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The effect of web interface features on consumer online purchase intentions

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Abstract

Corporations spend millions of dollars a year creating and maintaining corporate websites, yet many of these sites fail to reach the organization's goals [Freemantle D. The psychology of crm. Int J Cust Relatsh Manag 2002; http://www.superboss.co.uk/articles2main.htm]. Recent research suggests that these failures reflect poor website design, yet this research lacks the specificity necessary to provide practical recommendations for improving site performance [Rosen EE, Purinton E. Website design: viewing the web as a cognitive landscape. J Bus Res 2004; 57:787–94]. This study fills that gap by providing specific recommendations regarding website design elements that generate positive managerial outcomes. First, the study tests a wide range of design elements to determine those that provide human elements and computer elements. Next, these elements are linked through intermediaries using the uses and gratifications theory, technology acceptance model, and the concept of flow to explain purchase intentions and intentions to revisit the site.

Keywords: Internet; Online shopping; User interface features; Flow

1. Introduction

Online shopping is growing quickly, although not as pervasively as predicted (NTIA, 2002). This growth is fueled by the advantages of online shopping (Eroglu, Machleit, and Davis, 2001). In light of this growth, firms increasingly rely on e-commerce solutions to reach their profit objectives (Freemantle, 2002).

Unfortunately, many websites fail to help companies reach these objectives. Supporting this, Kearney (2001) found that 82% of online shoppers drop out of their shopping carts without completing the transaction. Another study found that websites fail to generate satisfying shopping experiences (Kane, 1999). The dot.com failure of the 1990's may be a direct result of this.

Several studies contend these failures are the result of neglected consumer needs (Nielsen, 2000; Rosen and Purinton, 2004). Supporting this, Richard (2005) likened web design to store atmospherics and supported its criticality in determining effectiveness (cf. Baker, Parasuraman, Grewal, and Voss, 2002). But little is known about how websites should be designed to optimize the customer experience (Song and Zahedi, 2005). Rather than create virtual spaces that enhance the online shoppers' experience, companies often chose to either copy successful sites or construct websites that mirror their offline stores (Rosen and Purinton, 2004).

Unlike traditional information systems, e-commerce systems contain characteristics of both an information system and a marketing channel, thus involving both machine and human elements subsumed in the computer/human interface. Effective web design requires an examination of both these factors from the user's viewpoint to ensure web sites provide required elements. Guidelines for creating more effective online shopping experiences come from Chen e al. (2002), who suggest e-tailers must: 1) make users feel comfortable; 2) create sites that are fun to use; 3) entice consumers to spend more time and revisit; and 4) increase the likelihood of a purchase. This rubric lacks the specificity necessary to determine the suitability of specific design elements.

This study presents several advantages over prior studies. First, this study exclusively focuses on purchase intention and

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reuse intentions, rather than intermediaries, as has been the focus of much of the existing research on web design. While these intermediating factors are clearly important, their link to the overarching managerial goal of online purchases has not been unequivocally established. Thus, a focus on elements directly impacting such purchases has a great deal of managerial import. We provide this by critically examining both machine and human elements of web design, first categorizing design elements, then linking these elements to managerial outcomes. Second, this study tests a comprehensive model combining elements from several research areas; including atmospheric cues, uses and gratifications theory (U&G), the technology acceptance model (TAM), and the concept of flow introduced by Csikszentmihalyi (1997).

The next section will review extant literature to develop a model related to effective web site design. We conduct preliminary research to categorize features as computer or human factors. Finally we test the model and discuss the managerial and consumer implications of the results.

2. Background

Retail customer interface, commonly termed store atmospherics, may account for up to two-thirds of in-store purchases (Bandyopadhyay, Wieragama, and Khuller, 2000). Key elements of atmospherics in traditional brick-and-mortar stores differentiate retailers' offerings, (Baker, Grewal, and Parasuraman, 1994; Baker et al., 2002).

In an online context, atmospherics are subsumed in the computer interface, yet little is currently known about how this interface affects consumers' purchase intentions (Richard, 2005). This may be because website design issues have traditionally been evaluated within an information technology paradigm (Yang et al., 2003). A consequence is websites that employ features indiscriminately and ones whose features pass from competitive advantage to minimum consumer expectations rapidly (Piccoli, et al., 2004). Recent studies prescribe building an understanding of how potential customers view the computer interface as a way to sustain competitive advantage (Richard, 2005).

Several research areas provide insights toward building a theoretical model of web interface features. For instance, Chen and Wells (1999) have identified elements contributing to customers' positive assessments of websites; namely entertainment, informativeness, and organization. In general, these elements fulfill consumer needs for information and entertainment, while containing organizational elements that facilitate these experiences. Empirical evidence supporting the importance of these elements in effective websites is mounting (Montoya-Weiss, Voss, and Grewal, 2003). Alternatively, Wolfinbarger and Gilly (2003) present evidence for a large number of potential elements desired by online consumers. In addition, interactivity and convenience are posited as critical for web effectiveness (Piccoli et al., 2004). Finally, Richard (2005) divides environmental cues into high task relevant, like navigation, organization, and structure, and low task relevant ones, like entertainment.

Across these studies, a relatively large number of Web interface elements have been discussed, but no study has investigated them in totality (Wolfinbarger and Gilly, 2003). Similarly, empirical trials have resulted in recommendations that lack the level of specificity required for implementation. For instance, while studies link interactivity with site effectiveness, they are mute on how designers might enhance users' perceptions of interactivity. They also marginalize the impact of human elements, such as color and graphics.

2.1. Website design features

Within the Web environment, computer factors are those whose presence provides functionality (Liang and Lai, 2001). These are characterized by Richard (2005) as high task relevant. In their study, Liang and Lai (2001) categorized these elements, including technical aspects, navigation, impartiality, and information content, as computer factors. Human factors are those hedonic elements that add value to the Website by contributing to user satisfaction (Zhang and von Dran, 2000). These authors identified five categories of human factors on the Web, specifically enjoyment, cognitive outcome, user empowerment, credibility, visual appearance, and organization of informational content. These correspond well with Richard's (2005) low task relevant features.

Generally, research in this direction suggests that providing richer media with a more real environment (providing improved human factors) has a more positive influence on user involvement with the content over improved computer factors. For instance, Fogg et al. (2002) found that nearly half of all consumers paid far more attention to the superficial aspects of a site, than to its content. Similarly, Rosen and Purinton (2004) demonstrate that sensory stimuli play a significant role in promoting online sales and repeat visits. The importance of computer factors is also supported across several studies (Montoya-Weiss, Voss, and Grewal, 2003).

2.2. Technology acceptance model

TAM is among the most commonly employed theories for examining technology acceptance (Davis, 1989). TAM is based on two specific behavioral beliefs that affect behavioral intentions, specifically perceived ease of use (PEOU) and perceived usefulness (PU). PEOU is the perception that a particular system or application is easy to use (Davis, 1989). Commonly, much of the effect of PEOU on behavioral intentions is mediated through PU (Kaplan, Schoder, and Haenlein, 2007) or it has no impact on behavioral intentions (Venkatesh and Morris, 2000). In addition, the effect of PEOU diminishes as users become familiar with a technology (Gefen, 2003). In our context, most users are already familiar with studied technologies, thus we expect that the impact of PEOU will be minimal. In light of these findings, this study excludes PEOU's impact on consumer attitudes toward an e-store. This conforms to recent research (Flavian, Guinaliu, and Gurrea, 2006).

PU is defined as the degree to which a person believes that using a technology would enhance his or her performance (Davis, 1989). PU, unlike PEOU, does have a substantial impact on behavioral intentions. In fact, Venkatesh and Morris (2000)

found the effect of PU was much greater than the effect of PEOU on behavioral intentions.

Recently, Calisir and Calisir (2004) examined various usability factors affecting end-user satisfaction and found that system capability and user guidance (computer factors) are determinants of PU. Van der Heijden (2003) similarly supports the role of human factors on PU. Further, website design features such as menus, icons, and links (computer factors), and colors, graphics, and music (human), are specifically intended to enhance usability (Song and Zinkhan, 2003). In other words, well-constructed sites containing positive computer factors may make transaction processes easy; increasing perceived usefulness. Factors that make websites fun, attractive, and appealing (human factors) may also increase the usefulness of the site (Chen and Wells, 1999). This study, therefore, hypothesize that:

H_1. A) computer factors and b) human factors are positively related to perceived usefulness.

2.3. Uses and gratifications

Shoppers are motivated by a variety of psychosocial needs apart from those strictly related to acquiring products. With this view, a growing body of literature employs the uses and gratifications (U&G) approach to study the use of the Internet as a shopping venue (e.g., Chen and Wells, 1999). U&G theory posit that individuals use particular forms of mass communication to meet specific needs. If these needs are gratified, it is likely that users will repeat the experience (Katz, Gurevitch, and Haas, 1973).

Informational content is considered one of the need-satisfying functions derived from media communications, according to the extended U&G theory (Ducoffe, 1996). A website is informative if it allows prospective customers to evaluate among alternatives to reach satisfying exchanges (Montoya-Weiss, Voss, and Grewal, 2003; Ducoffe, 1996). Human factors, such as using terminology familiar to users, rather than computer jargon, allow users to get desired information in less time. Computer factors that affect the arrangement of information, including factors such as page length and number of links, are also very important in determining informativeness (Schneiderman, 1996). This study, therefore, hypothesizes that:

H_2. A) computer factors and b) human factors are positively related to informativeness.

Lack of entertainment and social interaction are believed to be one disadvantage of e-commerce (Liebowitz, 2002). One study finds that entertainment value is a significant factor distinguishing the highest-rated and lowest-rated websites (Eighmey, 1997). A website's entertainment value is expected to be important through its ability to enhance the experience of visitors to the site (Ducoffe, 1996). U&G research indicates that the entertainment value of a commercial exchange lies in its ability to fulfill the audiences' needs for escapism, diversion, aesthetic enjoyment, or emotional release (Ducoffe, 1996). Incorporating human factors, such as humor, in website design may serve these entertainment purposes. Thus:

H_3. Human factors are positively related to perceived entertainment.

Irritation is an unintended outcome of a website (Koufaris, 2002). It can be caused by website elements that consumers find annoying or offensive (Ducoffe, 1996) or feelings of confusion, distraction, and messiness due to the organization of the website (Chen and Wells, 1999). Prior studies show that disorganized websites lack effectiveness; generating strong negative evaluations of their advertising value and intentions to return (Forrester Research, Inc. 2001). Meanwhile, Internet features that help organize the site will result in lower levels of irritation. Conversely, disorganized websites, containing features like broken links, inappropriate use of color, graphics, or animation, may irritate the user. Since these represent both human and computer factors, we hypothesize that:

H_4. A) computer factors and b) human factors are positively related to perceived irritation.

2.3.1. Attitude toward the site

According to Eighmey (1997), a successful website is accomplished through the intersection of information and entertainment, suggesting both are important for positive evaluations. Chen and Wells (1999) propose that attitude toward the site indicates the online shoppers' "predispositions to respond favorably or unfavorably" (p.20). Several studies have demonstrated that attitude toward the site is positively influenced by PU (Chen, Gillenson, and Sherrell, 2002). Furthermore the U&G literature supports that a website high in perceived informativeness, entertainment, and low in irritation is likely to generate a favorable attitude toward the site (Chen, Clifford, and Wells, 2002). Entertainment has also been linked with website satisfaction (Alpar 2001), attitude toward the site (Chen, Clifford, and Wells, 2002), and intentions to return (Koufaris, 2002). Whether the effect of informational content and entertainment on intentions is direct or mediated through attitude toward the site is not clear from previous studies, since authors have tested one or the other of these variables, but not both. Hence, we propose only the mediated effect, since this appears the most intuitive effect and mirrors the effect of advertising content on behavioral intentions (MacKenzie and Lutz, 1989). There is similar evidence for a link between irritation and attitude toward the site (Chen, Clifford, and Wells, 2002). Thus:

H_5. Attitude the toward site is a) positively related to perceived informativeness; b) positively related to perceived entertainment; c) negatively related to perceived irritation and d) positively associated with perceived usefulness.

2.3.2. The concept of flow

Hoffman and Novak (1996) propose that online flow is a cognitive state experienced during navigation. Csinkszentmihalyi (1997) characterizes online flow as involving machine interactivity, enjoyment, loss of self-consciousness, and as self-reinforcing. This cognitive state has been characterized as an "optimal experience"

that is "intrinsically enjoyable" (Csikszentmihalyi, 1997). Flow has been linked with other types of consumer activities where the individual becomes so engrossed with the activity as to create a pleasurable experience (Mannell and Jiri, 1988).

Hoffman and Novak (1996) argue that an online shopping environment can bring about a state of flow, which in turn leads to more browsing and, ultimately, purchase. According to their model, online flow is determined by: 1) high levels of skills and control; 2) high levels of challenge and arousal; 3) focused attention; and 4) interactivity and telepresence. Meanwhile, Smith and Sivakumar (2004) propose that flow facilitates online behaviors such as browsing, shopping, and repeat purchases. Indeed, some researchers view flow as central to human-computer interactions and have empirically assessed the capacity of flow to explain the use of computer systems (Ghani and Desphande, 1994; Koufaris, 2002).

Novak et al. (2000), found that 47% of users experienced flow on the Internet at some point. It is believed that, as computing power increases and broadband services are adopted, greater interactions with computers will generate improved flow and provide a better shopping experience. With new technological possibilities, viewers' attention will increase and these virtual environments will be perceived as more interesting. Thus, the belief is that consumers who are deeply engrossed in a site that is visually appealing, entertaining, informative, or perceived to be useful may experience a state of flow. Therefore, this study presents the following hypotheses:

H_6. Perceived flow is a) positively related to perceived informativeness; b) positively related to perceived entertainment; c) negatively related to perceived irritation and d) positively associated with perceived usefulness.

2.3.3. Online shopping intensions

A person's intention to revisit a website is seen as a result of his/her attitude toward using the technology involved in the site (Koufaris, 2002). Song and Zinkhan (2003) specifically identify behavioral intentions associated with website usage as: repeat purchases; repeat visits to the website; recommendation of website to others; and positive remarks or comments about the website. This study focused on the most commonly referenced online behavioral intentions – intention to purchase and intention to return – as these relate more directly to successful e-tailing and have been corroborated in several studies. Specifically, this study hypothesizes that:

H_7. a) Intention to return to the website and b) intentions to purchase from the website are positively related to attitude toward the website.

Little is known about how flow functions within websites and, while the relationship of flow with online shopping has been conceptualized, it has not been empirically tested (Smith and Sivakumar, 2004). The conceptual link is based on evidence of a relationship between flow and enjoyment in other contexts, such as gaming, sports, and work (Hoffman and Novak, 1996). The flow state is perceived as so pleasurable that individuals want to re-experience it as often as possible (Smith and Sivakumar, 2004). These authors propose that individuals will engage in online shopping as an extension of the pleasurable flow experience. Hoffman and Novak (1996) propose that flow has a number of positive marketing consequences, including increased consumer learning, exploratory behavior, and positive affect that arguably lead to intentions to return to the site. Furthermore, Koufaris (2002) more explicitly examined how flow experienced by consumers visiting an Internet-based store for the first time can influence their intentions to return to the site and likelihood to make unplanned purchases during their visit. Thus, we propose:

H_8. a) Intention to return to the website and b) intentions to purchase from the website are positively related to the perceived level of flow.

3. Methodology

3.1. Phase I. Classification of web interface features

First, we grouped interface features into computer and human factors by asking users with various levels of experience to sort a large number of website features into each group. This was deemed necessary since the computer environment is sufficiently different to make findings from print and electronic media less effective and the potential list of content options is vast (Rosen and Purinton, 2004). We initially started with a list of web interface features used by past researchers (e.g., Liang and Lai, 2001). The list was refined by comparison with several existing Internet checklists and interviews with Internet users. The final lists contained features comprising computer factors (e.g., dropdown menus, buttons, radio and check boxes, etc.) and human factors (background color, visual images, information density, etc). To ensure clarity, the lists of features were examined by experts on the subject, resulting in several changes in wording and deletion of redundant items were made. Thus, the final instrument of 60 features contained substantial face validity.

Undergraduate business students at a major Southern university were first divided into two groups based on prior internet experience — the first group (experts) self-selected based on agreement with the statement that they used the internet extensively over a number of years (N=48) while the second group (novices) contained the remaining students (N=39). Extant research suggests user needs vary based on experience, so the segmentation was made to control for this variable (Navarro-Prieto, Scaife and Rogers, 1999). However, no differences (at the .05 level) were detected between the groups with respect to which features were sorted into which list, so results were combined. Each participant was randomly directed to either www.dell.com or www.landsend.com to simulate the purchase of a customized laptop computer or clothing, respectively. Respondents were asked to spend about 20 min developing an understanding of each site's features and completing the shopping simulation task before completing the questionnaire. Students were also provided with a definition of the two factors and examples of computer factors and human factors to aid in their categorization.

3.1.1. Results of features classification

Among the original 60 features, 23 were classified as computer factors and 12 as human features, based on a 75% inter-rater agreement with the classification. The remaining 25 features were of an indeterminate nature and were eliminated from further use. The reliability of the features classification was assessed by examining inter-rater reliability using a measurement of how well 'novices' and 'experts' agreed with their classifications. This resulted in a Kappa (κ) of 0.69; demonstrating substantial inter-rater reliability (Altman 1991).

3.2. Phase II: model testing

Two separate samples were used to refine the survey instrument and test hypothesized relationships. The first sample involved undergraduate students at the same university, while the second used a random sample of respondents drawn from an online consumer panel of U.S. Internet users. Respondents were alternately assigned to one of two e-commerce websites where they were asked to simulate a specific purchase; then answer questions regarding their shopping experience. Students (N=154; 77 from each site) completed the survey; while 266 panel members (155 from website 1 and 111 from 2) completed the survey from the 2500 randomly selected panel members. The student sample was used as a pre-test for the survey instrument and to test reliability of the items prior to deployment of the panel survey. This resulted in refinements of the instrument and the online procedure. The panel sample was used to test hypothesized relationships.

ANOVA tests suggested responses did not vary (at the .05 level) based on which website the respondent visited, hence the panel data from the two websites were combined. Non-response bias was assessed using an extrapolation method comparing late and early respondents (Armstrong and Overton, 1977). No differences were detected across either demographic or substantive variables, suggesting no substantive non-response bias.

The student sample was primarily Hispanic, with a nearly equal distribution between male and female respondents. The non-student sample was slightly skewed towards women (53%), Caucasians (49.6%), and was also relatively young (18 to 45 years, 49.3%). In addition, about 70% of subjects reported they had shopped online in the past. Their experience supports our decision to exclude PEOU from the model, as mentioned earlier.

3.2.1. Measurement instrument

All constructs were assessed using 5-point Likert-type scales using very satisfied and very dissatisfied as the anchors, unless otherwise noted. Ducoffe's (1996) three-item scales were adapted to measure informativeness, entertainment, and irritation using the original 7-point Likert-type scales with definitely agree and definitely disagree as anchors. Perceived usefulness was operationalized using the TAM model (Davis, 1989). Attitude toward the site was composed of six items adopted from Chen and Wells (1999). Purchase intentions and intention to revisit were assessed using Yoo and Donthu's (2001) four-item and two-item 7-point Likert-type scales, respectively. In assessing flow, Hoffman and Novak (1996) suggested its antecedents and consequences must also be measured. Thus, the scale developed by Koufaris (2002) seemed most applicable in the online shopping context and was adapted for this study. The flow scale is multidimensional and composed of four scales measuring enjoyment, concentration, control, and challenges. The instrument also contained the human and computer factors resulting from Phase 1.

The study also identified and examined the influence of potential covariates as a control measure using MANCOVA. These included demographic characteristics, specifically age, gender, income, and education and usage characteristics. No impact was detected at the .05 level of significance. Appendix A contains final items in each measure.

The reliability and validity of these scales were first assessed using the student sample and later cross-validated with the non-student sample. Psychometric assessment of the scales' properties employed reliability assessment, inter-item correlations, and confirmatory factor analysis (CFA). As a final step in scale purification, λ loadings from CFA were evaluated. Results were higher than .5 and t-values were statistically significant at the .05 level. Reliability analysis was first assessed using Cronbach's alpha (see Table 1). In addition, the composite reliability (ρ), of the constructs was evaluated. All scales demonstrated acceptable Cronbach's alphas and composite reliabilities (Bagozzi and Yi, 1988; Nunnally and Bernstein 1994). The original 35 website features that were characterized through inter-rater reliability into either computer or human factors were evaluated using

Table 1
Correlation matrix and reliability analysis

Construct	1	2	3	4	5	6	7	8	9	10	ρ
1. Human factors	.77[a]										.77
2. Computer	.25**	.83[a]									.85
3. Entertainment	.39**	.01	.90[a]								.91
4. Informativeness	.42**	.04	.71**	.85[a]							.88
5. Irritation	.−31**	−.11	−.49**	−.42**	.93[a]						.97
6. Usefulness	.29*	.04	.69**	.6**	.44**	.91[a]					.96
7. Attitude	.45**	.08	.75**	.65**	.41**	.69**	.92[a]				.94
8. Flow	.38**	.14	.68**	.46**	.42**	.57**	.64**	.76[a]			.96
9. Int purchase	−.10	.29*	.51**	.31**	.17	.44**	.27**	.36**	.97[a]		.97
10. Int return	.26*	.39*	.53**	.47**	.3**	.39**	.35**	.36**	.81**	.94[a]	.95

**p<0.01, *p<0.05, ρ−composite reliability.
[a] Cronbach's reliability coefficient.

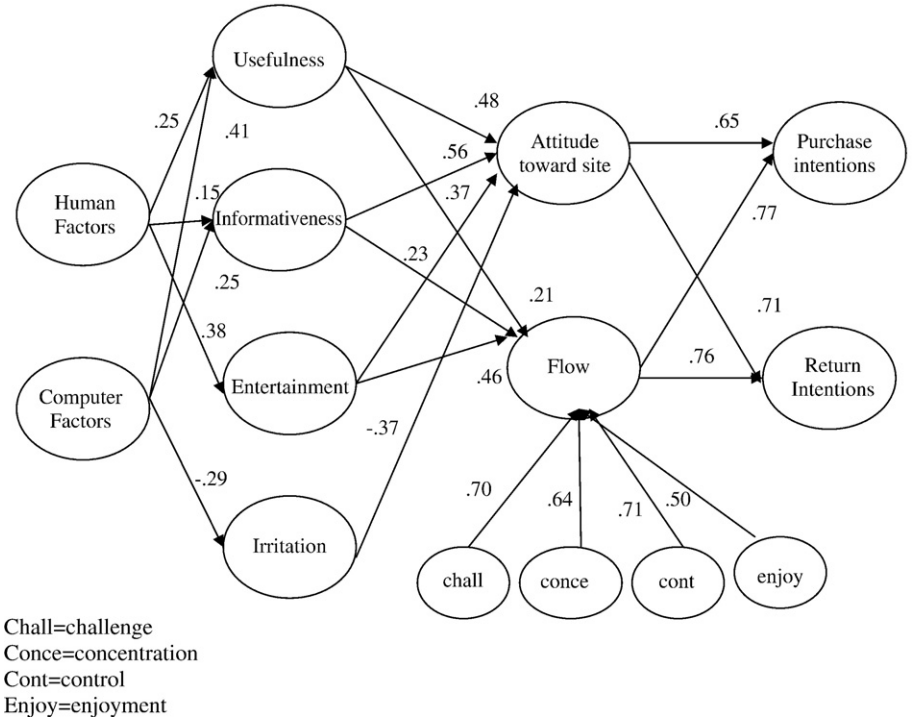

Fig. 1. LISREL results of model fit.

Exploratory Factor Analysis (EFA). The number of interface features was reduced using item-total correlations (from reliability analysis) and factor loadings to a more interpretable number of items. This resulted in 7 items clearly assigned as human factors ($\alpha = .79$) and 15 as computer factors ($\alpha = .86$). The reliability of each exceeded established norms (Nunnally and Bernstein 1994).

Overall, the measurement model exhibited a reasonable fit with the sample data, supporting validity. Fit measures used to assess this model included the ratio of χ^2 to the degree of freedom (χ^2/df), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Normed Fit Index (NFI). The results for the measurement model suggested good fit of the model to the data with χ^2/df ratios less than the threshold value of 3.0 (Bollen, 1989). RMSEA values were below the accepted .08 threshold (Byrne, 1998; Jöreskog and Sörbom, 2003), while values of overall fit (specifically CFI and NFI) were all above the threshold (.9) for acceptable model fit (Byrne, 1998). Furthermore, the Average Variance Extracted (AVE) for each construct also demonstrated acceptable discriminant validity by exceeding the .5 threshold (Bagozzi and Yi, 1988; Fornell and Larcker, 1981).

3.3. Hypothesis testing

Structural Equation Modeling (SEM) was conducted using LISREL 8.53 (Jöreskog and Sörbom, 2003). The results showed a good fit between the data and the model, as reflected by the RMSEA of .051; NFI of .95, and CFI of .98. The only statistic not indicative of good fit was the chi-square statistic of 5369.89 ($p = 0.0$; $df = 1252$), which is very sensitive to even minor variations in fit (Jöreskog and Sörbom, 1993). The path coefficients of the structural equation model provided direct evidence of hypotheses supported (see Fig. 1). Results suggested that human factors were influential on perceptions of usefulness, informativeness, and entertainment, but had little effect on perceived irritation related to the site and the signs of the coefficients were consistent with those hypothesized, thus supporting Hypotheses 1–3 but rejecting Hypothesis 4. Computer factors, as hypothesized in Hypotheses 1, 2, and 4, impacted usefulness, informativeness, and irritation and, again, the signs were consistent with hypothesized relationships. Thus, the effects of computer and human factors on these elements were different, with the computer factors having a more influential impact on the consequent variables than human factors.

The impact of perceived usefulness and entertainment value on both attitude toward the site and flow was much stronger than the impact of the other uses and gratifications constructs. This supports Hypotheses 5 and 6, except for H 5 c. Thus, while surprising that human factors did not impact perceived irritation; their strong impact on these more influential variables suggests their importance in website design. Meanwhile, the impact of the intermediary outcomes of attitude toward the site and flow on more managerially significant outcomes was significant, with flow having a more influential effect on these outcomes. This supports Hypotheses 7 and 8.

4. Discussion

In recent years, usability research has seen a surging interest in improving websites. The current research responds to this trend by proposing a model to explain consumer online shopping

intentions. In a practical sense, web design is critical in building customer relationships, facilitating customer support, and converting visitors into customers in the online environment (Ghose and Dou, 1998). The absence of theoretically-based guidance for Internet design has resulted in over-blown technologies that may irritate or frustrate the online user rather than aiding the user in undertaking shopping tasks. If e-tailers want to appeal to their customers, they must know what the latter prefer. Successful consumer relation management should be based on an in-depth understanding of the consumers' minds and hearts based on theoretical research.

Few studies have identified those technology features that motivate consumers to use online shopping; stopping short by assessing website satisfaction or attitude toward the site. The current study contributes towards this understanding of online purchases as a function of features contained in the website, which has several academic and practical implications. Further setting this research apart from previous research that often focuses attention on observable and tangible antecedents of online shopping adoption (e.g., Lohse and Spiller, 1998); the current study emphasizes both utilitarian and hedonic characteristics, which can be referred to as computer and human factors and the individual perceptions and attitudes toward website use for online shopping. Moreover, this study combines not only a large number of these features, but links them in a comprehensive way to several different theories posited to explain online evaluations, thus providing a means to evaluate the relative impact of theoretical variables across these studies in explaining online buying behavior.

This study's reported empirical findings indicate that cognitive and psychological factors do have meanings when we attempt to understand what motivates the online shopper. The study finds that both computer factors and human ones are necessary antecedents to online shopping, albeit indirectly through attitudes toward the site and flow. Significantly for scholars and e-commerce practitioners, the relative impact of human factors over computer ones in driving positive online behaviors is distinguishable. For instance, the impact of human factors is stronger in evaluations of usefulness and entertainment, which are more influential antecedents to attitude toward the site and flow that, in turn, impact purchase and return intentions. This suggests increased emphasis on these elements in the development, testing, and ultimate design of websites. Accordingly, Internet designers may add human features such as the use of humor, appealing graphics, or 3d virtual models to attract, retain, and motivate consumers to purchase from the site. On the other hand, computer features should be considered primary in every site design to generate positive perceptions of usefulness, and informativeness, while avoiding irritation; thus enabling consumers to understand the site layout and navigate in their search for products and services offered at the site. This irritation has a number of intermediate negative effects, including less favorable attitudes toward the site. The impact of flow on both purchase intentions and intentions to return is strong and further highlights the importance of creating a conducive online environment to promote positive behavioral outcomes.

From a practitioner's standpoint, the study identifies specific features that might increase online purchases and intentions to return. These features offer not only tools they can use in developing their websites, but tools they can use to have consumers evaluate existing websites. These features are listed in Appendix A. The additional features categorized initially as either computer or human factors in Phase I of this study might also supplement this list.

5. Limitations and future research

This study is not without limitations. A first limitation of this study is that it is cross sectional. However, websites are dynamic in their developments. Therefore, a longitudinal survey is needed to identify the changing roles of Internet features as perceived by consumers along side Internet technology advancements and consumer continued use of the Internet services. The use of students as a population for Phase I survey experiment poses as a second limitation. This study recognizes that student samples have often been criticized for their lack of generalizability and their inability to represent the population of interest (Gordon, Slade, and Schmitt, 1987), but may be valid in this case where online shoppers tend to be younger and more educated than the general population.

It is reasonable to assume that other e-commerce markets might react differently to some of the factors identified in this study. For example, entertainment might be of lesser importance for the business-to-business market relative to the consumer market. Investigating B2B market behavior, therefore, would improve the understanding managers have of how to attract potential customers to their shopping sites.

Finally, there are many other factors that can influence the shopping experience. For example, with the proliferation of broadband technologies, the shopping experience becomes richer and more engaging. Will we see consumers demanding even more Internet features in exchange for loyalty? Or will we see them lose more control over what they see and do on the Internet? Future research can study the impact of other variables such as time-related factors (e.g. download time), telepresence and other interactive related factors of Internet shopping.

Appendix A

A.1. Computer factors

Indication of security/secure site
Clear displays of page contents
Presence of clear menu items on each page
Presence of shopping cart
Up-to-date information
Un-do button
Assurance of privacy
Payment options
Purchase tracking services
Company logo
Consistent web page design
Declaration of intended use
Logical webpage information
Offers order confirmation
Product images as thumbnails

A.2. Human factors

Global search feature
Humor
Language options
Links to similar websites
Feedback features
Gift services
Number of visitors to site

A.3. Entertainment

The website is enjoyable
The website is pleasing
This website is entertaining

A.4. Informativeness

The website is a good source of product information
This website supplies relevant information
This website is informative about the company's products

A.5. Irritation

The website is annoying
The website is frustrating
This website is irritating

A.6. Usefulness

Using this website can improve my shopping performance
Using this website can increase my shopping productivity
Using this website can increase my shopping effectiveness
I find using this website useful

A.7. Attitude toward the site

This website makes it easy for me to build a relationship with this company
I am satisfied with the service provided by this website
I feel comfortable in surfing this website
I feel surfing this website is a good way to spend my time
Compared with other websites, I would rate this one as one of the best

A.8. Flow

Uninteresting–Interesting
Not fun–Fun
Dull–Exciting
Enjoyable–Not enjoyable
I feel confused about what to do
I feel agitated
I do not feel in control
I am not deeply engrossed
I am not absorbed intensely
My attention is not focused at the website
I do not fully concentrate on the website
How challenging is the website
How complex is the website

A.9. Purchase intentions

I will definitely buy products from this site in the near future
I intend to purchase through this site in the near future
It is likely that I will purchase through this site in the near future
I expect to purchase through this site in the near future

A.10. Revisit intentions

I am likely to revisit this site in the near future
I am encouraged to revisit this site in the near future.

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