

Jessica Shiaofahn Lin. "Commerce To Go": How Are Mobile Versions of E-Commerce Homepages Different? A Master's Paper for the M.S. in I.S degree. December, 2010. 40 pages. Advisor: Bradley M. Hemminger

This paper will explore the differences in E-Commerce homepage sites for desktop and mobile displays by examining the fifteen (15) most popular mobile commerce sites, as reported by The Nielsen Co. User interface design, navigation, search and browse functionality, and content will all be factors for consideration in determining the content richness of the mobile commerce sites. Similarities will be drawn between the standard E-Commerce PC sites and the mobile commerce sites, as well as between the mobile commerce sites themselves.

Headings:

HCI

mobile web interactions

webpage design

user interfaces

graphical user interfaces

user-centered design

“COMMERCE TO GO”: HOW ARE MOBILE VERSIONS OF E-COMMERCE
HOMEPAGES DIFFERENT?

by
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A Master’s paper submitted to the faculty
of the School of Information and Library Science
of the University of North Carolina at Chapel Hill
in partial fulfillment of the requirements
for the degree of Master of Science in
Information Science.

Chapel Hill, North Carolina

December 2010

Approved by

Bradley M. Hemminger

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1. Introduction

The increased use of Smartphones in recent years has spurred E-Commerce businesses to recognize the potential of growth in the mobile web. Consumers can easily check the availability of a product, find a store's location and hours, and view special deals from their mobile device. However, browsing can be difficult on some mobile commerce (M-Commerce) websites, and not all M-Commerce websites give consumers the option to purchase. Mobile commerce (M-Commerce) sites and applications already number over 100, as measured by Internet Retailer research (Briggs, 2009). eBay, the top visited mobile commerce site, garners 6,400 unique visitors monthly (Internet Retailer, Trends & Data, 2010).

While many of the E-Commerce sites examined in this paper share common marketing schemes on their standard PC sites, the execution of the mobile commerce sites is approached in different ways, most likely due to the perceived usage of the M-Commerce sites. Davis' technology acceptance model (TAM) proposes that a user's actual behavior is an outcome of perceived usefulness combined with perceived ease of use, shaping the user's attitude towards technology, which leads to behavioral intention, resulting in the user's actual behavior (Davis, 1986).

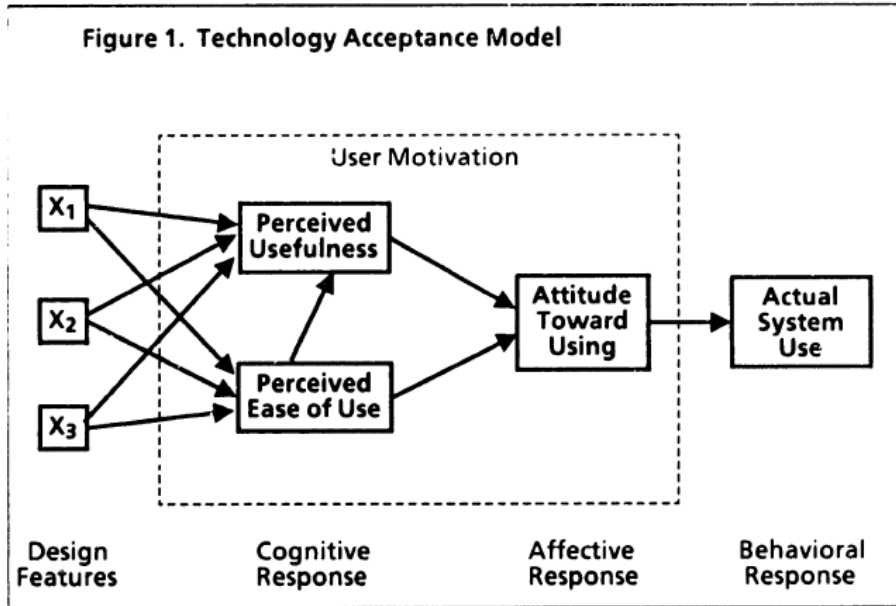


Figure 1. Technology Acceptance Model (TAM) (Davis, 1986).

Wu & Wang (2005) found that perceived ease of use has no significant effect on behavioral intention to use. A thorough examination of the top fifteen (15) mobile commerce sites as reported by the Nielsen Co. (*shown in Figure 2, as cited by Internet Retailer Trends & Data, 2010*) proves Wu & Wang's finding to be correct, since navigation through some of these top sites is very cumbersome. General constraints of developing for the mobile web are limited screen real estate, user interface (lack of precise inputs, such as a mouse and keyboard), and network speeds. Developers and designers have to employ the "bare-bones" approach to create an effective mobile site that contains only essential information, designed with simple graphics and backgrounds to reduce processing speed.

Internet retailers carry different perceptions on how consumers will use their M-Commerce site versus their standard PC site, which is the reason that so many discrepancies exist across the top 15 M-Commerce sites. However, a few common

principles do exist among the sites surveyed. Most of the M-Commerce sites allow the consumer to save a “wishlist” on their site, even if they do not allow an actual purchase transaction. Customers can use this same account to log-on to the standard PC site, retrieve the saved wishlist, and make a purchase. Most of the M-Commerce sites also have a “store finder” function, with hours and contact information provided. Some of these sites also provide maps and directions to the closest stores. The assumption here is that consumers “on the go” are looking for stores nearby, and not necessarily looking to purchase. Almost all of the M-Commerce sites have browsing capability, which addresses the assumption that consumers “on the go” are curious to know whether a nearby store carries a certain product.

The top 15 M-Commerce sites & apps in traffic as reported by the Nielsen Co. are listed in Table 1 below. This paper will survey similarities and differences between the standard E-Commerce PC sites and the M-Commerce sites, as well as similarities and differences among the M-Commerce sites, and try to draw conclusions about the choices companies make when designing for their mobile interfaces.

Table 1. Top 15 M-Commerce Sites & Apps (by traffic). The Nielsen Co., 2010

Retailer	Unique Monthly Visitors (000)	Average Visits Per Person Per Site	Average Time Per Visit (min)
eBay	6,400	7.5	10
Amazon	5,824	5.6	10
Walmart	2,299	4.2	10
Target	2,156	3.5	8
Barnes & Noble	1,253	4.6	10
Macy's	1,070	3.7	11
Kohl's	1,068	3.5	7
Overstock.com	1,021	3.8	7
J.C. Penney	1,017	3.4	6
Buy.com	906	6.2	6
Sears	905	2.5	7
Toys 'R' Us	572	4.0	8
1-800-Flowers.com	546	1.2	8
Zappos.com	391	3.8	7
FTD.com	357	1.8	9

2. Descriptive Survey of Mobile Commerce site interfaces

Four main categories will be discussed in this section: homepage, navigation, content analysis, and search & browse capabilities. The following tables (Tables 2–6) compare elements of mobile commerce sites and the standard E-Commerce PC sites.

Table 2. Mobile Commerce Site Features: User Interface Design & Main Content

Retailer	Link to Standard PC Site	Ability to Purchase	Main menu under 2L page	Deals category	Contact Us / Help
eBay	Yes	Yes	No	No	Yes
Amazon	Yes	Yes	Yes	Yes	Yes
Walmart	Yes	No	No	Yes	No
Target	Yes	No	Yes	Yes	Yes
Barnes & Noble	Yes	Yes	Yes	No	Yes
Macy's	Yes	No	Yes	Yes	Yes
Kohl's	Yes	No	No	Yes	Yes
Overstock.com	Yes	Yes	No	Yes	No
J.C. Penney	No	No	No	Yes	No
Buy.com	Yes	Yes	Yes	Yes	No
Sears	No	Yes	No	Yes	Yes
Toys "R" Us	Yes	Yes	Yes	No	Yes
1-800-Flowers.com	No	Yes	No	Yes	Yes
Zappos.com	Yes	Yes	No	No	No
FTD.com	Yes	Yes	No	No	Yes
Results:	12 yes, 3 no	10 yes, 5 no	6 yes, 9 no	10 yes, 5 no	10 yes, 5 no

Table 3. Mobile Commerce Site Features: Search & Browse

Retailer	Advanced Search	Faceted Search / Browse	Results displayed	Mobile Search Breadcrumbs
eBay	Yes	Yes	5, 10, 20 (all)	No
Amazon	No	Yes	10 (top 50)	No
Walmart	No	No	10 (all)	Yes
Target	No	Yes	10 (all)	No*
Barnes & Noble	Yes	Yes	10 (all)	No
Macy's	No	Yes	12 (all)**	Yes
Kohl's	No	Yes	13 (all)	Yes
Overstock.com	No	Yes	25 (total unknown)	No
J.C. Penney	N/A	No	N/A	N/A
Buy.com	No	Yes	20 (total unknown)	No*
Sears	Yes	Yes	20 (all)	Yes
Toys "R" Us	No	No	25 (all)	No
1-800-Flowers.com	N/A	Yes	N/A***	N/A
Zappos.com	No	No	100 (total unknown)	No
FTD.com	No	Yes	5 (all)	No
Results:	3 yes, 10 no, 2 N/A	11 yes, 4 no	All: 9 Top 50: 1 Total Unknown: 3 N/A: 2	4 yes, 9 no, 2 N/A

*Target & Buy.com: Breadcrumbs are only applicable when browsing. Search results do not return breadcrumbs.

**Macy's: 12 results are returned after performing a product search, but results are not shown immediately. The user is prompted to filter the results.

***1-800-Flowers.com: Number of product search display results is not applicable, since search is not enabled on the M-Commerce site. However, browsing returns no more than 13 products per page, with no option to view more.

Table 4. Standard E-Commerce PC Site Features: Content, Search & Browse

Retailer	Extra Facets*	Results displayed	Related searches	Social Media	Link to mobile site
eBay	Yes	25, 50, 100, 200	Yes	Yes	Yes
Amazon	Yes	16, 24**	Yes	Yes	No
Walmart	Yes	48, 96	Yes	Yes	Yes
Target	Yes	30, 60, 90	Yes	Yes	Yes
Barnes & Noble	No	10, 100	No***	No	No
Macy's	No	12, 24, 48, 96	No	Yes	No
Kohl's	Yes	12, 24, 48, 96	Yes	Yes	No
Overstock.com	No	30, 60, 90, 120	Yes	Yes	Yes
J.C. Penney	Yes****	21, 90	No	Yes	No
Buy.com	No	26, 38, 50	Yes	Yes	No
Sears	Yes	24, 48, 72, 96	Yes	Yes	Yes
Toys "R" Us	Yes****	12, view all	No	Yes	Yes
1-800-Flowers.com	Yes	20, view all	Yes	Yes	Yes
Zappos.com	Yes****	100	Yes	Yes	No
FTD.com	Yes	18, view all	Yes	No	No
Results:	8 yes, 7 no	1: 1 view option, 7: 2 view options, 2: 3 view options, 5: 4 view options	11 yes, 4 no	15 yes, 2 no	7 yes, 8 no

*In relation to the mobile site counterpart.

**16 results are displayed after performing a search. An advanced search within a department returns 24 results.

***Related searches only appear when the user is initially searching as suggestions in "real-time." Related searches are not present on the main results page.

****J.C. Penney's M-Commerce site does not enable search, but its standard E-Commerce PC site enables faceted search. Toys "R" Us and Zappos.com do not support faceted search on their M-Commerce sites, but their standard E-Commerce PC sites enable faceted search.

Table 5. Standard E-Commerce PC Site Features: Small Advertisements

Retailer	Total # of small ads / featured products	Store- related ads / featured products	External Ads	Credit card ad	Daily / Weekly ad
eBay	8	8	0	No	Yes
Amazon	22	17	1	Yes	Yes
Walmart	14	14	0	Yes	Yes
Target	7	7	0	Yes	Yes
Barnes & Noble	8	7	1	Yes	No
Macy's	11	11	0	Yes (2)	No
Kohl's	8	6	0	Yes (2)	Yes
Overstock.com	12	12	0	Yes	Yes
J.C. Penney	8	4	4	Yes (link)	Yes
Buy.com	6	3	3	N/A	Yes
Sears	17	10	7	Yes	Yes
Toys "R" Us	8	6	1	Yes	Yes
1-800-Flowers.com	19	9	10	No	Yes
Zappos.com	4	4	0	Yes	No
FTD.com	5	5	0	No	No
Results (Averages & Totals):	10	8	2	11 yes, 3 no, 1 N/A	11 yes, 4 no

Table 6. Standard E-Commerce PC Site Features: Layout & Advertisements

Retailer	Main Graphic Banner Type	# of Ads in Main Graphic Banner	Presence of Slider (featured slots)
eBay	Static	1	Yes, 2 slots
Amazon	Static	1	No
Walmart	Rotating	5	No*
Target	Rotating	2	Yes, 2 sliders with 5 slots each
Barnes & Noble	Rotating	N/A**	Yes, 1 slider with 4 slots, 1 tabbed format with 4 slots
Macy's	Static	1	No
Kohl's	Rotating	4	Yes, 6 slots
Overstock.com	Rotating	4	Yes, 2 sliders with 4 slots each
J.C. Penney	Static	1	No
Buy.com	Rotating	3 displayed at a time, 5 cycles	Yes, 4 slots
Sears	Static	2	Yes, 1 slider with 6 slots, 1 tabbed format with 8 slots max
Toys "R" Us	Rotating	4	Yes, 4 slots
1-800-Flowers.com	Static	1	No
Zappos.com	Static	1	Yes, 4 slots***
FTD.com	Static	4	Yes, 2 sliders with 4 slots each
Results:	8 Static, 7 Rotating	4 ads on avg. for rotating banner****	11 yes, 4 no

*Walmart does not have a slider on its homepage, but it does have an extra section with 5 featured deals.

**Barnes & Noble's main graphic banner is a rotating ad that features their picks for the week.

***Zappos.com uses their slider to depict their other departments in a graphical format. Their main departments (Clothing and Shoes) are listed in the right hand and left hand navigation areas.

****Barnes & Noble's main graphic is not counted in the average, since the number of books within the banner is subject to change, and it is a different banner style than the rest. Buy.com's main banner ad is counted as 5 ads, rather than 15, since it goes in 5 cycles.

2.1 Homepage

The standard E-Commerce PC sites are very similar in layout and image usage. Common elements include a main graphic banner, graphically advertised deals, and the use of the top or left navigation menus to list out categories. Although the mobile sites vary in other characteristics, these sites have also developed a standard layout format, with vertical menus, solid background, and minimal use of images.

2.1.1 Homepage: Visual Elements

All of the fifteen sites surveyed use a main banner ad that is either static or rotating (see Figures 2 and 3 for examples) to showcase a deal. The standard E-Commerce PC sites are rich in content, so they rely heavily on graphic elements to draw the consumer's attention to the most important deals. A light colored or white background is standard with bright accent colors, along with the deals and featured products displayed in a graphical format. Ten (10) sites employ the use of a slider on their homepage, which has the capability of showcasing multiple deals within a frame (see Figure 4). These sliders usually feature four (4) deals and allow the user to click arrows on each side to view more. On average, the standard E-Commerce PC site homepages contain ten (10) small advertisements (including featured products). These small advertisements/featured products are mostly internal, and some retailers choose to display promos such as gift cards and free shipping in a graphical banner (see Figure 5). Eleven (11) of these sites advertise a store credit card, usually including the card as an image (see Figure 6).



Figure 2. Example of a static banner with button toggle to view the other 3 ads (FTD.com)



Fig 3. Example of a main rotating banner that cycles through 4 ads (Toys "R" Us)



Fig 4. Example of a typical slider on the standard E-Commerce web sites (FTD.com)



Figure 5. Small internal advertisement, Amazon.com)



Figure 6. Store credit card advertisement, Macy's

In contrast, the mobile commerce sites are kept fairly simple, with only the retailer's logo at the top (usually a clickable link that takes the consumer back to the homepage), a solid color for the background, and the menu. Four sites (Macy's, Kohl's, Overstock.com, Toys "R" Us, and 1-800-Flowers.com) have chosen to include one large graphic advertisement on their mobile site (see Figure 7). Two sites (Amazon.com and Buy.com) showcase a product deal (image and price, see Figure 8). Four sites (Target, Macy's, Overstock.com, FTD.com) also include 2 small graphic deal buttons on their mobile site (see Figure 9). J.C. Penney's mobile site (<http://jcp.mobi>) features four (4) menu items that are displayed graphically, rather than textually (see Figure 10). J.C. Penney's mobile site also has some other key differences from the other mobile sites that will be discussed later.



Figure 7. Mobile Ad

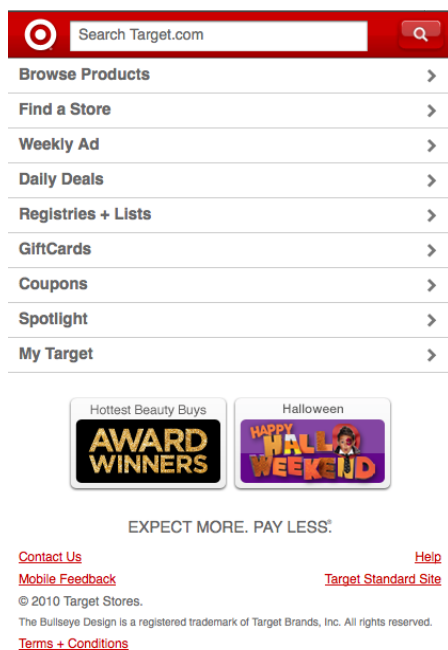


Figure 9. Graphic Deal Buttons

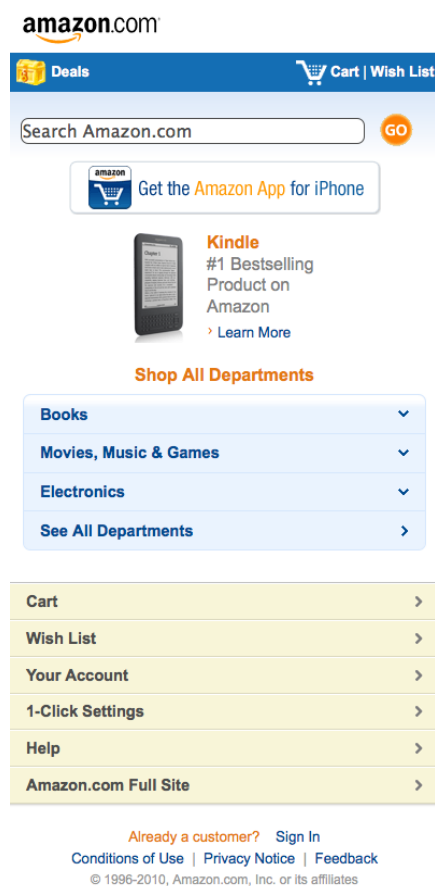


Figure 8. Featured Product

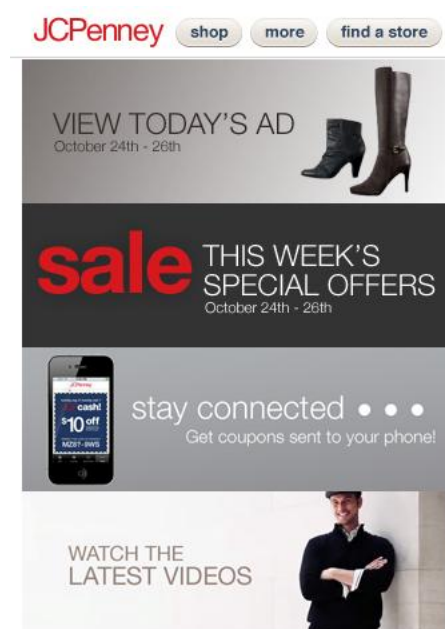


Figure 10. J.C. Penney's mobile site

2.1.2 Layout

As mentioned previously, the standard E-Commerce PC sites are heavy in graphics. Macy's and J.C. Penney create the appearance of mainly graphic websites by using banner advertisements to showcase deals, promotions, and featured products, while also keeping their content simple (see Figure 11). This approach allows the designers to really carry the brand through with custom graphics. The designers are unrestricted by web fonts and do not have to pay custom font licensing fees for services like typekit (<http://www.typekit.com>).

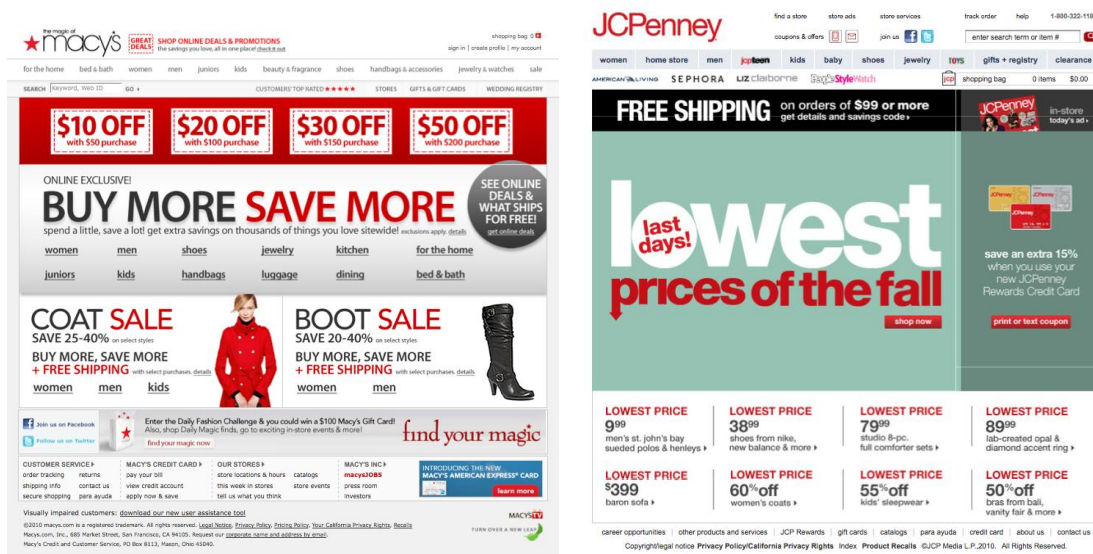



Figure 11. Mainly graphic websites: Macy's & J.C. Penney

Another popular, simpler method for showcasing featured deals is by using product shots and CSS to create text styles. The retailers employing this method (for example, Buy.com and Walmart) usually have multi-column layouts underneath their main graphic banner ad (see Figure 12). One major advantage to this approach is that the


text is live and searchable, as opposed to static images that need to be tagged in the code to create similar text search functions. The deals are most likely easier to be switched out, since they do not require heavy graphic treatment.

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Deal of the Week



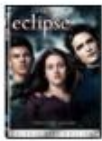
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Figure 12. Product Shots and CSS to highlight featured deals (Buy.com and Walmart)

On the other hand, the M-Commerce site layouts are fairly similar, with the exception of J.C. Penney. The screen of a mobile device does not really allow for much room for layout experimentation, and since this field is fairly new, it explains the adherence to a set template that users are familiar and comfortable with (like with websites created in the early phases of the Internet Age).

The M-Commerce site layouts are vertical, with the logo on top as a header, and menu items listed underneath (See Figures 7–10). Most of the sites also include footers that contain additional contact information and/or terms & conditions. Some sites, as mentioned previously, choose to include a few graphic elements, such as a large banner ad, or graphic buttons. Since large images decrease processing speed, these elements are low in quantity (usually less than 3 if present at all, with the exception of J.C. Penney).

2.2 Navigation

Navigation and menu placement are very similar among the standard E-Commerce PC sites as well as among the M-Commerce sites. By following a standard for formatting E-Commerce and M-Commerce sites, the retailers contribute to establishing credibility to the consumer through the notions of perceived ease of use and perceived usefulness as defined in Davis' TAM model. Users become familiar with shopping portal interfaces, and assume that certain elements exist on the homepage.

2.2.1 Navigation: Standard E-Commerce PC Sites

Navigation in standard E-Commerce PC sites is very important, since the sites are content rich, and information can be easily overlooked if the page is not organized in an intuitive manner. Hence, the top 15 retailers have chosen to use a combination of top navigation bars and side navigation bars to better aid the user. The following table (Table 7) compares the elements of navigation in standard E-Commerce PC sites.

Top navigation menus are highly utilized in the standard sites to regulate content. On average, the number of top navigation menus totals four (4). The “My Account” navigation bar is present on all of the sites, and is usually positioned as the top-most navigation bar. All of the E-Commerce sites surveyed display their product categories on the homepage. A slight majority of eight (8) sites use a top navigation bar to display their product categories, with the average number of nine (9) categories for breadth.

The left navigation menu is not as common as originally thought, numbering only four (4) out of fifteen (15) sites. However, using a left navigation menu to display product categories allows for greater flexibility in terms of quantity, since the average number of product categories equals seventeen (17). To compensate for lack of space on the top navigation menus, some sites such as eBay and Toys “R” Us choose to display their product categories in a category labeled “Category”, which contains a drop-down list of their numerous offerings. Since all of these sites use a main graphic banner, a left navigation menu might get lost next to the graphic busyness of the main content.

Although the majority of the sites prefer to use a top navigation menu to display their product categories, the left navigation menu is not completely overlooked. Five (5)

out of the eight (8) sites that use the top navigation menu also utilize the left hand navigation menu for “extras” such as specials (1-800-Flowers.com and FTD.com), “Top 20 Hot Searches” (Toys “R” Us), and favorite categories (eBay).

Target and Zappos.com both utilize more than one navigation menu to list product categories. Target chooses to use both a left navigation menu, which lists the most popular categories (Video Games, Women, Baby, Electronics, Weekly Ad), in conjunction with the top navigation menu, which lists all of the categories (See Figure 13). Zappos.com is very content heavy and utilizes the top menu, left hand menu, and right hand menu to list out all of its categories and sub-categories (See Figure 14). The main categories are listed in the top navigation menu, with a drop-down menu for “all departments.” The left hand menu lists sub-categories of shoes, specialty shoes, specialty clothing, and specialty sites. The right hand menu lists sub-categories of clothing, casual shoes, dress shoes, athletic shoes, and work & career shoes.


Table 7. Navigation elements: Standard E-Commerce PC Sites


Retailer	Number of top navigation menus	Main category menu type	Left navigation menu purpose
eBay	3	Top navigation menu (5)	Ads, favorite categories
Amazon	3	Left navigation menu (13)	Departments
Walmart	3	Left navigation menu (13)	Departments
Target	3	Left (5) & Top (15)	Popular Departments
Barnes & Noble	3	Top navigation menu (12)	N/A
Macy's	4	Top navigation menu (11)	N/A
Kohl's	5	Top navigation menu (9, 8)*	N/A
Overstock.com	3	Left navigation menu (21)	Departments, Visual Search
J.C. Penney	5	Top navigation menu (11)	N/A
Buy.com	5	Left navigation menu (25)	Departments
Sears	8	Left navigation menu (22)	Departments
Toys "R" Us	4	Top navigation menu (7)**	Top 20 Hot Searches
1-800-Flowers.com	3	Top navigation menu (9)	Specials
Zappos.com	4	Top (11), Left (28), Right (29)	Sub-categories
FTD.com	4	Top navigation menu (7)	Flowers by tomorrow
Results:	4	Top: 8, Left: 4, Top & Left: 1, Top, Left, & Right: 1	5 out of 8 with top navigation as main menu use the left menu for extras

*Kohl's uses a tiered top navigation menu with two levels to list their department categories. Altogether, the department categories total 17, with 9 categories on top and 8 categories on bottom.

**Toys "R" Us has 7 main categories in their top navigation menu, 8 categories including the cart.



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SAVE \$30 + 

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 Furniture >	 Home Décor >
 Bedding >	 Kitchen >
 Rugs >	 Appliances >
 Dinnerware >	 Window >

1 2 3 4 11

*Event ends 10/30/10. See offer details >

Figure 13. Target's top navigation menu used in conjunction with the left navigation menu to list out categories

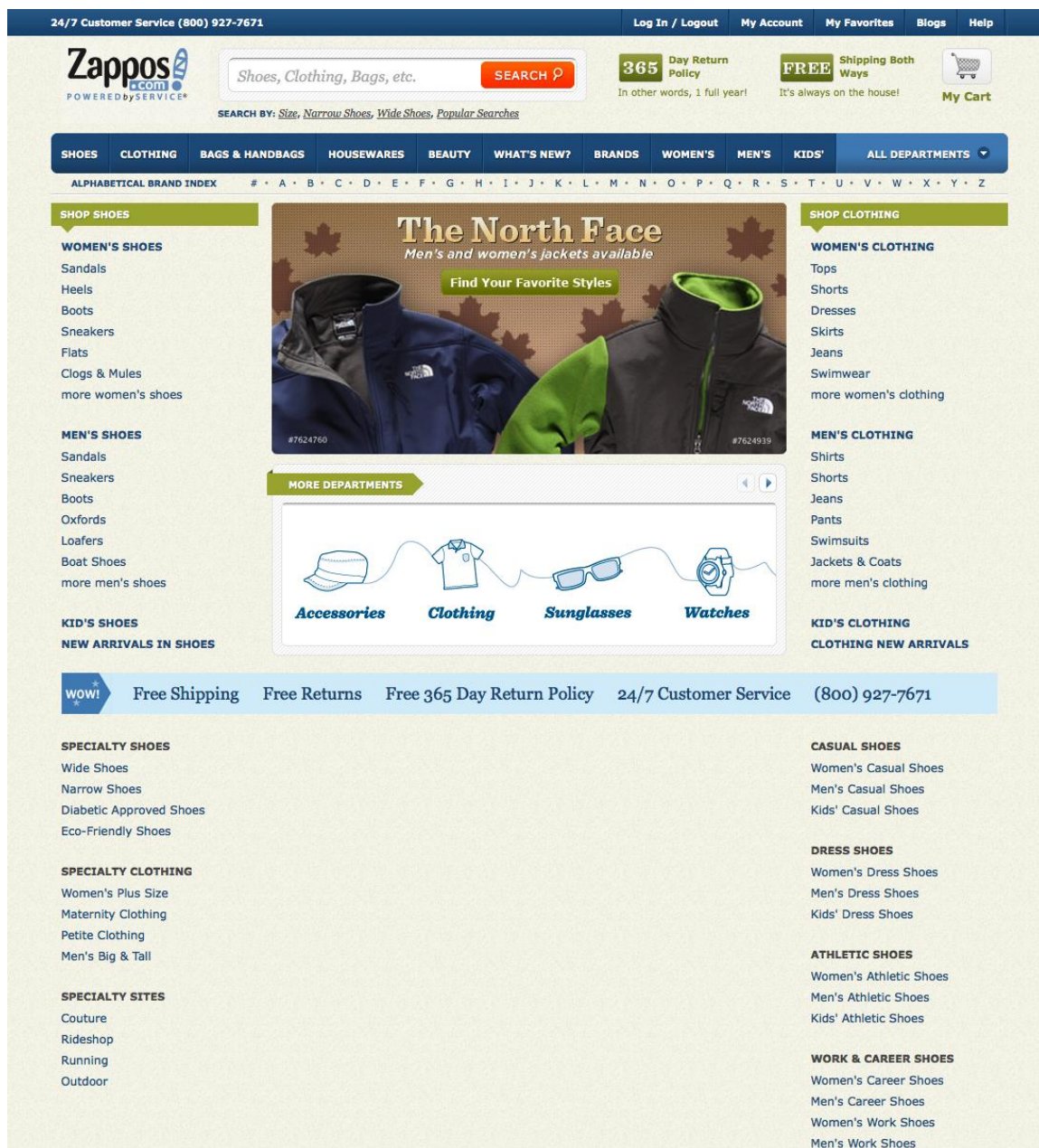


Figure 14. Zappos.com uses the top navigation menu, left navigation, and right navigation menu to list out all of its product offerings

2.2.2 Navigation: M-Commerce Sites

All of the retailers display their logo on their M-Commerce sites, and all but three (3) of these logos navigate back to the home screen from a 2nd level (2L) or 3rd level (3L)

page. Amazon.com and Overstock.com employ an iconographic “home” button on their 2L and 3L pages, while Buy.com has a home button located at the very bottom of a menu displayed under the product results on the 2L page. Sears.com, 1-800-Flowers.com, and FTD.com take no chances and use the clickable logo in conjunction with a text link to navigate back to the home screen.

Six (6) of the sites surveyed chose to include the main menu under the content of the 2L and 3L pages presumably to aid the consumer in navigation. This method, although slightly cumbersome (since it forces prolonged scrolling) is effective, since the consumer does not have to keep on hitting the back button to return to the main screen to select a different category. The majority of the sites (9) do not provide this extra feature (See Table 2).

Most of the mobile sites have all of their categories listed on their main menu, so the user does not usually end up drilling down into sub menus. However, both Target and FTD.com employ the drill-down method. It is not surprising that most of these sites do not use the drill-down method, because it is very cumbersome and time consuming to step through many items, especially if tapping on a Next Page button or similar is required. Generally, it would probably be more effective to use categories to drill down by, or facets for narrowing the search, in order to display fewer results per search.

2.3 Search

Searching is arguably the most essential element on any E-Commerce site (See Table 3 for comparable elements). While the standard E-Commerce PC sites all have the option of advanced search, an overwhelming majority of their mobile counterparts (10) do not employ this function. Only three (3) sites have advanced search capability: eBay, Barnes & Noble, and Sears. The limitations of mobile devices, including small screens, user interface constraints (such as the lack of a convenient point device and keyboard entry), and network speeds seem to factor into the absence of advanced search on the majority of the M-Commerce sites. Two (2) sites, J.C. Penney and 1-800-Flowers.com do not even have search functionality on their mobile sites. A number of reasons could explain the reasoning behind exclusion of search: cost/resources, network speeds, a preference to present the consumer with pre-selected products.

2.3.1 Text Search & Visual Search

The standard E-Commerce PC sites and M-Commerce sites, with the exceptions of J.C. Penney mobile and 1-800-Flowers.com mobile all use text based searching. One interesting finding is that Overstock.com also has a visual search option (See Figures 15 & 16 below), which allows the consumer to filter results by clicking on a picture (and displays objects similar to the item clicked) or through the “filter results” dialog box (presented as a button in the top menu). It is in the beta stage, but an interesting solution to browsing, which would help users that grow impatient wading through categories and

subcategories. The visual search provides an engaging way to shop online. It's refreshing compared to faceted lists of metadata, instead almost mimicking the way that a consumer would shop at a retailer's physical location.

As the consumer "drills down" during a search, the items are saved in the left navigation menu. These items can be removed from the list. The items can also be promoted, which gives the characteristics of the selected product more importance when aggregating similar results. Once the consumer has navigated to the details page of an item in the left navigation menu, the previously clicked items are lost when the "back" button is clicked.

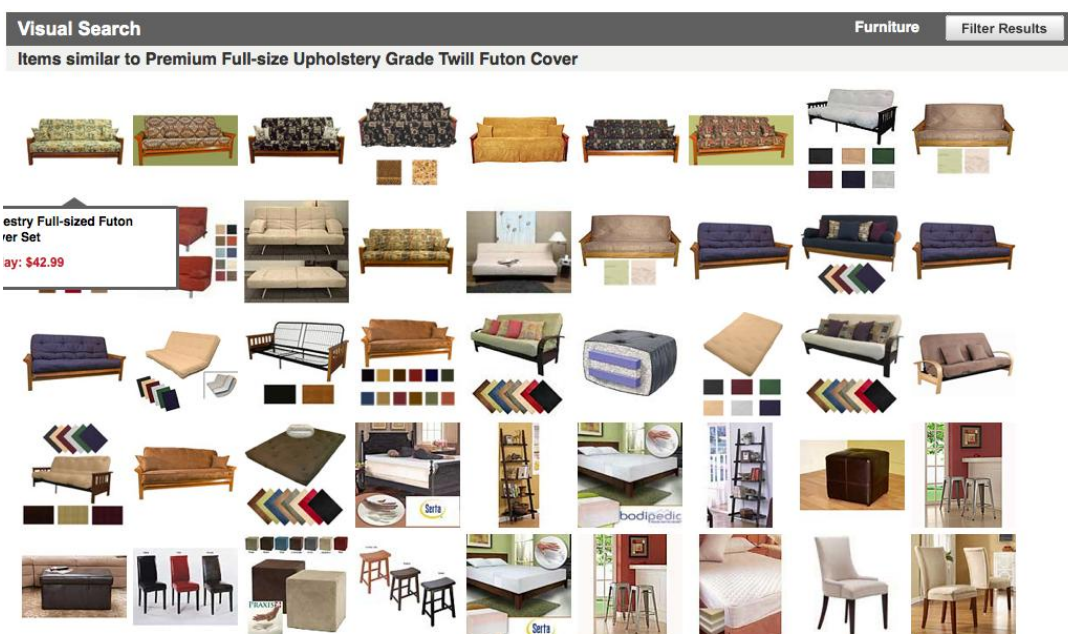
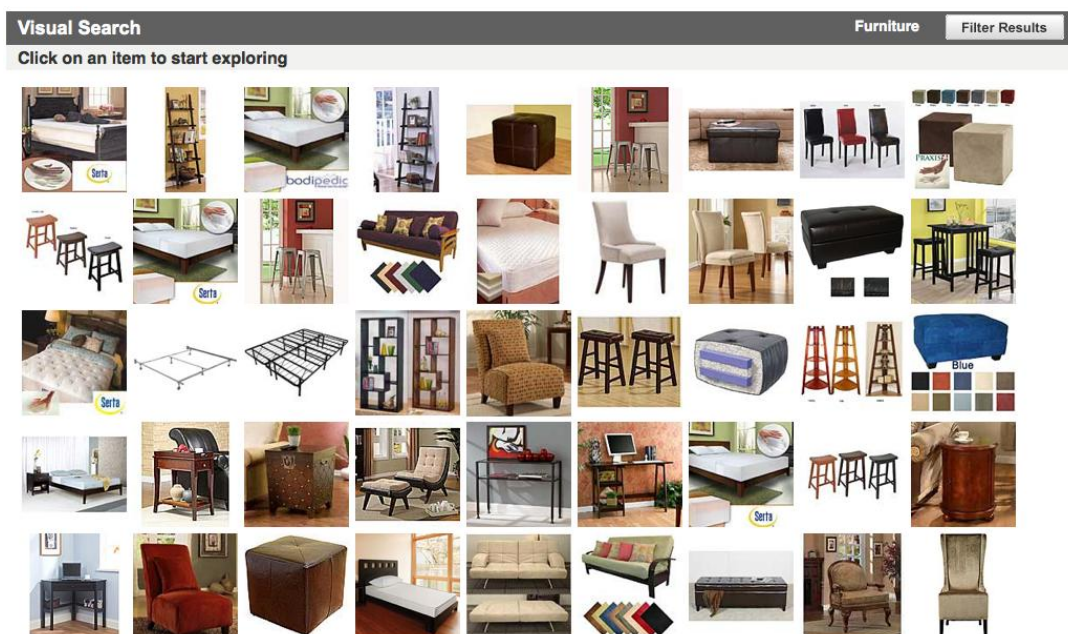


Figure 15. Visual Search function at Overstock.com: Furniture category, refined by clicking on a couch (row 2, column 4)

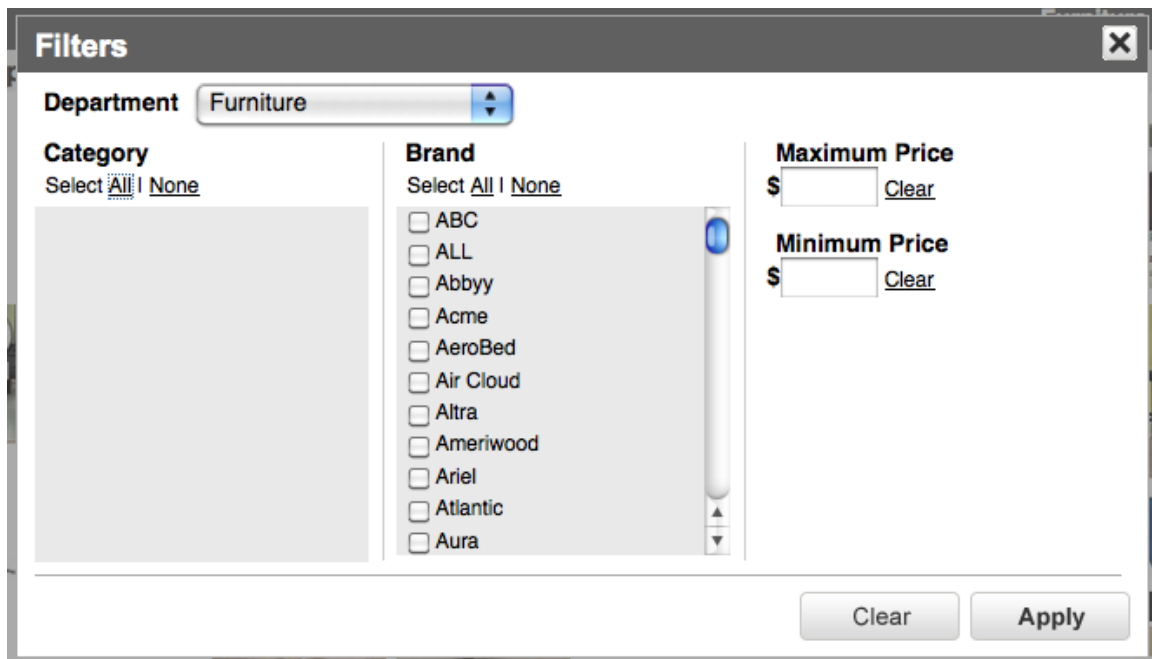


Figure 16. Visual Search function at Overstock.com: “Filter Results” pop-up dialog box, accessed from top menu

2.3.2 Faceted Search & Browse

In his book, *Faceted Search*, Daniel Tunkelang (2009, p. 23) defines faceted navigation as a function that “allows the user to elaborate a query progressively, seeing the effect of each choice in one facet on the available choices in other facets”. Although most of the M-Commerce sites surveyed do not have advanced search capability, ten (10) of the sites do provide faceted search capability (usually executed through a drop down menu). Only three (3) sites, Walmart, Toys “R” Us, and Zappos.com, which do not offer advanced search, also do not have faceted searching capability. Faceted searching is important in this regard, so that the consumer can filter results in a more efficient manner. The product search results on the M-Commerce site for Zappos.com are displayed with one hundred (100) results per page, making it very difficult for the consumer to shop. The

mobile site for 1-800-Flowers.com does not even offer a simple search capability, but allows the consumer to conduct faceted browsing.

In contrast, all of the standard E-Commerce PC sites offer faceted searching with their advanced search capability. Faceted searching is even more effective on a computer screen than on a mobile screen. The layout can accommodate a left hand navigation menu and also a top navigation menu to display more facets, which aid in refining the search (see Figure 17).

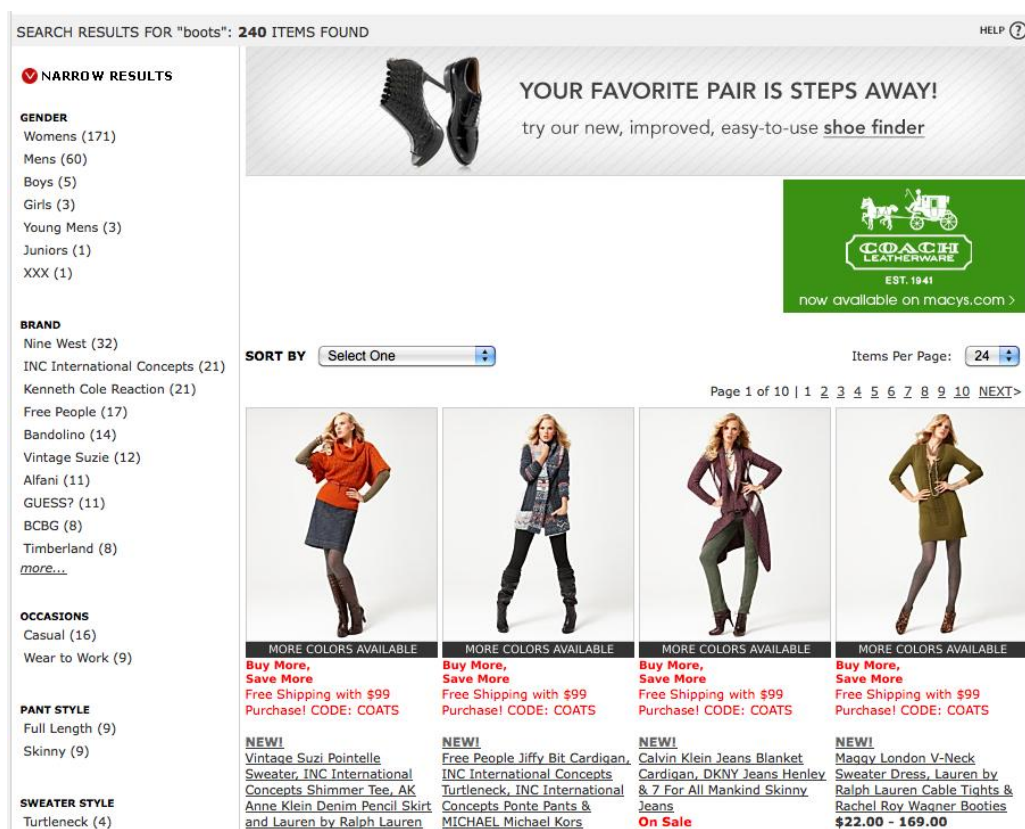


Figure 17. Faceted search on a standard E-Commerce PC site (Macy's)

Two (2) of the M-Commerce sites have tried to make searching and browsing easier by displaying breadcrumbs (Walmart and Sears, see Figure 18 below). Walmart's breadcrumb navigation makes up for its lack of faceted search. Although Target and

Buy.com do not offer the breadcrumb navigation element in their faceted search, these sites do include breadcrumbs in faceted browsing mode. Breadcrumbs are an important navigational aid, particularly on a mobile device, when the consumer does not necessarily have a way to back out without needing to start over from the home page.

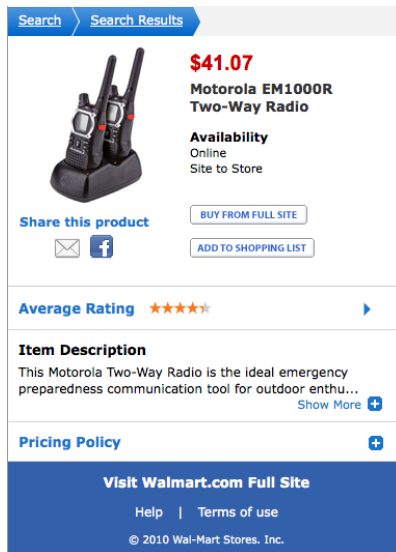


Figure 18. Breadcrumbs (Walmart mobile)

2.3.3 Clustered Search

Clustered search returns results that are grouped together according to relevance. The Clusty search engine, (now search.yippy.com) dynamically clusters the search results, then displays the clusters in the left-hand navigation menu, and allows users to drill down by selecting subclusters to explore (Iskold, 2007). None of the mobile sites surveyed use clustered search. Since online retailers already know all of the possible search results, dynamic clustering is unnecessary, making faceted search/browse a more sensible option.

2.4 Content Analysis

Mobile devices generally have significantly less screen space than desktop systems. As a result, retailers must make difficult decisions regarding which content to present on the mobile display. What material and functionality to retain, and even whether to take a completely different approach for the user interface. Examining the choices retailers make in deciding what content to make available on the mobile web, which information is most pertinent to their consumers in the context of mobile use, can be very revealing of retailers expectations and assumptions. Are consumers going to the mobile site to purchase products or merely to browse? Do consumers want to find the nearest store location so that they can purchase the product in person? Will the mobile site offer search functionality in conjunction with the store locator function, so that the consumer will be able to see if a product is located in a store nearby? Does the consumer need the same level of customer support that is provided on the standard site? Should only the most popular products be displayed, or should full product results be displayed? Is access to the standard PC site provided?

2.4.1 Content Retained for Mobile

All but three (3) of the mobile sites surveyed provide a link back to the standard E-Commerce PC site, whereas a little less than half (7) provide a link to the mobile site from the standard site (See Figure 3). For mobile users, this is a good sign, since it is often the case that extra information (such as customer support) has not been developed for the mobile site. It is not absolutely necessary for the standard sites to have a link to their mobile sites, since a consumer would automatically be re-directed to the mobile site

on a mobile device. However, the link would serve as a handy promotional tool for the internet retailer to increase consumer awareness of their mobile presence.

A majority of the M-Commerce sites (10) contain a “deals” category. This category might operate on the assumption that the user might visit a physical store based on the deals displayed on their mobile device. J.C. Penney’s mobile site operates exclusively on deals, making it a radical departure from the other mobile sites, which choose to showcase everything. In fact, J.C. Penney’s mobile site only contains 2 out of 9 categories listed on their standard site: Women’s Apparel and Men’s Apparel, which contain 4 subcategories each.

All of the other mobile sites, with the exception of J.C. Penney, contain a majority of the categories listed on their standard sites. While it is probable that many of these retailers do not include their entire product catalog on their mobile sites, the mobile sites still offer abundant product selections. For the most part, the consumer can still search and browse the product catalog as he/she would on the standard PC site (see Section 2.3.2). Account and wishlist information is standard (wishlist in lieu of purchasing on sites that do not offer purchasing functionality). Other common elements include store locator functionality, a simple help center, and terms of use.

2.4.2 Content Not Included on Mobile

Advanced search on mobile devices was a big function that was not usually carried over from the standard site to the mobile site. The option to display results differently from a product search was also discarded (such as in a grid, or number shown), due to the limited screen space. Many of the standard E-Commerce PC sites also

included categories such as top rated, best selling, related searches, recommended products, recalls, special categories (such as the Halloween Shop for Kohl's), careers, e-mail alert sign up, weekly ad (that is run in the newspaper but displayed in digital format on many standard sites), wedding registries, store credit card, and returns.

Social media links to twitter and facebook, as well as the capability to email a product page to a friend, are common in the standard sites. Community forums have a strong presence on some standard PC sites, such as Overstock.com, Zappos.com, and Amazon.com, but are not available on their mobile counterparts.

The standard E-Commerce PC sites also include a Spanish help section, which is not typically seen on the mobile sites. Some of the mobile sites have not fully developed their help section, opting to link the consumer back to the full HTML site. The help sections on the mobile sites are often specific to mobile site use, rather than the general help sections (i.e. returns, tracking) that are found on the standard PC sites.

Overstock.com has chosen not to develop four (4) of its major sections on their mobile site: Community, Cars, Real Estate, and Auctions. This retailer probably assumes that the consumer is more likely to visit the mobile site to shop for products.

3. Summary & Conclusions

A number of commonalities were identified across the mobile websites, such as the ability to purchase, store locator functionality, faceted search and browse, the absence of social media and community forums, and the relative ease of navigation among the mobile sites. A majority of the fifteen (15) sites surveyed allow the consumer to purchase

from the mobile website. The retailers that disable purchasing provide the option of creating a wishlist. The consumer must create an account to save items in the wishlist, which can be accessed later from the standard PC site, and subsequently purchased. It can be assumed that the retailers that choose not to enable purchasing might view the consumer's intentions for visiting their mobile site as browsing, finding deals, or locating a store. The retailers might also be concerned with financial security settings on the mobile web. As with other features, such as advanced search, these retailers might not have the resources to include purchasing functionality on their mobile web sites.

J.C. Penney's elimination of a majority of its categories on their mobile web could be based on popular clicks from their standard PC site. J.C. Penney also seems to lean towards an "act now" approach, since their mobile site focuses on deals. The other retailers have erred on the safe side and taken the approach of including a large selection of their product catalog. Zappos.com is a perfect example: after performing a search, many pages are returned, with each page containing 100 results.

The store locator functionality, which is included on most of the M-Commerce sites, assumes that it is essential for a consumer "on the go" to find the nearest location. Most M-Commerce sites also offer search functionality, which allows the consumer to check product availability before heading to the store.

Faceted search & browse is used on all of the standard sites, although it is not employed on all of the mobile sites. This capability effectively cuts down on product search & browse time. Breadcrumbs are not generally used on the mobile sites when performing a faceted search or browse, but provide an effective way for the consumer to trace paths, while also cutting down on linear searching/browsing.

Social media functionality and community forums are discarded across the board. Integrating social media functionality probably takes up too much processing speed, while community forums contain too much text. Although mobile keypads have improved greatly, it is generally not expected that a mobile user would want to type out a lengthy review or participate in a discussion on a mobile device.

The mobile websites were fairly easy to navigate since their content was stripped down significantly. In contrast, their standard PC site counterparts, while organized in a visually intuitive manner, were overflowing content-wise with menus, categories, subcategories, and advertisements.

Mobile commerce is on the rise, and although these sites share some similar patterns, they are not all on the same wavelength in regards to their target audience. It is surprising that while the standard E-Commerce PC sites have conformed to a standard user interface, their mobile counterparts have a fair number of differences. Perhaps the content specifically chosen for the mobile application was decided based on page hits of the standard site, resulting in different mobile content scenarios.

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