

December 2003

Effect of Website Characteristics on Consumer Behavior: A Multilevel Analysis

Sunil Mithas
University of Michigan

Narayan Ramasubbu
University of Michigan

Mayuram Krishnan
University of Michigan

Claes Fornell
University of Michigan

Follow this and additional works at: <http://aisel.aisnet.org/icis2003>

Recommended Citation

Mithas, Sunil; Ramasubbu, Narayan; Krishnan, Mayuram; and Fornell, Claes, "Effect of Website Characteristics on Consumer Behavior: A Multilevel Analysis" (2003). *ICIS 2003 Proceedings*. 88.
<http://aisel.aisnet.org/icis2003/88>

This material is brought to you by the International Conference on Information Systems (ICIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ICIS 2003 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

EFFECT OF WEBSITE CHARACTERISTICS ON CONSUMER LOYALTY: A MULTILEVEL ANALYSIS

Sunil Mithas, Narayan Ramasubbu,
M. S. Krishnan, and Claes Fornell

Business School
University of Michigan
Ann Arbor, MI USA

smithas@umich.edu nramasub@bus.umich.edu
mskrish@umich.edu cfornell@umich.edu

Abstract

This paper uses a hierarchical linear modeling approach to examine factors that affect Website effectiveness from a customer viewpoint. Use of hierarchical linear modeling allows analysis of multilevel and cross-level interactions that have not been explicitly considered in previous research. Our preliminary analysis of online Web survey data suggests that the relative importance of different Website features may vary depending on the domain in which Websites are nested.

Keywords: Website effectiveness, customer relationships, customer satisfaction, online surveys, business value of IT, e-commerce, hierarchical linear modeling (HLM)

Introduction

Firms spend millions of dollars in attracting new customers and retaining their existing customers. Information technology (IT) is increasingly playing a central role in managing order fulfillment and customer relationship processes. Among customer-related IT investments, creating and maintaining effective firm Websites has become one of the top priorities in recent times. However, Internet technology has also made it possible for customers to become more demanding and knowledgeable because of lowered search costs and easy availability of information about suppliers of competing products and services (Chabrow 2002; Romano and Fjermestad 2001). Given the important role a firm's Website plays in its marketing and communication strategy, it is important for business and marketing managers to understand the characteristics of Websites that influence consumer behavior.

Despite significant IT investments in customer-interfacing IT systems including creation and maintenance of Websites, recent academic research has failed to find a positive association between IT investments and customer satisfaction even during Internet boom years, a phenomenon that is aptly characterized as the "technology-customer disconnect" (Pralhad et al. 2002). Researchers have also noted the lack of knowledge in developing Websites to maximize profits and exploiting opportunities that Internet technologies present for enhancing business value (Hoffman and Novak 1996; Liu et al. 1997). Schlosser and Kanfer (1996) point out that many Websites do not incorporate features that exploit unique capabilities of the Internet, in terms of navigational ease and integration with other promotional media.

In this paper, we examine the effect of Website characteristics (such as content, functionality, structure and aesthetic) on customer loyalty of Websites considering the business domain in which the Websites are embedded. Existing usability studies provide several insights on how to enhance ease of use of Websites (Agarwal and Venkatesh 2002; Palmer 2002). However, these studies do not examine the relative importance of Website design factors affecting customer satisfaction and likelihood of customers revisiting the Website. Furthermore, much of the prior research has not considered nesting of Websites within business domains and how such domain-related contextual elements moderate the effect of Website features on customer loyalty. This study uses

multiple level analysis (i.e., hierarchical linear modeling) for studying the determinants of Website loyalty to overcome the methodological limitations that arise by ignoring the nesting of Websites within a certain business context.

Background and Literature Review

This section reviews the importance of customer satisfaction as a measure of Website effectiveness. The research questions addressed in this study are presented in the following section.

Customer satisfaction and customer loyalty are important determinants of long-term business success. Previous research has reported that customer satisfaction has a negative influence on customer complaints and a positive influence on customer loyalty and usage behavior (Bolton 1998; Fornell 1992). Empirical evidence suggests that customer perceptions of superior quality are associated with higher economic returns (Aaker and Jacobson 1994; Capon et al. 1990; Nelson 1995). Naumann and Hoisington (2001) report positive correlation between customer satisfaction, market share, and productivity measures at IBM Rochester. In the business-to-business context, studies report that satisfied buyers are less likely to award business solely on price criteria using reverse auctions (Mithas et al. 2002a). The significant amount of IT investments in customer relationship management systems to improve customer satisfaction provide further evidence of the importance that managers place on measuring firm performance from the customer perspective (Mithas 2003).

Measuring effectiveness of Websites in terms of customer loyalty and customer satisfaction is important for several reasons. First, managers need to know how effective their Website is in disseminating the right information to their target customers and how successful the Website is in meeting the needs of the population visiting the Website. Second, managers need a reliable tool and metric to track the effectiveness of any Website improvements or proposals. Industry reports suggest that Fortune 100 companies spend an average of \$1.5 million to \$2.1 million per year on site modifications without knowing whether such modifications actually made the site easier to use (Kalin 1999). Given that substantial changes in Website features such as layout, content, functionality, and navigation are expensive, it becomes important to reliably measure the effectiveness and relative importance of such changes in terms of customer experience. Third, an understanding of Website visitor profiles and their needs allows a company to tailor not only its prospective customer interface but also its future line of product features and offerings.

Despite the importance of measuring Website satisfaction, there are few rigorous empirical studies on the subject in the information systems literature. Much of the IS literature in the technology acceptance area concerns user satisfaction with a non-Web-based hardware or software system. Several studies (Forbes and Rothschild 2000; Lee and Moon 2000; Zhang and Small 1999) have examined consumers' online behavior. Although usability researchers have begun to acknowledge the importance of studying Web-specific ease of use characteristics, there are very few studies that relate usability characteristics with business performance measures from a customer viewpoint. Even in the business value of IT literature, which largely focuses on the economic impact of IT investments, it is only recently that researchers have started answering questions related to effect of IT investments and IT capability on customer related processes and outcomes such as customer management and customer satisfaction (Mithas et al. 2002b; Mithas et al. 2003).

Recent research has proposed new metrics that help managers in evaluating Website characteristics. Straub et al (2002) compile a list of recent studies that have focused on newer metrics for net-enabled organizations and illustratively categorize the metrics by research questions. Several of these metrics relate to usability and features related to download time of Websites. Some studies have explored the effect of usability features on some measures of Website success (McKinney et al. 2002; Palmer 2002; Rose et al. 2001). However, these studies do not address specific Website design parameters such as amount and type of content (pictures, text), structural and navigational characteristics, and functionality characteristics of a Website. Often managers responsible for e-commerce Websites have to make several trade-offs when it comes to making improvements on these Website parameters. For example, improving content with pictures requires more server space and increases Website download time at the customer's end. Very few rigorous guidelines exist that help managers allocate their resources among individual Website elements according to their business needs and customer expectations in the business domain of that Website. This paper attempts to analyze the influence of individual Website characteristics on customer satisfaction and loyalty incorporating the effect of the business domain in which the firm operates.

Research Questions

Previous academic research has explored the effect of several Website features, such as content, functionality, look and feel (layout), etc., on Website performance. It is important to consider how the domain of a Website and the nature of its offering may influence the relationship between individual site characteristics and Website effectiveness in terms of customer satisfaction or return likelihood to that Website. Hoffman and Novak (1996) classify commercial Websites into six distinct types: online storefront, Internet presence, content, mall, incentive site, and search agent. This classification of Websites into six categories is illustrative. In this study, we categorize Websites as belonging to distinct domains depending on nature of their offering (goods vs. services), type of ownership (government or nongovernment), and Website capability (transaction support vs. information provision). The nesting of individual Websites into a domain is analogous to a firm being embedded (or nested) in an industry space (Anderson and Rego 2000).

Given that Websites may be considered as nested within a certain business domain, we hypothesize that such nesting will have significant influence on a particular Website's success because customer expectations and online behavior differ significantly across business domains. Analysis of customer's online behavior using Website traffic logs reinforces this view (Davern et al. 2000; Padmanabhan and Qui 2000). For example, customers may be much more sensitive to a Website's functionality in affecting their return likelihood for transaction-oriented Websites than for Websites designed for disseminating information or enabling Internet search. Information-oriented Websites may be relatively sticky because of unique content they offer or a specialized niche they may be serving. For such Websites, customers may be more tolerant even if other functionality is relatively inferior. In other words, since it is primarily the content that draws customers repeatedly to Websites in the information domain, functionality of the Website may have less of a role in influencing the return likelihood compared to the Websites in other transaction-oriented domains.

In this research, we study the behavior of a large number of online visitors to net enabled and pure e-commerce Websites. In particular, we analyze the effect of individual Website characteristics (content, functionality, structure, ease of use) on customer loyalty with the Website and explore how the relationship between various Website characteristics and customer loyalty varies across business domains. The analytical strategy followed in this paper is similar to that in education research, where exploration of school effects is carried out at multiple levels such as child level, class level, and school district level using hierarchical linear modeling (Raudenbush and Byrk 2002). Recent IS research has also used this methodology to analyze salaries for IT professionals (Ang et al. 2002).

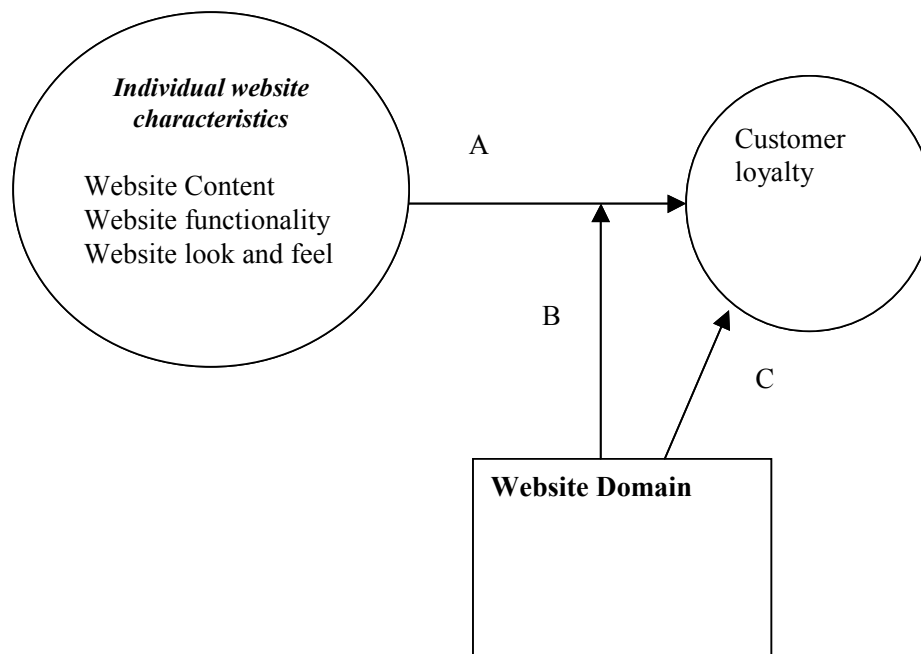


Figure 1. Research Model

Figure 1 depicts our research model and represents the multilevel analytical approach. Individual Website characteristics such as content, functionality, and look and feel (i.e., level one variables) are measured at the Website level, which are represented in circle. The domain of the Website (i.e., level two variable) is represented by the rectangle. The impact of individual Website characteristics on likely customer retention is represented by line A. Results associated with arrow A address our first research question: How do Website characteristics affect online consumer behavior? The degree to which domain characteristics influence the relationship between individual Website characteristics and customer loyalty is represented by line B. Results associated with arrow B address our second research question: how does the impact of Website characteristics on customer loyalty vary across business domain? The impact of business domain of the Website on mean level of customer loyalty is represented by line C.

Research Setting and Data Collection

We are collecting data for this study from a reputed firm that specializes in tracking customer satisfaction of Websites. We intend to present an analysis of the results of this study at the conference.

Acknowledgements

We thank Foresee Results for providing necessary data for this research. In particular, we would like to thank Larry Freed and Anne Kippe for their generous help and comments during the progress of the research. Discussions with Professors Valerie E. Lee and Julie Garcia were helpful in clarifying the proposed methodology used in this research. Financial support for this study was provided in part by the Michael R. and Mary Kay Hallman fellowship at the University of Michigan Business School.

References

- Aaker, D. A., and Jacobson, R. "The Financial Information Content of Perceived Quality," *Journal of Marketing Research* (31:2) 1994, pp. 191-201.
- Agarwal, R., and Venkatesh, V. "Assessing a Firm's Web Presence: A Heuristic Evaluation Procedure for the Measurement of Usability," *Information Systems Research* (13:2) 2002, pp. 168-186.
- Anderson, E. W., and Rego, L. L. "How Much Control Do Managers Really Have Over Customer Satisfaction?," Working Paper, University of Michigan, 2000.
- Ang, S., Slaughter, S., and Yee, K. "Human Capital and Institutional Determinants of Pay for Information Technology Professionals: Modeling Multi-Level and Cross-Level Interactions," *Management Science* (48:11), November 2002, pp. 1427-1445.
- Bolton, R. N. "A Dynamic Model of the Duration of the Customer's Relationship with a Continuous Service Provider: The Role of Satisfaction," *Marketing Science* (17:1) 1998, pp. 45-65.
- Capon, N., Farley, J. U., and Hoenig, S. "Determinants of Financial Performance: A Meta-Analysis," *Management Science* (36:10) 1990, pp. 1143-1159.
- Chabrow, E. "Keep 'Em Happy," *InformationWeek*, September 23, 2002, pp. 20-22 (available online at <http://www.informationweek.com/story/IWK20020920S0037>).
- Davern, M., Te'eni, D., and Moon, J. "Content Versus Structure in Information Environments: A Longitudinal Analysis of Website Preferences," in *Proceedings of the 21st International Conference on Information Systems*, W. J. Orlikowski, S. Ang, P. Weill, H. C. Krcmar, and J. I. DeGross (eds.), Brisbane, Australia, 2000, pp. 564-570.
- Forbes, M., and Rothschild, M. "Toward an Understanding of Consumer Experience on the Internet: Implications for Website Design," *Proceedings of the 33rd Hawaii International Conference on System Sciences*, IEEE Computer Society Press, Los Alamitos, CA, 2000.
- Fornell, C. "A National Customer Satisfaction Barometer: The Swedish Experience," *Journal of Marketing* (56:1) 1992, pp. 6-22.
- Hoffman, D. L., and Novak, T. P. "Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations," *Journal of Marketing* (60) 1996, pp. 50-68.
- Kalin, S. "Usability: Mazed and Confused," *CIO Web Business Magazine*, April 1, 1999 (available online at http://www.cio.com/archive/webbusiness/040199_use.html).

- Lee, J., Kim, J., and Moon, J. "What Makes Internet Users Visit Cyber Stores Again? Key Design Factors for Customer Loyalty," in *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems 2000*, The Hague, The Netherlands, 2000, pp. 305-312.
- Liu, C., Arnett, K. P., Capella, L., and Beatty, B. "Websites of the Fortune 50 Companies: Facing Customers Through Home Pages," *Information & Management* (31:6) 1997, pp. 335-345.
- McKinney, V., Yoon, K., and Zahedi, F. "The Measurement of Web-Customer Satisfaction: An Expectation and Disconfirmation Approach," *Information Systems Research* (13:3) 2002, pp. 296-315.
- Mithas, S. "Effect of Information Technology on Business Relationships and Firm Performance," in *Proceedings of the Ninth Annual Americas Conference on Information Systems*, J. Ross and D. Galletta (eds.), Tampa, Florida, 2003.
- Mithas, S., Jones, J. L., and Mitchell, W. "Non-Contractible Factors as Determinants of Electronic Market Adoption," in *Proceedings of the 20th International Conference on Information Systems*, L. Applegate, R. Galliers, and J. I. DeGross, Barcelona, Spain, 2002a.
- Mithas, S., Krishnan, M. S., and Fornell, C. "Effect of Information Technology Investments on Customer Satisfaction: An Empirical Analysis," Working Paper, University of Michigan Business School, 2002b.
- Mithas, S., Ramasubbu, N., Krishnan, M. S., and Sambamurthy, V. "Information Technology Management and Firm Performance: An Empirical Analysis of Mediating Influences," in *Proceedings of the Eighth Annual INFORMS Conference on Information Systems and Technology*, Atlanta, GA, 2003.
- Naumann, E., and Hoisington, S. H. *Customer Centered Six Sigma: Linking Customers, Process Improvement, and Financial Results*, ASQ Quality Press, Milwaukee, WI, 2001.
- Nelson, R. R. "Evolutionary Theorizing About Economic Change," in *Handbook of Economic Sociology*, N. J. Smelser and R. Swedberg (eds.), Princeton University Press, Princeton, NJ, 1995, pp. 108-136.
- Padmanabhan, V., and Qiu, L. "The Content and Access Dynamics of a Busy Website: Findings and Implications," in *Proceedings of the Conference on Applications, Technologies, Architectures, and Protocols for Computer Communication*, Stockholm, Sweden, 2000, pp. 111-123.
- Palmer, J. "Website Usability, Design, and Performance Metrics," *Information Systems Research* (13:2) 2002, pp. 151-167.
- Prahalad, C. K., Krishnan, M. S., and Mithas, S. "Customer Relationships: The Technology Customer Disconnect," *Optimize*, 2002, pp. 63-70 (available online at <http://www.optimize-mag.com/issue/014/customer.htm>).
- Raudenbush, S. W., and Byrk, A. S. *Hierarchical Linear Models: Applications and Data Analysis Methods* (2nd ed.), Sage Publications, Inc., Thousand Oaks, CA, 2002.
- Romano, N. C., and Fjermestad, J. "Electronic Commerce Customer Relationship Management: An Assessment of Research," *International Journal of Electronic Commerce* (6:2) 2001, pp. 61-113.
- Rose, G., Khoo, H., and Straub, D. "Current Technological Impediments to Business-to-Consumer Electronic Commerce," *Communications of the AIS* (1:16) 2001, pp. 1-74.
- Schlosser, A., and Kanfer, A. "Current Advertising on the Internet: The Benefits and Usage of Mixed-Media Advertising Strategies," Chapter 3 in *Advertising and the Internet*, D. Schumann and E. Thorson (eds.), Lawrence Erlbaum Associates, Hillsdale, NJ, 1996.
- Straub, D., Hoffman, D., Weber, B., and Steinfeld, C. "Toward New Metrics for Net-Enhanced Organizations," *Information Systems Research* (13:3) 2002, pp. 227-238.
- Zhang, P., and Small, R. "Websites that Satisfy Users: A Theoretical Framework for Web User Interface Design and Evaluation," in *Proceedings of the 32nd Hawaii International Conference on System Sciences*, IEEE Computer Society Press, Los Alamitos, CA, 1999.