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A Proposed Research Model for Appraisal and Evaluation of the Design Quality of Web Sites in the Context of Electronic Commerce

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Abstract
This evaluation framework combines features that are derived from information systems and marketing literature. It covers the three marketing phases (pre-sales, on-line sales, and after-sales) applicable to the electronic marketplace. The framework proposes information quality, learning capability, playfulness, system quality, system use, and service quality as factors that are related to well designed Web pages.

Introduction
As electronic marketing activities soar because of the developments of electronic commerce, many organizations have begun to cut costs, interact directly with customers, run more smoothly and in a more timely manner, and outperform competitors who have not yet engaged in electronic commerce (Cronin, 1994). With these benefits, interest in electronic marketing activities has expanded rapidly, largely as a result of the Web sites’ distinct features of global connectivity, world wide reach, and the interactive communication process. Because of the attractiveness of using Web to conduct business, a appraisal and evaluation of the design quality of Web sites should attract the attention of the academic and practitioner communities.

Research Problems in the Context of Electronic Commerce
The research problem is that little is known about how to evaluate the factors contributing to design quality of Web sites. Over the years, a considerable number of studies have focused on supporting electronic markets. Several studies have made significant contributions on understanding how business organizations diffuse information technology for electronic marketing activities (Kalakota and Whinston 1996; Armstrong and Hagel 1996; Applegate and Gogan 1995; Baty and Lee 1995; Bakos 1991; Maddox, Wagner, and Wilder 1995; Malone, Yates, and Benjamin 1987, 1989). However, except for security, few studies have been directed toward design issues which can facilitate electronic marketing activities on the Web. The studies listed above capture the present knowledge and current focus on electronic markets. But, they do not relate to direct or indirect design of an electronic market on the Web.

Research Objectives
The problems described above generate strong appeal for evaluation of design quality of Web sites in the context of electronic commerce. Therefore, our objective is to establish a framework to appraise and evaluate the design quality of an electronic marketplace on the Web.

The appraisal and evaluation of design quality is based on the three different phases of electronic marketing activities: pre-sales; on-line sales; and after-sales. Thus, this framework should link to different business objectives. Anderson and Rubin (1986) pointed out that communications in the pre-sales phase supports three functions: to inform, to remind, and to persuade. In this view Web designers should seek ways to attract customers on-line so that the pre-sales activities can be used to inform, to remind, and to persuade. Therefore, factors related to attracting customers are suggested to be critical in the pre-sales phase of marketing activities.

Security is today’s hot topic for on-line transactions and is an important one for the successful Web site design. However, businesses should keep in mind that security is only one design factor. Successful marketing demands relationship commitment and trust (Morgan and Hunt, 1994). Web sites should elicit trust for their on-line sales activities. Trustfulness is a more complex one than is security. Factors related to gaining and maintaining customer trustfulness are critical in the on-line sales phase.

In addition, Web markets should provide customer satisfaction with electronic services. Hence, factors regarding customer satisfaction are defined as critical in the after-sales phase for Web site design. A combination of these objectives within the three-
The Evaluation Framework and Propositions

The theoretical foundations supporting the proposed framework evolve from the disciplines of information systems and marketing. Literature review from the Consumer Information Search Process, Measuring Information System Success, and Providing Service Quality suggests: For the pre-sales design, the emphasis is placed on information quality, learning capability, and playfulness. For the design to support on-line sales activities, system quality and system use should be the focus. Finally, designers should consider how to provide service quality through the after-sales stage. Figure 1 presents a general research framework for this study. The factors in the model that are related to a well designed Web site are addressed in the research propositions that follow.

**Pre-Sales/Information Quality**

Literature review of measuring information systems success strongly suggests that information quality provided by any kind of systems is important. A direct relationship between information quality and Web site design quality is expected:

**P1:** Information quality is positively related to a well designed Web site.

**Pre-sales/Learning Capability**

For many potential consumers, the use of Web technology is a new experience. Learning tools are helpful because consumers need to develop and apply their abilities through exploratory behaviors (Webster, Trevino, and Ryan 1993). An important characteristic of electronic marketplaces is the presence of interactive dialog between buyer and seller (Bakos 1991). This two-way on-line communication between customers and businesses will not only facilitate building relational markets, but will also increase customers’ abilities as they learn to browse and to find relevant information. There should be a direct relationship between learning capability and successful Web site design:

**P2:** Learning capability is positively related to a well designed Web site.

**Pre-Sales/Playfulness**

In the context of marketing, hedonic value reflects shopping’s potential entertainment and emotional worth (Bellenger, Steinberg, and Stanton, 1976). Jarvenpaa and Todd (1996) revealed that shopping activities on the Web produce both hedonic and utilitarian outcomes. If consumers’ consumption activities are evaluated exclusively on the merit of any products or services acquired, business enterprises fail to recognize numerous intangible and emotional costs and benefits that must be examined before consumption activities can be fully understood. This will require designers to build hedonic pleasure into an electronic market on the Web. Therefore, the third proposition is:

**P3:** Playfulness is positively related to a well designed Web site.

**On-line Sales/System Quality**

The quality of system itself is an important indicator of whether the design is successful. According to a recent survey conducted by the European Electronic Messaging Association, more than 79 percent of respondents said that security is the top concern when conducting electronic marketing activities on the Web. However, security is only one aspect of designing the system quality. There should be a direct relationship between system quality and Web sites design:

**P4:** System quality is positively related to a well designed Web site.
**On-line Sales/System Use**

The use of an information system is often employed as a measure of system quality (Ives, Hamilton, and Davis 1980). Although factors such as voluntary versus non-voluntary use can influence system the amount of system use, Web site usage seems to be mostly voluntary.

**P5: System use is positively related to a well designed Web site.**

**After-Sales/Service**

Service quality literature clearly demonstrates that customer behavior intentions are strongly influenced by service quality. There should be a direct relationship between service quality and a Web site design quality.

**P6: Service quality is positively related to a well designed Web site.**

**Measurement Variables**

Literature review suggests that there are 11 variable items of measuring information quality on a Web site: relevant; accurate; useful; timely info.; flexible & customized info. products/services comparability; differentiation; complete description of products/services; price information; satisfying ethical standards; and perceived products/services quality. Five variable items measure learning capability: interactive function between customers and businesses; interactive function among customers; well defined link; help function and customized search engine; For playfulness, enjoyment, excitement, feeling of participation, charming, and escapism are the measurement variables. Security, rapid access, rapid error recovery, precise operation and computation, balanced payment method between security & ease of use, and coordination are the indicators of measuring system quality. For system use, confidence, control, ease of use, track on-line order status and privacy are the measurement variables. Finally, quick responsiveness, assurance, empathy, and following-up service are used to measure service quality.

A final proposition is:

**P7: Attractiveness, trustfulness, and customer satisfaction for a Web site can be used to predict customer behavior intentions.**

**Final Remarks and Future Research Direction**

An established evaluation framework will benefit business managers who are interested in opening an electronic market on the Web. While is easy to build a Web site to announce a company’s presence on the Internet, careful planning and evaluating are needed in order to ensure the design of the site achieves performance objectives. The proposed framework should serve to benefit system developers and designers.

The initial step of future research would be to employ Webmasters as a subject group to access the perceived design quality of Web sites. While others may heavily influence design issues, Webmasters are the individuals who implement and maintain the Web sites. Even though managers from different functional areas may dictate design features, Webmasters should have rich information about their Web sites and those of competitors because of the nature of their jobs. Therefore, design factors and individual measurement items included in the proposed evaluation framework should be organized into a well designed questionnaire to survey Webmasters. Next, the results obtained from Webmasters can also be used to form a second survey to present to customers to test whether significant design factors could lead to customer perceptions of attractiveness, trustfulness, satisfaction, and customer behavior intentions. We expect the future research results will confirm the proposal research model of appraisal and evaluation of the design quality of Web sites and thus establish a pool of tested design features which are appropriate for design quality and useful to designers.

**References**

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