DIFFERENCES IN PUBLIC WEB SITES:
THE CURRENT STATE OF LARGE U.S. FIRMS

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ABSTRACT

In the summer of 1999, the public Web sites of all the Fortune 500 were visited to identify the predominate types of site content and determine the extent to which the sites are transactional. The study found that these Web sites are largely informational - they focus on publishing product and financial materials about the firm. Four categories of site content emerged - *Customer Sales, Customer Service, Communication*, and *Informational*. The types of content provided on Web sites vary significantly across industries. Thus, the research contributes to the understanding of the content large companies provide via the Web.

The study also found that over one third of the public Web sites are transactional. Transactional sites allow visitors to place an order or perform some type of financial transaction, and may force them to log on. The use of the Web to perform business transactions varies across industries. A cross-industry comparison reveals that the industries most likely to offer transactions over the Web are airlines, commercial banks, computer hardware and software, network and telecommunications, and retailers. Thus, the research also contributes to the understanding of the level that public Web sites are used for business transactions.

1. Introduction

Commercial use of the Web for both business-to-consumer and business-to-business commerce is expanding dramatically. Business-to-consumer oriented sites such as Amazon and eBay get plenty of notoriety. However, it cannot be overlooked that business-to-business transactions are projected to account for 80% of Web sales in the next few years [IDC, 1998].

A casual reading of business literature leads readers to assume that most commercial Web sites are transactional and allow customers or trading partners to make a purchase or check the status of an account. However, this assumption is unfounded. Also, Web sites are used to do much more than process transactions. In addition to transactional capabilities, commercial Web sites frequently provide company information and enable communication with the firm. Furthermore, since many commercial sites have been operational for several years, there may now be common categories of content that appear on Web sites. It is important to note that not all electronic commerce (EC) takes place electronically via the Web. Other technologies such as electronic data interchange (EDI), electronic funds transfer (EFT), and e-mail have been used for many years to carry out electronic exchanges.

The average cost of creating and maintaining a commercial Web site to support business transactions is $1 million and increasing 25 percent per year [Gartner, 1999]. Therefore, firms that build commercial Web sites are often very large, or they must attract venture capital to build and operate the site. For example, many Fortune 500 firms, because of their resources, operate Web sites to support business processes.

The categories of content and level of transactional capability on commercial Web sites can be ascertained by examining the sites. The Fortune 500 list is widely recognized and provides a group of public Web sites to study. This research examines each of the Fortune 500 corporations' public Web sites. The purposes of the study are to identify and categorize Web site content, determine the percentage of transactional sites, and determine both site content and transactional differences across industries. This report summarizes earlier studies, describes this study,

and presents the results. The study's focus on public Web sites for EC excludes private extranets and EDI exchanges, thus understating business-to-business transactions on the Web.

2. Previous Research

Many recent studies have examined content and transactional uses of Web sites [Berthon, Pitt, and Watson, 1996; Gow, 1997; Liu, Arnett, Capella, and Beatty, 1997; Radosevich, 1997; Eighmey and McCord, 1998; Esrock and Leichty, 1998; Griffith and Krampf, 1998; Palmer and Griffith, 1998; Gardner, 1998; Ohlson, 1999; Weston, 1999]. However, significant variations are noticeable in previous studies of commercial Web sites concerning the focus of the study, study population, the segment of site examined, and most importantly their results. This section reviews these earlier studies chronologically.

A July 1995 study reviewed Web sites of major brands including a television network, a packaged food producer, and an athletic shoe company. The study concluded that Web sites must give visitors a reason to return to the site and discussed the organization of Web site content as revealed by the home page [Eighmey and McCord, 1998]. Another study listed four categories of Web site content: Product information and specifications, customer involvement and interactivity features (e.g., free samples), customer service (e.g., handling complaints), and customer communications [Berthon, et al. 1996].

Computerworld's 1996 Premier 100 survey listed information sharing, electronic mail, and customer service as the most popular site content. It also found that only 10% of those firms used their Web site for sales transactions [Gow, 1997]. That survey quoted International Data Corporation saying 80% of the Fortune 500 had a Web site. Also, in 1996 [Liu, et al. 1997] studied Web sites by examining the home pages of the Fortune 500. The study classified Web site usage by industry. They found 64% of Fortune 500 firms had a Web site but only 26% of the firms conducted business through the site.

A 1997 study analyzed a random sample of 100 Fortune 500 Web sites focusing on site content related to corporate social responsibility. Ninety percent of the firms had Web sites and 82% of the sites addressed social responsibility issues such as ecology and education [Esrock and Leichty 1998]. That same year a study of the Web strategies of the top 100 U.S. retailers examined the content of their sites, including on-line sales, communications, and customer service [Griffith and Krampf, 1998]. Sixty-four percent of the retailers had a Web site, but less than 20% did on-line selling. A third 1997 study visited 250 randomly selected Fortune 500 Web sites [Palmer and Griffith, 1998]. They examined how sites were used for on-line sales and customer service, and evaluated site technology (e.g., use of audio, video). The sites were used most often for technical support and less for marketing (e.g., promotions). Another study of Web technology concluded that sites should have a simple design, allow personalization, and avoid leading-edge technology that slows loading [Radosevich, 1997].

A 1998 study of 100 "global 1000" Web sites found 9% of the sites accepted orders from new customers [Ohlson, 1999]. A 1998 survey of Fortune 500 Webmasters found nearly 34% of the sites generated revenue through transactions [Gardner, 1998]. Key site content was publicity, customer support, and revenue generation via on-line transactions. Finally, a survey of corporate information technology executives [Weston, 1999] listed the content most often seen on EC sites: product or service information, customer support, sales transactions for products or services, dealer locator, financial transactions, personalization, and community/discussion.

This previous research suggests that the percentage of Fortune 500 firms with Web sites is growing (64% in 1996, 80 or 90% in 1997). It also suggests that the percentage of transactional sites is growing (10 or 26% in 1996, 20% in 1997, 34% in 1998). Additionally, many types of Web site content such as sales transactions, descriptive information about the firm, communication with stakeholders, customer service, and community/discussion have been described. However, significant variations are noticeable in this previous research of commercial Web sites such as the:

- study population **-** different groups of sites have been visited and most of the Fortune 500 Web site studies have systematically sampled these firms' sites instead of visiting every site.
- segment of the site evaluated - some studies visited only home pages, others looked for specific content (e.g., social responsibility). Few did a content analysis of the entire site.
- focus of the study – many of the studies were not focused solely on content. Many also investigated usability, user habits, technologies, or had a specific industry focus.

3. Research Questions

Previous studies have not analyzed industry differences in the capabilities of public Web sites, especially differences in site content and transactional features. Although Web site content was mentioned in several studies, to date there has been no formal categorization of site content. In addition, the site content issues of frequency of

appearance and industry differences have yet to be addressed. The Web sites of the Fortune 500 provide a very large and very diverse group of sites for examining these issues. Therefore, this study examines three research questions related to Web site content:

RQ1:   What are the categories of site content on Fortune 500 Web sites?
RQ2:   Which Web site content categories most frequently appear on Fortune 500 Web sites?
RQ3:   Do Fortune 500 industries differ in Web site content?

As Web usage matures, firms are moving from simply presenting information to transacting business over the Web. The Web becomes a source of direct revenue generation. This study addresses two questions relating to Web site transactional content:

RQ4:   What percentage of the Fortune 500 have transactional Web sites?
RQ5:   Do Fortune 500 industries differ in use of the Web for transactions?

4. Description of the Study

This is an exploratory and descriptive study. To answer the research questions one researcher examined the Web sites of every one of the Fortune 500 firms in June and July of 1999. The Fortune 500 list was found at the Pathfinder site [pathfinder.com/fortune/fortune500/]. The search engine AltaVista [altavista.com/] was used to attempt to locate the uniform resource locator (URL) - the Web address - for any firm that did not have a Web site URL listed on Pathfinder, or where the URL listed was found to be incorrect.

The researchers developed a form to facilitate data collection during the site visits (Appendix One). Individual items on the form were based on site content identified in previous studies, practitioner journals, and the researchers' experience in teaching electronic commerce. The form was piloted and modified after visits to 25 randomly selected Fortune 500 Web sites.

During data collection the researcher reviewed the home page and site map/site index (when available), visited all segments of each Web site, and noted the presence or absence of each type of site content. Unique content was also noted. Because the study focused on site content, the data collection form did not cover technical components such as frames or multimedia. Summarizing "yes/no" entries across all the forms (i.e., the sites did or did not have each type of content) yielded categorical data for analysis. Chi Square tests identified significant differences.

The U.S. Department of Commerce standard industrial classification (SIC) codes were used to categorize the firms on the Fortune 500 list into SIC Divisions such as Manufacturing and Retail Trade (Table 1). The categorization incorporated industry groups within each SIC Division by mapping the Fortune industry descriptions back to the respective SIC Division (e.g., "general merchandisers" are within the SIC Division "Retail Trade.") Appendix Two lists Fortune 500 industry groups, by SIC Division.

5. Findings

Most of the Fortune 500 (490 firms, 98%) have a public Web site. The ten firms without a site are in Manufacturing, Retail Trade, and Finance, Insurance, and Real Estate.[1] Table 1 lists the number of Fortune 500 firms with public Web sites, by SIC Division.[2] The firms are very large - average revenues are $11.5 billion and average profits are $673 million.

Table 1: Fortune 500 Firms with Public Web Sites - by SIC Division

SIC Division	# Firms	SIC Division	# Firms
A: Agriculture, Forestry, Fishing	0	F: Wholesale Trade	30
B: Mining	2	G: Retail Trade	55
C: Construction	7	H: Finance, Insurance, Real Estate	81
D: Manufacturing	192	I: Services	43
E: Transportation, Communication, Electric, Gas, and Sanitary Services	80		

6. Site Content

Table 2 lists the number and percentage of sites with each type of content. Three items appear on more than 90% of the sites: "Product/service description," "View financials," and "Send e-mail to firm." Some firms provide multiple e-mail addresses to help direct messages.

The site content was grouped into four categories (*Customer Sales*, *Customer Service*, *Communication*, and *Informational*) based on the primary function of each item. A *Customer Sale* is a product/service order or access to a financial account, with or without required log in ("Ordering/financial transactions" and " Log-in"). *Customer Service* is any aid that facilitates a customer sale either before ("Search for dealers, agents, stores"), during ("Calculator Function"), or after ("Check order/shipment status") the sale. *Communication* is individualized interaction between the company and the user ("Personalization" and "send e-mail to the firm") or between users ("Community/bulletin board" and "Free e-mail service"). Finally, *Informational* items supplement or replace hardcopy publications or facilitate site navigation. These are content items not directly related to the sales process that organize ("Links to firm's divisions"), locate ("Key-word search"), and provide ("Product/service description" and "Job opportunities") information to users in a non-individualized manner.

The item percentages in the categories reveal that these Web sites emphasize information presentation. Eight of the ten *Informational* items appear on over half of the sites. The remaining two appear on over a third of the sites. Aside from the *Communication* item "Send e-mail to the firm," none of the ten items in the other categories appear in more than half, and six appear on less than a quarter of the sites. However, both of the items in *Customer Sales* appear in over a quarter of the sites. Furthermore, a comparison across multiple content categories reveals that one third (33.3%) of these sites have neither *Customer Sales* nor *Customer Service* items.

Table 2: Web Site Content

Content *Category*/Items	# (%) Sites	Content *Category*/Items	# (%) Sites
Customer Sales		*Informational*	
Ordering/financial transactions	170 (34.7)	Product/service description	477 (97.3)
Log-in	144 (29.4)	View financials	466 (95.1)
Customer Service		Daily news highlights	436 (89.0)
Search for dealers, agents, stores	233 (47.6)	Job opportunities	433 (88.4)
Calculator function	72 (14.7)	Download financials	416 (84.9)
Check order/shipment status	21 (4.3)	Key-word search	291 (59.4)
Communication		Link to firm's divisions	289 (59.0)
Send e-mail to firm	451 (92.0)	Privacy policy posted	258 (52.7)
Receive news by e-mail	114 (23.3)	External links (e.g., *sec.gov*)	233 (47.6)
Personalization	31 (6.3)	Info for suppliers/resellers	167 (34.1)
Community/bulletin board	14 (2.9)		
Free e-mail service	7 (1.4)		

7. Transactional Web Sites

Just over one third (34.7%) of the sites in the study are transactional. (Private extranets and EDI exchanges were not researched.) Some sites request log-in to carry out a transaction, others do not. Fifty-five percent (94/170) of the sites with user log-in requirements demonstrated in other ways that the site had transactional capabilities; 76 sites have transactions without requiring log-in. Therefore, in this study the phrase "transactional Web site" refers to sites where there are pages for placing orders or conducting on-line financial transactions, with or without user log-in.

8. Industry Analysis

Table 3 lists site content, the percentage of firms in each SIC Division with each type of content, and the statistical significance of item differences across Divisions. Several differences emerge when comparing Web site content across SIC Divisions:

- *Customer Sales* - Retailers and financial institutions have a higher percentage of transactional Web sites than other Divisions. Retailers are most likely to have Web-based product orders, but they are less concerned about user log-in than financial institutions.
- *Customer Service* - Wholesalers, retailers, and financial institutions make it easy for site visitors to find their physical locations. Financial institutions provide calculators for various functions, such as estimating loan payments.
- *Communication* - Offerings of communication services are similar across SIC Divisions. Almost all accept e-mail, but when averaged across all Divisions, less than a quarter of the sites offer to send out financial, product, or other company news by way of e-mail updates.
- *Informational* - Retailers and financial institutions lead in privacy postings, as well as in the *Customer Sales* item ordering/financial transactions. Information for trading partners (e.g., suppliers or resellers) is low relative

to other *Informational* items. Wholesalers have the lowest percentage on six of the ten *Informational* items, which suggests that these sites are less information-rich than sites in other Divisions. Retailers were the lowest SIC Division for the two forms of external links - links out to other divisions of the same firm and external links off of the Web site (e.g., to government or other organizational Web sites such as the Small Business Administration).

Table 3: Web Site Content by SIC Division - Percentage of Firms

Content *Category*/Items	D	E	F	G	H	I	*p*
Customer Sales							
Ordering/financial transactions	24.5	30.0	23.3	65.5	56.8	23.3	***
Log-in	19.8	28.8	33.3	23.6	55.6	32.6	***
Customer Service							
Search for dealers, agents, stores	34.9	22.5	63.3	83.6	74.1	39.5	***
Calculator function	4.2	17.5	3.3	3.6	49.4	14.0	***
Check order/shipment status	2.6	10.0	0.0	7.3	3.7	2.3	---
Communication							
Send e-mail to firm	91.7	93.8	96.7	89.1	90.1	93.0	---
Receive news by e-mail	22.9	27.5	23.3	29.1	13.6	20.9	---
Personalization	3.6	7.5	0.0	9.1	12.3	7.0	---
Community/bulletin board	3.1	0.0	0.0	3.6	6.2	2.3	---
Free e-mail service	0.0	3.8	6.7	0.0	0.0	4.7	**
Informational							
Product/service description	100.0	97.5	90.0	90.9	100.0	93.0	***
View financials	98.4	97.5	86.7	90.9	92.6	93.0	*
Daily news highlights	91.1	92.5	80.0	85.5	86.4	90.7	---
Job opportunities	84.9	92.5	76.7	94.5	91.4	93.0	*
Download financials	89.6	88.8	86.7	80.0	77.8	76.7	---
Key-word search	63.5	71.3	30.0	47.3	56.8	60.5	***
Link to firm's divisions	65.1	65.0	50.0	45.5	46.9	67.4	**
Privacy policy posted	47.4	43.8	33.3	67.3	74.1	53.5	***
External links (e.g., *sec.gov*)	54.2	43.8	53.3	38.2	39.5	48.8	---
Info for suppliers/resellers	32.3	30.0	53.3	38.2	24.7	46.5	*

D: Manufacturing E: Transportation, Communication, Electric, Gas and Sanitary Services F: Wholesale Trade
G: Retail Trade H: Finance, Insurance, and Real Estate I: Services
*** $p<.001$, ** $p <.01$, * $p < .05$

An analysis <u>within</u> each SIC Division (Table 4) reveals that the percentage of transactional Web sites varies greatly between industry groups in each Division (e.g., "Entertainment" and "Health Care" are industry groups in SIC Division I: *Services*). In Division D: *Manufacturing* the number of transactional sites is low, exceeding a third of the sites (the study average) in only 44.4% (8/18) of the industry groups. Some well known manufacturers with transactional Web sites are: Procter and Gamble and Avon in "Soaps, cosmetics," Nabisco and Campbell Soup in "Food," and Motorola in "Electronics, electrical equipment."[3] Conversely, some manufacturers with recognizable brands, such as Nike and Coca-Cola, do not have transactional sites.[4]

Other SIC Divisions also show transactional differences (Table 4).[5] In Division E, airlines and network and telecommunications firms' sites are highly transactional, whereas only 5.3% of gas and electric utility firms' sites are transactional. Computer hardware and software firms appear in Division D and Division I; most of these computer firms have transactional Web sites. Sixteen of 19 firms (84%) in "computers, office equipment," "computer peripherals," and "computer software" have transactional sites. In Division H commercial banks are more than twice as likely to have a transactional Web site as insurance companies.

Some industry groups have no transactional sites, and are not listed in Table 4. In Division D they are: medical products and equipment (3 firms), tobacco (1), beverages (4), metals (8), apparel (3), building materials/glass (4), transportation equipment (1), textiles (1), and furniture (1). In Division E they are waste management (2) and railroads (4). None of the three food services firms in Division G is transactional. In Division I there are no transactional sites in temporary help (3), diversified outsourcing services (3), or advertising/marketing (3).

9. Privacy Policy

This study's privacy policy definition includes any mention of information privacy in the "terms and conditions" or "copyright notice" of the site. Even with this "loose" definition of a privacy posting barely half (52.7%) of these Web sites mention privacy of data submitted by site visitors.

Table 4: Transactional Web Sites by Industry

SIC Division and Industry Group	# Firms	# (%) Transactional
D: Manufacturing		
Rubber and Plastic Products	1	1 (100)
Toys, Sporting Goods	2	2 (100)
Computers, Office Equipment	11	10 (90.9)
Computer Peripherals	5	4 (80.0)
Soaps, cosmetics	4	3 (75.0)
Scientific, photo, and control equipment	3	2 (66.7)
Semiconductors	2	1 (50.0)
Electronics, electrical equipment	17	7 (41.2)
Petroleum Refining	15	4 (26.7)
Forest and paper products	13	2 (15.4)
Industrial, farm equipment	14	2 (14.3)
Chemicals	7	1 (14.3)
Publishing and printing	7	1 (14.3)
Aerospace	9	1 (11.1)
Metal Products	9	1 (11.1)
Pharmaceuticals	10	1 (10.0)
Food	22	2 (9.1)
Motor vehicles and parts	12	1 (8.0)
E: Transportation, Communication, Electric, Gas, Sanitary Services		
Airlines	8	8 (100.0)
Network and Telecommunications	15	11 (73.3)
Package/Freight Delivery, Trucking	6	3 (50.0)
Pipelines	6	1 (16.7)
Gas and Electric Utility	38	2 (5.3)
F: Wholesale Trade		
Wholesalers (durable and non-durable goods)	30	7 (23.3)
G: Retail Trade		
General Merchandisers, Specialist Retailers, Food and Drug Stores	49	35 (71.4)
Automobile Retailing and Services	3	1 (33.3)
H: Finance, Insurance, and Real Estate		
Savings Institutions	2	2 (100.0)
Commercial Banks	26	23 (88.5)
Securities	6	3 (50.0)
Insurance (Mutual and Stock)	39	15 (38.5)
Diversified Financials	8	3 (37.5)
I: Services		
Hotels, Casinos, Resorts	4	3 (75.0)
Computer Software	3	2 (66.7)
Entertainment	4	1 (25.0)
Health Care	16	3 (18.8)
Computer and Data Services	7	1 (14.3)

Transactional sites generally post a privacy policy. Six of the eight airlines (75%) and 13/15 network and telecommunications firms (86.7%) have a privacy posting. Out of 49 general merchandisers (e.g., Wal Mart, Sears), specialist retailers (e.g., Home Depot), and food and drug stores (e.g., Kroger, Walgreen), 71.4% (35 firms) have

transactional sites and 67.3% (33 firms) have a privacy posting; seven are transactional without a privacy notice. Of the 26 commercial banks, 88.5% (23 firms) post privacy policies; one is transactional without a privacy posting.

10. Other Items

Some content items did not fit into the items listed on the data collection form. Such items were used by only a small number of sites and were placed in an "other" category during data collection. Some of the "other" items were technology related such as software downloads, live Web casts, three dimensional views of products or locations, affiliate programs, on-line coupons, and gift registries. Others were user friendliness items such as user surveys, multiple language site versions, free tutorials, forms for follow-up service, and white papers.

11. Findings Summary

These Findings answer the Research Questions. Question 1, "What are the categories of site content on Fortune 500 Web sites," is answered by identifying four categories of content on Fortune 500 Web sites - *Customer Sales, Customer Service, Communication*, and *Informational* (Table 2). *Informational* content is the most prevalent content area, answering Question 2, "Which Web site content categories most frequently appear on Fortune 500 Web sites" (Table 2). Question 3, "Do Fortune 500 industries differ in Web site content," is answered affirmatively. There are statically significant differences in site content across industries (Table 3). For Question 4, "What percentage of the Fortune 500 have transactional Web sites," approximately a third of Fortune 500 Web sites are transactional (Table 2). Finally, Question 5, "Do Fortune 500 industries differ in use of the Web for transactions" is also answered affirmatively. Some industries do make greater use of the Web for transactions than others (Table 4).

12. Discussion

Four categories of site content emerge from the study, *Customer Sales, Customer Service, Communication,* and *Informational.* These categories combine and revise content types discussed in previous research [Berthon, et al. 1996; Gow 1997; Griffith and Krampf, 1998; Gardner, 1998; Weston, 1999]. Sites containing *Customer Sales* content allow for the ordering of products/services or the execution of financial transactions; they may or may not require user login. Sites that offer *Customer Service* content provide aids for use prior to, during, or after the sale; examples are the ability to locate dealers or monitor order status. Any site that allows for individualized interaction between a company and their customers and trading partners, or interaction among customers or trading partners, is offering *Communication* content. Finally, non-individualized information that is made available through a site is categorized as *Informational* content.

Currently, the public Web sites of the Fortune 500 emphasize information presentation. The sites contain a high percentage of *Informational* content (Table 2). A few items in the other three categories, such as the ability to send e-mail, are available on the sites. However, these content categories are distant in their level of usage when compared to *Informational* content. These differences between *Informational* and other content indicate that the predominant application for public Web sites is to publish information for stakeholders. This study's finding of an *Informational* focus for public Web sites parallels a recently published survey that reports the top two objectives of a company's Web site(s) are product/service information and increasing corporate awareness [ANA, 2000].

Analysis across SIC divisions shows that the divisions differ significantly in their application of at least one content item in all categories (Table 3). This difference is most pronounced in the *Customer Sales* category. This category identifies transactional capabilities on a Web site. In two of the other four categories, *Customer Service* and *Informational*, the industries differ significantly in their application of over two thirds of the content items. The only category where content application does not seem to differ across industries is *Communication*. It appears that using the Web for this purpose is universal.

The overall moderate rate of transactional capabilities on Fortune 500 public Web sites (34.7%) masks high usage rates in some industries. Transactional Web sites are widely adopted in airlines (100%), commercial banks (88.5%), computer hardware and software (84%), network and telecommunications (73.3%), and retailers (71.4%) (Table 4). Industry groups represented by four or fewer firms are purposefully ignored in this analysis to avoid unsupported conclusions. These "high adoption" industries have products or services that are amenable to Web-based electronic transactions (e.g., it is easy to buy an airline ticket or computer over the Web), and they are actively seeking electronic transactions with customers.

It is important to note that the overall transaction usage figure understates the extent of electronic interactions between Fortune 500 firms and their trading partners. Many of the Fortune 500 are linked to commercial trading partners using technologies other than a public Web site, such as private extranets and EDI. These interactions were not the focus of this study.

Two SIC Divisions, Division G: *Retail Trade* and Division H: *Finance, Insurance, and Real Estate*, have the highest percentage of transactional sites, and also the highest percentage of privacy policy postings (Table 3). This similarity suggests that firms with transactional Web sites are most concerned about the privacy of that transactional data. Of interest, however, is the fact that firms in Division I: *Services* are more than twice as likely to post privacy statements as to have transactional Web sites. Division D: *Manufacturing* and Division E: *Transportation, Communication, Electric, Gas and Sanitary Services* exhibit a similar, very large difference between the percentage of transactional sites and the percentage of sites with privacy postings. The higher levels of privacy postings relative to customer transactions in all six SIC Divisions in this study suggest privacy is an important issue, but apparently not as critical as publishing product and financial information. A pessimistic view says these privacy postings are nothing more than public-relations expediency.

This study finds that transactional Web sites are much less prevalent in a number of other industries, including: utilities (5.3%), publishing and printing (14.3%), chemicals (14.3%), aerospace (11.1%), motor vehicles and parts (8.0%), food (9.1%), pharmaceuticals (10.0%), forest and paper products (15.4%), industrial and farm equipment (14.3%), healthcare (18.8%), and computer and data services (14.3%) (Table 4). Some of these industries, such as petroleum and refining, forest and paper products, insurance, energy and utilities, motor vehicles and parts, and industrial and farm equipment, have been entrenched in non-Web-based EC for years. This prior investment in business-to-business interorganizational systems may be slowing the move to the Web for some of these industries. Some are moving toward Web-based electronic transactions:

- Publishing should adapt to electronic transactions well, but publishers are just beginning to electronically deliver books, magazines, and newspapers. They must deal with copyright issues and balance on-line revenue streams between advertising and subscriptions.
- Auto manufacturers are looking for ways to accommodate buyers who use the Web for gathering information about vehicle price and model availability. These manufacturers also want to establish Web links to the physical end point in their supply chain - the dealers.
- Paying a utility bill over the Web could be an electronic transaction. Gas and electric utilities may be delaying Web interactions with customers until both Web banking, and electronic bill presentation and payment, become more widely adopted by consumers.

A log-in area for trading partner access to account information may be an easy way for firms to move some transactions to the Web. However, few firms in the study (34.1%) provide information to existing or prospective trading partners through their public Web sites. Personalization may encourage Web-based interactions because site content can be tailored to visitor interests. However, when considering the importance of these one-to-one contacts, personalization is unusually low across all industries (6.3%). Conversely, most firms in the study (89%) encourage repeat visits to their public Web site by offering daily updates or highlights of company news. Most public Web sites accept e-mail (92%) but few (23.3%) offer to send e-mail updates back to site visitors. Therefore, given the low levels of trading partner information, personalization, and e-mail updates, the firms in this study do not seem to be using their public Web sites to develop two-way communications with trading partners or other site visitors.

Aggregating data across all 490 firms, or analyzing data at the SIC Divisional level, masks some important findings because of the differences that exist between industry groups. For example, when considering all 490 Web sites, the percentage of transactional sites is within one-half point of the percentage of sites that publish information to suppliers or resellers (Table 2). This comparison might imply that firms look equally to customers and suppliers in the supply chain when they use the Web to communicate with trading partners. However, twice as many firms in Division I: *Services* publish supplier information as have transactional Web sites (Table 3). In Division H: *Finance, Insurance, and Real Estate* this relationship is exactly opposite - twice as many firms have transactional sites as publish information to suppliers. In SIC Division E: *Transportation, Communication, Electric, Gas and Sanitary Services* these two percentages are exactly the same. In addition, in half of the SIC Divisions in the study, the percentage of transactional Web sites is less than 25% of the total sites. These examples suggest that industry-level factors affect the content of public Web sites within the Fortune 500.

To summarize this discussion, the findings of this study tell us that:

- most Fortune 500 companies have a public Web site,
- across all industries the predominant Web site usage is publishing financial, product and employment information, and communicating via e-mail with site visitors,
- industries differ in the types of content available on their Web sites,
- wide-spread adoption of Web site transactional capabilities is common in a few industries,
- transactional Web sites frequently post privacy policies and privacy policies are often posted regardless, and

- firms may be underutilizing their public Web sites for establishing two-way communications with trading partners and enabling site personalization.

13. Implications for Future Research

This study contributes to the field of knowledge by providing a current snapshot of the uses of Web sites by large companies. It was done qualitatively and therefore has some limitations. However, these limitations, in combination with the findings discussed previously, can provide the basis for further research.

First, this study is a point-in-time examination of the use of the Web. Studies of the features of Web sites must be ongoing because of the rapid changes in the nature of Web-based commerce. The same or similar studies should be done periodically to elucidate the changes or trends in Web site usage over time, and may reduce the possibility of bias in this study due to a single researcher analyzing the sites.

A study should be done with a different sample to validate the generalizability of the results. It could focus specifically on business-to-consumer or business-to-business sites to ascertain differences in content across the two types of sites. In addition, the Fortune 500 sample ignores all of the non-profit (.org), governmental (.gov), and foreign sites. Any of these could and probably do differ slightly in their content and use of the Web.

Finally, many differences in the use of the Web across industries surfaced in this study. Research could investigate any or all of these differences. Questions such as, "Why are SIC divisions D: *Manufacturing* and F: *Wholesale Trade* apparently behind in their use of the Web for transactional purposes?" and "Why is site personalization most offered in SIC division H: *Finance, Insurance* and *Real Estate*?," could be studied. Researchers could also look deeper within any of the SIC divisions. For example, one could ponder which of the five industries in SIC Division E: *Transportation, Communication, Electric, Gas,* and *Sanitary Services* are offering transactions, which are not, and why.

14. Conclusion

The capabilities of the Web have evolved radically in the last few years. In conjunctions with this evolution, companies continue to find new, innovative ways to take advantage of the Web. This study has summarized the current state of affairs for Fortune 500 firms, and has attempted to make sense out of that state of affairs. Much more will need to be done to truly understand the current uses of public Web sites. Even more will be required to stay abreast of the uses that are yet to come.

Notes
1. The ten firms without a Web site, and their Fortune 500 rank, are: Philip Morris (#8), Publix Super Markets (#139), Nebco Evans (#224), Giant Foods (#367), Provident Companies (#393), Smithfield Foods (#395), Hechinger (#431), U.S. Industries (#438), Interstate Bakeries (#451), and Golden West Financial Corp. (#471).
2. There are no Fortune 500 firms in SIC Division A: Agriculture, Forestry, and Fishing. Mining and Construction (SIC Divisions B and C) are not included in the analysis because there are only nine firms in those two Divisions and none have a transactional Web site.
3. The following manufacturing firms have transactional Web sites: P&G, Avon, Estee Lauder in "soaps, cosmetics;" 3M and Kodak in "scientific, photo, and control equipment;" Lucent, Motorola, Whirlpool, Eaton, AMP, Qualcomm, Micron in "electronics, electrical equipment;" Mobil, Texaco, Chevron, Sunoco in "petroleum refining;" Boise Cascade and Mead in "forest and paper products;" Deere and Parker-Hannifin in "industrial and farm equipment;" Eastman Chemical in "chemicals;" McGraw-Hill in "publishing and printing;" Boeing in "aerospace;" Gillette in "metal products;" Warner-Lambert in "pharmaceuticals;" Nabisco and Campbell Soup in "food;" and General Motors in "motor vehicles and parts."
4. Manufacturing firms without transactional Web sites include: Nike and Reebok in "apparel;" Baxter, and Becton Dickinson in "medical products and equipment;" Alcoa, Reynolds, and Bethlehem Steel in "metals;" PepsiCo and Coca Cola in "beverages;" and Owens-Illinois and Corning in "building materials and glass."
5. Transactional sites include, in SIC Division E: UPS, Federal Express, Yellow Freight Systems, AMR, United, Delta, Northwest, US Air, Continental, Southwest, Trans World, Entergy, American Electric Power, ATT, Bell Atlantic, SBC, GTE, MCI, Ameritech, Sprint, US West, and AirTouch Communications. Among freight companies, UPS, Federal Express, Airborne Freight, and Yellow Freight provide access to shipping status information from their Web site. Among the four railroads - Union Pacific, CSX, BN/Santa Fe, and Norfolk Southern - Santa Fe and Norfolk offer shipment status checks. Transactional sites in Division H include: Bank of America, Chase Manhattan, Bank One Corp., Bear Stearns, Paine Webber, and Schwab. In Services, Division I are: Aetna, MedPartners, Allegiance, Marriott, Hilton, and Host Marriott. Services includes four entertainment firms - Disney, Time Warner, Viacom, and CBS. Only Disney offers Web transactions, and only

Disney requests a log-in. Of the seven firms in "computer and data services" (EDS, Unisys, Computer Sciences, First Data, ADP, Science Applications Int'l., and Comdisco) only Comdisco has a transactional Web site.

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Appendix One: Data Collection Form

1999 Fortune 500 Web Site Research Project
[Data Source: Company Web pages; http://pathfinder.com/fortune/fortune500/]

1. Name of Firm: _____   2. Date of Review: _____
3. Fortune 500 Rank: _____   4. URL: _____
5. Revenue ($ millions): _____   6. Profit ($ millions): _____
7. Profit as % Revenue: _____   8. Number of Employees: _____
9. Industry: _____

Description of the Web Site

Web Site Contents: ☐   10. No Web Site
☐   11. Daily highlights, news update, specials   ☐   12. Job opportunities
☐   13. Company Financials   ☐   14. Describe Products or Services
15. Notes to Trading Partners (suppliers or customers) about business
Describe: _____

☐   Links to Web sites (not the URL) --
16. Other company divisions: _____
17. Other external links: _____
☐   18. Search Function for dealers, company stores
☐   19. Search the site by key-word index, or pull-down box with a checklist
☐   20. Calculator: ____estimate costs   ____ financial planning
             ____ arrange flight schedule   ____ other _____
☐   21. Electronic Community - chat room, on-line bulletin board
☐   22. Outside Advertising -- name of firm(s): _____

Transactions On the Site

☐   23. No transactions or user interactions, information presentation only
☐   24. Order products, services, make reservation, on-line banking
Describe transaction: _____

Customer Support/Other Interaction with Site Users:
◯   25. Ask user to log in to the site from initial screen/home page
◯   26. Offer personalized version of the firm's Web page to the user
◯   27. Register for electronic news delivery about the firm
◯   28. Send electronic mail to firm (e.g., questions about products)
◯   29. Firm offers free e-mail service to site users
◯   30. Check order/shipment status
◯   31. Request financials or product information
◯   32. Fill out form & submit (e.g., home mortgage application)
◯   33. Pop-up Window: ___ Survey   ___ Ad   ___ Help Desk ___ Product Information
◯   34. Other: _____
35. Privacy: _____

Other Comments/notes about the Site

_____

Appendix Two: Fortune 500 Industry Groups, in this study, by SIC Division

D: Manufacturing

Aerospace	Motor Vehicles and Parts
Apparel	Petroleum Refining
Beverages	Pharmaceuticals
Building Materials, Glass	Publishing and Printing
Chemicals	Rubber and Plastic Products
Computers, Office Equipment	Scientific, Photo, and Control Equipment
Computer Peripherals	Semiconductors
Furniture	Soaps, Cosmetics
Electronics, Electrical Equipment	Textiles
Food	Tobacco
Forest and Paper Products	Toys, Sporting Goods
Industrial and Farm Equipment	Transportation Equipment
Medical Products and Equipment	
Metals	
Metal Products	

E: Transportation, Communication, Electric, Gas, and Sanitary Services

Airlines	Telecommunications
Mail, Package, Freight Delivery	Trucking
Network Communications	Utilities, Gas and Electric
Pipelines	Waste Management
Railroads	

F: Wholesale Trade

Durable goods	Non-durable goods

G: Retail Trade

Automobile Retailing and Services	General Merchandisers
Food and Drug Stores	Specialist Retailer
Food Services	

H: Finance, Insurance, and Real Estate

Diversified Financials	Insurance, Life and Health (Mutual)
Commercial Banks	Insurance, Life and Health (Stock)
Hotels, Casinos, Resorts	Insurance, Property and Casualty (Mutual)
Savings Institutions	Insurance, Property and Casualty (Stock)
Securities	

I: Services

Advertising and Marketing	Entertainment
Computer and Data Services	Health Care
Computer Software	Temporary Help
Diversified Outsourcing Services	