



MEASURING THE ROUTINIZATION OF WEB-BASED SUPPLIER DIVERSITY

Dale Young, Ph.D., Decision Sciences & MIS, Miami University, Oxford, Ohio 45056

Office: (513) 529-4472, Fax: (513) 529-9689, YoungLD@muohio.edu

ABSTRACT

This study reports on the Web-based supplier diversity initiatives of the Fortune 500. It develops a measure of Web-based supplier diversity routinization, based on previous innovation diffusion and innovation routinization studies. The study finds that few firms (15.6%) among the Fortune 500 use their public Web site to publicize supplier diversity efforts. The largest firms in the study are the ones most likely to mention supplier diversity. However, among the firms that do mention supplier diversity on their public Web site, the degree of routinization does not vary between small and large firms.

INTRODUCTION

Supplier diversity programs are well established in many large firms. The large buying firms have formal efforts for developing trading partner relationships with small, women-owned, and minority businesses. Supplier diversity is a component of corporate diversity programs for dealing with diverse employees and customers in a global marketplace (Wentling and Palma-Rivas, 2000). The business case for supplier diversity is not based on altruistic motives alone, but on the belief that it helps the supplier base reflect the customer base (*Purchasing*, 1998).

Some large firms are beginning to move supplier communications, including supplier diversity efforts, to their public Web sites. A recent survey of corporate Web sites found that just over a third of the large firms studied publish some form of supplier information on their public Web site (Young and Benamati, 2000). Web-based supplier diversity initiatives are an important research area because of the competitive impact of diversity efforts and the potential the Web has for reaching a diverse audience of prospective suppliers. The public Web sites of the Fortune 500 are a valid resource for studying Web-based supplier diversity initiatives because of the size of these firms, their public exposure and need to be responsive to diverse constituencies, and the potential that these firms already have well-established diversity programs. The Web may be a component of off-line diversity programs for employees, customers, and suppliers.

This study examines Web-based supplier diversity initiatives on the public Web sites of the Fortune 500. The study's objective is to develop a formal measure of the extent to which each Web site presents a routinized supplier diversity initiative - one that is part of the accepted practice in the firm. The study's theoretical backing is the segment of innovation diffusion theory that explains the routinization of innovations within organizations. This paper reviews previous information systems (IS) research that is supported by diffusion theory, uses the routinization literature to develop a measure for Web-based supplier diversity, reports the findings, and discusses the current state of Web-based supplier diversity initiatives. The differentiating characteristics of this paper are applying innovation routinization to a Web-based IS, integrating the topic of diversity into an information technology study, and examining the role of a public Web site in developing relationships with diverse members of a supply chain.

INNOVATION DIFFUSION IN INFORMATION SYSTEMS RESEARCH

Innovation diffusion theory provides researchers a means of tracking the spread of a new idea or practice within a single firm or across an entire industry. The theory has been widely applied in various disciplines by following an innovation through the initia-

tion and implementation stages (Rogers, 1983). The implementation stage is composed of several sub-stages, including routinization (Wolfe, 1994). Routinization is the process by which the innovation becomes part of the normal activity and accepted routine of an organization (Cooper and Zmud, 1990) and is no longer viewed as an innovation (Yin, 1979).

Innovation diffusion has been used in numerous IS studies, especially to examine the factors that influence the adoption and implementation of a particular technology. For example, in recent studies it has been used to study adoption of object-oriented software (Sultan and Chan, 2000), windows technology (Karahanna, et al. 1999), telework (Ruppel and Howard, 1998), automatic teller machines (Dos Santos and Peffer, 1998), and electronic publishing (Schoch and Hahn, 1997). Diffusion theory has also been applied in contemporary studies of technology implementation regarding EDI - electronic data interchange (Young, et al., 2000), telephone networks (Flynn and Preston, 1999), and productivity and analysis tools (Grover et al., 1998).

Several IS studies have used innovation diffusion to identify factors that influence the extent of the technology's implementation. Lai (1997) determined factors that affect the extent of integrated services digital network implementation. Premkumar, et al. (1994) measured the extent of EDI integration into organizations. Zmud and Apple (1992) identified the extent of routinization of electronic scanner systems in the U.S. supermarket industry. Cooper and Zmud (1990) examined the infusion of material requirements planning software among manufacturers.

Very few studies have linked innovation diffusion and Web-based technologies. Liao, et al. (1999) applied the theory to virtual banking and Lee (1998) to Internet-based financial transactions. Likewise, few studies have examined the impact of Web technologies on supply chain relationships. Lancioni, et al. (2000) note that using the Internet for managing supply chains is new and few studies have been done in this area. At least two studies have examined the Web and the supply chain. Web-based catalogs assist with procurement and so supplier interaction (Baron, et al., 2000). A recent retail technology study found that large retailers have been slow to use their Web sites to interact with trading partners (CSC, 2000).

In summary, innovation diffusion is well established as a means of providing theoretical support for both IS adoption and implementation. The concept of innovation routinization has been successfully applied in IS studies as well. However, few studies have examined the role of the Web in supply chain collaboration, or related innovation diffusion and routinization to Web-based ISs, and no study to date has applied these concepts to Web-based diversity initiatives.

MEASURING THE ROUTINIZATION OF TECHNOLOGICAL INNOVATIONS

After the adoption of a technology innovation, organizations begin the process of installing and maintaining the system. Some organizational processes may be adapted or changed because of the new system, organizational members accept and use the technology, it becomes routinized as part of each day's normal activity, and the organization may be able to measure increased effectiveness because of the infusion of that technology (Cooper and Zmud, 1990). Innovations become routinized and are sustained in an organization by budgets, personnel, training of personnel, rules and procedures, and maintenance operations (Yin, 1979). These categories suggest variables that may be applicable to other studies of innovation routinization.

Grover and Goslar (1993) measured the extent of implementation of several telecommunication technologies on a seven-point scale that ranged from "extensive" to "low." Premkumar, et al. (1994) used a five-point scale to measure the extent of EDI integration. Yin (1979) measured the extent of routinization by a simple count of the number of budget and other cycles for each innovation studied, including computers. Zmud and Apple (1992) measured the level of routinization of electronic scanners by adapting the variables suggested by Yin and totaling the score for the appearances of each variable. Therefore, scales or simple counts have been common methods for measuring innovation routinization in previous IS studies.

MEASURING SUPPLIER DIVERSITY ROUTINIZATION

This study adapts four categories of variables from Yin (1979) – budgets, personnel, training, and rules/procedures - to determine the routinization of Web-based supplier diversity efforts.

- For *budgets* the study identifies stated dollar amounts spent on diversity initiatives and evidence of multiple budget cycles represented by a start date for the diversity program.
- *Personnel* classifications include a title for the program manager, and additional supplier diversity job classifications or titles below that of manager.
- *Training* is a formal means of introducing an innovation to members of an organization, it suggests organizational commitment for the innovation, and it is a way of communicating that commitment. The two study items for supplier diversity commitment are references on the Web site to the importance of supplier diversity, and specific statements about how personnel are to treat potential diverse suppliers.
- Four items are used for *rules and procedures*: requiring the supplier be certified by an outside agency as a minority or women-owned or small business, specifying the use of access technologies such as EDI, describing formal procedures or steps that are followed by personnel for evaluating diverse suppliers, and presenting expectations in areas such as product quality, financial stability, or geographic coverage.

DATA COLLECTION

The researcher visited the public Web site of each Fortune 500 firm in June of 2000. During each site visit all the Web pages relating to suppliers and to corporate diversity initiatives were printed for later analysis. The printed Web pages were content analyzed by identifying items about supplier diversity. Mentions of routinization items (e.g., budgets, personnel) were coded on the printed Web pages. The occurrences of each variable across all the Web sites were entered on a tabulation sheet and totaled to provide a routinization score. This data collection and analysis process follows the grounded theory method of Strauss (1987) for examin-

ing textual data.

FINDINGS

All but five of the firms on the 2000 Fortune 500 list have a public Web site. Although public Web sites are common, mention of supplier diversity on these sites is not. Only 38/495 Fortune 500 firms (7.7%) use their public Web site to describe a formal supplier diversity program. Another 24/495 (4.8%) simply ask that diverse supplier prospects "call us" and do not describe their supplier diversity program. A third group of sites (15/495, 3.0%) briefly mention supplier diversity but do not provide any contact information. In total, just 77/495 Fortune 500 firms (15.6%) use their public Web site as a means of attracting a diverse group of suppliers.

The 77 firms with some mention of supplier diversity are in 29 different industries. The most common industries are: gas and electric utilities (9 firms), general merchandisers (6), computers and office equipment (6), motor vehicles and parts (5), telecommunications (5), aerospace (5), and electronics/electrical equipment (4). The mix of industries suggests that no single industry is currently taking a lead in using the Web to publicize supplier diversity.

Supplier diversity content items that appear on these Web sites include: application forms that can be completed on-line or printed and mailed, requirements or expectations regarding technology links such as using EDI, requests for financial statements, contact information (e.g., the supplier diversity officer's name, address, phone, and/or e-mail), definitions for the various categories of minority businesses, and information regarding certification by external agencies. Some firms have multiple Web pages that present this content, while others simply state that supplier diversity is important and request that the prospective diverse supplier mail a letter of introduction or phone for more information.

The frequencies and percentages of firms for each supplier diversity routinization item are listed in Table 1. For example, 48 different firms mention certification on their public Web site so there are 48 unique comments for this item among the 77 firms. Only the first occurrence of each item on each site was counted. The most commonly occurring items are statements about the importance of supplier diversity and listing of certification requirements. Just over half of the Web sites list a formal title and/or name for the supplier diversity officer.

"Outreach participation" (a "commitment" item) means the firm describes its attendance at forums or minority/small business job fairs. Certification is carried out by organizations such as the Small Business Administration and the National Minority Supplier Development Council. "Operational requirements" include specification of access technologies (e.g., EDI), quality standards such as ISO 9000, and product label requirements by retailers.

There are 333 unique occurrences of supplier diversity routinization items among the 77 firms in the Fortune 500 that have some mention of supplier diversity on their public Web site. The number of statements made is skewed toward the larger firms in the study. Out of these 333 unique diversity statements, 159 (47.7%) occur among the Fortune 100 and 242/333 (72.7%) occur in the 250 largest firms on the list. Supplier diversity statements appear less frequently among the "smaller" firms in the study. (The revenue of the smallest Fortune 500 firm on the 2000 list exceeds \$3 billion, which indicates the relative size of the firms in the study). Only 17 firms ranked 401-500 on the list mention supplier diversity on their public Web site, whereas 88 (five times as many) of numbers 1-50 mention it.

DEGREE OF SUPPLIER DIVERSITY ROUTINIZATION

This study measures the extent of supplier diversity routinization on public Web sites by the method established by Yin, and followed in other IS studies. Table 2 presents a summary of the routinization scores for all the firms in the study. The ten routinization items are described in Table 1. Firms with one to three different routinization items on their public Web site have a low degree of routinization for supplier diversity; 30/77 (39.0%) are rated as low. Six of 77 firms (7.8%) have a high degree of supplier diversity routinization and 41/77 (53.2%) are rated as medium. The routinization scores suggest that even when supplier diversity is mentioned on a public Web site, the description is generally sparse.

The mean routinization score for all 495 firms is a 4.3; the average firm mentioned just over four of the ten supplier diversity routinization items on its public Web site. The mean for firms ranked 1-250 is also 4.3. That score changes very little when moving down the Fortune 500 list. The mean for firms 1-50 is 4.4, 1-100 is 4.4, 101-200 is 4.1, 201-300 is 4.7, and 301-400 is 4.0. Among the Fortune 500, the relative size of the firm does not seem to affect the degree of supplier diversity routinization on its public Web site.

BEST PRACTICES

The top five percent of these firms in terms of supplier diversity routinization, the two "9's" and two "10's," are arguably a best practices example by which other Web-based supplier diversity efforts can be measured. The two "10's" are Sprint (Fortune rank 81) and U.S. West (Fortune rank 134). Both are in the telecommunications industry. The two "9's" are PepsiCo (Fortune rank 76; beverages) and TRW (Fortune rank 103; motor vehicles and parts). Due to space considerations, this brief discussion focuses on Sprint and U.S. West.

The supplier diversity segment of Sprint's public Web site opens with a letter from the Chairman/CEO about the importance of a "world class supplier base" and the role of women and minority businesses in that supplier base. They cite year-to-year increases in diversity spending as a reflection of "Sprint's company wide commitment to facilitate participation of these businesses in the purchasing process." The site provides an overview of the Supplier Diversity Department (including names, phone numbers and e-mail addresses), its supplier database, and purchasing process. They offer a list of commodities that are purchased. Sprint provides a checklist for prospective suppliers, which includes a reminder about certification and an application form to be completed and submitted on-line.

U.S. West publishes a Web brochure that describes its minority and women business enterprise program. The brochure features a commitment statement from both the Chairman of U.S. West Inc. and President of U.S. West Communications. They present a photo of the diversity program staff and a detailed statement of program accomplishments from the supplier diversity program director. They offer a case study of small and minority businesses that have been successful as U.S. West suppliers. The site segment on supplier diversity also features press releases, diversity awards, and statements from procurement officers and the vice president of supplier diversity. They provide phone numbers and addresses to certifying agencies and other diversity resources, and definitions for the various categories of minority and women-owned businesses (e.g., African American, Hispanic American).

DISCUSSION

This study finds that the public Web sites of large corporations are rarely utilized as a means of promoting supplier diversity. This is one aspect of trading partner and supply chain interaction for which the Web is well suited. Rogers (1983) estimates that innovators – the earliest users, and early adopters – the next group to begin using an innovation, make up approximately 16% of the total population of users for any innovation. These individuals or organizations serve as role models for later adopters. The 15.6% of Fortune 500 public Web sites with some mention of supplier diversity appear to be in Roger's categories of earliest adopters and so may serve as "best practices" examples for firms in a variety of industries.

The largest corporations among the Fortune 500 make the greatest number of total unique statements about supplier diversity. More of the bigger firms on the list mention supplier diversity than smaller firms. However, firm size is not related to the degree of routinization on an individual Web site because the Web sites of the biggest firms in the study exhibited no more supplier diversity routinization than the smallest firms.

The most frequently mentioned supplier diversity item (68/77, 88.3%) among firms with supplier diversity communication on their public Web sites is the importance of these efforts; they often use a letter from the company chairman or president as an introduction to the supplier diversity segment of the site. These types of letters indicate strong commitment from the top for these programs. The second most frequently mentioned item is certification (48/77, 62.3%). These firms are quick to point out that prospective diverse suppliers cannot self-certify; they must go through the certification processes of recognized federal or private agencies. These certification processes can be rigorous and so may be a hurdle for some small suppliers.

On-line applications and personnel contacts both appear on more than 50% of the sites that mention supplier diversity. However, nearly half of the sites omit a contact name and request direct inquiries to an impersonal supplier diversity office. Less than a third mention budgets or program start dates for supplier diversity initiatives. In short, the majority of these firms use their public Web sites to say supplier diversity is important, direct the prospect to an agency for certification, and provide a contact name and application form to begin the interaction process with the buying firm. Thus, regarding supplier diversity, corporate Web sites are largely a means of expressing or publishing a commitment and initiating a review process. The Web is another channel for accomplishing the initial screening of a prospective supplier.

CONTRIBUTION

The primary contribution of this study is to develop and test a measure for the routinization of Web-based supplier diversity initiatives. A secondary contribution is to review the Web-based supplier diversity efforts of every firm on the Fortune 500. Firms with well-established, formal supplier diversity programs should be using the Web as a means of publicizing these programs. The overwhelming majority of Fortune 500 firms are not currently utilizing the capabilities of a public Web site for this purpose. The drop-off in usage of this most elementary Web site application – content publishing – becomes more pronounced among the smallest firms on the list. The routinization measure developed in this study reveals that even fewer firms on the 2000 Fortune 500 list are highly routinized in using the Web to promote their supplier diversity initiatives.

A key limitation of this study is that it is a point-in-time snapshot of how a group of firms are using the Web. Public Web

sites change constantly and so the extent of supplier diversity efforts will undergo constant change. A second limitation is the study population itself; the Fortune 500 are extremely large firms and so are not representative of every corporation. However, they are firms that are likely to have the resources to support a public Web site and are also likely to have existing programs that support supplier diversity. A final limitation is the Web-focus of the study; the study does not provide an external measure of the off-line, or non-Web, supplier diversity efforts of these firms to use as a comparison.

The author acknowledges the support of the R.T. Farmer School of Business for this research.

REFERENCES

- Baron, J., M. Shaw, and A. Bailey (2000). "Web-based E-catalog Systems in B2B Procurement." *Communications of the ACM* (43, 5), May, 93-100.
- Cooper, R. and R. Zmud (1990). "Information Technology Implementation Research: A Technological Diffusion Approach." *Management Science* (36, 2), February, 123-139.
- CSC – Computer Science Corporation (2000). "The E-merging Future in Retail." 10th Annual Retail Technology Study, <http://www.csc.com>.
- Dos Santos, B. and K. Peffer (1998). "Competitor and vendor influence on the adoption of innovative applications in electronic commerce." *Information and Management* (34), 175-184.
- Flynn, R., and P. Preston (1999). "The long-run diffusion and techno-economic performance of national telephone networks: A case study of Ireland." *Telecommunications Policy* (23, 5), June, 437-457.
- Grover, V. and M. Goslar (1993). "The initiation, adoption, and implementation of telecommunications technologies in U.S. organizations." *Journal of Management Information Systems* (10, 1).
- Grover, V., J. Teng, A. Segars, and K. Fiedler (1998). "The influence of information technology diffusion and business process change on perceived productivity: The IS executive's perspective." *Information and Management* (34, 3), October, 141-159.
- Karahanna, E., D. Straub, and N. Chervany (1999). "Information Technology adoption across time: A cross-sectional comparison of pre-adoption and post-adoption beliefs." *MIS Quarterly* (23, 2), June, 183-213.
- Lai, V. (1997). "Critical factors of ISDN implementation: An exploratory study." *Information and Management* (33), 87-97.
- Lancioni, R., M. Smith, and T. Oliva (2000). "The Role of the Internet in Supply Chain Management." *Industrial Marketing Management* (29), 45-56.
- Lee, M. (1998). "Internet-based financial EDI: towards a theory of its organizational adoption." *Computer Networks and ISDN Systems* (38), 1579-1588.
- Liao, S., Y. Shao, H. Wang, and A. Chen (1999). "The adoption of virtual banking: an empirical study." *International Journal of Information Management* (19), 63-74.
- Premkumar, G., K. Ramamurthy, and S. Nilakanta (1994). "Implementation of Electronic Data Interchange: An Innovation Diffusion Perspective." *Journal of Management Information Systems* (11, 2), fall, 157-186.
- Purchasing (1998). "Obstacles on the road to supplier diversity." *Purchasing* (125, 2), August, 64S14 – 64S16.
- Rogers, E. (1983). *Diffusion of Innovations*. New York: Free Press.
- Ruppel, C. and G. Howard (1998). "Facilitating innovation adoption and diffusion: The case of telework." *Information Resources Management Journal* (11, 3), Summer, 5-15.
- Schoch, N. and K. Hahn (1997). "Applying diffusion theory to electronic publishing: A conceptual framework for examining issues and outcomes." *Journal of the American Society for Information Science* (34), 5-13.
- Strauss, A. (1987). *Qualitative Analysis for Social Scientist*. Cambridge University Press.
- Sultan, F. and L. Chan (2000). "The adoption of new technology: the case of object-oriented computing in software companies." *IEEE Transactions on Engineering Management* (47, 1), February, 106-126.
- Wentling, R. and N. Palma-Rivas (2000). "Current status of diversity initiatives in selected multinational corporations." *Human Resource Development Quarterly* (11, 1), spring, 35-60.
- Wolfe, R. (1994). "Organizational Innovation: Review, Critique and Suggested Research Directions." *Journal of Management Studies* (31, 3), May, 405-431.
- Yin, R. *Changing Urban Bureaucracies: How New Practices Become Routinized*. Lexington, Massachusetts: Lexington Books.
- Young, D. and J. Benamati (2000). "Differences in Public Web Sites: The Current State of Large U.S. Firms." *Journal of Electronic Commerce Research* (1, 3), August.
- Young, D., H. Carr, and R. Rainer (2000). "Strategic Benefits from a Mature Innovation." *The Mid-American Journal of Business* (15, 2), fall.
- Zmud, R. and E. Apple (1992). "Measuring Technology Incorporation/Infusion." *The Journal of Product Innovation Management* (9, 2), June, 148-155.

0 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/proceeding-paper/measuring-routinization-web-based-supplier/31652

Related Content

OSTRA: A Process Framework for the Transition to Service-Oriented Architecture

Fabiano Tiba, Shuying Wang, Sunitha Ramanujamand Miriam A.M. Capretz (2009). *International Journal of Information Technologies and Systems Approach* (pp. 50-65).

www.irma-international.org/article/ostra-process-framework-transition-service/4026

The Role of Systems Engineering in the Development of Information Systems

Miroljub Kljajicand John V. Farr (2008). *International Journal of Information Technologies and Systems Approach* (pp. 49-61).

www.irma-international.org/article/role-systems-engineering-development-information/2533

Radio Frequency Identification Technologies and Issues in Healthcare

Amber A. Smith-Ditizioand Alan D. Smith (2018). *Encyclopedia of Information Science and Technology, Fourth Edition* (pp. 5918-5929).

www.irma-international.org/chapter/radio-frequency-identification-technologies-and-issues-in-healthcare/184293

Usability and User Experience: What Should We Care About?

Cristian Rusu, Virginica Rusu, Silvana Roncaglioloand Carina González (2015). *International Journal of Information Technologies and Systems Approach* (pp. 1-12).

www.irma-international.org/article/usability-and-user-experience/128824

Project Contexts and the Possibilities for Mixing Software Development and Systems Approaches

D. Petkov, S. Alter, J. Wing, A. Singh, O. Petkova, T. Andrewand K. Sewchurran (2012). *Research Methodologies, Innovations and Philosophies in Software Systems Engineering and Information Systems* (pp. 360-375).

www.irma-international.org/chapter/project-contexts-possibilities-mixing-software/63272