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The Impact of Usability on the Intention of Planned Purchases in E-commerce Service Websites

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Abstract

For e-commerce websites to be successful in a highly competitive environment, the designers and managers should know what usability attributes can affect the probability of customers' making purchases. This paper proposes a website usability study to measure attributes and the users' intention of planned purchases. This study provides a designer's perspective of the online customer which can be a significant step towards understanding customer online decision-making and their intention of planned purchases. The study is validated on two existing e-commerce service websites. Current HCI studies, psychological and Information Systems theories are used to identify key usability attributes that can influence customers' purchasing intentions. Implications and limitations of the findings are discussed.

Keywords

Website usability, design, subjective usability, usability guidelines, intention to purchase

1. Introduction

The Internet, by virtue of its multimedia capabilities, provides opportunities for websites to offer unique and satisfying shopping experiences to its visitors and customers (Hoffman and Novak, 1996). Studies have shown that customers are not satisfied with their experience of using e-commerce websites. Forrester Research (1999) indicates that two-thirds of purchase attempts initiated on websites were abandoned because customers were not satisfied with their experience. A study by Boston Consulting Group (2000) reports that 28 % of all attempted purchasing failed and four out of five ordering online experienced one failure. The study also suggests that customers are not likely to use the website after an initial unfavorable shopping experience.

The e-commerce website is a primary user interface for net-enabled business (Straub & Watson 2001). For website owners to be successful and customers to be satisfied, design

criteria need to be considered (Nielsen 2000; Olson & Boyer 2002). Poor design of website interfaces has been a key reason in a number of high profile site failures (Buschke 1997). Hence, designing sites that are responsive to customers' needs is critical for e-businesses.

Past research has been conducted to understand which factors affect customer purchasing behavior. Although these studies attribute reasons for low intention to purchase to design factors, the results are largely general in content and cannot be used by a designer to evaluate and re-design the website (Vassilopoulou, Keeling, Macaulay & McGoldrick 2001). This research adopts a design perspective and offers specific guidelines for the designer to re-develop the website.

Usability evaluation plays an important role in the design of the interface of an e-commerce website (Palmer 2002). Visitors can arrive at a site for different reasons such as to browse, search or purchase. This additional dimension of uncertainty makes a usable website even more important. Thus creating websites with high usability features that encourage planned purchasing and repeat visits is an important objective for e-commerce websites (Vassilopoulou et al. 2001).

Usability is defined in this study as the ability of an interactive system to assist users and tasks. It can be measured in two ways, objective and subjective. Both types of measures are equally effective for assessing system usability (Nielsen 1993). Subjective usability assesses user attitudes concerning attributes of a website. However, website usability is not easily achievable (Huang 2002). Firstly, there is no well-defined set of usability principles, only vague principles of good usability. Secondly, the concept of usability is both scientific and subjective and it is difficult to resolve the conflicting opinions.

In this study, subjective usability is used as customer attitudes towards dimensions of the websites are assessed. It is more appropriate to use subjective usability as attitudes are often perceptual in nature. This research puts forward two questions in the designers' perspective:

1. What are the usability factors of e-commerce service websites?
2. Is website usability positively associated with the intention of purchases which customers have specific products or services in mind before shopping (planned purchases) on e-commerce service websites?

To meet the objectives of this research, a multidisciplinary approach is ideal and is adopted for this study.

2. Literature Review

The usability and design of websites has been examined in Web-specific usability research as well as in human computer interaction (HCI) literature. Theories of information systems success can also be used for the website usability since e-commerce websites are information systems providing aid in customer decision-making.

2.1 A Designer's Perspective

Researchers and practitioners have been conducting studies that aim to understand which factors affect users' online buying behavior. These factors include *personal characteristics*: personal innovativeness (Limayem, Lhalifa & Frini 2000) and web skills (Koufaris 2002); *website design attributes*: information quality, response time and system acceptability (Lin & Lu 2000); download delay, website navigation, interactivity, quality content (Palmer 2002);

security and privacy (Ranganathan et al. 2002) and *cognitive responses*: perceived control, shopping enjoyment, perceived usefulness and perceived ease of use (Koufaris 2002). While these studies attribute some of the reasons for relatively low intention to purchase to poor interfaces and online navigation they provide results that are largely general in content and cannot be used by a designer in order to evaluate and re-design the website (Vassilopoulou et al. 2001).

This research takes the perspective of a designer, encompassing the website design attributes and the customers' perceptions towards the website. In spite of a sound technical architecture, e-commerce service websites will not be effective if they fail to meet customer expectations (Ranganathan et al. 2002). The design and usability of e-commerce service websites plays an important role in attracting, sustaining and retaining the interest of a customer during his or her shopping experience. According to Nielsen (2000), customers of e-commerce websites will experience the user interface and then he or she will decide whether to buy or leave the sites.

2.2 Human Computer Interaction

HCI researchers and practitioners have also been working on developing techniques that measure users' perceptions and associate them to specific usability attributes. One of the popular HCI techniques to assess website usability is questionnaire-based. There exist two well documented examples of questionnaire-based usability techniques specifically for the web: i) the Questionnaire for User Satisfaction (QUIS) (Harper, Slaughter & Norman 1997) and ii) the Web site Analysis and MeasureMent Inventory (WAMMI) (Kirakowski, Claridge & Whitehand 1998). Both techniques measure the usability of Web user interfaces by traditional usability evaluation measurements, such as attractiveness, control, efficiency, affect, learnability and satisfaction. These questionnaires measure user satisfaction against traditional usability attributes.

Measurement of user satisfaction does not provide the web site designer of an e-commerce service website with enough information about customers' actual online buying behavior. This is consistent with evidence from psychological literature whereby it suggests that the measurement of behavioral intention is a better predictor of actual usage of a system, rather than satisfaction (Davis, 1989). Davis (1989) defines behavioral intention as "a measure of the likelihood a person will employ the application." The findings of Neal (1999) also support that the observed relationship between satisfaction and repeat purchase is weak. Therefore, this research also measures the customers' intention to purchase rather than just users' attitude to the various attributes of the website.

2.3 Information Systems Theories of Success (Quality)

E-commerce websites provide customers with information for their decision making and services that aid in their shopping experiences. As e-commerce websites are also information systems, dimensions of information systems success can be used to derive usability attributes. Theories have been formulated to assess the success of information systems (IS). The two prominent theories of IS success are DeLone and McLean (1992, 2002) and Seddon (1997). In DeLone and McLean's (2002) theory of IS success, there are five variables affecting use of the IS: System Quality, Service Quality, Information Quality, Net Benefits and User Satisfaction.

Empirical evidence from IS success theories has shown that System Quality, Information Quality, Service Quality, Net Benefits and User Satisfaction is positively associated with IS use. DeLone and McLean's (2002) reformulated IS success model suggests the intention to use can be a worthwhile alternative measure. This research attempts to extend the context of the theories to e-commerce and show that there is a systematic association between each of the four variables and the intention of planned purchases of customers. Instead of measuring the intention to use, this research will investigate the intention of planned purchase on e-commerce service websites.

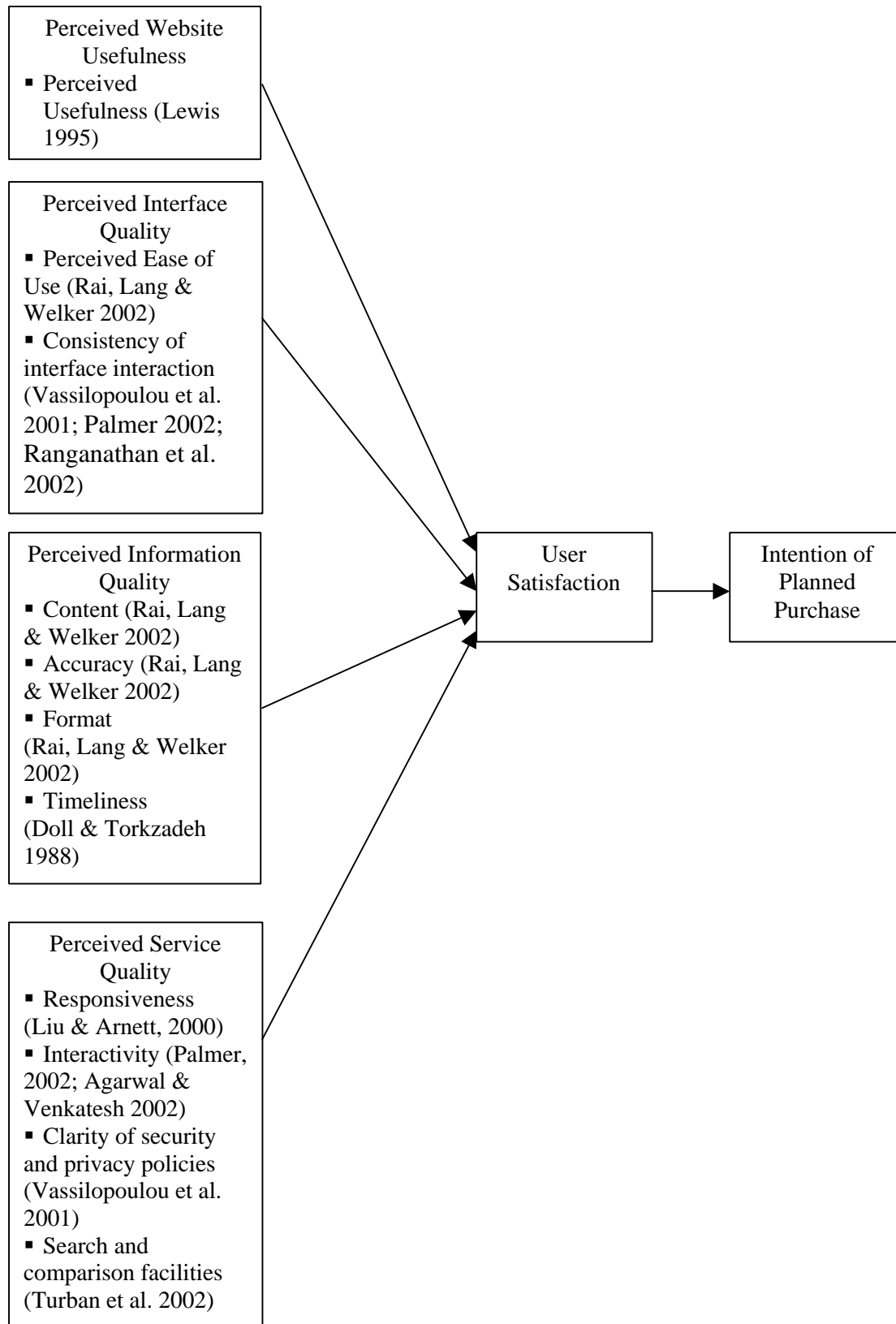


Figure 1 Research Model

3. Model and Hypotheses

Three frameworks have been used to build the research model of this study: Fishbein and Ajzen (1975), Lewis (1995) and DeLone and McLean (2002). The research hypotheses can then be developed from the theories to be examined in this study.

In DeLone and McLean's (2002) reformulated theory of IS success, system quality, information quality, service quality and net benefits are positively associated with the user satisfaction. The theory also proposes that user satisfaction is positively associated with the intention to use. According to Lewis's IBM Computer Usability Satisfaction Questionnaire (1995), satisfaction with system usability can be measured in three dimensions: system usefulness, interface quality and information quality. To apply both frameworks in the context of e-commerce, this research investigates the impact of perceived website usefulness, perceived interface quality, perceived information quality and perceived service quality on the user satisfaction of users of e-commerce websites. Furthermore, this study examines the impact of user satisfaction on the intention of planned purchases.

To understand the relationship between user satisfaction and the intention to purchase, the Theory of Reasoned Action (Fishbein and Ajzen, 1975) can be utilized, which is widely recognized as a fundamental model of explaining behavior. According to this theory, behavior is determined directly by the intention to perform the behavior which is in turn influenced by attitude and by subjective norm. Attitude is defined in this study as one's positive or negative evaluation of performing the behavior (Bagozzi, 1992). User satisfaction is measured in this study which is defined by Turban et al. (2002) as the extent to which the user likes using the system. Hence, user satisfaction qualifies as an attitude. Subjective norm is the perceived social pressure to perform the behavior (Bagozzi, 1992). However, subjective norm is not examined in this research as it adopts a design perspective investigating individual internet purchasing intentions. For attitude, beliefs that performing the behavior will lead to specific outcomes combine with the evaluations of the outcomes. In this study, we will examine the impact of the four beliefs: Perceived Website Usefulness, Perceived Interface Quality, Perceived Information Quality and Perceived Service Quality on User Satisfaction, as well as the impact of User Satisfaction on Intention of Planned Purchase.

3.1. Perceived Website Usefulness

Perceived Website Usefulness is defined in this study as the degree to which using a particular website would enhance his or her job performance. Convenience and time savings are often listed by customers as the main reasons for shopping online (Turban et al. 2002). Customers can help themselves to the services and information provided by the website at their own convenience. E-commerce service websites must be designed in such a way customers do not need to spend so much time in finding the information they require (Ranganathan et al. 2002).

Hypothesis 1: The level of Perceived Website Usefulness of e-commerce service websites by is positively related to User Satisfaction.

3.2 Perceived Interface Quality

Perceived Interface Quality is defined in this study as the degree to which the user believes the interface of the website is easy to use (Doll & Torkzadeh 1988) and consistency of interface interaction. In Palmer's (2002) study on website success, ease of navigation is a factor affecting website success. Usability researchers suggest that organization and navigation is "important to outcomes" (Nielsen 2000). Consistency of interface interaction is also important in interface quality (Vassilopoulou et al. 2001; Palmer, 2002; Ranganathan et al. 2002). It means the site used the same procedure when you did similar operations for example the same colored button on each page (Vassilopoulou et al. 2001).

Hypothesis 2: The level of Perceived Interface Quality of e-commerce service websites is positively related to User Satisfaction.

3.3 Perceived Information Quality

Perceived Information Quality is defined in this study as the degree to which the user believes that the information on the website has the attributes of content, accuracy, format (Rai et al. 2002) and timeliness (Doll & Torkzadeh, 1988). Media richness theory (Daft & Lengel 1986) suggests that the quality, accuracy and reliability of the information exchanged across a medium are critical. Evans and Wurster (2000) highlight richness and quality of information. Content quality and variety are also key customer measures when shopping on the web (Jarvenpaa & Todd 1997). Therefore, the construct Perceived Information Quality includes the attributes of information as well as the use of text, graphics and multimedia.

Hypothesis 3: The level of Perceived Information Quality of e-commerce service websites is positively related to User Satisfaction.

3.4 Perceived Service Quality

Perceived Service Quality is defined in this study as the degree the user believes the website is responsive, interactive; clear about security and privacy policies; and effective in its search and comparison capabilities. Service quality is defined by Pitt, Watson & Kavan (1995) as the discrepancy between customers' perceptions and expectations of the service. Customer service on the web can take many forms, such as answering customer inquiries, providing search and comparison capabilities (Turban et al. 2002) and the clarity of privacy, security and sales policies (Vassilopoulou et al 2001). There are also tools to enhance customer service which include personalized webpages, frequently asked questions and web-based help desks. These tools come under the service categories of interactivity and responsiveness. Interactivity includes the ability to customize the site's look, feel and content as well as provide interaction with the user (Palmer 2002). Responsiveness is the presence of feedback to users and the availability of response from the customer representatives (Palmer 2002).

Hypothesis 4: The level of Perceived Service Quality of e-commerce service websites is positively related to the User Satisfaction.

3.5 User Satisfaction

User satisfaction is defined by Turban et al. (2002) as the extent to which the user likes using the system. According to the Theory of Reasoned Action, intention is determined by attitude. User satisfaction has been measured in past usability studies without linking it to the intention to purchase. Hence this study will link the user satisfaction of users to their intention to purchase.

Hypothesis 5: The level of User Satisfaction of e-commerce service websites is positively related to the Intention of Planned Purchase.

4. Research Method

The aim of this part of the study is to empirically validate the use of usability attributes specifically for e-commerce service websites to predict customer intention to purchase using a website usability questionnaire.

4.1 Target sites

Specifically, the e-commerce websites selected for this study are Travelocity.com and Expedia.com. These are international online travel companies relatively unknown to Singaporeans compared to local travel companies with an online presence. Online travel services come under Turban's (2002) classification of service industries on the internet. Virtual travel agencies offer almost all the services provided by conventional travel agencies. The reasons why these two websites are chosen are discussed below.

Travelocity has been named the World's Leading Travel Internet Site for five consecutive years at the World Travel Awards and it operates websites in seven languages across four continents. Being a strong competitor of Travelocity, Expedia.com is the Yahoo! Internet Life Best Overall Travel Site and was named "Editor's Choice" by PC Magazine (2002) in a head-to-head review of online hotel booking sites. Travelocity and Expedia both have comprehensive features that allow for personalization, expert advice on vacation planning, easy navigation and feedback.

Furthermore, we obtained information from Bizrate.com which offers users detailed store ratings of listed websites by customers. Customers were asked to rate their satisfaction on Bizrate.com with several usability categories. The overall ratings of both Travelocity.com and Expedia.com out of a maximum of 10 are both above 8.5 as of October 2002.

4.2 Sample

Undergraduates are chosen to be participants in this study as they have substantial experience in using websites for their projects, assignments and their interests. As such, they can be effective candidates to rate usability of websites for this research. 51 students are assigned to use Travelocity.com and another 51 are assigned to use Expedia.com. The characteristics of the sample are shown in Table 3.

Demographics	Frequency (Percentage)
Gender	
Male	34 (33.3%)
Female	68 (66.7%)
Age	
18-20	41 (40.2%)
21-23	54 (52.9%)
24-26	7 (6.9%)
Previous purchases on the Internet	
Yes	24 (23.5%)
No	78 (76.5%)
Frequency of purchases per year on the Internet	
None	76 (74.5%)
1-2	20 (19.6%)
3-4	3 (2.9%)
>4	3 (2.9%)
Previous visit to other online travel websites	
Yes	42 (41.2%)
No	60 (58.8%)

Table 1. Sample Population Demographics

4.3 Research procedure

Undergraduates are invited to participate in this research through advertisements and rewards in cash are offered for participation. The participants in this study are asked to assume the role of the customer who is planning his/her vacation to a fixed destination, Penang, Malaysia. They are asked to follow a comprehensive set of procedures on an instruction sheet to simulate a scenario of an online travel planning experience. In this study, the participants are instructed to search for available flights to Penang and accommodation in the duration of stay there. Based on the information given by the website, participants decided on which flight and accommodation to book. They stopped at a point before actually purchasing the air tickets and accommodation (for example, the stage when they are asked for their credit card information). The research procedure and questionnaire were pre-tested on a small sample of 10 honours year students before it was officially administered to the participants.

4.4 Measurement of variables

Existing literatures were utilized to measure the variables of this study to support the specification of a set of potentially strong metrics (Churchill 1979). Hence existing instruments were used to measure constructs in this research. For all of the constructs mentioned below in Table 2, ratings of each item will be made on a seven point Likert scale (1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neutral, 5 = slightly agree, 6 = agree, 7 = strongly agree).

Constructs	Number of items	Measurement sources
Perceived Website Usefulness	5	Davis (1989); Lewis (1995)
Perceived Interface Quality	7	Davis (1989); Lewis (1995)
Perceived Information Quality	7	Doll and Torkzadeh (1988); Lewis(1995)
Perceived Service Quality	7	Vassilopoulou et al. (2001); Agarwal and Venkatesh (2002)
Attitude	3	Agarwal and Venkatesh (2002)
Intention of Planned Purchase	1	Davis (1989)

Table 2. Constructs and Measurements

5. Data Analysis and Results

The hypotheses of this research were tested using Partial Least Squares analysis (PLS), a multivariate analysis technique that is ideal for testing structural models with latent variables. Sample sizes need not be large and the assumption of a normal distribution is not necessary. The path coefficients from a PLS analysis are standardized regression coefficients. Results can be interpreted in the context of regression.

5.1 Descriptive Statistics

Means and standard deviations for the latent variables are reported in Table 3. To compute these descriptive statistics, multiple-item scales were summed and averaged. The means of all the variables lie between 4.5 and 5.5. Standard deviation values are less than +1.50. Hence, the descriptive statistics obtained in this study is acceptable. The correlations between the variables are shown in Table 4.

Construct	Mean	Standard Deviation
Website Usefulness	5.27	1.03
Interface Quality	4.89	1.12
Information Quality	5.30	0.89
Pre-order Service Quality	5.33	0.88
User Satisfaction	5.19	0.95
Intention of Planned Purchase	4.96	1.29

Table 3. Descriptive Statistics

	Website Usefulness	Interface Quality	Information Quality	Service Quality
Website Usefulness	1.00			
Interface Quality	0.6348	1.00		
Information Quality	0.6229	0.6749	1.00	
Service Quality	0.6737	0.6472	0.6919	1.00

Table 4. Correlation Matrix

5.2 Reliability

In order to ensure that the items comprising each variable were internally consistent, reliability assessment was carried out using Cronbach's alpha. A low value of Cronbach's alpha indicates that the items are not internally related in the manner expected. The internal consistency reliability coefficients for the research constructs are all well above 0.8. Each alpha exceeds the minimum acceptable level of 0.70 recommended by Nunnally (1978). Table 5 shows the reliability coefficients for each construct as well as the correlation of each item to its construct.

Construct	Cronbach's alpha	Correlations to items
Website Usefulness	0.92	0.85, 0.87, 0.85, 0.91, 0.87
Interface Quality	0.95	0.93, 0.83, 0.91, 0.87, 0.86, 0.92, 0.78
Information Quality	0.92	0.79, 0.84, 0.86, 0.87, 0.85, 0.76, 0.78
Service Quality	0.89	0.74, 0.81, 0.84, 0.81, 0.78, 0.74, 0.82

Table 5. Reliability Coefficients and Correlations to Items

5.3 Construct Validity

The data was also analyzed using principal component extraction with VARIMAX rotation. The factor analysis (see Appendix A) shows four orthogonal factors with eigenvalues above 1.0, together accounting for 70.3% of the variation. The results of the factor analysis after a VARIMAX rotation are presented in Table 6. Loadings above 0.50 are shown in boldface. Overall, the factor analysis shows a simple loading pattern with items loading appropriately on their expected constructs. This proves the construct validity of the usability questionnaire.

5.4 Hypotheses Testing

The hypotheses of this research were tested using Partial Least Squares analysis. Figure 2 show the results of the tests of hypotheses. All the path coefficients are statistically significant at $p < 0.05$. This lends empirical support to the research model of this study and therefore H1, H2, H3, H4 and H5 are supported by the data. The four beliefs: Perceived Website Usefulness, Perceived Interface Quality, Perceived Information Quality and

Perceived Quality explained 87.2 % of the variation in attitude. Attitude explained 71.0% of the variation in the intention to planned purchase.

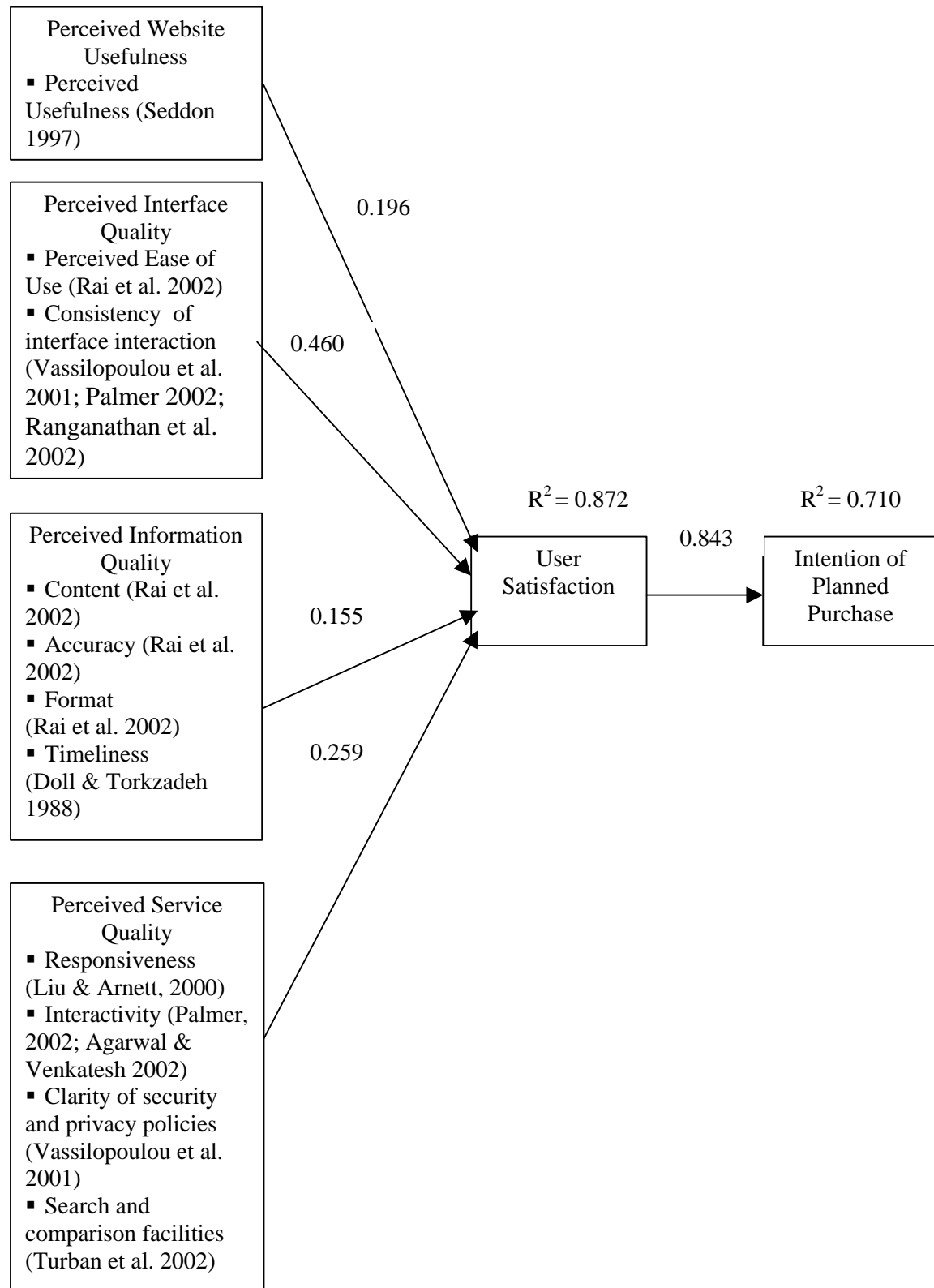


Figure 2. Tests of hypotheses

In addition to the fact that all the scales displayed high reliability, those of Perceived Website Usefulness, Perceived Interface Quality, Perceived Information Quality and Perceived Service Quality also demonstrated high nomological validity. While tested in a nomological network derived from past frameworks, they behaved as hypothesized in this research. The factor analysis also produced factors that fitted well with the theoretical framework for the research. Thus the questionnaire of this study is a valid tool for use in assessing the website usability of e-commerce service websites.

6. Discussion

This paper makes several contributions to our understanding of the effects of consumers' beliefs on user satisfaction and consumers' intention of planned purchase. One of the contributions of this research is that a new framework for website usability is designed, with four main beliefs of usability dimensions, namely, Perceived Website Usefulness, Perceived Interface Quality, Perceived Information Quality and Perceived Service Quality. With these beliefs of website usability dimensions, website designers can then make improvements to e-commerce websites according to the amount of influence that each of these beliefs have on User Satisfaction. This will result in e-commerce websites that will satisfy consumers and result in a more enjoyable purchasing experience for consumers. Another important contribution of this study is the testing and validation of metrics from the paradigms of psychology and Information System success theories for e-commerce service websites.

6.1 Information Quality

Findings from the data analysis suggest that Perceived Information Quality is important in influencing User Satisfaction. According to Palmer (2002), a website that provides better information will result in more successful websites. Since one of Palmer's (2002) measures of success is user satisfaction, it coincides with the findings of this research that the Perceived Information Quality is positively associated with user satisfaction. To improve information quality, website designers should work upon content, accuracy, format and timeliness.

For content, e-commerce websites should provide relevant and sufficient information for customers to make a good decision for purchase. Websites should also take note the amount and depth of information offered to customers. The information given in an e-commerce website should be just sufficient for customers to make a decision and effort should be taken to avoid giving too much, as this may cause information overload.

In the area of accuracy and timeliness, efforts should be taken to ensure the website provides information that is correct, reliable and timely. Customers should feel that the information they have obtained from the website is dependable. One way of achieving this is to have alliances with business partners, sharing information directly with them. For example, travel agencies can form alliances with airline companies, obtaining the most accurate airfares for their customers.

Besides content, accuracy and timeliness, website designers should also pay attention to the format of information. Information should be presented in a clear and organized layout. If multimedia is used to communicate the information, options should also be given for customers to have the information in text. There should not be excessive use of multimedia in the website as it will slow down the download time of the webpages.

6.2 Interface Quality

From the data analysis, Perceived Interface Quality is also crucial in determining User Satisfaction. User manipulation and utilization of the information provided via websites is strongly influenced by Interface Quality (Lohse & Spiller 1999). For website designers to improve interface quality, they should work upon increasing the ease of navigation and consistency of interface interaction. It is only when a website has a good user interface that consumers can make better use of the information provided.

The customer should feel that it is easy to navigate in the website. To facilitate easy navigation, there should be useful navigation buttons and an index to the website. Navigation buttons should be placed near to each other so that the customers need not search all over the page to navigate within the website. Website designers should also put headers and other navigational aids such as path statements give users a sense of location within websites. This will facilitate the customers' ease of navigation in the website.

Website designers should also implement steps to increase the consistency of interface interaction. The page layout should be consistent throughout the site. For example, the search field should be in the same position in each page. The website should also use the same procedure when customers perform related tasks. For example, clicking the same coloured button to purchase a service.

6.3 Service Quality

The hypothesis of the positive association of Perceived Service Quality and User Satisfaction is supported. To improve upon the service quality of e-commerce websites, website designers can work on responsiveness, interactivity; security and privacy policies; and search and comparison facilities.

E-commerce websites respond to their customers through email, telephone and frequently asked questions. The contact information of customer representatives should be clearly displayed. This is to give customers assurance that their concerns will be clarified as soon as possible by the customer representatives. The customers should also be allowed to feedback their opinions regarding on how to improve the website and the services they provide. This will increase the responsiveness of the website. The website designer should also provide a personalized and customized interaction for customers. The enhancement of the website's interactivity is associated with the success of the website (Palmer, 2002).

Customers are concerned about the security of the website and their privacy when they shop online. Website designers should conspicuously display their security and privacy policies as well as get independent companies to verify, audit and certify the privacy policies of various websites. E-commerce websites also provide search and comparison capabilities. This will help the customer to choose and arrange the criteria for the evaluation of the product. The tabulated data will allow the customer to compare the options. Website designers should ensure that these facilities will generate helpful results to the customers.

6.4 Website Usefulness

The hypothesis of the positive association of Perceived Website Usefulness and User Satisfaction is also supported. To improve on website usefulness, website designers should implement features that enhance the customer's shopping experience. E-commerce websites should work towards becoming the one-stop virtual location for the customers' needs. This enables the website to be self-contained and enables shopping to be convenient for the customer. For example, travel websites can allow customers to book flights, accommodation, car rental and purchase travel insurance all within the website.

6.5 User Satisfaction

From the data analysis, user satisfaction of e-commerce service websites is positively associated with the intention of planned purchase. This is consistent with the findings of Fishbein and Ajzen (1975) and Davis et al. (1989). As a result, website designers can try to add value to the Interface Quality, Information Quality, Service Quality and Website Usefulness in Web design features in order to have greater satisfaction among the consumers. In addition, this will lead to a higher intention of purchase among consumers. Therefore, by improving the consumer satisfaction of their websites, e-commerce companies are more likely to earn greater revenue through the increased sales.

6.6 Application of frameworks

The results show that variables from Theory of Reasoned Action, Information System Success and HCI studies can be used to determine the intention of planned purchase. It also shows that TRA also applies to e-commerce and the adoption of Internet technology. Furthermore, the results are in line with DeLone and McLean's (2002) reformulated IS success model where it suggests that the intention to use can be a worthwhile alternative measure. The Partial Least Squares model for intention of planned purchases explained large percentages of variance. This demonstrates the robustness of IS success and TRA in this context.

7. Limitations of Research and Future Study

One of the limitations of this study is that the participants were asked to browse through the websites until they have nearly completed the transaction phase. However they were not asked to complete the transaction. Further validation is needed against actual purchase. Using undergraduates rather than potential customers is another limitation of this study. The study can be repeated on a sample of potential customers of websites to further validate the results obtained in this research. Furthermore, the relative importance of the perceptions of usability attributes depends on the context of use, for example corporate or personal purposes. It is often advisable to repeat the testing in several different contexts and different users (Bevan & Macleod 1994).

8. Concluding Remarks

E-commerce websites are no longer simply designing user interfaces but are seeking to convert users into customers. The study provides a theoretical as well as empirical support that consumer beliefs of usability dimensions are positively associated with user satisfaction which is in turn positively associated with the intention of planned purchases. In order to assess users' expectations we need to tailor specific usability factors to the web environment.

The research has also showed that the questionnaire is a valid measure of usability of e-commerce service websites.

The research proposes that the features e-commerce websites can improve upon can be classified into the four usability dimensions of Website Usefulness, Interface Quality, Information Quality and Service Quality. E-commerce service websites can focus on the usability attributes that the customers feel that the website should emphasize on and develop strategies to enhance the conversion rate of users to customers. This can further assist e-commerce websites to design or market their sites to meet customer expectations. Determining how to develop e-commerce websites that can effectively attract and retain consumers so that main objectives such as online purchases and repeat visits are attained is an important step in orchestrating an overall e-business strategy of an organization.

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Appendix A - Factor Analysis

Item	Factor 1 Website Usefulness	Factor 2 Interface Quality	Factor 3 Information Quality	Factor 4 Service Quality
B1	.692	.283	.222	.339
B2	.749	.252	.136	.333
B3	.782	.281	.233	.120
B4	.793	.222	.247	.278
B5	.743	.213	.346	.254
C1	.208	.840	.217	.275
C2	.211	.786	.171	.160
C3	.216	.832	.241	.208
C4	.259	.697	.329	.301
C5	.306	.719	.310	.168
C6	.277	.776	.318	.230
C7	.104	.696	.316	.188
D1	.213	.313	.679	.141
D2	.269	.213	.777	.133
D3	.164	.241	.805	.185
D4	.201	.270	.730	.327
D5	.270	.264	.669	.357
D6	.122	.206	.620	.328
D7	.202	.250	.697	.138
E1	.191	.146	.083	.790
E2	.171	.221	.239	.757
E3	.228	.199	.200	.735
E4	.276	.274	.277	.650
E5	.065	.320	.494	.529
E6	.276	.239	.264	.563
E7	.359	.173	.390	.615
Eigenvalue	3.932	5.244	5.052	4.302
Percent Explained Variance	15.125	20.170	19.429	16.546

Appendix B - Website Usability Questionnaire

A. Details of Vacation:

Departure Flight Number: _____

Return Flight Number: _____

Roundtrip Air-ticket price: _____

Hotel Name: _____

Nightly Room Rate: \$ _____

Please indicate your agreement with the next set of statements in the following sections using the following rating scale.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

B. Website Usefulness:

	Strongly Disagree						Strongly Agree
1. Travelocity can improve my overall travel planning experience.	1	2	3	4	5	6	7
2. Travelocity can enable me to purchase travel services faster than when I use offline channels.	1	2	3	4	5	6	7
3. Travelocity can enhance the possibility of purchasing the vacation of my preference.	1	2	3	4	5	6	7
4. Travelocity makes it convenient for me to purchase travel services.	1	2	3	4	5	6	7
5. Travelocity can be useful in my vacation planning.	1	2	3	4	5	6	7

C. Interface Quality:

	Strongly Disagree						Strongly Agree
1. The Travelocity website is easy to use.	1	2	3	4	5	6	7
2. It is easy to become skilful at using the Travelocity website.	1	2	3	4	5	6	7
3. Learning to operate the Travelocity website is easy.	1	2	3	4	5	6	7
4. The Travelocity website is flexible to interact with.	1	2	3	4	5	6	7

- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5. My interaction with the Travelocity website is clear and understandable. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. It is easy to interact with the Travelocity website. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. The overall page layout was consistent throughout the Travelocity website. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

D. Information Quality:

- | | | | | | | | |
|---|----------------------|---|---|---|---|---|-------------------|
| | Strongly
Disagree | | | | | | Strongly
Agree |
| 1. Travelocity provides the accurate information I need to purchase travel services. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. Travelocity provides sufficient information to enable me to purchase travel services. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Travelocity provides enough depth of information about the service products. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. The information provided is helpful for me to purchase the travel services. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. The information is clear for me to make the purchase. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. Travelocity uses graphics or animation effectively to communicate the information necessary for me to purchase the services. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. Travelocity provides up-to-date information. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

E. Service Quality:

- | | | | | | | | |
|---|----------------------|---|---|---|---|---|-------------------|
| | Strongly
Disagree | | | | | | Strongly
Agree |
| 1. It is easy to contact the customer representatives of Travelocity. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. Travelocity allowed me to provide feedback about the website and services. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Security and privacy policies were conspicuously displayed. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. I am satisfied with the content of the security and privacy policy of Travelocity. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

5. Travelocity is able to personalize the type of information to my needs for the decision of the vacation choices. 1 2 3 4 5 6 7
6. The frequently asked questions (FAQs) feature has assisted me in my use of the Travelocity website. 1 2 3 4 5 6 7
7. The search facility is useful in my information search of travel flights and accommodation. 1 2 3 4 5 6 7

F. Intention of Planned Purchase:

1. Assuming I have the budget, I am very likely to purchase the my vacation from the Travelocity website. Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Why?

Please indicate your agreement with the next set of statements in Section F using the following rating scale.

1	2	3	4	5	6	7
Extremely Poor	Poor	Slightly Poor	Neutral	Slightly Good	Good	Extremely Good

G. Overall Satisfaction:

1. How do you rate the overall usability of the Travelocity website? Extremely Poor 1 2 3 4 5 6 7 Extremely Good
2. How do you rate the overall design of the Travelocity website? Extremely Poor 1 2 3 4 5 6 7 Extremely Good
3. How do you rate your overall experience of the Travelocity website? 1 2 3 4 5 6 7

H. Post-Questionnaire

1. Age

- <18
- 18-20
- 21-23
- 24-26
- >26

2. Gender

Male

Female

3. Nationality

Singapore

Malaysia

India

People's Republic of China

Vietnam

Others, please specify: _____

4. Race

Chinese

Malay

Indian

Others, please specify: _____

5. Highest Education Attained:

PSLE (Primary School Leaving Examination)

'O' Level

'A' Level

Diploma

Undergraduate

Graduate

Post-graduate

Others, please specify _____

6. Faculty of Study:

Arts and Social Sciences

Business

Computing

Dentistry

Design and Environment

Engineering

Law

Medicine

Science

7. Year of Study

Year 1

Year 2

Year 3

Year 4

8. Do you purchase services on the World Wide Web?

Yes

No

9. If yes, how often?

1-2 times a year

3-4 times a year

>4 times a year

10. Have you heard of Travelocity.com before the survey?

Yes

No

11. If yes, how do you rate your impression of Travelocity before the survey?

Extremely Poor						Extremely Good
1	2	3	4	5	6	7

12. Have you used Travelocity.com before?

Yes

No

13. If yes, how often?

1-2 times a year

3-4 times a year

>4 times a year

14. Have you been to other online travel websites?

Yes (Please specify) _____

No

15. If yes, how do you rate your overall experience with the websites?

Extremely Poor						Extremely Good
1	2	3	4	5	6	7