

December 1997

A Multi-Dimensional Study Of WWW Use In Hong Kong

Ming-Te Lu
Lingnan College

Follow this and additional works at: <http://aisel.aisnet.org/pacis1997>

Recommended Citation

Lu, Ming-Te, "A Multi-Dimensional Study Of WWW Use In Hong Kong" (1997). *PACIS 1997 Proceedings*. 8.
<http://aisel.aisnet.org/pacis1997/8>

This material is brought to you by the Pacific Asia Conference on Information Systems (PACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in PACIS 1997 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

A Multi-Dimensional Study Of WWW Use In Hong Kong

Ming-Te Lu

Lingnan College, Tuen Mun, Nt, Hong Kong

E-Mail: Lumt@Ln.Edu.Hk, Tel: (852) 2616 8102, Fax: (852) 2892 2442

Executive Summary

This research investigates the use of World Wide Web (WWW) by organizations in Hong Kong to promote their activities and/or to sell their products and services. Expanded upon past research, a multi-dimensional measuring scheme for various uses of WWW by both for-profit and not-for-profit organizations is conducted. This scheme measures the Web pages of an organization in terms of the amount of on-line data provided, the degree of application dependency by the organization, and the set of technical quality metrics. Data on all three measures will be collected in a survey based on stratified random sampling of Web pages maintained by organizations in different industries and sizes in Hong Kong. Results obtained through this survey should provide insights on Internet commerce in Hong Kong such as how different organizations are using the Web for what purposes and how do different industries compare with one another in terms of their strategic views on the use of Internet commerce.

Introduction

This paper describes a study in progress of World Wide Web (WWW) or the Web uses by both for-profit and not-for-profit organizations in Hong Kong. In the study, the most important element of Internet commerce, marketing and commercial activities on the Web are scrutinized to reveal the purposes, the methods, and key issues and problems of use at the individual firm level and at the industry level. The specific dimensions investigated include the amount of information provided at a Web site, the level of application dependency by an organization on Internet commerce, and the technical quality of the Web pages developed. In addition, aggregate statistics of industrial uses will be compiled for comparison across industries.

Internet has been hailed as the most important development in information technology since the introduction of personal computers in 1970s (Microsoft, 1996). The fact that this global communication network can be accessed by persons with low-cost personal computers with basic data communication hookups anywhere and anytime in the world has not escaped the attention of both the general public, and for-profit and not-for-profit organizations. More than 30-million current users of the Internet are estimated worldwide (Internet World, 1996). The number of users has, in fact, increased almost exponentially in the last few years due to the introduction of the Web. The Web has revolutionized the way ordinary people access and retrieve information; on the other hand, it has also revolutionized the way businesses conduct their marketing and selling activities. Numerous businesses have set up Web sites to promote and sell their products and services. The era of the so-called "Internet commerce" has arrived. However, due to its newness, both academicians and practitioners know relatively little about this phenomenon.

Hong Kong has also seen a drastic increase in the Web usage in the last few years. It is estimated that, as of the end of September, 1996, at least 737 organizations maintain over 100,000 Web pages at 209 sites in Hong Kong (CUHK, 1996; HKUST, 1996). Also, Internet service providers (ISP) have increased from one only three years ago to more than eighty today. Given this rapid increase, it is predicted that Internet commerce would become an important channel of distribution in Hong Kong for two reasons: first, its global reach matches perfectly with the international trade orientation of Hong Kong, and secondly, a virtual store eliminates the need for paying the exorbitant rental a physical storefront requires in Hong Kong.

Background

The fact that the Internet provides global connectivity with a uniform interface at a very reasonable cost to individuals with different hardware platforms has great appeal to marketers. Today, millions of organizations use Web sites and Web pages to publicize their products and services. Many of these organizations have the capability of accepting customer orders directly on the Net. It is estimated that the US Web-generated sales of products and services for June 1996 reached US\$130 million while a year earlier the sales were only US\$27 million (ActiveMedia, 1996). According to INPUT, an electronic commerce consulting firm, electronic marketing will generate US\$230 billion of sales by year 2000 (Information Management, 1996). Among the various media in the electronic marketplace, Internet commerce will account for more than 50% of the predicted sales. Various success stories of Internet uses have been reported (Carlton, 1996). Today, the Internet has been widely regarded as a competitive business resource with corporations of various sizes heavily engaged in developing strategies and deploying solutions to deal with the Internet challenge (Anthes, 1994/1995; Cronin, 1996; Ellsworth & Ellsworth, 1995; Radosevich, 1996).

Internet commerce has also been called digital retail, e-shopping, e-tailing, cybershopping, or virtual retail sites (Margolis, 1996). Due to its enormous market potential, many academicians and businesses are closely studying and monitoring the explosive growth in this marketplace (Anderson & Choobineh, 1996; Bento & Bento, 1996; Cooper, Duncan, & Whetstone, 1996; Gary, 1996; Haley, Carte, & Watson, 1996; Kuula, 1996; Lee, Barua, & Whinston, 1996; Mawhinney & Larsen, 1996; Senn, 1996). Since the Web has been the major instrument of Internet commerce, studies on Web sites and Web pages have been conducted to gain deeper insights into how individuals and organizations are using them to carry out various commercial activities. To better describe current practice and usage, several frameworks or classification schemes for the use of the Web have been proposed. At the industry level, it would help to provide an overview of the Web usage at various levels of dependency and sophistication by different industries and would also be helpful for predicting the future; at the firm level, it would help to ascertain a particular organization's positioning in the use of the Web and would help the organization formulating Internet commerce strategies for the future (Bento and Bento, 1996). However, the classification schemes proposed in the literature so far have fallen short of the refinement, detail and inclusiveness required for such purposes.

Prior Research

Bento and Bento (1996) proposed the MIDIA-C (Marketing, Information Dissemination, Information Acquisition and Control) framework to classify various uses of the WWW by businesses. In this framework, the marketing uses of the Web for business include Web presence, sales and customer service. Information dissemination comprises training, electronic distribution and electronic publication. Information acquisition refers to the acquisition of information about the industry, social and economic information, and technical and scientific information. Control enables an organization to utilize resources more effectively, to coordinate the different parts of the organization for the achievement of its overreaching goals, and to improve the collection of data for decision making. The framework was applied to 72 business Web sites.

In Bento and Bento's framework, the intertwine nature of the definitions for marketing, information dissemination, and information acquisition makes it quite difficult to delineate the different uses of the Web. In addition, the four elements of the framework reflect Web uses both from the clients' (browsers) and servers' (hosts) perspectives. Thus the framework is better for describing Web uses at a more macro level.

Cappel and Myerscough (1996) provide a classification scheme to cover major uses of the Web by "for-profit" companies. The five major purposes for Web applications are: (1) promoting greater awareness of their companies and products; (2) providing customer support for their products; (3) offering sales of products or services directly or indirectly either exclusively through the Web or supplementing existing marketing channels; (4) selling advertising space on Web sites to other companies; and (5) offering electronic information services. Since "not-for-profit" organizations account for a large share of Web usage, this classification scheme cannot be used to classify all Web sites in existence. However, the classification scheme does delineate application sophistication and recognize Internet intermediaries who provide Web-related services to other organizations.

In a study by Haley, Carte, and Watson (1996) on how a business uses the Web to interact with its customers, companies were classified by Standard Industrial Code (King, 1996). Also each company's Web site was classified using the phases of the Customer Service Life Cycle (CSLC), a

variation of the Customer Resource Life Cycle (Ives and Learmonth, 1984; Ives and Mason, 1990). In the CSLC, the service relationship with a customer is separated into four phases: requirements, acquisition, ownership, and retirement. The requirements phase consists of activities which assist the customer to determine needs such as product photos, sound bytes, files, etc. The acquisition phase includes activities which help the customer to acquire a product or service, such as on-line order entry. The ownership phase is comprised of activities which support the customer, such as on-line user groups, resource libraries, etc. Finally, the retirement phase includes activities assisting the customer to dispose of the service or product, for example, on-line resale. The first phase of Haley, Carte, and Watson's study was conducted in the fourth quarter of 1994. A sample of 98 companies was selected; the second phase of the study took place in 1995. Findings indicate that the complexity of the Web sites with similar life cycle phases varied greatly. In other words, similar applications may have quite different levels of technical sophistication.

A survey of 147 persons on Internet uses by their organizations was conducted by Mawhinney and Larsen (1996). Practically all the results were placed in the marketing category which includes product promotion, product/customer support, and product distribution. Thus a fairly narrow perspective of Web use is adapted here.

A Multi-Dimensional Measuring Scheme

A multi-dimensional measuring scheme for the Web use is developed in this study to provide a more refined classification system for current and future Web applications. Web pages, thus, can be categorized and analyzed to gain insights on the Internet commerce practices and strategies of organizations in different industries. This classification system incorporates three different perspectives with respect to how a Web site is being used and for what purposes. This system overcomes the simplicity of one-dimensional classification schemes in prior research and is capable of providing richer information and better understanding of Internet commerce. The three dimensions or measures are:

Amount of data--This refers to the amount of data made available at a Web site by an organization. It could vary from one single page to over thousands of pages of on-line data concerning a firm's products for buyers and users worldwide. The amount of data can also be measured in numbers of kilobytes or megabytes. Furthermore, it can be measured in numbers of bytes for the contents of the Web pages excluding those characters for the purpose of formatting and establishing linkages.

Technical quality--This relates to the technical quality in Web page design and implementation which could affect the readability and maintainability of Web pages. A quality model for measuring the readability and maintainability of hyperdocuments has been proposed which employs the Factor-Criteria-Metric (FCM) model approach (Hatzimanikatis, Tsalidis, and Christodoulakis, 1995). The first phase in developing such a model is to identify the high-level factors that determine the quality of hyperdocuments, such as readability, maintainability, correctness, integrity, usability, etc. Next, factors are decomposed into lower-level criteria that can be more easily measured. For example, criteria affecting both readability and maintainability may include: size, path complexity, tree impurity, modularity, individual node complexity, etc. The final step is to find metrics that can allow us to come up with values for those criteria. Several metrics based on a refinement of the FCM model will be used as guidelines for judging the quality of the Web pages at a particular site.

Application dependency--To what degree are Web pages being used to support an organization's commercial activities? Do they support 10% or 90% of the activities in an organization? This measure may be obtained by examining all the activities supported by Web pages and compare them with all the activities of an organization.

Much insight will be obtained by examining the Web pages maintained by an organization according to the above three measures. The amount of data indicates how much information the organization wishes to provide to its current or potential customers and is related to the organization's commitment to the use of the Web. The technical quality often indicates whether the organization has expertise on the Web. Application dependency measures how heavily the organization depends or intends to depend on the Web for its business. Aggregate data on the three measures may be used to study different uses of Internet commerce Web in different industries.

Methodologies

The project employs survey research methodology. Survey research generally collects information by asking people using structured/predefined questions. However, in this project, instead of asking people for information, direct observation of Web pages is used to obtain information. Due to the competitive implications of Internet commerce it was felt that most of the organizations would be unwilling to provide information about their Web uses and strategies. Thus, it was determined that direct observation would be the most effective and objective means of data collection. In addition, this project employs stratified random sampling, stratified by industry (King, 1996), in which the population frame coincides with the population under study (organizations employing Web pages in Hong Kong) as much as possible. Tabulations of data and hypotheses testing will be performed to see whether significant differences exist among various industries with respect to the use of Web pages. Similarly, differences among firms of various sizes will also be tested.

References

- ActiveMedia, Inc. *The Numbers behind Net Commerce*. <http://www.activemedia.com/charts.html>.
- Anderson, M. D. and Choobineh, J. "Marketing on the Internet." *Information Strategy: The Executive's Journal*, Summer 1996, 22-29.
- Anthes, G. "Cruisin," *Computerworld*, December 26, 1994/January 2, 1995, 20-21.
- Bento, R. F. and Bento, A. M. "A Framework for Analysis of the Uses of the World Wide Web for Business," 1996 Association of Information Systems Conference.
- Cappel, J. J. and Myerscough, M. A. "World Wide Web Uses for Electronic Commerce: Toward a Classification Scheme," 1996 Association of Information Systems Conference.
- Carlton, J. "Small Outfits Take Advantage of a Global Market on the Net," *The Wall Street Journal Interactive Edition*, June 17, 1996.
- Chinese University Hong Kong. *WWW Servers in Hong Kong*. <http://www.cuhk.hk/hkwww.html> (26 Sept. 1996).
- Cooper, L. K., Duncan, D. J. and Whetstone, J. "Is Electronic Commerce Ready for the Internet: A Case Study of a Financial Services Provider." *Information Systems Management*, Summer 1996, 25-36.
- Cronin, M., ed. *The Internet Strategy Handbook: Lessons from the New Frontier*, Harvard Business School, 1996.
- Ellsworth, J. H. and Ellsworth, M. V. *Marketing on the Internet*, Wiley, 1995.
- Gary, P. "The Global Information Infrastructure: From the Internet toward Worldwide Commerce." *Information Systems Management*, Summer 1996, 7-14.
- Haley, B. J., Carte, T. A., and Watson, R. T. "Commerce on the Web: How is it Growing?", 1996 Association of Information Systems Conference.
- Hatzimanikatis, A.E., Tsalidis, C.T., and Christodoulakis, D. "Measuring the Readability and Maintainability of Hyperdocuments." *Software Maintenance: Research and Practice*, 7, 1995, 77-90.
- Hong Kong University of Science & Technology. *WWW Index and Search Engine*. <http://www.cs.ust.hk/IndexServer> (26 Sept. 1996).
- Information Management*, Spring 1996, (9: 1/2), 14.
- Internet World, "Online Analysis," November 1996, 18-23.
- Ives, B. and Learmonth, G. P. "The Information Systems as a Competitive Weapon," *Communications of the ACM*, 1984, (27:12), 1193-1201.
- Ives, B. and Mason, R. "Can Information Technology Revitalize Your Customer Service?" *Academy of Management Executive*, 1990, (4:4), 52-69.
- King, D. "Fortune 500 on the Web: The Road to Second-Level Effects." *Proceedings of the 29th Annual Hawaii International Conference on System Sciences*, 1996, 463-470.
- Kuula, J. "The Effect of Electronic Commerce on the International of Business," 1996 Association of Information Systems Conference.
- Lee, S. C. H., Barua A., and Whinston, A. B. "Winning with Mass Customization and Electronic Commerce," 1996 Association of Information Systems Conference.
- Margolis, B. "Digital Commerce: The Future of Retailing," *Direct Marketing*, January 1996, 4146.
- Mawhinney, C. H. and Larsen, G. "A Preliminary Study of Industry's Use of the Internet," 1996 Association of Information Systems Conference.
- Microsoft Corp. White Paper. "The Active Internet: Microsoft's Vision and Strategy," March 1996.
- Radasevich, L. "Can You Measure Web ROI?," *Datamation*, July 1996, 92-96.
- Senn, J. A. "Capitalizing on Electronic Commerce: The Role of the Internet in Electronic Markets." *Information Systems Management*, Summer 1996, 15-24.