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Benchmarking the Complementary Features of Online Auction Sites – A Survey

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Abstract: The functionalities required for successful deployment and operation of online auction site can be broadly classified into two categories: *core features* and *complementary features*. Core features are essential for the existence of a site, whereas complementary features enhance a users experience with the site. Since a site has to have the core features, it is the complementary features that contribute to the popularity of the auction sites. We have conducted a survey of 100 auction sites to study 23 features. We found out the similarities among these sites based on their feature vectors. Three distinct groups are formed in the process. The groups are found to be distinct with respect to the core features. We also compared the complementary features of these sites. The results of the chi square tests revealed that the groups do differ with respect to most of these features. We propose a model to assign weights to the features distinctly for three auction site categories. Pareto analyses show important features that contribute to eighty percent of the weights in each group. We next define *Site Evaluation Index* based on these weights. The analysis shows that the sites with higher site evaluation index are indeed the popular ones, as per their ranking in the results of search engines. The highest scored sites can serve as a benchmark to choose the value adding complementary features to guide the upcoming auction sites.

I.   Introduction

Increasing participation of end-users in e-commerce has led to enormous popularity of online auctions. Online auctions present many interesting and challenging research issues from studying software architecture and security to understanding the user behavior on the auction Web sites.

In this paper we focus on the functionalities required for successful deployment and operation of online auction sites. Such functionalities for features can be broadly classified into two categories: *core features* and *complementary features*. Core features are essential for the existence of a site. Besides having these features the auction sites also provide many complementary features to enhance users experience with the site. Today, there are hundreds of Web sites dedicated to online auctions. But not all the sites are as popular as that of eBay or uBid. It is interesting to study what features make a site successful. Since a site has to have

the core features, it is likely that the presence or absence of complementary features contributes to the popularity of the auction sites. Our study explores this issue by surveying the complementary features of 100 auction sites.

The rest of the paper is organized as follows. In the next section we present a brief review of the related work. We then describe our survey followed by results and conclusions.

II.   Related Work

Online auctions are a blend of technology and tradition, Bapna, *et al.*[2] are of the view that, auctions are as modern as today's technology, yet as old as mankind. Unlike traditional auctions that were limited in scope, online auctions have brought this mechanism to masses. Almost all the traditional auction models have been implemented on the Internet. As identified by Dans [6], 11 different auction models were found to be in use. These include traditional formats like English and Dutch auctions or their variants like Japanese and Yankee auctions. Lucking-Reiley [10] classified auction formats into four major categories: English, Dutch, sealed-bid, and double auctions. He identified various formats in these four categories, for example in sealed-bid auction he found two formats, first price and second price.

The segment benefiting most from online auctions is the business sector. There are three major business models prevalent on the Internet that are used in auction: B2B, B2C and C2C. The most common of these as stated by Dans [6] and Lucking-Reiley [10] also had similar observation. A report by Forrester Research [10] shows that B2B segment underwent "triple digit growth" during 1998 - 2002According to Parente *et al.* [11] B2B online auctions totaled $109 billion worth of transactions in 1999 alone and that number was expected to grow to $2.7 trillion by 2004. This shows the growth and evolution of Internet auctions from plain C2C format to a sophisticated format enabling business to achieve new levels of efficiency. . A new trend in business models was identified by Bapna *et al.* [2], as a C2B model for an auction Web sites called *Priceline.com,* which collects information from customers and provides it to companies.

Unlike traditional auctions, online auctions allow users to sell almost any product or service they want. From collectibles to latest brand new products users of online auctions are selling everything. Bapna *et al.* [2] states that

eBay sells goods in over 18,000 categories and sub-categories. Beam and Segev [4] identified that nearly 26% of goods auctioned on the internet are "non-physical" goods, consisting of some kind of software or information. This shows how the Internet has affected the auctions and giving users capacity to put a price on their knowledge also.

Security is a very important factor which must be considered while participating in online auctions. Beam and Segev [4] especially studied security in online auction Web sites and state that only 27% of auction Web sites offered secure transfer of user's information and only half of these Web sites mentioned security issues on their Web sites and some Web sites offered users to give their credit-card information over fax or telephone. According to Wareham and Cecil [14] auction frauds represent the biggest form of online frauds. Curry [5] identifies more than 13 forms of frauds that take place in auctions online. Bajari and Hortacsu [1] discuss how Web sites can help in reducing online frauds and what measures are currently taken by the Web sites.

EBay is the most popular online auction Web site. According to Beam and Segev [4], eBay accounts for nearly 70% of online auctions in C2C category. Considering the large size of this Web site, studying how eBay operates and how auctions take place on eBay is a topic of interest for many researchers. Since eBay makes its auction data available online for about 30 days after the auction has closed, it makes it easier for researchers to get precise data about user behavior in online auctions. Shah *et al.* [12] study how eBay accepts bids from its users and how users engage in shill bidding and methods to identify shill bidding. Shumeli and Jank [13] developed a tool STAT-zoom to understand how eBay operates.

Wellman and Wurman [15] target the processing of huge amount of information on auction Web sites and how to synchronize the data processing. Kumar and Feldman [9] address the issue of designing a secure and easy to use auction Web site. They have developed a generic software model that can be used in many situations for any auction format. Huhns and Vidal [7] address the issue of agents and advocate the use of standard XML based protocols to allow better use of agents. Wurman [16] discusses the issues related to the temporal and data intensive behavior of the auction system that a developer or an auction service provider must consider. He says that though all the auction system provide same core functionality of bid processing, they differ widely in providing complementary features, which requires a very flexible system.

Dans [6] surveyed over 300 auction Web sites in 1998 to identify the auction and business models used. A similar survey was conducted by Lucking-Reiley [10]. Using 142 Web sites, he studied the economic features like the value of goods sold on a particular Web site, presenting an economist's view on auctions. He also studied eBay and compared it to new auction Web sites, Yahoo and Amazon. To find the current state and changes in online auctions Beam and Segev [4] surveyed 100 Web sites to identify current practices, new trends and business models in online

auctions. Barnes and Vidgen [3] assessed the quality of four popular Web sites based on its customer's survey. They developed WebQual a tool for assessing the quality of internet sites.

III. THE SURVEY

The survey covered 100 auction Web sites operating on the Internet and studied 23 core and complementary features of these Web sites. The aim of the survey is to understand the current state of online auctions, studying the features and services provided by the auction Web sites. The survey was done during January and February 2005.

III. 1   Selection of the Sample

The sample was selected using Google (*www.google.com*), Yahoo (*www.yahoo.com*), Khoj (*www.khoj.com*) and Rediff (*www.rediff.com*) search engines and auction site listings at Rediff and *www. internetauctionlist.com.* Rediff and Khoj were used for selecting Indian Web sites. Google and Yahoo search engines were used for searching for other Web sites. Internetauctionlist.com lists all the auction Web sites around the world, both traditional and online. Since all the references considered for this work, surveyed almost similar number of Web sites, the sample size selected for this work is considered reasonable. The overall sample demography consists of 11 Indian Web sites, 2 Canadian Web sites, 7 European Web sites, 2 Japanese Web sites and rest are from US. The names of the Web sites have been provided in Appendix B.

While selecting the sample it was found that though there are many auction Web sites that have been included in auction listings and search results, some of these Web sites no longer operate. In some cases as many as 60% of the links were false. When some of the links given by Lucking-Reiley in 1998 [10] were checked they were not working properly. Hence it can be said that most of the Web sites that are not popular, last only for few years. In our survey also 100 Web sites were found fully functional after considering all the possible sources of information. Beams and Segev [4] had a similar result, when they say that nearly 31% of the auction Web sites they surveyed were less than a year old, 27% were less than two years old and the rest 39% were more than three years old.

Online auctioning segment is dominated by some popular Web sites. When selecting the sample it was found that many Web sites use the resources of the popular auction Web sites to conduct auctions for them. For example, *www.artstall.com* redirects to the arts section of *www.baazee.com.* Air Sahara uses *www.indiatimes.com* to conduct its auction for airline tickets. These few popular Web sites have multiple domain names registered with them, for example, two domain names that lead to Baazee.com are *www.baazee.com* and *www.bidorbuyindia.com.* So, even though there are many domain names and search results that show up while searching for online auctions, the segment is

actually dominated by few popular Web sites.

Finding 100 auction Web sites proved to be more time consuming than expected because the search results and Web site listings include a lot of Web sites of offline auctioneers. These Web sites do not host any auctions   and were simple Web sites for traditional auction houses. So, even though all the auctioning is not done through Internet, traditional auctioneers do realize the power of Internet, and feel the need for online presence. Sotheby's , which is the second largest auction house in the US realized the threat that auction Web sites pose to them and declared that they too will be expanding into the Internet domain. In the survey *www.teletrade.com* is a Web site which engages in both online as well as offline auctioning.

III. 2   Selection of features

The selected Web sites were studied for various core and complementary features. The survey of the literature helped in identifying four core features and nine complementary features. They are listed in Table 1. EBay, [18] being the most popular site and the choice for many such studies was used as a representative Web site to select one more core feature and nine other complementary features. Thus a total of 23 features were studied. Appendix A gives the list and descriptions of all core and complementary features. Most of the features were checked for their presence and absence only, marked by 1 and 0 respectively. However, features like, business models, auction format, phases of auction, payment methods, scripting language were marked for each category in these features. Text-graphics ratio was approximated for each Web site based on the design of its home page.

Table 1: Feature References

Core features	
1.	Business models: B2B, B2C, C2C [6]
2.	Auction formats: English, Dutch, Buy-it-now, Sealed bid, Reverse [6]
3.	Number of products categories [4]
4.	Payment options [16]
Complementary features	
5.	Faulty user identification [16]
6.	Seller's ranking [16]
7.	Search facility [8][16]
8.	Advertisements [8]
9.	Career oriented services [8]
10.	Auction update notification [16]
11.	Text-graphics ratio [8]
12.	Security [7]
13.	Sitemap [8]

III. 3   Collection of Data

All the Web sites were visited and scanned for relevant data. Particularly Home page, Help and support pages, Site map, and Registration page for both seller and buyer along with few other pages provided most of the information needed. In most of the cases homepages provided information for the features like, faulty bidder/seller identification, search facility, advertisements, career oriented services, links to other sites, help and support, customer feedback forum, language customization, sitemap, other services, customer counter, book marking, scripting language and text to graphics ratio. Help and support pages provided information for business models followed, auction formats used, payment method available. Site map was used for finding broadly what categories of products were auctioned on the Web site. To get information about newsletter and auction update notification, registration pages for both buyers and sellers were visited. Besides this, a few auction pages were visited to know about shopping basket and phases of auction.

IV.   Results

This section is divided into five subsections. We first present observations based on each feature. We then perform a cluster analysis and group the Web sites followed by across group comparison of complementary features. We then present the benchmarks for complementary features.

Feature-wise Observation

Business models: The distribution of the business models were 19%, 62%, and 58% respectively for B2B, B2C and C2C. B2C and C2C dominate the auction segment. There is a very high percentage of overlap between these two categories. In B2C model Web sites that sell their own products and/or allow other businesses to use their site to auction their products are included.

Auction formats: In the survey, 6 popular models (English, Dutch, Yankee, Buy-it-now, Sealed bid and Reverse) were searched for in the Web sites. The distribution of these models is: 90% English, 78 % Dutch, 72% Buy-it-now, 2% Sealed bid, 2% Yankee and 16% Reverse auction. English auction is found to be the most popular format, followed by Dutch and Buy-it-now auctions.

Categories of products: For the purpose of surveying the products were divided into 18 broad categories. Most of the Web sites offered products from multiple categories. However, a few Web sites auctioned items from a single category (e.g. *auction.newline.com*). The divisions of Web sites according to the number of product categories they offer are: 1 category 33%, 2 to 5 categories 37%, and more than 5 categories 30% of the sample.

Payment methods: The B2C and C2C auction Web sites are just a medium for hosting Web sites. These Web sites do not sell their own items to the users. Hence, these Web sites only facilitate item and money transfer between the bidders and the sellers. For this purpose almost all the B2C and C2C Web sites use Pay Pal service. Web sites give sellers option to select the payment options they are comfortable with. These options include money orders, cheques, bank drafts etc. In this case Web sites do not have any role to play. In case of B2B Web sites and B2C Web sites that sell their own

products, credit cards are the most used form of payment.

Phases of auction: Online auction proceeds through four phases, namely, Registration, Bidding, Payment, and Dispute handling. All the Web sites surveyed follow the above sequence of phases.

Seller's rating and faulty user identification: Auction Web sites collect user feedback based on their interaction with the sellers on their Web sites as a mechanism to prevent frauds. This feature is limited to C2C Web sites primarily and B2C Web sites that allow other businesses to sell on their sites. 79 Web sites are found to offer this feature. When customers deal with a direct seller site such as Onsale or uBid, they do not have to worry about fraud because they are buying directly from the auctioneer.

Shopping basket and search facility: Among the Web sites surveyed 79 sites had shopping basket feature. Almost all the Web sites had search facility.

Advertisements and career oriented services: Revenues for any e-commerce Web sites not only come from the product they are selling but also from advertisements. In the survey, 35 Web sites had advertisements. Only the homepage of the Web sites were used to judge this feature. Most of the Web sites that had this feature were C2C and B2C. The auction sites use their Web sites as a medium to advertise the job openings they may be having. It was found that only 12 Web sites advertised their job postings on their sites. These few Web sites are among the most popular auction sites. These include eBay, Onsale and Baazee.

Links to other sites and other services: Some auction houses have multiple Web sites. For example, eBay has more than one Web site. Apart from one, other eBay Web sites are dedicated to a single product category like auto auctions. In the survey 11 Web sites were identified that had multiple Web sites. 21 Web sites are not dedicated to auctioning alone. They are offering other services like email, news, shopping etc. Some of these Web sites are *auctions.yahoo.com* and *auctions.indiatimes.com*.

Newsletter and auction update notification: Almost all the popular Web sites had a newsletter that they circulate among its users. To check the presence of this feature Web site's registration pages were checked. Usually Web sites ask the user's preference to subscribe to a newsletter. Auction update notification means that Web sites inform the users about the updates that have taken place in the auction they are participating. For this purpose Web sites collect user's email address. All the Web sites in the survey notified users about the updates via email.

Help & support and sitemap: Almost all the Web sites had some sort of help pages, but the quality information varied widely between big and small Web sites. This could be one of the reasons why a few Web are more popular than others. Sitemap was found to be present in all the sites.

Feedback forum and book marking: B2C Web sites have a large number of customers across globe. To get feedback from them and to keep users hooked to their sites, they provide discussion forums as an additional feature. Web sites also provide link that allow users to book mark their site

easily for future use. In the survey, 14 Web sites had users' discussion forum. Most of these 14 Web sites were popular Web sites like eBay, Yahoo and indiatimes. The book-marking feature was provided by 16 Web sites.

Language customization: The European Web sites that were surveyed provided this feature. These Web sites could be seen in almost all European languages. None of the other Web sites had this facility. This may be probably because the European languages are very much similar in writing, they use the same script so programs can be easily written that translate one language to other.

Scripting language and text-graphics ratio: This feature was studied to study what scripting languages are used by the auction Web sites. Five different languages were taken and their use in the auction sites was measured. The distribution of sites according to the scripting language is: 46% use ASP, 23% use PHP, and 31% use JSP, CGI and Cold-fusion. Text to graphics ratio was measured to know the level of usage of graphics in the Web sites. It was a general observation that popular Web sites like eBay and Onsale used much more images and graphics in their Web sites as compared to other Web sites.

Security: There are various aspects of security that Web sites must take care of, to protect their users. In this survey Web sites SSL security was studied. Among the Web sites studied 69% had SSL security. All the Web sites that had SSL security were using to encrypt only user sensitive information, but *www.ebidderz.com* is fully SSL secured. So, even when a user is simply browsing the Web sites he can be sure that he is visiting a secured Web site. In contrast Segev and Beams [4] reported that in 1998, only 27% of auction Web sites had this security feature. This clearly shows an increased concern among the Web sites to safeguard their user's sensitive information.

Grouping the Web sites

To further study and analyze the Web sites features we try classify them based on certain characteristic(s). But it was found that the Web sites were overlapping in many features, hence, it was not possible to divide Web sites into groups by considering differences only in a few features. To solve this problem we performed a cluster analysis of all the 100 Web sites.

All the Web site features except number of product categories, phases of auction, help & support, search facility, scripting language and text-graphics ratio were used in clustering the Web sites. These features were not used because either they were similar in all the Web sites, like phases of auctioning, help & support and search facility, or they were not measured in a 0/1 scale such as number of product categories, scripting language used and text-graphics ratio. Based on cluster analysis, three groups were identified. The distribution of Web sites in three groups is: Group 1 consists of 32 Web sites, Group 2 of 29 Web sites and Group 3 consists of 39 Web sites (Appendix B). Figures 1, 2, and 3 show the distinct characteristics of the groups based on three core features: Business Model, Auction

Model, and Payment Methods respectively. Figure 1 shows that the dominant models of Group 1, 2 and 3 are B2C, B2B and C2C respectively. These sites also support other business models to enhance their functionality For example, a site in group 3 may adopt a B2B model to operate its supply chain while at the same time may directly interact with the end users by adopting a B2C model. Figure 2 shows the difference between websites based on the number of product categories they auction. For example Figure 2.b shows Group 2 sites, dominant in B2B model offer fewer product categories compared to other two groups. It is natural for single businesses to have limited product offerings compared to the market places with multiple buyers and sellers (B2C and C2C sites). Figure 3 (*Key:* On Pay: Online payment option, Off Pay: Offline payment option, No Opt: No payment option) shows only some of the B2B sites have nonpayment options. This may be due to the fact that some businesses might be continuing with the traditional mode of payment with their existing business partners. Appendix C shows examples of some interesting sites in each group with unique features.

Across group Comparison of Complementary Features

The previous analysis shows the differences and similarities that exist among the Web on the basis of their core features. We use chi-squared test to study complementary features. The features, scripting language and text-graphics ratio were however excluded, since they are measured differently,. Table 2 gives the p values for the chi-square test. We test the Null hypothesis that *the proportion of Web sites having a particular feature is equal in all three groups* against the alternative hypothesis that *at least two of them are not equal*. Asterisk (*) marked cell entries indicate the features in which the three groups differ. The difference in features like services, career and advertisements can be attributed to the different business models that the groups follow. For example, in case of services, group 1 and 2, the groups dominant in B2C and B2B models, have the highest percentages of Web sites offering services other than auction. These services included Web site hosting service as in *www.afternic.com* or email services from *www.indiatimes.com*. Only Web sites that cater to Businesses or are dependent on businesses for their products offer these services. C2C Web sites (group 3) have the least number of Web sites offering other services. Features like seller's ranking, newsletter and users' forum are different because of the customers the Web sites cater to. For example, in case of seller's ranking B2B Web sites in group 2 offers the least number of Web sites having this feature, probably because the users of these Web sites are authenticated before they participate in auctions on these Web sites. B2C Web sites have a large number of users, so to keep the users hooked to their Web sites; they provide features like newsletter and forum. Other feature in which the Web sites differ is the links to other Web sites feature. This is so because of the fact that group 1, which has the

highest number of Web sites having this feature, contains many popular Web sites, like *eBay* and *yahoo*. These popular Web sites have specialized Web sites devoted to a product category or a separate Web site for other country.

<u>Relative Importance of Complementary Features</u>

We define relative importance of the complementary features in each group by associating weights. The weights are defined as follows:

$$w_i = \frac{NOF_i}{OF} \times 100$$

For $i = 1, 2\ldots 16$

where,
w_i is the weight assigned to a feature i,
NOF_i is the number of occurrences of a feature i in all Web sites of the group, and
OF is the number of occurrences of all features in the group

Table 3 gives the weights for complementary features in the three groups. It also the ranks of these features based on their weights.

Pareto Analysis of Feature Weights

Pareto Analyses, presented in Table 4, identifies the features that add up to 80% of the weight in each group. These features are shown in *italic*. It can be seen that many of the features are common in the three groups. Common features are: help & support, search facility, seller's ranking, shopping basket, auction update, security and sitemap.

Benchmarking the Complementary Features

In order to have a benchmark for complementary features, we first find out the *Site Evaluation Index, SEI,* (defined later) of all the Web site. The sites with highest SEI can serve as Benchmarks. Based on this benchmark we evaluate the design characteristics of the 11 Indian auction sites.

<u>Finding the Site Evaluation Index</u>

$$SEI = \sum_{i=0}^{16} w_i \times f_i$$

where w_i is the feature weight in a particular group and
f_i is 1 or 0 according to presence/absence of the feature

Based on this index the Figure 4 gives the distribution of sites in the groups. Table 5 gives the maximum, minimum and the average values of the evaluation index.

In many cases sites with high value of SEI are popular sites on the Internet. Though there is no direct proof for this statement, here we cite some resources that support it. EBay the world's most used online auction website ,recently completed its 10 years of existence. On this occasion many of the world's leading news-sites wrote articles. BBC has

written an article titled "eBay's 10-year rise to world fame" [19]. Similarly, Indiatimes, which has a high score among the Indian sites (SEI 86), is the most popular Indian site as per a US-based market research firm, Ranking.com [20]. Superbrands India Ltd. rated Indiatimes as among the 60 business superbrands [21]. Bidz.com which has a high SEI (96), is a leading online auctioneer of jewelry, art and collectibles according to Market Wire, a leading company news distribution company [22]. CQout.com is the UK's second largest auction site in terms of sales and has a high SEI (92) [23]. Indiamart, India's leading B2B marketplace was featured on CNBC as analysed by McKinsey & Company, as a successful online business model that survived the dotcom bust during 1999-2001, has an SEI of 86 [23]. Other than news sources search engines also provide certain measure of the web site's popularity. Today search engines use advanced techniques to analyse the importance of a web site, with reference to the search query. When Google.com is searched for "online auction" or "auction" keywords, the first 10 results that are displayed include eBay, ubid (SEI 94), Yahoo auctions (SEI 84), QXL (SEI 95) and Cqout (SEI 90). All these auction web sites have a very high SEI in our analysis as indicated in the parenthesis. Similar effect has been observed with other leading search services like Yahoo and MSN.

Where do Indian auction sites stand?

Table 6 gives the score of Indian Web sites in all the groups. It can be seen that Indian B2C-C2C sites (*www.bazee.com* and *auctions.indiatimes*.com) present in Group 1 have a very high score compared to B2B sites in other groups, which have scores less than their respective group's average score. Indian B2C-C2C sites are very feature rich, compared to other Indian Web sites. Only one Indian B2B Web site has a very high score. This Web site offers auctioning surplus inventory (*auction.indiamart.com).*

V.   Conclusions

In this work we broadly classify the functionalities of online auction sites as core and complementary features. We conduct a survey to study the existence of these features on a set of 100 online auction sites. We applied a clustering technique to group the sites into three groups which are distinct in most functional and complementary features. We describe a scheme to assign importance weights to the complementary features in the three groups. It is found that the new featured considered by us   (Table 1 and Appendix A) like help and support, shopping basket etc. are among the important ones. We propose a model to evaluate web sites based on these feature weights.   We provide some anecdotal evidences to show that the sites with very high site evaluation (SEI) are indeed the popular ones. Therefore we conclude that the proposed model can be used as a benchmark to evaluate the functionalities of online auction site.

Auction Web site Features
Core features
1.   Business model
   1.   **B2B:** they target business customers instead of individual consumers.
   2.   **B2C:** These are sites that either offer their products to consumers, or act as intermediary between merchants and consumers.
   3.   **C2C:** This is also known as person-to-person. The auction site acts as an intermediary.
2.   Auction formats
   1.   English: Bidders offer increasing price, aware of previous bids
   2.   Dutch (multiple unit auction): More than one similar items being auctioned. Bidders bid for one or more units, usually more than one winner.
   3.   Buy-it-now: Seller specifies a minimum price. Any bidder offering to pay that price wins.
   4.   Sealed bid: Bidders submit bids unaware of other bids
   5.   Yankee: Similar to Dutch, difference is in Dutch winner(s) pay the lowest winning price, but in Yankee, winner(s) pay what they bid for.
   6.   Reverse: Demand comes from the buyers, and sellers bid their price.
3.   Number of product categories: number of categories in which Web site had divided the product it was auctioning
4.   Payment options
   1.   Online payment: PayPal, credit card and online money transfer.
   2.   Offline payment: cheques, money orders, cash.
   3.   No payment option
5.   Phases of auction
   1.   Register-Bid-Pay-Dispute sequence of events.

Complementary features
6.   Faulty user identification: Warning users about faulty users on the web site.
7.   Seller's ranking: Auction Web sites collect users feedback based on their interaction with the sellers on their Web sites. On the basis of this feedback Web sites rate the sellers, so that other bidders can get information about the sellers.
8.   Shopping basket: In order to help bidders keep track of their bids Web sites have a feature called shopping basket. Using this feature bidder can track items without even bidding for them.
9.   Search facility: facility to search the Web site
10. Advertisements: advertisements of other companies or Web site's own services.
11. Career oriented services: information on career opportunities and current job openings
12. Links to other sites: links to country sites or sites dedicated to a special product category

13. Help and support: help content for users to make full use of the Web site
14. Newsletter: circulating newsletter among registered users, containing current happenings on the Web site
15. Auction update notification: Notifying users with update about the auctions in which they are participating
16. Customer feedback forum: forum for users' to discuss the Web site
17. Language customization: facility to view Web site in other language
18. Sitemap: categorization of Web site links
19. Other services: services other than auction, being offered by the Web site
20. Book marking: facility allowing users to book mark the Web site for future use
21. Security: use of SSL security by the Web site
22. Scripting language: the language used by the Web site for programming
    1. ASP
    2. PHP
    3. Other (JSP, CGI etc.)
23. Text-graphics ratio: approximate ratio of text-graphics as they appear on Web sites home page

Appendix B

Group 1
www.bazee.com
auction.indiatimes.com
www.ebay.com
auction.yahoo.com
www.onsale.com
www.ubid.com
www.livetoplay.com
www.aquaauction.com
auctions.amazon.com
www.quicklysell.com
www.backbayauctions.com
www.thefreeauction.com
www.childrenbookmart.com /auction/auction.asp
www.auction4acause.com
www.cqout.com
www.qxl.com
www.buyselltrades.com
www.u-1.ca
www.eurobid.com
www.jamesjreeves.com
www.justbeads.com
www.qxlsmartbid.com
www.ebid.com
www.teletrade.com

www.interauct.com.sg
www.bidmonkey.com
www.buysellit.com
www.bidway.com
www.canadabids.com
www.auctionarms.com
www.alpaca.com
www.ducks.org/auction

Group2
www.auctionfire.com
www.sportsauction.com
www.winebid.com
www.travelbids.com
www.matexnet.com
www.beatlebids.com
www.everypart.com
www.auctionindia.com
www.machinetools.com/mt
www.assetline.com
www.afternic.com
www.sellxs.com
www.bid4indianart.com
auction.indiamart.com
www.patentauction.com
auctions.samsclub.com
www.playle.com
www.auctionzone.co.uk
www.gsemarket.com
www.indiaelectricmarket.com
www.dovebid.com
www.ecazoo.com/default1.asp
www.bidvantage.com
www.itauctions.co.uk
auction.newline.com
www.japankoionline.com
www.golfclubexchange.com
auctions.fairmarket.com
www.fastparts.com

Group3
www.bidz.com
www.first-auction.com
www.bidnow.com
www.auction.com
www.7bids.com
www.auctionwin.com
www.theknifeauction.com
www.esiliconworld.com

www.itnation.com
www.ubidfast.com
www.biddersnsellers.com
www.onlineauction.com
www.stamphead.com
www.bidnation.com
www.relicauction.com
www.Friday-auction.com
www.teletradeauction.com
www.componentbazaar.com
www.bid4assets.com
www.bidshot.com
www.stampfair.com
www.eggbid.com
www.indiaenterprise.com /auctionindex.html
www.baymore.com
www.bidera.com
www.erock.net
www.snatchit.com
www.labx.com
www.allcruiseauction.com
www.buyitmall.com
www.creativeauction.com
www.online-equine.com
www.bullnet.co.uk/auctions
www.bestofferauction.com
www.ebidderz.com
www.ticket-auction.net
www.bidville.com
www.melonbones.com
www.bestfares.com

Appendix C

Examples of Web sites

There are thousands of Web sites on the Internet. Hence it is very important for a Web site to have some distinguishing features, which make it stand apart from the crowd, and attract customers. In all the three groups that were formed, such features were observed. Here is a list of Web sites from each group along with the special features they have.

- **Group 1**
  1. *http://www.auctions4acause.com*: auctions for charity, auctioning brand new items
  2. *http://www.qxlsmartbid.com*: uses a new auction format, with multiple sealed bids, where highest (or lowest) unique bid wins
  3. *http://www.bidway.com*: uses less commonly used Vickery auction format
  4. *http://auction.indiatimes.com*: popular Indian auction Web site, many big businesses, like *Air*

Sahara and *Philips*, use it to auction their products, like in this case airline tickets and electronic goods

- **Group 2**
  1. *http://www.winebid.com*: allows a seller to offer its products in a "parcel" which may comprise several lots of wine
  2. *http://www.patentauction.com*: auctions patents, only Web site found with this product category listed separately
  3. *http://www.golfclubexchange.com*: offers users 48 hours inspection period for the products they have won before they pay for it
  4. *http://auction.newline.com*: auctions items used by actors in Newline Cinema films

- **Group 3**
  1. *http://www.eggbid.com*: provides a separate page warning users about spam which contains Web site's name
  2. *http://www.bidshot.com*: first m-commerce enabled Web site
  3. *http://www.baymore.com*: enables users to organize private auctions, where only bidders submit bids by invitation through the seller
  4. *http://www.ebidderz.com*: the whole Web site uses SSL security, thus protecting user's privacy

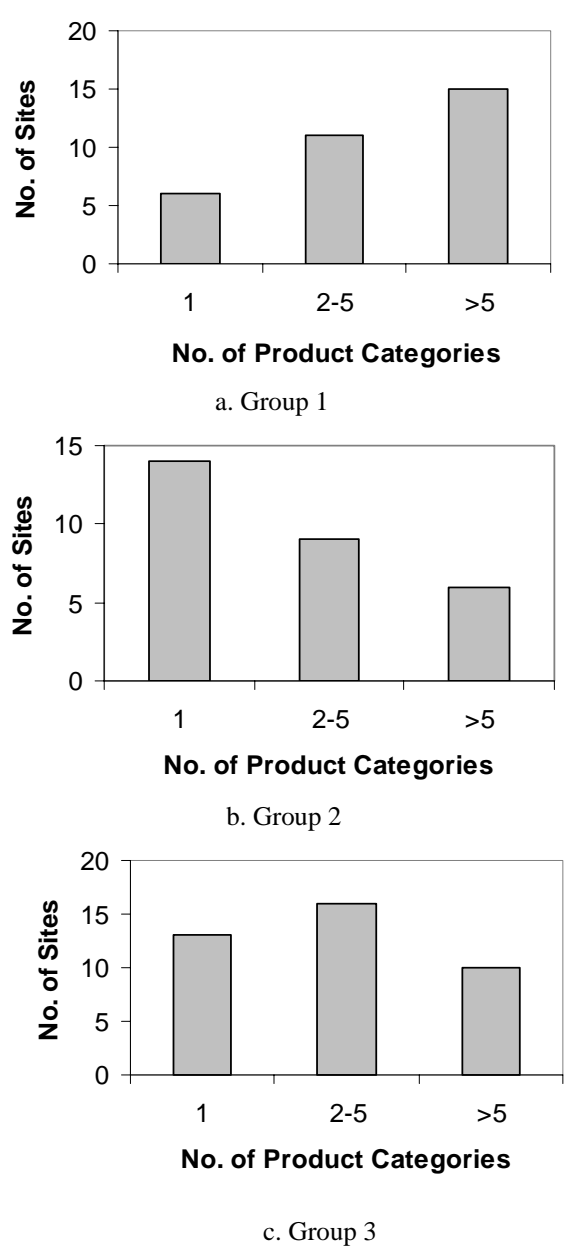## References

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Web sites

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[21] News article about indiatimes among 60 superbrands http://economictimes.indiatimes.com/articleshow/1225415.cms

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[23] Cqout.com information page about the position of company in the UK auction market: http://www.cqout.com/press.asp

[24] Indiamart new article about the analysis done by McKinsey and Co. on their business model: http://www.indiamart.com/press-section/mediasays/cnbctext.html

a. Group 1
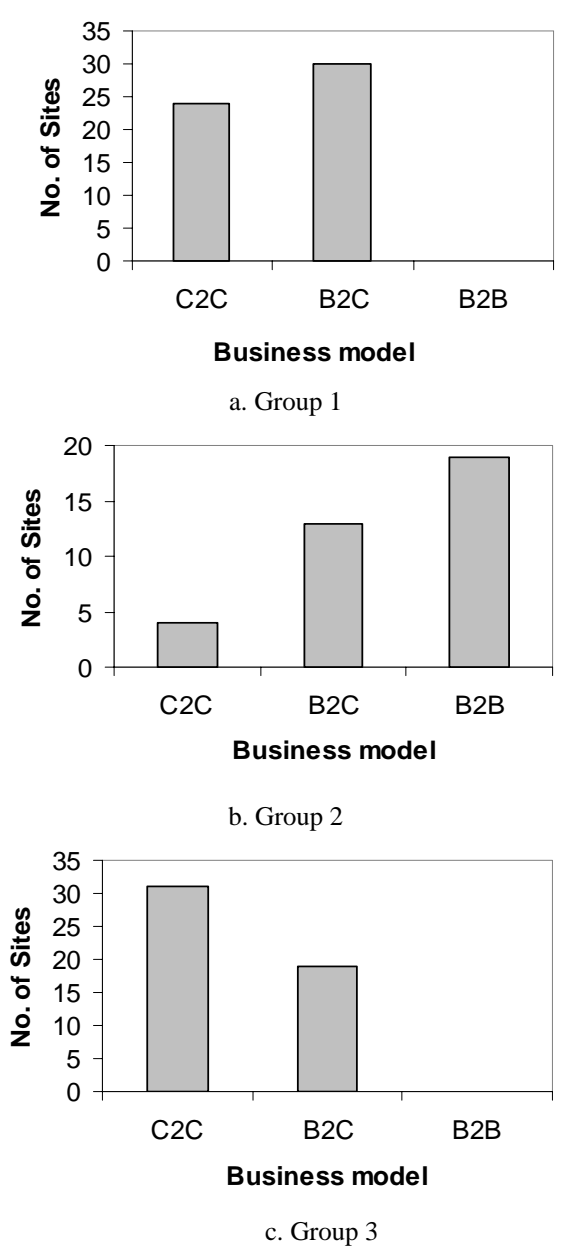
b. Group 2

c. Group 3
Figure 1. Frequency distribution of "Business Models" in three groups

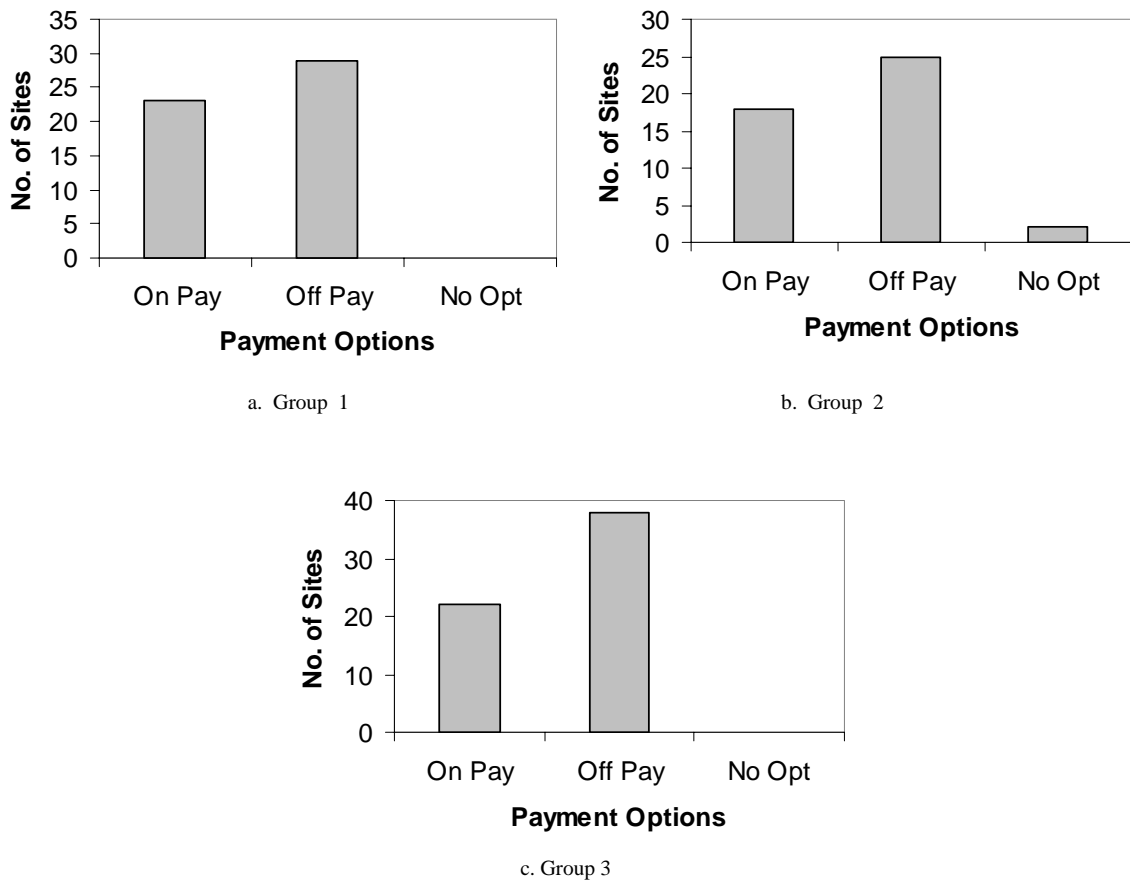

a. Group 1

b. Group 2

c. Group 3
Figure 2. Frequency distribution of "Number of Product Categories" in three groups

Table 2: Chi Square Test for complementary features

	Group 1	Group 2	Group 3	Chi Sq (p)
	Percentage of Web sites in each group possessing the feature			
Faulty user identification	9.38	3.57	2.56	7.33 E-02
Seller's ranking *	90.63	60.71	84.62	4.15 E-02
Shopping basket	87.50	75.00	84.62	5.94 E-01
Search facility	96.88	92.86	92.31	9.36 E-01
Advertisements *	53.13	39.29	25.64	8.24 E-03
Career *	25.00	10.71	5.13	4.46 E-04
Links *	31.25	3.57	0.00	1.13 E-11
Help & Support	100.00	100.00	100.00	1.00 E+00
Newsletter *	87.50	64.29	51.28	6.92 E-03
Auction update *	90.63	71.43	64.10	8.30 E-02
Forum	37.50	3.57	2.56	1.56 E-12
Language	9.38	3.57	2.56	7.33 E-02
Sitemap	65.63	53.57	56.41	5.07 E-01
Services *	31.25	32.14	7.69	2.99 E-04
Security	75.00	78.57	58.97	2.15 E-01

Figure 3. Frequency distribution of "Payment Options" in three groups

a. Group 1

b. Group 2

c. Group 3

Table 3: Complementary features-weights and ranks

Features	Group 1 Weight	Group 1 Rank	Group 2 Weight	Group 2 Rank	Group 3 Weight	Group 3 Rank
Faulty user identification	1.03	15	0.97	13	0.40	13
Seller's ranking	9.93	3	8.25	7	13.10	3
Shopping basket	9.59	5	10.68	3	13.10	4
Search	10.62	2	13.11	2	14.29	2
Advertisements	5.82	9	5.83	9	3.97	9
Career	2.74	13	1.94	11	0.79	12
Links	3.42	11	0.49	14	0.00	16
Help &Support	10.96	1	14.08	1	15.48	1
Newsletter	9.59	6	9.22	6	7.94	8
Auction update	9.93	4	9.71	5	9.92	5
Forum	4.11	10	0.49	15	0.40	14
Language	1.03	16	0.49	16	0.40	15
Sitemap	7.19	8	7.77	8	8.73	7
Services	3.42	12	4.37	10	1.19	10
Book marking	2.40	14	1.94	12	1.19	11
Security	8.22	7	10.68	4	9.13	6

Table 4: Complementary features comprising 80% weight

| GROUP 1 Feature	GROUP 1 Cumulative Weights	GROUP 2 Feature	GROUP 2 Cumulative Weights	GROUP 3 Feature	GROUP 3 Cumulative Weights
Help & support	10.96	Help & support	14.08	Help & support	15.48
Search facility	21.58	Search	27.18	Search	29.76
Seller's ranking	31.51	Shopping basket	37.86	Seller's ranking	42.86
Auction update	41.44	Security	48.54	Shopping basket	55.95
Shopping basket	51.03	Auction update	58.25	Auction update	65.87
Newsletter	60.62	Newsletter	67.48	Security	75.00
Security	68.84	Seller's ranking	75.73	Sitemap	83.73
Sitemap	76.03	Sitemap	83.50	Newsletter	91.67
Advertisement	81.85	Advertisement	89.32	Advertisement	95.63
Users' forum	85.96	Other services	93.69	Other services	96.83
Links to other sites	89.38	Career	95.63	Book marking	98.02
Other services	92.81	Book marking	97.57	Career	98.81
Career	95.55	Faulty user identification	98.54	Faulty user identification	99.21
Book marking	97.95	Links	99.03	Forum	99.60
Faulty user identification	98.97	Forum	99.51	Language	100.00
Language customization	100.00	Language	100.00	Links	100.00
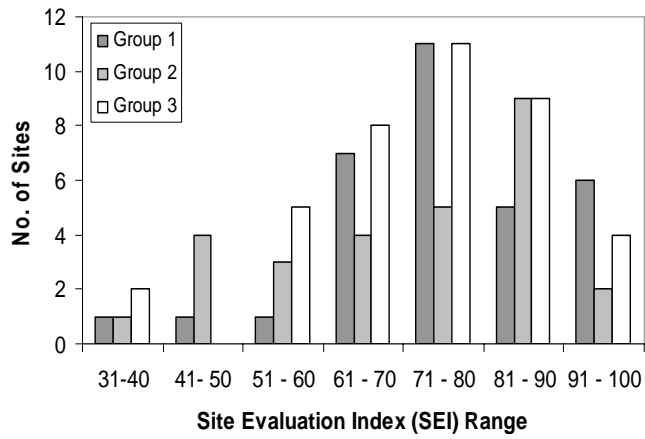
Figure 4: Distribution of SEI in three groups

Table 5: Maximum, Minimum and Average value of SEI in three groups

	Group 1	Group 2	Group 3
Minimum	35.61	24.27	37.30
Maximum	96.57	93.68	96.03
Average	75.08	68.76	72.83

Evidences for relating SEI with the popularity of a site

Table 6: Indian sites' evaluation index values

Group 1	Group 2	Group 3
85.61	44.66	37.30
94.52	50	38.49
	51.45	51.58
	53.88	52.77
	85.92	