

BENCHMARKING FOR DESIGN EVALUATION OF CORPORATE WEB SITES A STUDY

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ABSTRACT

No standard till date exists for corporate Web site design. This paper analyzes the features of the Web sites of some of the top performing companies from the Fortune 500 list dealing with various categories of products - consumer durables, consumer non-durables, industrial products, and services. We show the order of differences on various features that exist in site design among these categories. We also show the importance assigned to various commercial and design features by these category of companies and calculate weights assigned to these features. These weights can be used to provide a benchmark to evaluate the design of any corporate Web site. Next we analyze the content of some of the top performing Indian companies in each category and compare them with the corresponding companies from Fortune 500 group for various features. Finally, we have shown how a benchmark can be used for overall design evaluation of a Web site, taking Indian Web sites as an example.

INTRODUCTION

The content and the design of the corporate Web sites is a matter of great concern for most of the companies. This is evident from the fact that large US companies spent \$10 billion on their Web site development in the year 1999 [11]. Many authors consider a Web site as an efficient medium for marketing communication [2] [7]. So a considerable amount of effort is needed to

formulate the corporate strategy for the same [17] starting from advertising to product distribution. Many argue that the Web can be used as suitable marketing tool for consumer products [18], [13] as well as for industrial products [8] and services [16]. But the fundamental differences in characteristics that exist in these categories of offering by any company should be reflected in the content and the design of the corresponding Web sites. So the contents of the Web sites need to be analyzed to find out the presence of any such commercial feature. In this paper we have adopted a 'follow-the-leader-strategy' to extract the commercial features required by a corporate site. Palmer & Griffith [15] conducted a study in spring 1997 on the Web sites of a sample from US Fortune 500 group to show the trend in Web site design. There, they argued that US Fortune 500 is the most likely group to have utilized the widest array of technologies and innovations in their Web site design. Influenced by the idea we have considered Web sites of the samples from this group to prepare the proposed benchmark.

Besides, commercial features the Web sites must possess some technical features. Palmer & Griffith [15] argue that media richness, through the use of multimedia and other technical features can give a firm competitive advantage. We have analyzed the content of the Web sites to see the recent trend in the actual uses of such features by any Web site. Besides multimedia features, we have studied some design features used to enhance navigability, improve quality and support visitors while making a virtual tour in the site.

According to a survey by Nasscom, India's Internet subscribers increased from a meager 0.14 million in November 1998 to over 1.8 million by 31 December 2000. The number of Internet users also increased considerably from 0.7 million to 5.5 million during this period (www.nasscom.org/it_industry/ecommm_survey.asp). The survey projects the figure to increase to 10 million and 30 million for number of subscriptions and Internet users respectively. The total volume of e-commerce transactions in India was about Rs. 4,500 million in 1999-2000. The Nasscom survey reveals that e-business transactions in India are expected to exceed Rs. 23,000 million in 2000-01 and go up to a whopping Rs. 4,00,000 million in 2003-04 (www.nasscom.org/it_industry/int_survey.asp).

With this scenario it is important to see the preparedness of the Indian companies to cater to the situation. In this paper we have also presented the result of a survey conducted on the Indian Web sites to see the features offer by them and have validated them based on the proposed benchmark. Center for Monitoring Indian Economy (CMIE), brings out every year a list of top performing Indian companies. We have selected samples from this group for our study.

The purpose of this paper is to study the recent trends in corporate Web site design, prepare benchmarks and evaluate Indian Web sites based on this benchmark.

SELECTION OF THE SAMPLES

We have selected the Web sites of 80 companies from the first 200 of the US Fortune 500 (as on January 2001) group of companies to serve as a representative set to prepare a benchmark for corporate Web site design. During the study we could not access the sites of 3 companies because of some reason or other. Thus the final list consists

of a total of 77 companies. We have sub-grouped these companies based on their market offerings into 4 groups: consumer durables, consumer non-durables, industrial products, and services. The sample sizes from these groups are 14, 20, 21 and 22 respectively.

We have also selected 80 companies from top 200 of CMIE list (as on January 2001) for the study. But the Web sites of some of the companies could not be accessed due to some reason or other. The final list consists of 71 Indian companies with 20, 11, 23 and 17 companies from consumer durables, consumer non-durables, industrial products, and services category respectively. Both the lists can be found in Appendix-1. The survey started in March 2001 and continued for 2 months.

Some of the companies in each list are conglomerates dealing with multiple strategic business units and various types of product offerings. These companies have been grouped depending on its major product or industry type as they have been entered in the US Fortune 500 list. For example, Boeing, besides aircrafts, also deals with apparels and toy airplane models. But we have considered it as a company dealing with industrial products rather than a company dealing with consumer durables.

A feature analysis of individual Web site is not possible as each site consists of many static pages and is capable of generating unlimited number of dynamic pages depending on a visitor's queries. While searching for requisite features we have restricted our study to the home page (index page) and the pages that are 10 mouse clicks away from the home page. Here we could make one interesting qualitative observation that the sites that provide site maps, makes the site navigation easier by allowing links to all the static pages that exists in

the site. Navigation becomes difficult if the visitor does not find such a repository of links and searches, instead, randomly for a particular functionality offered by the site.

SELECTION OF WEB SITE FEATURES

Various authors have given different classification schemes for classifying Web site features. Palmer and Griffith [15] have classified the features into marketing and technical. Huizingh[10] has given a different classification based on content and design. We define the design of a Web site to a set of features that a site might contain. We have identified 34 features for design and feature analysis of a corporate Web site. The entire set of features is further classified into two broad categories, i.e. Commercial features and Non-commercial features. Commercial feature includes some marketing features (classified under McCarthy's 4-Ps - Product, Price, Place of Distribution, Promotion) and other commercial features. The non-commercial features are further classified as technical features and design features. Table-1 gives an exhaustive list of these features and Appendix-2 defines these features. Various authors, for the purpose of their work, have already considered some of these features or have cited the importance of these features. Table-2 gives the list of features considered by other authors, which we have adopted. Features considered by the authors after conducting a preliminary survey are star-marked in Table-1. They are career, legal notices, privacy statements, investor relation, use of Flash, site map, foreground color and background color. Next paragraph describes the rationale for including these features in the study.

Career opportunities in the form of current job opening information through the Web sites help to

draw the attention of the prospective candidates worldwide and serve as a form of public relation. **Legal notices** mostly warn the users of the site against any possible misuse of the site and make them aware of the legal actions that follow thereafter. Sometimes they provide disclaimer statements that help the company against any possible legal actions for providing wrong information by mistake through the site. A Web visitor's personal data, opinion, etc., are valuable source of information for the company. Company's definition of the type of **privacy** to be provided by the company is likely to make a visitor confident and secure to share his personal details and opinion. Company's declaration of its financial statements and stock quotes through **investor relations** is likely to draw more investment from the public. Besides the commercial features, the use of **Flash** can make the site attractive. Use of **site map** can make the site navigation easy. **Foreground** and **background** colors can make a site attractive to a user.

All the features other than page size, graphics size, foreground color, background color, and advertisement are of Yes/No type. Page size and graphics size are measured in terms of kilobytes. Advertisement is measured in a 4-point scale. But it is also considered in the benchmarking process as a Yes/No type variable to show the presence or absence of advertisement. This feature is again analyzed afterwards to show the general trend in advertising in all the 4 categories of Web sites. Foreground color and background color are measured in a 10-point scale.

The features page size, graphics size, foreground color and background colors are not considered in the benchmarking process as they are assumed to be trivial. However they are analyzed separately to show their general trend in Web site design.

RESULTS AND ANALYSIS

The study consists of three different parts:

1. A product category-wise comparison among the Web sites of the US Fortune 500 companies.
2. Establishment of a benchmark for corporate Web site evaluation.
3. A product category-wise comparison between Indian companies and US Fortune 500 companies.

Inter-Category Comparison Within Fortune 500 Group

In this section we present our findings on the test of equality of presence of commercial to non-commercial features across the four categories of companies. As mentioned earlier, the commercial features of the Web sites of the various categories of companies are likely to differ from one another. To test our hypothesis, the data has been analyzed to show the degree of differences that exists among various categories of companies on individual features. Table 3 gives the results of chi-square test performed on each feature individually for all the 4 categories of the companies to test the hypothesis that the group means are equal against the alternative hypothesis that at least two of them are different. In this Table the p-values indicate the level of significance at which the hypothesis can be rejected. It can be seen that the features, price, dealer locator, link to country sites, advertisement, online ordering, virtual communities, customer support, privacy statements, investor relations and links to e-markets or ebusiness sites, differ at a level less than or equal to 0.05.

Our belief that the non-commercial features do not differ from one another is confirmed by the fact

that p-values for the non-commercial features other than use of frames, do not differ at a level less than or equal to 0.05.

Besides the above observation a number of other observations can be made on the results in Table 3. The features link to brand sites/product page and profile appear in more than 85% of the sites in each category. Presence of Internal links is trivial in all the sites. That means all the sites contain many number of pages and are fairly navigable. Market research is the least observed feature and appears in less than 5% of the sites. The non-commercial features like real-time interactivity, use of audio and video is sparse.

The 4-point scale used for measuring advertisement was defined as: 0-nil, 1-minimum, 2-moderate, 3-extensive. The authors subjectively considered the number of products advertised and the amount of space devoted for advertisement in a page to evaluate a Web site for advertisement in this scale. Figure 1 shows the advertising pattern in each industry. It can be seen clearly that none of the industrial product company shows extensive advertisement. Consumer non-durable companies show a uniform distribution for advertising categories. Majority of the consumer durable companies (about 60%) use moderate level of advertisement while that for majority of the service companies was low to moderate.

Assuming that the server speed of all the companies is same, the amount of graphics per home page is directly proportional to the time to connect to that site. Amount of text is an indication of the content richness of the sites. Table 4 gives the mean and standard deviation for both the features for all the 77 companies taken together. Figure2 and figure 3 shows the scatter diagram of

the values of the text and graphics respectively. It also be seen that text size and graphics size are limited to 50KB and 100KB for most of the companies.

Foreground and background colors are measured in a 10-point scale (1-10), 1 indicating white 4 blue, 7 maroon and 10 indicating black. Other colors are given a number each subjectively in the scale. For all the companies taken together, white appears to be the most favored background color and blue as the foreground color.

Benchmarking the Features

We have seen in the earlier section that the commercial features differ in various categories of companies whereas the non-commercial features do not. So we have prepared benchmarks for commercial features separately for four categories of the companies. Benchmark for non-commercial features have been proposed considering all the companies together.

Table-1. Classification Of Corporate Web Site Features

Commercial Features			Non Commercial Features	
Marketing Features	Product	1. Links brand sites or Product page	Technical Features	21. Site search
	Place	2. Dealer Locator 3. Link to country sites		22. Real time interactivity
	Price	4. Price		23. Use of audio
	Promotion	5. Advertisement 6. Sales Promotion 7. On-line Ordering 8. Market research 9. Customer support 10. Virtual Community 11. Customer feedback		24. Use of video
Other Commercial Features	12. Profile		Design Features	25. Use of frames
	13. Career*			26. Use of Flash*
	14. News and events			27. Site evaluation offer
	15. Legal notices*			28. Site map*
	16. Privacy statements*			29. External links
	17. Investor relations*			30. Internal links
	18. FAQs			31. Page size
	19. Contacts			32. Graphics size
	20. Links to e-markets or e-business sites			33. Background colour*
				34. Foreground colour*

(*Features considered by the authors)

Table-2 The List Of Features Adopted From Other Authors

Features	References
1.Links to brand sites/ Product page	[8], [15], [5], [6], [10], [4], [18].
2. Dealer locator	[8], [12], [4], [18].
3. Link to country sites	[8], [12] [4], [18].
4. Price	[4], [18].
5. Advertisement	[8], [12], [4], [18].
6. Sales promotion	[8], [15], [6], [18].
7. On-line ordering	[8], [15], [5], [6], [10], [4]
8. Market research	[8], [4]
9. Customer support	[5]
10. Virtual community	[1] [18]
11. Customer feedback	[5], [4]
12. Profile	[15], [5], [10]
13. News and events	[8], [15], [5]
14. FAQs	[15], [5]
15. Contacts	[5], [6]
16. Site search	[5], [9], [10] [18].
17. Real time interactivity	[5], [18].
18. Use of audio	[15], [5]
19. Use of video	[15], [5]
20. Use of frames	[15]
21. Site evaluation offer	[15], [5]
22. External links	[15], [5]
23. Internal links	[15], [5]
24. Page size	[15]
25. Graphics size	[15]
26. Electronics market	[3] [14]

Table3: Results of chi square test for all the features to show the design difference that exists among various categories of companies.

*p values are < 0.05 .

Features	Consumer durables (N=14)		Consumer non-durables (N=20)		Industrial products (N=21)		Services (N=22)		p value
	Yes	%	yes	%	yes	%	yes	%	
Commercial Features									
Link To Brand Sites/ Product List	14	100	17	85	20	95.2	21	95	0.3084
Price	13	92.9	6	30	1	4.76	18	82	0*
Dealer Locator	4	28.6	1	5	4	19	9	41	0.0465*
Link To Country Sites	14	100	4	20	8	38.1	4	18	0*
Advertisement	13	92.9	16	80	18	85.7	21	95	0.4164
Sales Promotion	4	28.6	3	15	0	0	12	55	0.0003*
Online Ordering	12	85.7	6	30	1	4.76	17	77	0*
Market Research	0	0	1	5	0	0	0	0	0.4093
Virtual Community	4	28.6	1	5	0	0	1	4.5	0.0133*
Customer Support	9	64.3	2	10	2	9.52	15	68	0*
Customer Feed Back	1	7.14	1	5	2	9.52	4	18	0.5252
Profile	14	100	19	95	21	100	22	100	0.4093
Career	12	85.7	15	75	16	76.2	19	86	0.7151
News & Events	11	78.6	18	90	19	90.5	19	86	0.7358
Legal Notice	4	28.6	6	30	8	38.1	7	32	0.9276
Privacy	11	78.6	7	35	8	38.1	16	73	0.009*
Investor Relation	9	64.3	18	90	20	95.2	11	50	0.0016*
FA Qs	2	14.3	5	25	2	9.52	3	14	0.5692
Contact	13	92.9	11	55	14	66.7	18	82	0.062
Link To E-Market/ E-Business sites	0	0	0	0	11	52.4	4	18	0*
Non-Commercial Features									
Site Search	11	78.6	14	70	19	90.5	15	68	0.3025
Real-time Interactivity	0	0	0	0	0	0	0	0	NA
Free Site Evaluation Offer	0	0	1	5	0	0	0	0	0.4093
Sitemap	4	28.6	13	65	7	33.3	9	41	0.1125
External Links	0	0	2	10	7	33.3	5	23	0.0561
Internal Links	14	100	20	100	21	100	22	100	NA
Audio	0	0	2	10	0	0	0	0	0.119
Video	0	0	1	5	1	4.76	0	0	0.6138
Frames	0	0	3	15	0	0	0	0	0.0307*
Flash	3	21.4	2	10	1	4.76	2	9.1	0.4593

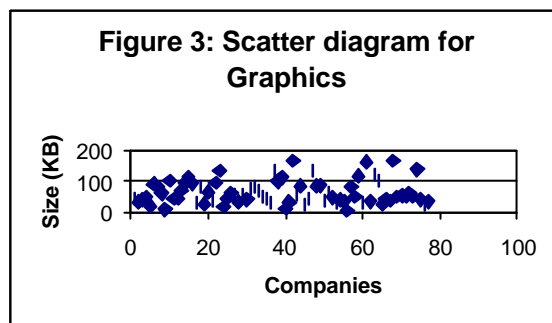
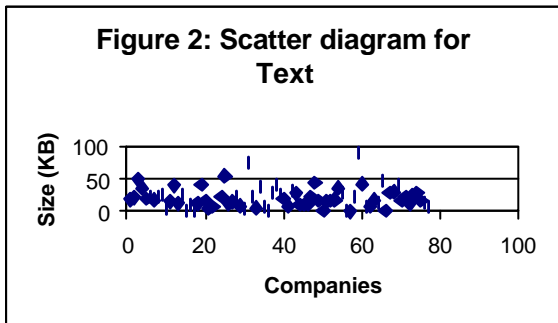
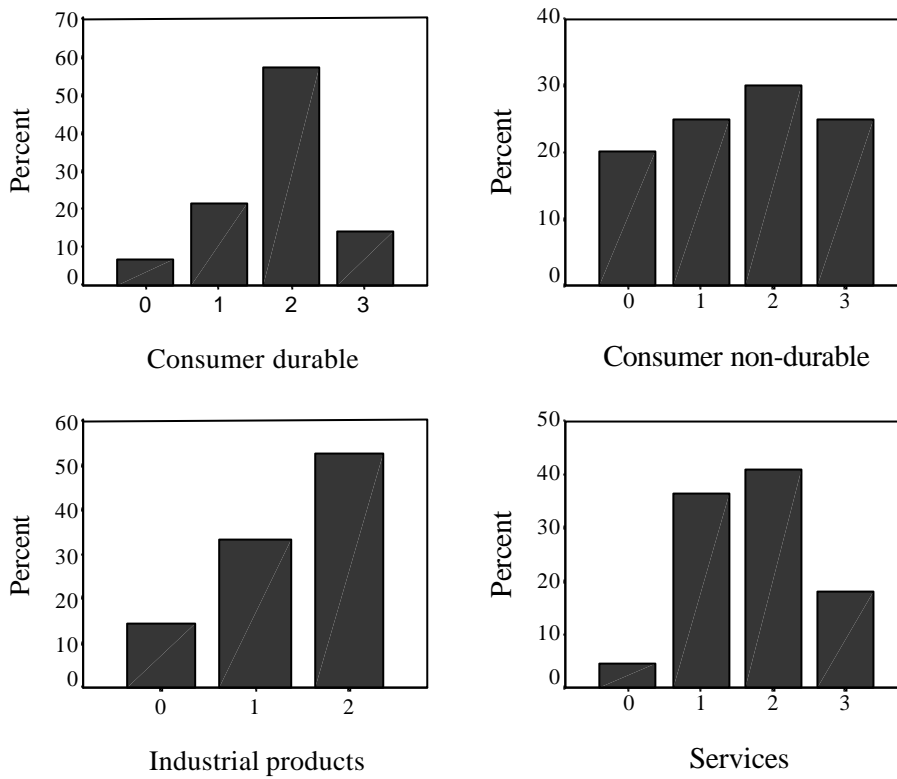
N indicates sub-samples size.

Yes indicates total number of samples having the feature in the specified category.

Table 4. Text and graphics in the home page

	mean	Standard deviation
Text (in KB)	21.7484	64.081
Graphics (in KB)	16.6183	38.027

Figure 1. Advertising pattern



We propose a weighting scheme to find the relative importance assigned to each feature by the US Fortune 500 companies. We calculate the weight of a feature by dividing the number of occurrences of that feature by sum of the number of occurrences of the entire set of features and multiplying by 100. For example, if feature 1 occurs in m companies and there are n such features then

$$\begin{aligned}
 & \text{Weight}_{\text{feature 1}} \\
 &= ((\text{occurrences of feature 1 in all Web sites}) / \\
 & \sum_{i=1}^n \text{Occurrences of feature } i \text{ in all the Web sites}) * 100 \\
 &= (m*100) / \sum_{i=1}^n \text{Occurrences of feature } i \text{ in all the Web sites)
 \end{aligned}$$

The procedure is repeated for all the categories. Table 5, 6, 7 and 8 gives the weights of each

commercial feature in each product category. Table 9 gives the weights for all the non-commercial features.

We use these weights to benchmark the design of a corporate Web site. Extracting its commercial and non-commercial features and adding the corresponding weights for features to get an overall score can evaluate the design of a corporate Web site.

Besides benchmarking we can also make certain other observations for various features from the study. For example, link to e-markets or e-business site of the company is a feature observed only in industrial products and services category. Profile and link to brand sites/product page is invariably the top priority features of all the categories. Price for industrial products is most often not displayed in the Net. But for consumer non-durable

companies no other category uses the Web as a tool for market research. Customer feedback is a low priority feature in all the sites though the contact information is of high priority. Thus the companies seem to assume that the contact address should be the same for all the purposes. Authors speculate that this type of approach will prevent the free movement of email to the concerned person in the company and will result in a delayed response to the to the customer or the perspective customer. Companies do not extensively use the features available for media richness. They might be avoiding such features for the fear of increased page upload time. Though some studies [15], [5] have highlighted the importance of the media richness using audio, video and graphics, the companies in our survey give least importance to these features. This may be to avoid the time delay and to decrease the network traffic.

Table 5

Consumer durables	
Features	Weight
Links brand sites or Product page.	8.537
Link to country sites	8.537
Profile	8.537
Price	7.927
Advertisement	7.927
Contact	7.927
Online ordering	7.317
Career	7.317
News & events	6.707
Privacy	6.707
Customer support	5.488
Investor relations	5.488
Dealer locator	2.439
Sales promotion	2.439
Virtual community	2.439
Legal notice	2.439
FAQs	1.22
Customer feed back	0.61
Market research	0
Link to e-market/ e-business	0
	100

Table 6

Consumer non-durables	
Features	Weight
Profile	12.1
Investor relations	11.46
News & events	11.46
Links brand sites or Product page.	10.83
Advertisement	10.19
Career	9.554
Contact	7.006
Privacy	4.459
Legal notice	3.822
Online ordering	3.822
Price	3.822
FAQs	3.185
Link to country sites	2.548
Sales promotion	1.911
Customer support	1.274
Customer feed back	0.637
Dealer locator	0.637
Market research	0.637
Virtual community	0.637
Link to e-market/ e-business	0
	100

A Feature-wise comparison of Indian Web sites with US Fortune 500 Web sites

In this section we compare the Web site features of Indian companies with those of Fortune 500 group of companies. Each comparison is a one-tailed test where we test the null hypothesis $p_0 = p_1$ against the alternate hypothesis $p_0 < p_1$ or $p_0 > p_1$ depending on the appropriate situation. Here p_i is the proportion of the Web sites containing a particular feature; $i=0$ for Fortune 500 group and $i=1$ for Indian companies. We say a feature to be under-stressed if $z > z_{0.05}$ and a feature to be over-stressed if $z < -z_{0.05}$ where $z_{0.05} = 1.64$. If a feature is found to be under-stressed, it means that the Indian Web sites tend to use this feature scarcely compared to their US counterparts. Similarly, an

over-stressed feature is an indication of its extensive use by the Indian Web sites.

We say, based on Table 3, that the commercial features of the Web sites are bound to vary depending on the types of the product. Thus we compare the commercial features of Indian and US Fortune 500 group of companies separately for each category. Table 10, 11, 12 and 13 give the results of test performed separately on each group. Table 14 gives the list of over-stressed and under-stressed features in each category. The e-commerce is in its infancy in India. This is evident from the fact that under-stressed features are more in each category than the over stressed-features. But the presence of over-stressed features might be either the indication of increased concern or an over enthusiasm on the part of the Indian Web site designers.

Table 7

Industrial products	
Features	Weight
Profile	12
Investor relation	11.43
Links brand sites or Product page.	11.43
News & events	10.86
Advertisement	10.29
Career	9.143
Contact	8
Link to e-market/ e-business	6.286
Legal notice	4.571
Link to country sites	4.571
Privacy	4.571
Dealer locator	2.286
Customer feed back	1.143
Customer support	1.143
FAQs	1.143
Online ordering	0.571
Price	0.571
Sales promotion	0
Market research	0
Virtual community	0
	100

Table 8

Services	
Features	Weights
Profile	9.129
Links brand sites or Product page.	8.714
Advertisement	8.714
Career	7.884
News & events	7.884
Price	7.469
Contact	7.469
Online ordering	7.054
Privacy	6.639
Customer support	6.224
Sales promotion	4.979
Investor relations	4.564
Dealer locator	3.734
Legal notice	2.905
Link to country sites	1.66
Customer feed back	1.66
Link to e-market/ e-business	1.66
FAQs	1.245
Virtual community	0.415
Market research	0
	100

Table 9

Non-commercial Features	wt
Site search	48.4
Sitemap	27
External links	11.5
Flash	6.56
Frames	2.46
Audio	1.64
Video	1.64
Free site evaluation offer	0.82
Real-time interactivity	0
	100

The non-commercial features of the Web sites are compared without any distinction on category basis. Table 15 gives the results of the test. Site search is found to be the only under-stressed feature and use of frames is found to be the only over stressed feature in the Indian Web sites. Table 16 gives the size of text and graphics in the home page for Indian companies. Compared with Table 4 one can see that the confidence interval for the population is 8.5 KB for an alpha value 0.05. This means Indian companies' Web sites contain more graphics than required, and the text size is much less in Indian Web sites. One can interpret from this that Indian companies put more stress on using graphics than having a richer text content. Assuming that amount of graphics increases the page upload time the, the data shows that Indian companies are not putting more stress on decreasing page upload time.

EVALUATION OF WEB SITES

We propose that by using the weights corresponding to the features present can do a overall design evaluation of any Web site. This

weighted sum, henceforth-called 'score' can serve as a benchmark to see where a Web site stands:

$$S = \sum_{i=1}^n w_i f_i$$

where, S is the score, n is the number of features, w_i is the weight assigned to feature i , $f_i = 1$ or 0 depending on the presence or absence of a feature i . S is to be calculated separately for commercial and non-commercial features of a company.

For example, the score of an Indian consumer durable product company Bajaj Auto Ltd (www.bajajauto.com) having the commercial features profile, advertisement, contact and investor relation, is 29.87. This score for a set of companies can be analyzed together to give a generalized picture of their Web site design. For example, Indian consumer durable product companies have a mean score of 46.5 and standard deviation 14.23. So we can say that consumer durable industry sector needs considerable improvement in their Web site design from commercial front.

Table 10. Comparison of consumer durable companies

	US Fortune 500 Companies (N=14)		Indian Companies (N=20)		z value
	yes	%	yes	%	
Link to brand sites/Product list	14	100	17	85	1.52
Price	13	92.86	5	25	3.9
Dealer locator	4	28.57	11	55	-1.53
Link to country sites	14	100	1	5	5.49
Advertisement	13	92.86	20	100	-1.21
Sales promotion	4	28.57	7	35	-0.39
Online ordering	12	85.71	5	25	3.48
Market research	0	0	0	0	
Virtual community	4	28.57	0	0	2.54
Customer support	9	64.29	6	30	1.98
Customer feed back	1	7.14	6	30	-1.62
Profile	14	100	19	95	0.85
Career	12	85.71	6	30	3.2
News & events	11	78.57	11	55	1.42
Legal notice	4	28.57	0	0	2.54
Privacy	11	78.57	0	0	4.82
Investor relation	9	64.29	8	40	1.39
FAQs	2	14.29	2	10	0.38
Contact	13	92.86	17	85	0.7
Link to e-markets/ e-business sites.	0	0	1	5	-0.85

Table 11. Comparison of consumer non-durable companies

	US Fortune 500 Companies (N=20)		Indian Companies (N=11)		z value
	yes	%	yes	%	
Link to brand sites/Product list	17	85	9	81.82	0.23
Price	6	30	1	9.09	1.33
Dealer locator	1	5	0	0	0.75
Link to country sites	4	20	0	0	1.59
Advertisement	16	80	10	90.91	-0.79
Sales promotion	3	15	1	9.09	0.47
Online ordering	6	30	1	9.09	1.33
Market research	1	5	0	0	0.75
Virtual community	1	5	2	18.18	-1.19
Customer support	2	10	1	9.09	0.08
Customer feed back	1	5	4	36.36	-2.27
Profile	19	95	11	100	-0.75
Career	15	75	4	36.36	2.11
News & events	18	90	8	72.73	1.25
Legal notice	6	30	0	0	2.02
Privacy	7	35	0	0	2.23
Investor relation	18	90	8	72.73	1.25
FAQs	5	25	1	9.09	1.07
Contact	11	55	9	81.82	-1.49
Link to e-markets/ e-business sites.	0	0	0	0	

Table 12. Comparison of industrial product companies

	US Fortune 500 Companies (N=21)		Indian companies (N=23)		z value
	yes	%	yes	%	
Link to brand sites/Product list	20	95.24	23	100	-1.06
Price	1	4.76	5	21.74	-1.64
Dealer locator	4	19.05	9	39.13	-1.46
Link to country sites	8	38.1	0	0	3.28
Advertisement	18	85.71	12	52.17	2.38
Sales promotion	0	0	1	4.35	-0.97
Online ordering	1	4.76	5	21.74	-1.64
Market research	0	0	0	0	
Virtual community	0	0	0	0	
Customer support	2	9.52	3	13.04	-0.37
Customer feed back	2	9.52	6	26.09	-1.42
Profile	21	100	22	95.65	0.97
Career	16	76.19	11	47.83	1.93
News & events	19	90.48	18	78.26	1.11
Legal notice	8	38.1	3	13.04	1.92
Privacy	8	38.1	0	0	3.27
Investor relation	20	95.24	14	60.87	2.72
FAQs	2	9.52	2	8.7	0.09
Contact	14	66.67	22	95.65	-2.49
Link to e-markets/ e-business sites.	11	52.38	4	17.39	2.45

Table 13. Comparison of service companies

	US Fortune 500 Companies (N=22)		Indian Companies (N=17)		z value
	yes	%	yes	%	
Link to brand sites/Product list	21	95.45	17	100	-0.89
Price	18	81.82	8	47.06	2.28
Dealer locator	9	40.91	9	52.94	-0.75
Link to country sites	4	18.18	1	5.88	1.14
Advertisement	21	95.45	13	76.47	1.76
Sales promotion	12	54.55	3	17.65	2.35
Online ordering	17	77.27	3	17.65	3.69
Market research	0	0	0	0	
Virtual community	1	4.55	0	0	0.89
Customer support	15	68.18	12	70.59	-0.16
Customer feed back	4	18.18	4	23.53	-0.41
Profile	22	100	17	100	
Career	19	86.36	2	11.76	4.63
News & events	19	86.36	15	88.24	-0.17
Legal notice	7	31.82	1	5.88	1.99
Privacy	16	72.73	0	0	4.58
Investor relation	11	50	8	47.06	0.18
FAQs	3	13.64	6	35.29	-1.59
Contact	18	81.82	16	94.12	-1.14
Link to e-markets/ e-business sites .	4	18.18	1	5.88	1.14

Table 14. Summary of the observations of Indian companies when compared with Fortune 500 group

Category of the Indian company	Over-stressed / Under-stressed features
Consumer Durables Companies	Under-stressed features: Price, Link to country sites, Online ordering, Online ordering, Customer support, Career, Legal notice, Privacy
Consumer Non-durable Companies	Over-stressed feature: Customer feed back Under-stressed features: Career, Legal notice, Privacy
Industrial Product Companies	Over-stressed feature: Price, Online Ordering, Contact Under-stressed features: Link to country sites, Advertisement, Career, Legal notice, Privacy, Investor relation, Link to e-markets/ e-business sites.
Service Companies.	Under-stressed features: Price, Sales promotion, Online Ordering, Career, Privacy

Table 15. Comparison of Non-Commercial Features Between Indian and Fortune 500 group.

Comparison of Non-Commercial features					
	Fortune 500 group		Indian companies		z value
	n (N=77)	%	n (N=71)	%	
Site search	59	76.62	20	28.17	5.9
realtime interactivity	0	0	2	2.82	-1.48
site evaluation offer	1	1.3	1	1.41	-0.06
Sitemap	33	42.86	38	53.52	-0.11
External links	14	18.18	13	18.31	-0.02
Audio	2	2.6	1	1.41	0.51
Video	2	2.6	4	5.63	-0.93
Frames	3	3.9	13	18.31	-2.82
Flash	8	10.34	4	5.63	1.06

Table 16. Text and graphics in the home page of Indian companies

	Mean	Standard deviation
Text (in KB)	11.3346	10.7513
Graphics (in KB)	74.023	54.939

CONCLUSION

The authors have surveyed the commercial and non-commercial features of Web sites of a sample of US Fortune 500 and derived the degree of importance (weights) they attach to each feature. The weighted sum of the features is a benchmark that can be used to evaluate a corporate Web site

design. We have also surveyed a sample of Indian corporate Web sites and evaluated some of them against the benchmark set.

The companies surveyed have been divided into four product categories: consumer durables, consumer non-durables, Industrial products and services. We have used various statistical tests to

highlight the differences/similarities existing between features of these categories. Once again we feel that this product category specific characteristic can be kept in mind while designing a new corporate Web site.

The study assumes that Fortune500 group as the most advanced group. Since the e-commerce is still in experimental stage by many companies, the way the features are used might not have been used properly by the companies. For example some of the sites changed their site structure when observed afterwards by the authors. Thus similar type of study needs to be performed to keep track of the recent trend. We have seen just the presence or absence of a particular feature. But the qualitative aspect of the feature is also required to give a fair judgment about the site.

Moreover the authors strongly feel the need of a standard for Web site design features depending on the specific use of a site. The feature name should

A third contribution of the present paper is the analysis done to highlight the significant differences that exists among Web site features of US Fortune 500 companies and top Indian corporates.

be standardized not to give a surprise to a visitor to discover two different features in the same name or same feature with different names. This will decrease the search time for a particular feature in any Web site. As observed by the authors, most of the companies maintain multiple sites for various reasons. Sometimes these sites are not mentioned in the main corporate site that authors feel is desirable.

The present study can be extended to know where the Web site stand after the score is known. This can be done by finding the maximum achievable score by any web site. The data can be further analyzed to find out the general scoring pattern of the US as well as Indian Web sites.

APPENDIX-1

List of companies along with their Web site addresses Samples from Top 200 of US Fortune 500

Fortune 500 rank	Company Name	Web site Address
197	Nike	www.nike.com
6	Intl. Business Machines	www.ibm.com
13	Hewlett-Packard	www.hp.com
20	Compaq Computer	www.compaq.com
56	Dell Computer	www.dell.com
87	Xerox	www.xerox.com
150	Sun Microsystems	www.sun.com
84	Microsoft	www.microsoft.com
195	Oracle	www.oracle.com
164	Whirlpool	www.whirlpoolcorp.com
1	General Motors	www.gm.com
4	Ford Motor	www.ford.com
140	Goodyear Tire & Rubber	www.goodyear.com
124	Eastman Kodak	www.kodak.com
76	PepsiCo	www.pepsico.com
83	Coca-Cola	www.cocacola.com

118	Coca-Cola Enterprises	www.cokecce.com
151	Anheuser-Busch	www.anheuser-busch.com
79	Sara Lee	www.saralee.com
120	Archer Daniels Midland	www.admworld.com
125	IBP	www.ibpinc.com
161	Farmland Industries	www.farmland.com
183	H.J. Heinz	www.heinz.com
172	Gillette	www.gillette.com
43	Johnson & Johnson	www.jni.com
107	Pfizer	www.pfizer.com
129	American Home Products	www.ahp.com
135	Abbott Laboratories	www.abbott.com
170	Eli Lilly	www.lilly.com
185	Schering-Plough	www.schering-plough.com
23	Procter & Gamble	www.pg.com
187	Colgate-Palmolive	www.colgate.com
155	R. J. Reynolds Tobacco	www.rjrt.com
9	Philip Morris	www.philipmoris.com
10	Boeing	www.boeing.com
52	Lockheed Martin	www.lockheedmartin.com
57	United Technologies	www.utc.com
65	Honeywell International	www.honeywell.com
82	Raytheon	www.raytheon.com
42	E.I. du Pont de Nemours	www.dupont.com
89	Dow Chemical	www.dow.com
167	Monsanto	www.monsanto.com
121	Emerson Electric	www.emersonelectric.com
37	Motorola	www.motorola.com
115	Halliburton	www.halliburton.com
61	International Paper	www.internationalpaper.com
145	Weyerhaeuser	www.weyerhaeuser.com
85	Caterpillar	www.CAT.com
106	Alcoa	www.alcoa.com
181	Illinois Tool Works	www.itwinc.com
108	Johnson Controls	www.johnsoncontrols.com
18	Enron	www.enron.com
112	Dynegy	www.dynegy.com
39	Intel	www.intel.com
180	Texas Instruments	www.ti.com
77	AMR	www.aa.com
63	AutoNation	corp.autonation.com
11	Bank of America Corp.	www.bankofamerica.com
5	General Electric	www.ge.com
45	Time Warner	www.timewarner.com
123	Winn-Dixie Stores	www.winn-dixie.com
132	McDonald's	www.mcdonalds.com
36	J.C. Penney	www.jcpenny.com
49	Aetna	www.aetna.com
200	Marriott International	www.marriott.com
194	Guardian Life Ins. Co. of America	www.glic.com

19	TIAA-CREF	www.tiaa-cref.org
111	Liberty Mutual Insurance Group	www.libertymutual.com
48	Prudential Ins. Co. of America	www.prudential.com
46	United Parcel Service	www.ups.com
22	Lucent Technologies	www.lucent.com
159	CSX	www.csx.com
29	Merrill Lynch	www.ml.com
109	Lowe's	www.lowes.com
8	AT&T	www.att.com
174	Manpower	www.manpower.com
100	Bergen Brunswig	www.bergenbrunswig.com

Samples from Top 200 of CMIE enlisted Indian companies

CMIE rank	Company Name	Web site address
54	Hindalco	www.adityabirla.com
161	Kirloskar Oil Engines Ltd.	www.kirloskars.com
15	Larsen & Toubro Ltd.	www.larsentoubro.com
7	Steel Authority of India Ltd.	www.sail.co.in
8	National Thermal Power Corporation Ltd.	www.ntpc.co.in
12	Bharat Heavy Electricals Ltd.	www.bhel.com
14	Tata Iron & Steel Co. Ltd.	www.tatasteel.com
19	TELCO	www.telcoindia.com
165	Ballarpur Industries Ltd.	www.biltpaper.com
52	Hindustan Aeronautics Ltd.	www.hal-india.com
57	Rashtriya Chemicals & Fertilizers Ltd.	www.rcfltd.com
59	Ashok Leyland Ltd.	www.ashokleyland.com
60	Sterlite Industries (India) Ltd.	www.sterlite.com
75	National Aluminium Co. Ltd.	www.nalcoindia.com
77	Crompton Greaves Ltd.	www.cglonline.com
89	Usha (India) Ltd.	www.ushasemi.com
92	Indo Rama Synthetics (India) Ltd.	www.indo-rama.net
6	Reliance Industries Ltd.	www.ril.com
24	Mahindra & Mahindra Ltd.	www.mahindraworld.com
103	Bharat Earth Movers Ltd.	www.bemlindia.com
107	Bharat Electronics Ltd.	www.bel-india.com
85	Hindustan Motors Ltd.	www.hmppd.com
132	H M T Ltd.	www.hmti.com
144	Bombay Dyeing & Mfg. Co. Ltd.	www.bombaydyeingindia.com
10	Maruti Udyog Ltd.	www.marutiudyog.com
73	Philips India Ltd.	www.philipsindia.com
29	Bajaj Auto Ltd.	www.bajajauto.com
155	Asian Paints (India) Ltd	www.asianpaints.com
46	Videocon International Ltd.	www.videoconinternational.com
51	M R F Ltd.	www.mrftyres.com
62	Century Textiles & Inds. Ltd.	www.centurytext.com
65	B P L Ltd.	www.digitalbpl.com
79	Hero Honda Motors Ltd.	www.herogroup.com/honda.htm
81	Indian Rayon & Inds. Ltd.	www.indianrayon.com
93	T V Sundram Iyengar & Sons Ltd	www.tvssuzuki.com

102	J K Industries Ltd.	www.iktyre.com
120	Apollo Tyres Ltd.	www.apollotyres.com
133	Arvind Mills Ltd.	www.arvindmills.com
139	Voltas Ltd.	www.voltasltd.com
157	Modi Rubber Ltd.	www.modigroup.com
170	Mafatlal Industries Ltd.	www.mafind.com
174	Godrej-Ge Appliances Ltd.	www.godrejappliances.com
177	Godrej & Boyce Mfg. Co. Ltd.	www.godrej.com
9	Hindustan Lever Ltd.	www.hll.com
11	I T C Ltd.	www.itc-ilttd.com
148	Dabur India Ltd.	www.dabur.com
152	Godrej Soaps Ltd.	www.godrejindia.com
74	Ruchi Soya Inds. Ltd.	www.ruchigroup.com
83	Nirma Ltd.	www.nirma.co.in
150	Mcdowell & Co. Ltd.	www.mcdowellindia.com
153	Glaxo India Ltd.	www.glaxowellcome.co.in
158	Tata Tea Ltd.	www.tatatea.com
176	Shaw Wallace & Co. Ltd.	www.shawwallace.com
187	Allanasons Ltd.	www.allana.com
56	indian railways	www.indianrailway.com
18	Videsh Sanchar Nigam Ltd	www.vsnl.net.in
13	Industrial Development Bank of India	www.idbi.com
16	I C I C I Ltd.	www.icici.com
20	Mahanagar Telephone Nigam Ltd	www.mtnl.net.in
25	Air India Ltd.	www.airindia.com
30	Indian Airlines Ltd.	indian-airlines.nic.in
42	Shipping Corporation of India	www.shipindia.com
69	Wipro Ltd.	www.wipro.com
70	South India Corpn. (Agencies) Ltd.	www.sical.com
71	Housing Development Finance Corpn.	www.hdfcindia.com
141	Great Eastern Shipping Co. Ltd.	www.greatship.com
142	Federal Bank Ltd.	www.federal-bank.com
146	H C L Infosystems Ltd.	www.hclinfosystems.com
162	Housing & Urban Development Corpn. Ltd.	www.hudcoindia.com
164	Ahmedabad Electricity Co. Ltd.	www.aecindia.com
172	Vysya Bank Ltd.	www.vysbank.com

APPENDIX-2

Definition of Features

- 1. Link to brand site/ product page :** The product description by any such means i.e static pages/ database search/ maintaining separate sites for individual brands.
- 2. Dealer locator :** The variable is true if the site shows the product description by any such means i.e static pages/ database search/ image maps.
- 3. Link to country sites :** Links to the sites of a corporate specifically dedicated for its operations in another country.
- 4. Price :** Availability of price information on the products and services offered by the company.
- 5. Advertisement :** Advertisement on companies own products and services.

- 6. Sales Promotion :** Any functionality to promote companies product / information on any type of sales promotion activity.
- 7. Online Ordering:** Facility to procure / order a product (service) online.
- 8. Market Research :** Any facility (questionnaire survey, opinion pole etc.) provided by the site to collect data for conducting market research.
- 9. Customer support :** Any facility provided by the company to help a customer to select a product/service.
- 10. Virtual community :** Any facility (discussion groups, user forum etc.) provided by the site to enable the customers to communicate with each other on the issues related to the products (services) offered by the company.
- 11. Customer Feedback :** Any facility (forms, email addresses specifically for the purpose of getting feedbacks and complaints) provided to the customers to put forward their views, complaints and suggestions on companies products and services.
- 12. Profile :** General information on company's history, performance and achievements.
- 13. News and events :** Information on current happenings and special events to take place in the near future.
- 14. Career :** Information on career opportunities and current job openings existing in the company.
- 15. Legal Notices :** Legal notices to the users of the Web site.
- 16. Privacy Statements :** Company's definition of privacy to be provided to the users of the Web site.
- 17. Investor Relations :** Information on company's financial statements, stock quotes etc.
- 18. FAQs :** List of frequently asked questions on companies products and services.
- 19. Contact :** The contact address of various key persons in the company.
- 20. Link to e markets/ e business sites :** Links to the company's site dedicated for e- business / links to some e markets or portal for the products/ services offered by the company.
- 21. Site Search :** Facility to search company's Web site for required information.
- 22. Real Time Interactivity :** Chat facility.
- 23. Use of Audio:** Presence of any audio files.
- 24. Use of Video :** Presence of any video files.
- 25. Use of frames :** Use of frames in the Web site to divide the user interface to multiple windows.
- 26. Use of Flash :** Use of flash software.
- 27. Site Evaluation Offer :** Any facility to get users feedback on Web sites design and facilities offered by the site.
- 28. Site Map:** A repository and categorization of the links present in the site.
- 29. External Link :** Links from the home page (index page) to the pages that are not the part of the concerned site.
- 30. Internal Links :** Links to the pages that belong to the concerned site.
- 31. Page Size :** The size in KB of the companies home page.
- 32. Graphics Size:** The size in KB of the graphics used in the home page.
- 33. Back-ground color:** Back ground color of the home page.
- 34. Fore ground color:** Text colour of the home page.

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