WEBSITE QUALITY IN THE AUSTRALIAN ELECTRONIC MARKETSPACE: APPLICATION OF THE WEBQUAL™ INSTRUMENT

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Abstract - **The issue of assessing the quality of a Website has received growing attention from academics and practitioners. This study applies the newly developed WebQual™ framework developed by Loiacono et al. (2002), to empirically assess if the quality of Australian Website's impact the purchase intentions and site revisit intentions in electronic markets across three industry groups. The study further highlights relevant managerial implications for managing Website quality, and directions for future research are discussed.**

Keywords: - **Website quality, WebQual™, Service encounters, TAM.**

1. INTRODUCTION

The quality of a Website has now emerged as an issue of strategic importance to effectively communicate and transact with consumers. As the development of Internet technology continues, coupled with the flux of online competition with a click of a mouse enough for an online customer to select a new provider (Singh, 2002), the measurement of perceived Website quality has forced academics and practitioners to develop rigorous and reliable methods. Thus, the conceptualization and the measurement of Website effectiveness, or quality, have now received growing coverage within the Information Systems (IS) and marketing literature. Previous measurements of Website quality have been developed in business consulting and the popular press for some time (see Nielsen, 2000), however, these measures are ad-hoc which have not been statistically validated and tested for reliability, potentially leading to poor management decisions (Zeithaml *et al.*, 2002). In academia, previous measures of Website quality within the IS and marketing disciplines have been either

conceptual in nature or primitive in their analysis and methodological development. Limited scales have been published that captures the holistic multi-dimensional attributes of Website quality in a rigorous and psychometrically sound way (Zeithaml *et al.*, 2002). Riel *et al.* (2001) supports the scarcity of research claiming that research on electronic services is in its infancy with no generally accepted theories for customer evaluations of online service offerings.

The purpose of this research is to contribute to the advancement in the theory development of Website quality. Despite the scarcity of tools to assess perceived Website quality, the study applies the WebQual^{TM} instrument developed by Loiacono *et al.* (2002), to assess three industry sectors in the Australian online commerce setting: 1) airlines, 2) e-retail and 3) computers. The WebQual^{TM} instrument has emerged into the literature as a comprehensive tool to assess user perceptions of Website Quality performance. The results of this study will be used to compare Website quality dimensions between each industry category examined, as well as to contrast the findings in similar research efforts by (Barnes & Vidgen, 2001) and (Loiacono *et al.*, 2002). This paper adopts an interdisciplinary approach to the study with the findings presented in three key sections. First, a review of the relevant literature within the domain of information systems and services marketing is presented. In the second section, details of the methodology and results of the analysis are highlighted. Thirdly, conclusions and managerial implications are discussed with directions for future research suggested.

2. LITERATURE REVIEW

2.1   *Internet and the Service Encounter*

Service encounters have been defined as the moment of interaction between a customer and a firm (Bitner *et al.*, 1990; Shostack, 1985), which are considered as critical moments of truth in which customers often develop enduring impressions of a firm providing the service (Bitner, 1990). The infusion of technology in the service encounter, such as the Internet, has been dramatically changing the nature of customer relationships and interactions (Bitner *et al.*, 2000). More specifically, Websites are now considered a strategic tool with the capability to influence a customer's perception of the firm (Watson *et al.*, 1998). Website administrators and e-marketers must now continuously innovate and "engineer" branded customer experiences of their online service offering, that both differentiates from competitors and strengthens customer relationships (Carbone & Haeckel, 1994; Dutta & Segev, 2001).

2.2   Self-Serving Technologies

Recent research has begun to emerge that examine the factors underlying satisfaction in technology-based service encounters (Meuter *et al.*, 2000). These types of encounters involve customers interacting with Internet based service encounters, automated phone services, kiosk services and services delivered via CD or video technology. These technology-based service encounters are referred to as self-service technologies because the customer essentially provides his or her own service (Zeithaml & Bitner, 2003). (Bitner *et al.*, 2000) asserts that these encounters can occur in non-human interactions such as the Internet, where each encounter is an opportunity for a firm to sell itself, to reinforce its offering, and to satisfy the customer. As (de Ruyter *et al.*, 2000) notes "...an e-service is an interactive, content centered and Internet-based customer service, driven by the customer and integrated with related organizational customer support processes and technologies with the goal of strengthening the customer-service provider relationship" (p. 186). The Internet has now become one of the most significantly used self-service technologies available, which enables the customer to become intimately involved in the service encounter. This self-serving nature of the Web allows consumers to search for information, products and services and converse (e.g. obtain advice or comments from peers) with other members in virtual communities (Hagel, 1999; Bagozzi & Dholakia, 2002).

2.3   An Integrated View of Website Quality

Invariably the mechanics of Website development is based on the literatures surrounding both the information systems and marketing fields. Much of the Website implementation could be directly tied to the field of information systems while the content development is in parallel to the marketing arena. While both academic and practitioner researchers have begun to conceptualise and measure Website quality, limited attention is given to providing definitions of their theoretical domains.

Two dominant theoretical models have begun to emerge from the IS and marketing literature to assess the quality of the Website, these include: (1) Technology Acceptance Model (TAM), and (2) Service Quality (SERVQUAL). The Technology Acceptance Model (TAM) was first conceived by (Davis *et al.*, 1989), to explain and predict the individual's acceptance of information technology. TAM is based on Theory of Reasoned Action (TRA) (Hagel, 1999), which suggest that social behaviour is motivated by an individual's attitude towards carrying out that behaviour. The TAM model posits that the actual use of a technology can be predicted by user's behavioural intention and his or her attitude towards its use, which in turn are influenced by a technology's perceived

ease of use and perceived usefulness. Applications of the TAM model include e-mail, voice-mail, word processing, spreadsheets and internal company computer systems (Davis *et al.*, 1989;Phillips, *et al.*, 1994; Davis & Venkatesh, 1996). The model has since been modified and extended within the context of the online environment (see Atkinson & Kydd, 1997; Shaw *et al.*, 1997; Lederer *et al.*, 2000; Loiacono *et al.*, 2002) and has also been applied within the marketing literature examining TAM as viable predictors of adoption of the Internet for retail usage (Fenech & O'Cass, 2001).

Currently, there is a debate in the service marketing/management literature as to whether existing measures of service quality (e.g. initially developed by (Parasuraman *et al.*, 1998) apply in electronic environments. According to (Voss, 2000), the five SERVQUAL dimensions (reliability, responsiveness, assurance, empathy, and tangibles) are relevant and important in a Web-based environment. However, Parasuraman & Grewal (2000, p. 171) suggest that research is needed on whether "the definitions and relative importance of the five service quality dimensions change when customers interact with technology rather than with service personnel". Research efforts utilising the SERVQUAL framework are now beginning to emerge into the literature (see Janda *et al.*, 2002; O'Neill *et al.*, 2002; Yang & Jun, 2002). However, these initial research efforts suffer from the generalizability of results with more research needed to improve and refine the quality dimensions.

A critical concern of both Information System (IS) and e-marketing researchers has been how to measure the quality of a Website. Although Website quality has received limited studies attention in the literature, empirical academic research is beginning to emerge. Table 1 presents a summary of previous studies examining the measurement of Website quality.

Goodhue and Thompson (1995) and Loiacono *et al.* (2002) argue that to provide value to businesses, an instrument measuring Website quality must identify in more detail the specific aspects that cause a Website to be easy to use or useful to consumers since this clarification of quality dimensions is conceptually important to empirically prove that some aspects of quality are more important than others in determining online consumer behaviour. Although previous research efforts have provided valuable insight and advancement into what dimensions constitute Website quality, most instruments are either limited in the development and refinement of the instrument, narrowly focused or highly domain specific to a particular sector of the Internet (e.g. e-retailing or library sites). As a result of the unique properties of the Internet (Hoffman & Novak, 1996), a holistic instrument is required to effectively capture the success dimensions of a Website.

Although several researchers have developed scales to measure Website quality and related constructs, limited research has produced a rigorous, multidimensional instrument. Loiacono *et al.* (2002) used several sources

Table 1: Previous empirical studies measuring Website quality

Author(s)	Context	Factors	Items	Alpha
Loiacono, et al. (2002) (MKTG & IS)	B2C Websites	Informational fit-to-task	3	.86
		Tailored communications	3	.80
		Trust	3	.90
		Response time	3	.88
		Ease of understanding	3	.83
		Intuitive operations	3	.79
		Visual appeal	3	.93
		Innovativeness	3	.87
		Flow/emotional appeal	3	.81
		Consistent image	3	.87
		On-line completeness	3	.72
		Relative advantage	3	.81
		TOTAL	**36**	
Janda, Trocchia and Gwiner (2002) (MKTG)	E-retail Websites	Performance	6	.72
		Access	4	.78
		Security	4	.83
		Sensation	4	.61
		Information	4	.80
		TOTAL	**22**	
O'Neill, Wright and Fritz (2001) (MKTG)	Library Websites	Reliability	4	.71
		Contact	4	.86
		Tangibles	5	.73
		Response	4	.68
		TOTAL	**17**	
Barnes and Vigden	B2C Websites	Information Quality	8	
			8	.89
		Usability	6	.81
		TOTAL	**22**	
Wolfinbarger (2001) (MKTG)	E-retail	Website design	5	.83
		Fulfilment/reliability	3	.84
		Privacy	3	.79
		Customer service	3	.88
		TOTAL	**14**	
Chen and Wells (1999) (MKTG)	B2C Websites	Informativeness	6	.92
		Organisation	6	.84
		Entertainment	4	.94
		TOTAL	**16**	

including literature review, interviews with Web users and designers, and a study of a large organization's standards for Website design to generate measurement items which they termed WebQual[TM]. The instrument has emerged into the IS/marketing literature as a highly reliable and valid instrument to assess the perceived quality of Websites. The instrument is grounded in the Theory of Reasoned Action (TRA) (Hagel, 1999; Ajzen & Fishbein, 1980), and Technology Acceptance Model (TAM), one of the most widely cited pieces of IS research

(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 at a later time. The WebQual^{TM} 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 collapsed into 4 second order latent variables: (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 marketspace.

3. METHODOLOGY

3.1   Sample Frame

There are numerous ways to evaluate the quality of a Website (see (Cunliffe, 2000)). Data collection of the WebQual^{TM} (Loiacono *et al.*, 2002) model is based on the online questionnaire method of Website users. To gather a comfortable target population, our study required respondents with previous experience in the 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. Prior to the actual study, the students were asked to browse and evaluate several sites such as dell.com.au, ibm.com.au, sony.com.au, flightcentre.com.au, qantas.com.au, virgin.com/blue and dstore.com.au during their tutorials. This process allowed respondents to trial the Websites before its subsequent evaluation. The decision to choose which Websites for the study, were derived after an informal survey consisting of 120 students. The students were asked to choose a representative Website from the three industries. Almost more than two-thirds of the students chose Qantas.com.au, Dell.com.au and dStore.com.au to represent their respective industries.

3.2   Survey Design and Administration

The survey used for this study was hosted online using an independent server – surveypro.com. Internet-survey responses hold an advantage over other types of survey, as they are known for their speed and low cost in addition to its

anonymity. The URL of the questionnaire was given to all the respondents. The respondents were directed to the start page of the survey where a set of instructions briefed on the survey prior attempting. The questionnaires were designed to auto-check on the validity of the answers before submission, which helped the survey to gather 502 valid responses. The survey was hosted for one month from October to November 2002 and is comprised two key sections. The first section consisted WebQual^{TM} (Loiacono *et al.*, 2002) and the latter was concerned with purchase intention and Website revisit. 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".

4. DATA ANALYSIS

4.1   Survey Data in Brief

Table 2 depicts the summarised data, which accounts for 502 responses. The table shows the mean and standard deviation scores across all the questions. Each construct was represented by several questions unerringly following WebQual^{TM} (Loiacono *et al.*, 2002). On the whole, the computer industry represented by Dell.com.au outperformed the other industries (Airline and E-retail). Measured using WebQual^{TM}, Dell.com.au was found to have an upper hand on the

Table 2 : Mean and Standard Deviation Scores for Each Industry.

No.	Constructs	Airline (Qantas) n=178	S.D	Computer (Dell) n=150	S.D	E-retail (dStore) n=170	S.D
1	Fit To Task (FIT)	5.39	1.32	5.53	1.16	5.19	1.18
2	Tailored communicaions(TC)	5.40	1.34	5.36	1.33	4.97	1.26
3	Trust (T)	4.53	1.53	4.85	1.42	4.15	1.34
4	Response time (RT)	4.25	1.61	4.41	1.34	4.15	1.49
5	Ease of Understanding (EOU)	5.34	1.30	5.51	1.08	5.41	1.14
6	Intuitive Operations (IO)	5.72	1.34	5.68	0.99	5.73	1.03
7	Visual Appeal (VA)	4.60	1.26	4.90	1.25	4.99	1.35
8	Innovativeness (I)	4.32	1.35	4.71	1.22	4.95	1.28
9	Emotional Appeal (EA)	3.93	1.36	4.20	1.36	4.35	1.34
10	Consistent Image (CI)	5.62	1.33	5.63	1.24	4.96	1.04
11	Online completeness(OC	5.41	1.43	5.58	1.22	5.73	1.17
12	Relative Image (RI)	5.21	1.48	5.17	1.40	5.46	1.26
13	Purchase Intention	4.89	2.70	5.48	3.33	6.54	3.15
14	Website revsit	4.96	1.28	4.78	1.32	4.21	1.50
	Total average		20.63				19.5

constructs related to fit to task (5.53), trust (4.85), response time (4.41), ease of understanding (5.51), and consistent image (5.63). The Qantas.com.au Website was somehow rated below for almost all the constructs except for tailored communications (5.40), while, dStore.com.au was having high scores on constructs such as intuitive operation (5.73), visual appeal (4.99), online completeness (5.73), and relative image (5.46). Meanwhile on questions related to purchase intention, dStore.com.au was way ahead with a score of 6.54, followed by Dell.com.au (5.48) and Qantas.com.au (4.89). However, this result was totally in contrast with the intention for Website revisit. Qantas.com.au recorded the highest score at 4.96, followed by Dell.com.au (4.78) and dStore.com.au (4.21).

Figure 1 presents a graphical illustration of the average scores, which show that the computer industry (Dell.com.au) consistently falls on the outer grid for most of the constructs. Further results show a significant difference between industries in constructs related to *trust, tailored communication, consistent image* and *innovativeness*. However, when the constructs were consolidated, the results revealed a slightly different view of the industries. In almost all of the industries examined, the results (as shown in Figure 3 and Table 3) suggest an equal understanding in the importance of securing customer relationships (Fingar *et al.*, 2000; Hanson, 2000), which is seen through the   construct *complementary relationship*.
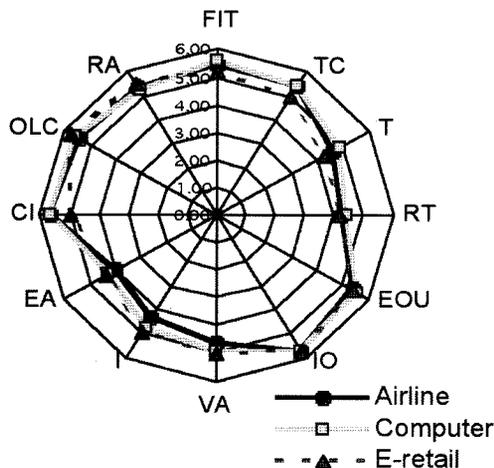

Figure 1: Radar plot of WebQualTM Showing the Constructs for the Three Websites

Similarly, all industries are competing to produce Websites that are 'readily usable'. Nevertheless, the differences are obvious when it comes to the *usefulness* construct, where the computer industry scoring the highest. Conversely, the whole scenario was reversed when evaluating the entertainment elements. The results state that the e-retail industries (*4.78*) try to pose an 'entertaining' mood to actually gain their customer compared to the airline industry (*4.28*). These results are consistent with that of (Erogolu *et al.*, 2001) who suggest that e-retailing Websites should emphasise facilitate 'online atmospherics' that are fun, entertaining and visually appealing to encourage purchase intentions.
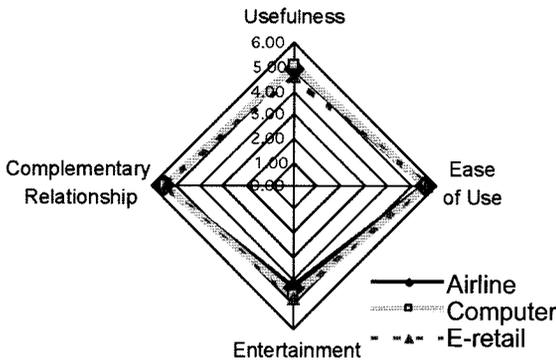

Figure 2: Radar Plot of WebQual's Second Order Constructs

This might explain the intense competition and low entry barrier within the e-retail business, which forces all players in the market to provide a significantly unique experience (e.g. entertainment) to the Website visitor. To further compare and contrast between the industries, an exploratory factor analysis was conducted. Factor analysis is known for identifying the core structure (variables) that is latent by summarising the data set (Hair *et al.*, 1998). Furthermore, to ensure that the research instrument has high reliability, each dimension was measured using Cronbach alpha (Cronbach, 1951).

Table 3: Average Dimensional Scores for Each Industries

Dimensions	Airline	Computer	E-retail
Usefulness	4.89	5.04	4.62
Ease of Use	5.53	5.59	5.57
Entertainment	4.28	4.60	4.76
Complementary Relationship	5.41	5.46	5.39

For all three data sets, Varimax rotation, Eigen value more than 1.0, with a factor loading excess of more than 0.55 was retained for significant results (Hair *et al.*, 1998). The results of the factor analysis in Table 4 revealed the latent dimensions that were core of our study. The results suggest that the airline industry appeared to be divergent from the other two industries. The *usefulness* and *ease of use* dimensions explained 55% of the data. Whereas, the dimensions *entertainment* and *complimentary relationship* explained 56.5% of the computer industry, and 50% of the e-retail industry data. Even though Table 3 and Figure 2 illustrate almost a different average result, however internally the score for each industry is revealed by the factor analysis test.

Table 4: Average Dimensional Scores for Each Industries

Categories	Industry		
	Airline	Computer	E-retail
Variance explained	78.5%	77.3%	79.5%
Factor description	7 factors (2 dominant factors with 5 weak factors)	6 factors (2 dominant factors with 4 weak factors)	6 factors (2 dominant factors with 4 weak factors)
Latent dominant dimensions	Usefulness and Ease of Use	Entertainment and Complimentary Relationship	Entertainment and Complimentary Relationship

The purpose of this is to access the stability and consistency of responses to related items measured where an alpha value above 0.60 is acceptable (Nunnally, 1978). Table 5 shows the Cronbach alpha value showing all the dimensions were highly reliable with all scores raking above 0.8.

Table 5: Cronbach Alpha Scores of the Dimensions Across Industries.

	Cronbach Alpha		
Dimensions	Airline	Computer	E-retail
Usefulness	0.86	0.84	0.84
Ease of Use	0.94	0.91	0.92
Entertainment	0.94	0.95	0.94
Complementary Relationship	0.92	0.94	0.89
Overall	0.96	0.96	0.95

5. CONCLUSION, MANAGERIAL IMPLICATIONS & LIMITATIONS

The aim of this paper was to apply the WebQual^{TM} model within the context of Australian online commerce across three Australian industries i.e. Airline, Computers and E-retail. The WebQualTM approach has been found to be a powerful benchmarking tool against competitors. While the model used in this study falls short of prescribing how an organisation can improve its Website, it can however, report the current state of an organization's Website. The results of the study indicate that the intention to purchase from the Website is highly correlated with elements related to visual appeal, online sales ability, ease of use and navigability. However, the intention to revisit the Website is linked to elements related to customization of information, which has been the underlying principle of customer relationship management (CRM). As a result of the increasing volume of online companies, it is now strategically imperative for organisations to develop consumer focused Websites to increase market share.

Consistent with (Barnes & Vidgen, 2001), respondents have hinted that 'effective information' is closely related to trust which is one of the key issues in determining a Website's success. The Dell.com.au Website had the highest score of trust, which could be explained by the overall 'superiority' of the Website. This could also be a result of external factors such as customer's previous experiences with service and high brand-image (Aaker & Joachimsthaler, 2000; Barnes & Vidgen, 2001) that Dell has earned within the Australian market. In essence the Australian Websites namely the airline, computer and e-retail industry are concerned with issues such as customer relationship, trust, Website usability and visual appeal.

This study provides an initial research effort in the theory development and application of Website quality, and as such suffers from two obvious limitations. Firstly, even though respondents of this study were made of university students who were comfortable and familiar with website evaluation. They did not represent the general Australian online population, which would have induced some degree of bias to the data. Secondly, the numbers of websites used to represent the industries were rather insufficient. Although the websites used for the study were voted to represent the industries, an average score derived from several websites per industry would have been more appropriate.

6. FUTURE RESEARCH DIRECTIONS

As a result of the exploratory nature of the study, a number of directions for future research arise from this paper. First and foremost, further refinement of the WebQual^{TM} technique is required which should use larger randomised sample

sizes made up of the general Internet population to avoid bias and to provide more statistical power. Future research should also investigate the higher order effects of Website quality with particular constructs to be used, include, examining customer satisfaction, perceived value of the Website to consumers and loyalty to the Website. Advanced statistical techniques such as structural equation modeling (SEM) could be further employed to investigate these inter-relationships between constructs. Furthermore, the role of Internet experience should also be examined for moderating effects on these prescribed relationships. More research is required across other industry sectors within the Australian context to refine the WebQual^{TM} dimensions with particular attention to the aspect of customer service and delivery. Further critical issues may also include exploring if differences exist between user perceptions based on Internet purchaser vs non-Internet purchaser characteristics and the role demographic information. Finally, future research efforts should include testing the generalisability of the WebQual^{TM} instrument in a global context to capture the moderating effects of country culture on perceptions of performance and importance of quality dimensions. Such research would provide fruitful information to compare and contrast the different elements that are critical to Website quality in the international setting.

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