APPLICATION OF THE WEBQUAL™ INSTRUMENT TO THREE AUSTRALIAN B2C WEBSITES: AN EXPLORATORY INVESTIGATION

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ABSTRACT

Assessing the quality of a Website has received growing attention from academics and practitioners. The objective of this study is to apply the WebQual™ framework developed by Loiacono, Watson and Goodhue (2002) to determine whether any differences exist between three Australian industry groups across the Website Quality constructs. This study delineates the Website Quality model into its latent dimensions and examines for differences between three B2C Websites. This extends previous research on the WebQual™ instrument by presenting some preliminary findings in the Australian setting. Relevant implications for managing Website quality are highlighted, with directions for future research discussed.

INTRODUCTION

As the development of Internet technology continues to grow at an exponential rate the measurement of Website quality in the context of business-to-consumer (B2C) electronic commerce has forced academics and practitioners to develop rigorous and reliable methods (Zeithaml, Parasuraman and Malhotra 2002). To increase the customer base in B2C e-commerce it is important to implement and continuously review the quality of e-services (Singh 2002). Therefore, identifying the key Website success attributes is a first step for organisations to improve the success of there online presence (Zeithaml 2002). Although empirical studies are beginning to emerge into the marketing literature to measure the multidimensional properties of a Website (e.g. Barnes and Vidgen 2002; Chen and Wells 1999; Francis and White 2002; Janda, *et al.* 2002; Jeong, Oh and Gregoire 2003; Loiacono, *et al.* 2002; Riel *et al.* 2001; Yang and Jun 2002; Wolfinbarger and Gilly 2002; Yoo and Donthu 2001), relatively little is known about how consumers perceive and evaluate electronically offered services in a variety of industry settings with no generally accepted theories for customer evaluations of online service offerings (Riel *et al.* 2001).

Since this study is an exploratory investigation, the objectives of this research are two-fold. First, it attempts to broaden the understanding of the quality dimensions of a Website by applying the WebQual™ model in the Australian B2C Internet commerce context and report some descriptive findings. This is important since WebQual™ has emerged into the marketing and information systems (IS) literature and has been reported as a highly reliable and valid instrument to assess the perceived quality of Websites (Loiacono *et al.* 2002). The instrument is grounded in the Theory of Reasoned Action (TRA) (Fishbein and Ajzen 1975; Ajzen and Fishbein 1980), and Technology Acceptance Model (TAM) which is one of the most widely cited pieces of IS research (Davis 1989; Venkatesh 2000). These theories provide a strong

conceptual basis for a link between user beliefs about a Website and the behavioural intentions of reusing the Website in the future. The instrument consists of 12 core dimensions: *informational fit-to-task, tailored communications, trust; response time, ease of understanding, intuitive operations, visual appeal, innovativeness, flow/emotional appeal, consistent image, on-line completeness* and *relative advantage*. These 12 dimensions further collapse into 4 second order latent constructs: (1) Usefulness, (2) Ease of use, (3) Entertainment, and (4) Complimentary relationship. Loiacono *et al.* (2002) argue that the instrument is able to support a range of important IS and marketing studies as researchers attempt to understand what contributes to success in the electronic market space. The second objective of the study adopts a 'drill-down' approach (Finn and Kayande 1997) into the specific constructs of the WebQual™ instrument to explore whether any differences exist between three Websites. Additionally, it provides a preliminary understanding of differences between Websites from different industry settings. Although these Websites are not representative of the Industries, however it does provide a basis for more in-depth research. The Websites selected for the study were drawn from the 1) airline, 2) e-retail and 3) computer industry. The results of this study will be used to advance theoretical development of the WebQual™ model and help contribute to the growing research area of Internet marketing in the context of Australian B2C electronic commerce.

METHODOLOGY

To gather an appropriate target population, our study required respondents with previous experience in the B2C e-commerce area. The respondents for the survey were undergraduate and post-graduate students enrolled in an electronic commerce and electronic marketing subjects at a large Australian university. Since the topic of Website evaluation was part of their syllabus, they were considered to be an ideal target population. Furthermore, the use of student samples within similar Internet marketing consumer-based studies has been previously used by Barnes and Vidgen (2002), Chen and Wells (1999), Vijayasarathy and Jones (2000) and Loiacono *et al.* (2002) as a result of the shared demographic characteristics and level of user expertise/familiarity in using the Internet. An Internet-based survey was then used to collect the data. The online survey was hosted for one month from October to November 2002 and is comprised of two key sections. Respondents were invited to evaluate each of the sites using a 7 – point scale (as in similar studies). The questions were anchored as 1 = "Very strongly Disagree" and 7 = "Very strongly Agree". The online questionnaires were designed to auto-check on the validity of the answers before submission, which helped the survey to gather 413 valid responses.

RESULTS AND DISCUSSION

For the three data sets, Varimax rotation, Eigen value more than 1.0 and a factor loading in excess of 0.55 was retained for significant results Hair *et al.* (1998). The results of the factor analysis in Table 1 revealed the dominant latent dimensions for each industry. The results suggest that the airline industry (represented by Qantas.com.au) appeared to be divergent from the other two industries. The *Usefulness* and *Ease of Use* constructs explained 55% of the data. Whereas, the constructs *Entertainment* and *Complimentary Relationship* each explained 56.5% of the computer industry, (represented by Dell.com.au) and 50% of the e-retail industry (represented by Dstore.com.au) data.

Table 1: Results of the Latent Constructs of the Websites

Categories	Industry		
	Airline	Computer	E-retail
Variance explained	78.5	77.3	79.5
Factor description	7 factors	6 factors	6 factors
Second order latent constructs	1. Usefulness 2. Ease of Use	1. Entertainment 2. Complementary Relationship	1. Entertainment 2. Complementary Relationship

Table 2 reports the cronbach alphas for the various constructs across the three Websites. All the reliability estimates demonstrated stability and consistency of responses to related items measured with an alpha value greater than the suggested cut-off point of 0.70 (Nunnally 1978).

Table 2: Average Cronbach Alpha Scores of the Dimensions Across Industries.

Dimensions	Cronbach Alpha		
	Airlines	Computer	E-retail
Usefulness	.86	.84	.84
Ease of Use	.94	.91	.92
Entertainment	.94	.95	.94
Complimentary Relationship	.92	.94	.89
Overall	.96	.96	.95

Each Website representing a different industry demonstrated its own characteristics and consequently, it seemed apparent that there may be a difference in the relative importance of the core quality attributes. To clearly understand whether there were in fact significant differences, one-way ANOVAs were conducted to test each item. Since one of the key objectives was to delineate the WebQual™ model. This process resulted in a large number of separate tests. Consequently, in order to maintain experiment-wise error rate of 0.01, Banferroni correction (Pagano and Gauvreau 1993) was employed in the ANOVA.

Table 3 presents the ANOVA test results in the items found to be significantly different across the three Websites. One construct (*Ease of Use*) out of the four was found to have no significant differences between the three Websites within the individual items and all scored highly (5.6 from a scale of 7). This may be explained since *Ease of Use* has become a fundamental criterion for a successful Website as perceived by users. However, some significant differences were found between Websites in the remaining three constructs. Overall, Dell.com.au was perceived by respondents as the superior Website with strong ratings in most of the core quality dimensions. Despite many of the items displaying strong results across all Websites, an interesting finding from Table 3 was the differences found in the dimension of *Trust*, which falls within the *Usefulness* construct. For example, for the question "I feel safe in making transactions", the Qantas.com.au Website scored 4.43, Dell.com.au Website scored 4.75, and Dstore.com.au, 3.99. There was a significant difference found between Dell.com.au and dStore.com.au (p=0.00). A considerable body of extant research suggests that *Trust*, and trust building, is expected to be a strategic differentiator of future success in e-commerce (Dayal *et al.* 1999; Jarvenpaa *et al.* 2000; Lee and Turban 2001; Hoffman *et al.* 1999). The results from this study indicate that online trust is still an issue of concern as perceived by respondents towards the three Websites examined in this study.

Table 3: Comparison of Differences between Airline, Computer and E-Retail Websites

Dimension and Variable	Mean and Standard Deviation			Sig. (P <.05)*
	Airline (Qantas) n = 89	Computers (Dell) n = 159	E-Retail (Dstore) n = 170	
Usefulness				
Information meets my needs	5.34 (1.34)	**5.57 (1.14)***	5.21 (1.13)*	.023
Information that is presented is effective	5.34 (1.31)	**5.45 (1.18)***	5.08 (1.14)*	.018
Ability to receive tailored information	**5.51 (1.37)***	5.43 (1.27)	5.06 (1.30)*	.008
Website has interactive features	**5.34 (1.38)**	**5.34 (1.32)***	4.98 (1.24)*	.022
Ability to interact with the Website	**5.35 (1.29)^**	5.31 (1.39)*	4.88 (1.24)*^	.004
Trust Website admin. staff with my personal information	4.73 (1.44)	**4.96 (1.40)***	4.45 (1.31)*	.004
Keep personal information safe	4.43 (1.57)	**4.84 (1.39)***	4.02 (1.37)*	.000
I feel safe in making transactions	4.43 (1.62)	**4.75 (1.47)***	3.99 (1.35)*	.000
Website loads quickly	4.71(1.57)*	**4.91 (1.31)^***	4.20 (1.44)^	.000
Little waiting time between actions	4.55 (1.62)*	**5.12 (1.26)^***	4.38 (1.41)^	.000
Website takes too long to load	3.48 (1.67)	3.19 (1.46)*	**3.88 (1.62)***	.000
Entertainment				
Website is visually appealing	4.51 (1.30)*	4.86 (1.28)	**5.01 (1.43)***	.017
Website is innovative	4.37 (1.36)*^	**4.89 (1.24)***	4.95 (1.21)^	.002
Website design is innovative	4.38 (1.38)*	4.77 (1.24)	**4.95 (1.33)***	.004
Website is creative	4.21 (1.32)*	4.55 (1.18)^	**4.93 (1.30)*^**	.000
I feel cheerful when I use the Website	3.93 (1.28)*	4.26 (1.32)	**4.42 (1.34)***	.018
Complimentary Relationship				
Website projects a consistent image with the organisation	**5.67 (1.35)***	5.62 (1.27)^	5.00 (1.10)*^	.000
Website fits the image of the organisation	5.61 (1.30)*	**5.66 (1.18)^**	4.93 (1.07)*^	.000
Website image matches the organisation's image	5.57 (1.33)*	**5.60 (1.27)^**	4.96 (0.96)*^	.000
All my business can be completed via the Website	5.02 (1.57)*^	5.51 (1.27)*	**5.66 (1.16)^**	.001
Website allows transactions online	5.24 (1.36)*	5.25 (1.26)^	**5.66 (1.09)*^**	.003
Easier to use the Website then to call the organisation	5.02 (1.52)*	5.12 (1.38)^	**5.49 (1.23)*^**	.009
Website is a good alternative then calling customer service	5.03 (1.57)*	5.13 (1.42)	**5.48 (1.25)***	.018

Note: 1. Results obtained from sample ANOVA applied to each item separately.

*2. *Denotes significant at 5 % level (P <.05) after Bonferroni adjustment for multiple comparisons*

3. ^Denotes significant difference at 5 % level (P <.05) after Bonferroni adjustment for multiple comparisons

4. No significant differences were found within the Ease of Use construct.

In the *Entertainment* and *Complimentary Relationship* constructs, further analysis revealed that the differences between Qantas.com.au and Dstore.com.au to be greater than the differences between Dell.com.au and Qantas.com.au. These differences may be attributed to the fact that Dstore.com.au is a pure online business whereas, Qantas.com.au, is a 'click-and-brick' organisation. As a result, Qantas.com.au may focus more on generating sales through traditional channels with the Website acting as an ancillary sales channel, with enhancing consumer value given priority. Additionally, Dell.com.au and Qantas.com.au appear to be more similar within the *Usefulness* construct, whereas Dstore.com.au was significantly superior in the *Entertainment* construct. All dimensions within the *Entertainment* construct (i.e. *Innovativeness* and *Visual Appeal*) were rated highly in the Dstore.com.au Website, followed by Dell.com.au and Qantas.com.au. This may be attributed to the on-line retailing nature of Dstore.com.au emphasising the experiential nature of online shopping to induce purchase intentions. For example, factors within the *Entertainment* construct, such as *Visual*

Appeal, *Innovative* use of the interface and *Flow* (i.e. playfulness), may assist consumers reduce their risk perceptions to purchase online since sensory information would be available during the online service encounter (Novak *et al.* 2000; Eroglu *et al.* 2003). In addition, research in the offline environment has found that experiential shopping has been associated with more impulsive and increased spending (Babin *et al.* 1994).

The third and final construct, which showed significant difference between all Websites, was *Complimentary Relationship*. The dimensions that showed differences within this construct include *Consistent Image* of the Website with the organization's image, (2) *Online Completeness* of the Website to conduct business, such online transactions and, (3) *Relative Advantage* of the Website to enhance customer relationships. Although significant differences were identified between all Websites within each dimension, all items performed strongly as perceived by consumers. The prior discussion suggests that the three Websites examined significantly differ in the ratings and provides preliminary evidence that the composition WebQual™ differs between Websites from different industries. Consequently, Website developers may need to be aware of these differences when developing Websites. Additionally, Dstore.com.au was consistently rated high across all items, emphasising the importance of these dimensions within the e-retail category for pure e-businesses.

CONCLUSIONS, LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

The objective of this exploratory investigation was to apply the WebQual™ model within the context of Australian online B2C commerce and present some preliminary findings across three B2C i.e. airline, computers and e-retail. This study provides useful diagnostic information for managers and Website administrators. As a result of the exploratory nature of the study, a number of limitations and future research directions arise from this study. First, because the respondents consisted of university students, generalizability beyond this population of the findings must be taken with caution. The respondents' demographics may have influenced their perceptions of Website quality performance. It is possible that the dimensions of Website quality may have been different had the sample included a broader cross section of people from various age and socio-economic groups. Consequently, future research should widen the respondent universe to include users with more diverse Internet and online shopping experience, e.g. age and income levels. Second, this study provides a preliminary understanding of differences between three B2C Websites from three different industries. For more reliable and valid examination of differences between industries and website quality, future research should analyse a more representative sample of websites from each industry Third, further research should employ advanced statistical analysis such as structural equation modelling to empirically test the interrelationships between constructs within each industry. For example, which attributes drive overall Website quality? Do these attributes differ between industries? Furthermore, research should also explore the effects of Website quality on other consumer behaviour constructs. For example what is the effect of Website quality on satisfaction and loyalty intentions? Does satisfaction mediate this relationship? In conclusion, this study makes an exploratory attempt to examine some important attributes of Website quality in the context of Australian B2C electronic commerce. Furthermore, this study helps contribute to the understanding of Website quality measures and assist in the advancement of theory in this area. The study also contributes to the development of the WebQual™ framework to provide managers with a useful tool to understand customer perceptions of Website quality in the Australian B2C e-commerce setting.

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