to learn participants' feedback with interacting with system [11]. For use in general, several well-known subjective usability questionnaires have been developed, including System Usability Scale [10], Software Usability Measurement Inventory (SUMI) [4][5], and Post-Study System Usability Questionnaire [6][7]. However, these questionnaires have been developed with the aim of common use for all products. Obviously, e-service websites used in telecom field differs general products or websites. In addition, web survey has become an effective and efficient way to collect user feedback in a large sample sizes. Nevertheless, how to develop a reliable web survey questionnaire with reducing respondents' answer burden is still important [3]. Based on previous studies, a framework was proposed for understanding and evaluating user experience quality in telecom e-service website use practice. Thus, one of the aims in this study was to examine reliability of an initial e-service website user experience scale according with this framework.

The association between e-service website quality and customer satisfaction was also addressed in many previous studies. For example, [2] investigated e-service quality and its importance to customer satisfaction for e-retailing by banks. In [2], a four-factor solution of "personal needs", "site organization", "user-friendliness" and "efficiency" was examined to be effective factors for evaluating e-service website quality, and which was found to be a predictor of overall customer satisfaction with baking performance. The results in [2] indicated the importance of user experience of e-service website to customer satisfaction. The current study also considered the association in telecom e-service settings.

In general, by using web survey to collect respondent's feedback in a large sample size, the aims of the current study were to 1) examine the validity and reliability of a five-factor user experience questionnaire for measuring e-service websites in telecom setting; 2) investigate how e-service website user experience quality affects customer satisfaction.

METHODS

Respondents

The data used in this study was from a web survey, which was conducted for investigating the user's experience satisfaction toward electronic channel related products (e.g., websites, WAP, and APP), especially to study the elements which influence users' satisfaction toward one e-commerce website. A total of 115,502 website visitors participated to answer a structured online questionnaire. With respect to assure that the responses ware reliable, some basic criteria were used for the selection of valid closed-ended responses, such as those filled the same scaled scores for most or all closed items were excluded. In summary, 20,040 respondents met the requirements. Out of all these respondents, 70.8% were male and 29.2% were female. With respect to age group, 4.5 % aged at 18 years or below, 32.5% aged at 19-25 years, 41.8% aged at 26-35 years, 15.6% aged at 36-45 years, and 5.5% aged at 46 years or above.

Questionnaire Measures

Being a part of the e-channels satisfaction survey, the main aim of this study was to examine the reliability of e-services website related user experience(UX) questionnaire, as well as to investigate how user experience related factors affect users' satisfactions towards a website of e-channel. In UX practice for e-channels in telecom field, we created a user experience evaluation index. In this framework, five components or factors of UX were identified for understanding UX when using the e-channels for services checking or handling: the functional completion of the website, the performance of the website, the quality of interface or interaction of the website, the quality of content or information, and the quality of online customer service. In accordance with the framework, a panel consisting of three UX experts ware required to develop a self-reported questionnaire for collecting respondent's qualitative feedback and quantitative in web survey. With several basic criteria like the numbers of items shouldn't be too large for reducing respondents' response affordance, a total of 31-item survey was created after some informal tests. The questionnaire measures used in this paper consisted of the main part of this 31-item survey. Beside the demographic measures including age and gender was used in this paper, one item was used to assess the respondent's satisfaction towards the website ("Overall, I am satisfied with use of the current website (*scored 1 strongly disagree to 5 strongly agree*)") and a 16-item initial user experience scale was used in this study. As a main questionnaire in this study, the details of e-Service Websites User Experience Questionnaire was described as below.

E-service Websites User Experience Questionnaire

As mentioned above, five components in the original scale were identified for evaluating user experience for using the e-channels in telecom setting: perceived the functional completion of the website (one item was used for the evaluation), perceived the performance of the website (two items), perceived quality of interface or interaction of the website (five items), perceived quality of content and/or information (five items), and perceived quality of online customer service (three items). Table 1 includes a summary of the user experience questionnaire variables and measures used in this study. Respondents were required to score on a 5-points scale (*scored 1 strongly disagree to 5 strongly agree*) for each item.

Table 1. Summary of user experience questionnaire variables and items.

Variables	Items	Measures
Perceived the Functional Completion (PF)	PF1	The website provides all functions that I need.
Perceived the Performance of the Website (PP)	PP1	The website dose not crash, get interrupted, fail or flashed back when loading.
	PP2	The Web page loading is fast.
Perceived the Quality of Interface and Interaction (PI)	PI1	The website is easy to use.
	PI2	The procedures or steps were simple and clear for use like service checking and handling.
	PI3	The navigation or structure in the homepage is clear, and I can use it to visit target quickly.
	PI4	The interface is aesthetical.
	PI5	The important functions or contents were presented well in the prominent place on the site.
Perceived the Quality of Content and Information (PC)	PC1	The important information such as charge and promotion is correct and there is no out-of-date information on the site.
	PC2	The kinds of responding product (e.g., mobile terminals, cell No.) provided by the site are plentiful, and it can satisfy my demands.
	PC3	The texts for introducing mobile services and promotions are clear and understandable.
	PC4	I can find what I need through searching the website search.
	PC5	The kinds of services provided by the site are plentiful, and it can satisfy my demands.
Perceived the Quality of Online Customer Support or Service (PS)	PS1	I can get timely reply from online customer service when I ask for helps.
	PS2	The online customer service on the website can always solve my problems effectively.
	PS3	The guides across different mobile service pages are designed well, and it can help me find important information that I need.

RESULTS

E-service User Experience Questionnaire Analysis

Principal Component Analysis

We first conducted a confirmatory factor analysis to confirm key components in the initial perceived user experience evaluation framework, a five-factor structure of functional completion, website performance, interface and interaction quality, content and information quality, and online support or service quality. Preliminary analysis showed no items that did not correlate with any other item or items having a correlation coefficient of > 0.9. Furthermore, the Kaiser-Meyer-Olkin statistic was more than 0.5 (0.960), and Barlett's test of sphericity was significant ($p < 0.000$), indicating that the data was appropriate for principal component analysis [11]. We used a principal component factor analysis (PCA) to test the five dimensions in the user experience questionnaire. The PCA procedure for the scale of user experience was conducted based on total responses of 20,040 (participants) × 16 (items). With use five factors in the method of "fixed number of factors", each item was categorized in responding component as expected, and we found the factor loading for responding items were greater than 0.5. The results were presented in Table 2.

Table 2. User experience questionnaire: item and factor loadings.

Variables or Factors	Items	*1*	*2*	*3*	*4*	*5*
Perceived the Quality of Interface and Interaction (PI) ($\alpha = 0.864$)	PI1	**0.770**	0.213	0.183	0.197	0.131
	PI2	**0.718**	0.255	0.242	0.153	0.096
	PI3	**0.694**	0.321	0.215	0.158	0.140
	PI4	**0.664**	0.210	0.164	0.217	0.182
	PI5	**0.528**	0.516	0.270	0.149	0.069
Perceived the Quality of Content and Information (PC) ($\alpha = 0.841$)	PC1	0.242	**0.754**	0.176	0.195	-0.001
	PC2	0.165	**0.699**	0.170	0.117	0.255
	PC3	0.426	**0.595**	0.313	0.138	0.025
	PC4	0.374	**0.582**	0.285	0.147	0.215
	PC5	0.284	**0.552**	0.355	0.110	0.230
Perceived the Quality of Online Customer Support or Service (PS) ($\alpha = 0.857$)	PS1	0.226	0.249	**0.832**	0.169	0.101
	PS2	0.245	0.278	**0.823**	0.155	0.116
	PS3	0.425	0.372	**0.565**	0.132	0.152
Perceived the Performance of the Website (PP) ($\alpha = 0.705$)	PP1	0.188	0.166	0.141	**0.852**	0.024
	PP2	0.255	0.171	0.157	**0.771**	0.179
Perceived the Functional Completion (PF)	PF1	0.285	0.255	0.191	0.168	**0.850**

Internal Consistency

An analysis conducted on the 16-item scale demonstrated good internal consistency ($\alpha = 0.933$). Again, preliminary analysis showed that the inter-item correlation was between $r = 0.285$ and $r = 0.759$, indicating that initial items are evidently differentiating and not redundant with one another. To check the reliability of the each variable or subscale (expect for perceived functional completion), internal consistency analysis (Cronbach's α) was conducted. In Table 2, the Cronbach's α statistic for each subscale was high (0.705 or higher) and indicated reasonable inner reliability for each user experience component measured. These psychometric analyses showed that the self-report user experience measures used in this paper were valid and reliable.

Table 3. Zero-order correlations between the study variables (N = 200, 40)

Variables	1	2	3	4	5	6	7	8
1. Overall Satisfaction	—							
2. Functional Completion	0.546***	—						
3. Perceived Performance	0.452***	0.399***	—					
4. Interface and Interaction	0.622***	0.552***	0.544***	—				
5. Contents and Information	0.569***	0.555***	0.495***	0.771***	—			
6. Support or Service	0.544***	0.489***	0.464***	0.690***	0.729***	—		
7. Gender	0.023**	0.043***	0.019**	0.042***	0.054***	0.019**	—	
8. Age group	0.024**	0.074***	0.031***	ns	ns	ns	-0.078***	—

Note. ** $p < 0.01$; *** $p < 0.001$; ns = not significant

Correlations between the Variables

Given the possible business concerns, we did not present average values in terms of customer satisfaction and each subscale in user experience questionnaire. This did not affect the research aim of this study, which was to address the reliability and valid of the user experience questionnaire for e-service websites, and its determination effects on customer satisfaction. The overall satisfaction is higher than e-service website user experience quality; including mean scores of each subscale and overall score. Results of correlations analysis showed in Table 3 indicate that the correlations among customer satisfaction and variables of user experience were all significant. The relationships between demographic measures and user subjective response satisfaction were weak correlated.

Predictors of Customer Satisfaction: Regression Analyses

To answer the second aim of the study, a procedure of hierarchical multiple linear regression analyses was used to assess the contribution of perceived user experience measures, along with measures of gender and age group. In the hierarchical regression analyses, the five perceived user experience variables (i.e., functional completion, perceived the performance of the website, quality of interface or interaction, quality of contexts or information, and online customer support or service) were entered in step 1, the demographic measures (i.e., gender and age group) were added in step 2. By controlling the influence of other variables, this approach allowed us to assess the predictive utility of each kind of predictors. The results are summarised in Table 3. In step 1, the five perceived user experience variables were able to explain 47% of the variance in users' satisfaction towards the website ($F (5, 20034) = 3539.600$, $p < 0.001$), with all five variables emerging as significant predictors. In step 2, the addition of demographic variables resulted in no any increment to the variance for explaining customer satisfaction. The result suggested that gender and age groups did not emerge as significant predictors ($F_{change} (2, 20032) = 1.023$, $p > 0.005$). Among the five user experience variables, perceived the quality of interface or interaction emerged as the biggest contribution for predicting customer satisfactions towards the website (Beta = 0.300). The quality of content or information on the website emerged as a minor influence factor for predicting users satisfaction (Beta = 0.060), though it significantly affected customer satisfaction in statistically. In sum, the findings indicated that the user experience quality of the e-service website play a very important role in predicting address the customer satisfaction.

Table 4. Regression analysis: predicting users' satisfactions towards the website (N = 200, 40)

Predictors	B	S. E	Beta	t	Sig.	95% C.I
1. Perceived user experience measures						
Functional Completion	0.200	0.005	0.246	38.105	0.000	0.189-0.210
Perceived Performance	0.088	0.005	0.104	16.660	0.000	0.078-0.098
Interface and Interaction	0.300	0.009	0.296	33.377	0.000	0.283-0.318
Contents and Information	0.057	0.009	0.060	6.525	0.000	0.040-0.074
Support or Service	0.114	0.007	0.128	16.097	0.000	0.100-0.128
2. demographic measures						
Gender	-0.013	0.009	-0.007	-1.414	0.157	-0.030-0.005
Age group	0.000	0.004	0.001	0.104	0.917	-0.008-0.009
R Square (R^2)	$R^2 = 0.469$ [$F(5, 20034) = 3539.600$, Sig. = 0.000]					

Note. 95% C.I means 95% Confidence Interval for B with lower and upper bound

DISCUSSION AND CONCLUSIONS

The aim of this study were to investigate how to measure e-service websites user experience, along with to explore the relationship between user experience factors of e-service websites and customer satisfactions, With respect to user experience questionnaire, a five-factor scale was developed. The results indicated that the aspects of e-service websites user experience in telecom differ from those for other products. In this study, the factors of perceived functional completion, perceived e-service website performance, quality of interface and interaction, quality of content and information, and quality of online support or service were examined in a large size data. As for the impact of user experience factors on customer satisfaction, this study suggested that all five user experience factors emerging as significant variables for predicting customer satisfaction. Results of correlations analysis among customer satisfaction and variables of user experience showed great significance, while that among demographic measures and user subjective response satisfaction showed weak correlation. Again, the five perceived user experience variables had explained 47% of the variance in users' satisfaction which made it a significant predictor towards telecom e-service websites, while demographic variables meant nothing to prediction. Hence, it's important to focus on the quality of user experience on the telecom e-service websites when predicting customer satisfaction. According to these analysis, stakeholders of e-service website could decide how to improve user experience and turn visitors into customers.
On the other hand, we found out how the user experience quality of e-service website affects customer satisfaction.

Even though we found the importance of user experience quality in predicting customer satisfaction in this research, but it still showed some limits. Firstly, as the sample is derived from one website of telecom e-service websites, generalizability of the results is limited. Although tests for reliability and validity provided initial support in this article, there still remains a possibility

that not all e-service website were consistent with the regular pattern. Secondly, the amount of respondents' feedback used for analysis is big, which may be easy to reach statistical significance other than variables effectively significance. The results would be used carefully.

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