

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/309562722>

An experimental investigation of the influence of website emotional design features on trust in unfamiliar online vendors

Article in *Computers in Human Behavior* · February 2017

DOI: 10.1016/j.chb.2016.10.018

CITATIONS

67

READS

1,661

2 authors:



Supavich (Fone) Pengnate
North Dakota State University

15 PUBLICATIONS 100 CITATIONS

[SEE PROFILE](#)



Rathindra Sarathy
Oklahoma State University - Stillwater

77 PUBLICATIONS 1,794 CITATIONS

[SEE PROFILE](#)



Full length article

An experimental investigation of the influence of website emotional design features on trust in unfamiliar online vendors

Supavich (Fone) Pengnate^{a, *}, Rathindra Sarathy^b^a Department of Accounting, Finance and Information Systems, College of Business, North Dakota State University, Barry Hall 246, NDSU Dept. 2400, PO Box 6050, Fargo, ND 58108, USA^b Department of Management Science and Information Systems, Spears School of Business, Oklahoma State University, 221 Business, Stillwater, OK 74078, USA

ARTICLE INFO

Article history:

Received 24 April 2016

Received in revised form

10 October 2016

Accepted 19 October 2016

Available online 29 October 2016

Keywords:

Initial trust

Unfamiliar website

Website design

Emotional design

Website visual appeal

Website usability

Gender effects

ABSTRACT

Online trust is considered as a critical factor in online shopping, especially when dealing with unfamiliar vendors. This research provides empirical findings from an experimental investigation of the influence of website emotional design features, visual appeal and ease of use on users' perceptions of usefulness, trust, as well as intention to use websites. The proposed research model was developed based on theories in the human-computer interaction and Information Systems domains. An experiment was conducted using a hypothetical website with four conditions of treatment manipulation. The study revealed that visual appeal can produce a greater influence on customers' evaluation of trust, than ease of use. It was also found that both visual appeal and ease of use are contributing factors in developing online trust among male customers, with visual appeal dominating trust formation among female customers.

Published by Elsevier Ltd.

1. Introduction

Establishing online trust is a challenge faced by the vast majority of online vendors, especially by those with newly established websites or by vendors who do not enjoy a brand reputation. For such vendors, the website is the primary means by which online consumers evaluate whether or not to engage or conduct business with the vendor. Consequently, the design features of the website should play a large role in establishing trust. Even though practitioners have proposed various website strategies for establishing trust in relatively unknown online stores, the mechanisms by which trust is built in such computer-mediated environments are still not well understood (e.g., Lankton, McKnight, & Thatcher, 2014; Schlosser, White, & Lloyd, 2006). Therefore, this study examines the affective and cognitive aspects of website design features and proposes that these design features play a significant role in developing online trust, and that affective aspects such as visual

appeal of the website may be more important in the unfamiliar vendor context. In this study, drawing from Norman's (2004) emotional design framework, we develop a conceptual research model and investigate on how website characteristics influence customers' trust in unfamiliar online vendors.

A substantial body of literature in the Information Systems (IS) and human-computer interaction (HCI) disciplines has examined the relationships between website design features and online trust. Much of that literature has largely focused on the cognitive aspect of design features, especially ease of use. Ease of use reflects the features of a website which can help or hinder users as they acquire knowledge or access different sections of a website (Cyr, 2008; Garrett, 2003). On the contrary, somewhat less attention has been devoted to affective aspects such as the design of website user experiences that requires emotional involvement in an online commerce activity. However, the affective dimension has received increasing attention in recent years (Hassenzahl & Monk, 2010; Hassenzahl, 2004; Norman, 2004; Tractinsky, Cokhavi, Kirschenbaum, & Sharfi, 2006). Furthermore, relatively few studies have been carried out in the context of unfamiliar websites. The investigation of how online trust can be established in unfamiliar vendors is especially important because of the growing

* Corresponding author.

E-mail addresses: fone.pengnate@ndsu.edu (S. Pengnate), rathin.sarathy@okstate.edu (R. Sarathy).

number of businesses that are choosing the Internet as an alternative channel for developing a brand reputation, for transacting with and servicing customers and investors, or simply for public relations purposes (Subramaniam, Shaw, & Gardner, 2000; de Kunder, 2012). In addition, contrary to the majority of prior research in our context that have used non-experimental survey approach (Cyr, 2008; Hampton-Sosa & Koufaris, 2005; Vance, Elie-Dit-Cosaque, & Straub, 2008; Zhang, Prybutok, Ryan, & Pavur, 2009), we use an experimental design in our investigation because of the potential for better control, higher internal validity, and greater replicability of results. The experiment can also control for confounding factors such as characteristics of individuals in a group or environmental factors that can influence the outcome (Creswell, 2002; Pedhazur & Schmelkin, 1991).

In the literature, website design features have been classified in multiple aspects. For example, Hassenzahl (2004) proposed a model classifying website characteristics into pragmatic and hedonic attributes. Garrett (2003) developed a model categorizing website design features into information design, navigation design, and visual design. In the current research, we use Norman's (2004) emotional design model to explain the relationships between website characteristics and the user experience. The emotional design model fits the goals of this study because it is a comprehensive model that categorizes website design features broadly into affective, cognitive, and reflective modes of users' information processing. Norman's (2004) model describes different levels of aesthetics appreciation which should receive greater attention from researchers, as well as website designers. Consequently, our primary goal is to conduct an experiment to investigate how both affective and cognitive aspects of website design features, based on Norman's (2004) framework of emotional design, influence users' trust perception and intention to use unfamiliar websites.

2. Background and literature review

2.1. Website design and the emotional design framework

Website design features have been found to be key factors in influencing users' responses and experience (Nielsen & Loranger, 2006). To understand the impact of website design features on users, researchers have taken multiple approaches. Some studies have focused on specific, low-level aspects such as color (e.g., Coursaris & van Osch, 2016; Cyr, Head, & Larios, 2010), layout (Geissler, Zinkhan, & Watson, 2006), images (e.g., Karimov, Brengman, & Van Hove, 2011), navigation (e.g., Cyr, 2008; Flavián, Guinalíu, & Gurrea, 2006), and multimedia elements (Hong, Thong, & Tam, 2004). On the other hand, other studies investigated design features at a higher level of abstraction, for example, hedonic and pragmatic dimensions of design features (Hassenzahl, 2004).

We believe users' evaluations and responses are generally driven from the overall impression of a website rather than specific elements. Therefore, we aim to examine the holistic aspects of website design features that can provide a better understanding of a comprehensive user's reaction to websites. Specifically, our focus is on users' perceptions toward website design features, which include visual appeal and ease of use. In this study, perceived website visual appeal refers to visual aesthetic impressions of a website (Lavie & Tractinsky, 2004) and perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989).

Website visual appeal is an over-arching concept which has been classified into two types — classical and expressive (Lavie & Tractinsky, 2004). While classical aesthetics is primarily

characterized by pleasant, clear, clean, and symmetric designs, expressive aesthetics considers creativity, fascinating, and sophisticated designs. These two dimensions have been adopted by past studies that investigated website aesthetics (e.g., Coursaris & van Osch, 2016; Lindgaard, Dudek, Sen, Sumegi, & Noonan, 2011; Tractinsky & Lowengart, 2007).

In the HCI literature, Norman's (2004) emotional design model is one of the most prominent models used to explain how different aspects of a product influence emotions, which subsequently affect cognition and user behavior (Sharp, Rogers, & Preece, 2007). The model has been broadly adopted by HCI researchers because it examines how attributes of a product cause emotional responses in users, such as feeling at ease, being comfortable, and enjoying the experience of using interactive products (Hassanein & Milena, 2004; Lavie & Tractinsky, 2004; Sharp et al., 2007; Tractinsky & Lowengart, 2007). According to Norman (2004), the emotional design model classifies users' mental processing into three levels—the visceral level, the behavioral level, and the reflective level. This framework is consistent with prior conceptual and empirical research in cognitive science (e.g., Sweller, van Merriënboer, & Paas, 1998), which typically distinguishes among three distinct levels of information processing — affective (cf. visceral), cognitive (cf. behavioral), and reflective thought (cf. reflective).

The first level, visceral, is where the aesthetics of a system (a website in this study) dominates human biological responses, which then leads to rapid judgment (in milliseconds) of a system (e.g., website)—whether it is good or bad, safe or dangerous and whether to approach or avoid (Lindgaard, Fernandes, Dudek, & Brown, 2006; Norman, 2004). The visceral level also evokes users' emotional responses to stimuli, e.g., pleasure, joy, and fear (Sharp et al., 2007). For example, on seeing a website with very poor visual design, users may experience fear, causing them to leave the website (Éthier, Hadaya, Talbot, & Cadieux, 2006). The second level of the emotional design model, behavioral, involves active and task-driven use of the website. For example, experienced computer users effortlessly work with computers or browse websites for well-learned routing or familiar operations (Gefen, Karahanna, & Straub, 2003). The last level, reflective, is at the top of the emotional design model. This level is associated with a higher level of cognition that reflects on one's cognitive processing. This level entails conscious thought, where users can generalize their evaluations across the behavioral and visceral levels, for example, a website's informativeness or usefulness (Wang & Emurian, 2005).

2.2. Trust in an unfamiliar website

Although understanding how trust is established in customers remains a crucial issue in all online settings, it is particularly important for websites with no prior or brand reputation. Since few studies have examined the impact of website design features on trust specifically in the unfamiliar website context, we review studies in the general online context.

Trust has been proposed as a critical determinant of customers' responses (Hong et al., 2004; Kim, Ferrin, & Rao, 2009; Ratnasingham, 1998) and has been found to be related to satisfaction (Flavián et al., 2006), perceived website usefulness (Gefen et al., 2003), intention to use a website (Jarvenpaa, Tractinsky, & Vitale, 2000; Pennington, Wilcox, & Grover, 2003; Schlosser et al., 2006), intention to buy from a website (Lim, Sia, Lee, & Benbasat, 2006), and e-loyalty (Cyr, 2008; Flavián et al., 2006). In the mobile commerce context, trust has been considered as a key predictor of customers' intention to use mobile websites (Cyr, Head, & Ivanov, 2006; Siau & Shen, 2003).

According to McAllister (1995), trust consists of cognitive and affective dimensions. Cognition-based trust relies on rational

evaluation, available knowledge, and good reasons (Jeffries & Reed, 2000). Websites can engender cognitive-based trust primarily through attributes of vendors, such as reliability, familiarity, and professional credentials, while affect-based trust refers to emotional attachment and emotional bonds between individuals. In psychology, it has been proposed that trust (both the affective and the cognitive dimensions) develops and emerges over time (McAllister, 1995).

The focus of our study is to investigate trust in the context of unfamiliar websites. Therefore, the absence of prior experience dictates that our definition of trust be more along the lines with the notion of *initial trust* (McKnight & Chervany, 2001; McKnight, Cummings, & Chervany, 1998). McKnight et al. (1998) indicate that initial trust includes individual disposition to trust, institution-based trust and cognitive trust. Of these, cognitive-based trust is developed based on rapid, cognitive cues or first impressions, and is most applicable to our context. In the case of unfamiliar vendors, website design features behave as cognitive cues that create a first impression and establish emotional bonds between the website and users. These cues form the basis for the user to decide whether the vendor will deliver on its promise. With this in mind, we define trust as “an online customer's belief that the (unfamiliar) vendor will engage in generally acceptable practices and will be able to deliver the promised products or service” (Lim et al., 2006; Mayer, Davis, & Schoorman, 1995). This trust is developed purely on the basis of the user's first impression of the visual appeal, ease of use, and usefulness of the website (e.g., Reinecke, et al., 2013).

2.3. Influence of website design features on trust

The relationships between website design features and trust have been explored in existing studies in the IS and HCI domains, for example, security of transactions and third-party seals of approval (Kim & Tadisina, 2010; Lim et al., 2006; Pennington et al., 2003), security and privacy statements (Hu, Wu, Wu, & Zhang, 2010; Li, Sarathy, & Xu, 2011; Schlosser et al., 2006), reputation (Gefen et al., 2003; Kim & Tadisina, 2010), and content (Cyr, 2008; Cyr & Bonanni, 2005; Karimov et al., 2011; Wang & Emurian, 2005).

While online trust has been investigated in the literature, most of the studies focused on website transaction security and privacy issues. Our approach is somewhat different and is based on the creation of trust through a positive user experience with the website by its visual appeal and ease of use, rather than explicit security assurances or seals of approval, which is consistent with the few other studies in this area. For example, Cyr (2008) reported that visual design and navigation design (as an aspect of ease of use) both are significant determinants of trust in the local version of the SonyStyle™ website. Vance et al. (2008) found significant influences of visual appeal and navigational structure on trust in Amazon.com's mobile website. Zhang et al. (2009) conducted a survey on 20 Fortune companies' websites and found that both presentation quality and ease of navigation are significant predictors of trust. In the recent work of Skulmowski et al. (2016), website visual appeal and perceived usability were reported to be strongly correlated with trust, which could be formed in ultra-rapid website exposure (50 ms). In contrast, Hampton-Sosa and Koufaris (2005) found that only website appeal produces a statistically significant effect on trust. However, it is important to note that Hampton-Sosa and Koufaris (2005) conceptualized website appeal as a second-order factor, measured by two formative indicators—perceived usefulness and perceived enjoyment. Thus, website visual appeal was not investigated in their study.

In addition, while previous studies investigated effects of

website designer features on trust primarily rely on a non-experimental method to investigate such phenomena, our study employs a rigorous experiment in which confounding factors are controlled is crucial for a better understanding of how visual appeal and ease of use impact trust, especially in the unfamiliar website setting where users do not have prior knowledge about websites.

3. Theoretical foundation and hypothesis development

Our theoretical research model is shown in Fig. 1. The model was developed to test the impact of perceived visual appeal and perceived ease of use on perceived usefulness and trust, which consequently results in behavioral intention to use the website based on theories discussed in the previous section.

According to Norman's (2004) three levels of aesthetics appreciation, we posit the following hypotheses:

Hypothesis 1. *Perceived website visual appeal will result in perceived ease of use of a website.*

Hypothesis 2. *Perceived website visual appeal will result in perceived usefulness of a website.*

Hypothesis 3. *Perceived ease of use will result in perceived usefulness of a website.*

Drawing on the psychology literature, website features may be considered stimuli that provide executional cues to viewers' emotional responses and behaviors (MacInnis, Moorman, & Jaworski, 1991). The visual appeal of a website is especially related to emotional states of users, such as joy, liking, and fear, which were found to influence the users' evaluations of online vendors' attributes, such as trust (Cyr et al., 2006; Éthier et al., 2006; Hassanein & Milena, 2004), and perceptions of efficiency, effectiveness, and usefulness in conducting transactions online (Schlosser et al., 2006).

Such an effect can be explained by the notion of “affect as information” (Lindgaard et al., 2011; Lindgaard et al., 2006; Nisbett & Wilson, 1977; Schwarz, 1986) and as a “halo effect” of emotional responses that carries over to the evaluation of the overall quality of website as well as the vendor (Hwang & Kim, 2007; Kim & Tadisina, 2010). According to the affect-as-information framework, emotional states inform individuals about the current situation and then cause approach or avoidance behaviors, such as physical movement to further explore or avoid the object (Deng & Poole, 2010; Nisbett & Wilson, 1977; Schwarz, 1986).

In addition, in the context of unfamiliar websites, instead of being considered as simply cosmetic, visual appeal likely communicates performance, especially the vendors' quality and ability to provide products/services to the customer (Schlosser et al., 2006). Some website visual appeal features that impact trust include color (Cyr et al., 2010; Kim & Moon, 1998; Skulmowski et al., 2016), design clarity and perceived visual appeal (e.g., Cyr, 2008; Li & Yeh, 2010; Liu & Goodhue, 2012; Robins & Holmes, 2008), and human images (e.g., Cyr, Head, Larios, & Pan, 2009; Karimov et al., 2011; Wang & Emurian, 2005). Thus, in this study, we propose that website visual appeal as well as ease of use evoke an emotional state in online users which subsequently influences their perception of website trust and their evaluations of website quality and attributes. Therefore, it is posited that a user's perception of the website's visual appeal will result in the user's trust and perception of usefulness.

Hypothesis 4. *Perceived website visual appeal will result in trust in a website.*

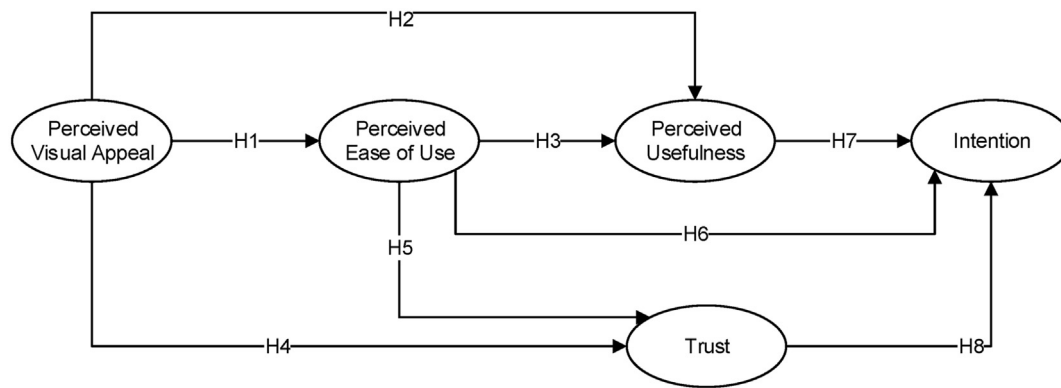


Fig. 1. Proposed research model.

Perceived ease of use is related to a website's ability to interact with its users, especially to help minimize the user's learning curve. Greater ease of use offers a comfortable environment that might color the users' perception of website quality and consequently influence perceived usefulness, trust, and intention to purchase (Flavián et al., 2006). Several studies have attempted to explain or predict the relationships between website perceived ease of use, user perceptions, and behavioral responses in the online commerce setting. Ease of use has been found to improve attitudes toward the website, which in turn, leads to positive user responses (Becker & Mottay, 2001). For example, ease of use perceived by users has shown a significant influence on trust (e.g., Cyr, 2008), satisfaction (Cyr, 2008; Lindgaard & Dudek, 2002), and intention to use websites (Gefen et al., 2003). Furthermore, previous studies have found that perceived ease of use is one of the antecedents of perceived website quality (Loiacono, Watson, & Goodhue, 2007; Palmer, 2002). Hassanein and Milena (2004) proposed that perceived ease of use represents a pragmatic attribute of a system. Pragmatic attributes are connected to the users' need to achieve behavioral goals; therefore, a system that allows for effective and efficient goal-achievement is perceived as pragmatic (Hassenzahl, 2004). Consequently, perceptions of pragmatic attributes can lead to a positive evaluation of the system, especially perceived usefulness (Hassenzahl & Monk, 2010; Hassenzahl, 2004).

Hypothesis 5. *Perceived ease of use will result in trust in a website.*

According to Davis (1989) and Davis et al. (1989), technology acceptance model (TAM) predicts that perceived usefulness and perceived ease of use are determinants of new IT system adoption. TAM is a parsimonious and robust model that predicts IT adoption in a variety of settings. An integrated model of trust and TAM has been proposed in previous research (Gefen et al., 2003), where both perceived ease of use and perceived usefulness significantly influence intention to use websites. For example, in the context of online commerce, an online vendor that is perceived as being capable of providing high quality products or services is likely to be accepted by customers. Therefore, in this study, we hypothesize a positive path between perceived usefulness, trust and intention to use websites.

Hypothesis 6. *Perceived ease of use will result in intention to use websites.*

Hypothesis 7. *Perceived usefulness will result in intention to use websites.*

Hypothesis 8. *Trust will result in intention to use the website.*

4. Methodology

4.1. Participants

Prior to a full examination of the proposed hypotheses, a pilot study was conducted with 10 graduate students at a major mid-western U.S. university to help refine potentially ambiguous items, perform manipulation checks on the website treatments, and identify possible problems in the experimental procedure. As a result, a few questions were re-worded. All the experimental website conditions were perceived as a realistic website from a legitimate vendor. In the main experiment, an invitation email was sent to 131 third and fourth year undergraduate students in business majors and to 4,000 graduate students, faculty, and staff to voluntarily participate in the experiment. Demographic information and the participants' experience with online transactions are presented in Appendix.

4.2. Website manipulations

In order to investigate how visual appeal and ease of use influence user responses, the experimental website treatment needed to (1) vary only in terms of visual appeal and ease of use, (2) represent a legitimate unfamiliar online vendor, and (3) evoke the subjects' perception of the vendor's product/service quality. Following these criteria, one of the authors who has expertise in user interface design of commercial websites created four conditions for an apartment rental company's website which varied at two levels of visual appeal and two levels of ease of use. Each of the four websites displayed the same content but varied in the levels of image quality and navigation capability, for example, use of drop-down box and calendar. Visual appeal was also manipulated at two levels by using Lavie and Tractinsky's (2004) definitions of classical and expressive aesthetics. Based on these two dimensions of aesthetics, the experimental website's visual appeal was manipulated through different choices of color harmony, image resolution, number of images, and sophistication of design. Regarding ease of use, the experimental website was also manipulated at two levels (high vs. low). We first identified the website features that users generally use and that comply with the habit of browsing a website in the experimental task—the navigation and date picker features. The website's ease of use was then manipulated to create irritation while using the website (Hasan, 2016). For instance, while the items in the menu bar were presented as a static text in the higher ease of use website condition, the menu bar was animated and the menu items were presented as a scrolling text in the lower ease of use

website condition. In addition, in the higher ease of use website condition, a date picker (calendar) feature was provided so that participants did not need to type the date in the required format manually. Although both visual appeal and ease of use of the experimental website were manipulated, we ensured the realism of all the experimental website conditions by mimicking such characteristics from legitimate websites. All four conditions of the website treatment are shown in Fig. 2. An apartment rental company's website was selected for the experiment because it is a product that users, especially the majority of our target sample—university students, would not be familiar with unless they visited the actual apartment buildings. In addition, the users' perception of the product (apartment room) quality could be evoked by viewing the images of apartment buildings presented on the website. Note that the experimental website was designed to fit the display of users' devices (e.g., desktops monitor or tablet PC's) to avoid horizontal and vertical scrollbars.

Subjects were randomly assigned to only one of the four treatment conditions. A major task was to browse the experimental website as naturally as possible for about 5–10 minutes to find apartment information and get an overall impression about the website. The subjects were then required to use the website to request an appointment reference number for an apartment showing. In order to request the appointment, the subjects needed to enter an apartment community name and pick a visiting date. Specific to the manipulation of the website's ease of use, of the four

website treatment conditions, Condition 1 and Condition 3 featured a navigation bar on the top of the web page to clearly show different communities provided by the apartment rental company. This navigation bar allowed the subjects to easily browse the website for the apartment information. In addition, when the subjects made an appointment for a visit, these two conditions enabled them to select an apartment community from a dropdown list with community names and pick a date from an embedded date picker (calendar) feature. For Condition 2 and Condition 4, we manipulated ease of use by customizing the navigation bar; neither condition offered website features that facilitated the task of obtaining the appointment reference number. We used an animated menu bar in Condition 2 to ensure high visual appeal, but the menu was designed such that it moved across the page at a slow and steady pace, so if the subjects wanted to explore another apartment community, they needed to wait for the desired items in the menu to appear. Finally, for Condition 4, we used a tree menu bar for the main navigation, which required more mouse clicks to get to the desired apartment community. Note that implementing the animated menu bar as in Condition 2 in a simple web page with low-resolution graphics and images such as Condition 4 caused the page to load noticeably slow and this could affect the results. However, this was not the case in Condition 2 since the page contained high quality images so the increase in loading time due to the moving menu was not significant. Therefore, we decided to implement an alternative navigation approach which is the tree

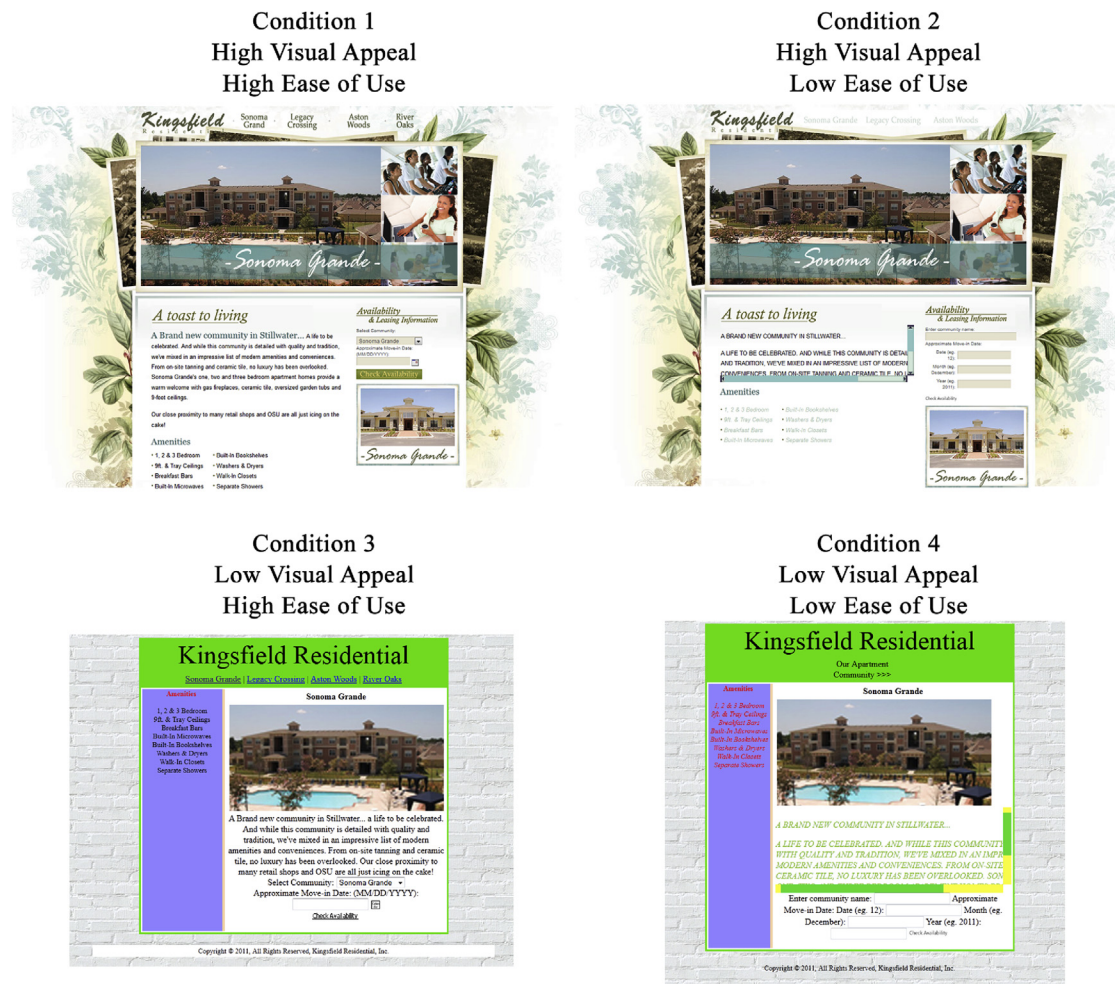


Fig. 2. Experimental websites.

menu in Condition 4. In addition, using the tree menu as in Condition 4 to lower ease of use in Condition 2 was also problematic. The tree menu caused the appearance of Condition 2 to look apparently different from Condition 1 since all the menu items must be collapsed into single item and this could affect the results. Therefore, in order to keep the visual appeal of these two conditions as similar as possible, we decided to implement the moving menu in Condition 2 instead of the tree menu. The layout and placement of the moving menu were similar to the static menu in Condition 1.

Following the completion of the task (acquire an appointment reference number), the subjects were instructed to fill out an online questionnaire about their experiences with the website they had visited. The experiment was conducted entirely online and subjects could complete the study from any computer with an Internet connection, thus increasing the task realism.

4.3. Variable measurement

Previously validated scales used in existing research in the online commerce literature were adapted for measuring variables in the research model. Some items were slightly re-worded to better fit our research context. Items in the questionnaire included the standard TAM scales of perceived usefulness and perceived ease of use adapted from Davis' (1989) and Davis et al.'s (1989) scales. Perceived website visual appeal was measured using five items adapted from Cyr et al. (2006). In this study, we did not investigate the effects of trust in sub-dimensions as proposed by McKnight et al. (1998) but instead measured trust in general as a unidimensional construct, which is better suited for understanding a more comprehensive user reaction to a website (Cyr et al., 2010; Gefen & Straub, 2003). Trust and behavioral intention to use the website were measured by items adapted from Jarvenpaa et al. (2000). All scales have previously been shown to apply well in e-commerce research and already exhibited strong content validity. The scales were assessed by a seven-point Likert scale ranging from "strongly disagree" to "strongly agree." See Appendix for the detailed scales for each construct.

5. Data analysis and results

5.1. Manipulation checks

Manipulation checks were performed to validate the manipulations of website visual appeal and ease of use of the experimental website. Subjects exposed to website treatments with higher visual appeal conditions were more likely to agree that the website is more visually attractive ($p < 0.001$) than those assigned to lower visual appeal conditions. In addition, participants who were shown website treatments with higher ease of use conditions were more likely to agree that the websites were easy to use ($p < 0.001$) than those who viewed websites with lower ease of use conditions. Therefore, overall, the manipulations on website visual appeal and ease of use were deemed successful. However, we also conducted t -test to analyze whether perceived ease of use was impacted by the different navigation approaches used in Conditions 2 and 4 (moving menu and tree menu). The results do not reveal statistically significant difference of the overall ease of use scores between these two conditions ($p = 0.711$). Thus, we can conclude that perceived ease of use measured from these two conditions are equivalent and comparable.

We then inspected the data to look for subjects that might not have paid attention to the experiment and did not browse the website for apartment information. Two questions in the questionnaire were examined to prevent such participants from

contaminating the data and analysis. These questions included (1) How many apartment communities were offered by this rental company? and (2) What was the name of the rental company? If the subjects reported wrong answers to both questions, we removed them from the data set. Consequently, after data processing, the data set contained a total of 192 usable responses.

The research model was then tested using partial least squares (PLS) analysis with SmartPLS (version 2.0) software. PLS requires fewer data points than other structural equation modeling techniques (e.g., LISREL) and is relatively robust to deviations from a multivariate distribution (Chin, 1998). Therefore, based on these considerations, PLS better fits our study. In PLS, the measurement model analysis and the structural model analysis are evaluated simultaneously.

5.2. Measurement model assessment

The measurement model was assessed for the quality of the constructs by testing reliability, convergence, and the discriminant validities of the research instrument. Measures for all constructs were adapted from studies in the existing literature where the measures had been repeatedly tested and had exhibited strong content validity. Construct reliability was assessed using composite reliability (CR) and Cronbach's alpha. As shown in Table 1, CR values ranged from 0.9396 to 0.9772 and the alpha values ranged from 0.9043 to 0.9719. The suggested value of both reliability measures should be higher than 0.7 (Hair, Tatham, Anderson, & Black, 1995); therefore, all scales were found to be reliable. Construct validity is demonstrated when there are relatively high correlations between measures of the same construct (convergent validity) and low correlations between measures of different constructs (discriminant validity) (Straub, 1989). Factor loadings from Varimax rotation of the items on the corresponding construct are presented in Appendix. As a rule, items in a construct load highly if the loading coefficient is above 0.6, and do not load highly if the coefficient is below 0.4 (e.g., Bagozzi, Yi, & Phillips, 1991; Hair et al., 1995; Straub, 1989). The constructs in the survey demonstrate convergent validity. Discriminant validity was determined to ensure that constructs differed from each other. Correlation between items in any two constructs should be lower than the square root of the average variance shared by items within a construct (Hair et al., 1995). In Table 2, the square root of the variance shared between a construct and its items is greater than the correlations between the construct and other constructs in the model. Therefore, the measures satisfy the criteria for discriminant validity.

5.3. Structural model assessment

Fig. 3 summarizes the results of hypothesis testing (t -values shown in parentheses under the paths), standardized path estimates, and the amount of variance explained in each endogenous variable (R^2). With regard to the proposed hypotheses, H1, H2, H3, H4, H7, and H8 are supported. Perceived visual appeal significantly impacts perceived ease of use as suggested by the sequential interaction between the first two levels of Norman's (2004) emotional design model. Based on both emotional design model and TAM, we hypothesized that visual appeal and perceived ease of use would significantly influence trust. However, we found only perceived visual appeal that shows strong effect on trust. As predicted by TAM, perceived ease of use and perceived usefulness are found to have significant positive effects on behavioral intention. Nevertheless, the path from perceived ease of use to intention is not statistically significant. The results also suggest that trust has a significant direct impact on behavioral intention. With respect to the variance explained, perceived visual appeal, 40.6% of the

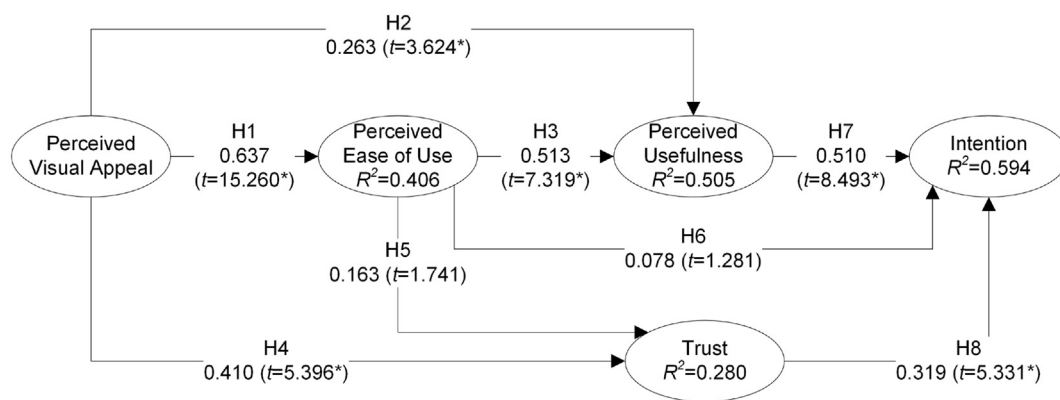
Table 1
Construct validity.

	Perceived visual appeal	Perceived ease of use	Perceived usefulness	Trust	Intention
CR	0.9676	0.9680	0.9772	0.9396	0.9731
Alpha	0.9552	0.9602	0.9719	0.9043	0.9448
AVE	0.8820	0.8344	0.8774	0.8385	0.9477

Table 2
Discriminant validity.

	Visual appeal	Ease of use	Usefulness	Trust	Intention
Perceived visual appeal	0.9391				
Perceived ease of use	0.6370	0.9134			
Usefulness	0.5903	0.6810	0.9367		
Trust	0.5139	0.4239	0.4621	0.9157	
Intention	0.6469	0.5609	0.7109	0.5881	0.9735

Note: Diagonal elements in boldface represent the square root of AVE.

**Fig. 3.** PLS model results for hypothesis testing (* $p < 0.05$).

variance explained in perceived ease of use accounts for perceived visual appeal, 28% of the variance explained in trust account for both perceived visual appeal and perceived ease of use, 50.5% of the variance explained in the perceived usefulness, and 59.4% of the variance explained in the behavioral intention. All R^2 values of the endogenous constructs in the model exceed the 10% threshold recommended by Falk and Miller (1992).

5.4. Mediating effects of perceived visual appeal and trust on the relationship between perceived ease of use and intention

One of the objectives of this study is to investigate how perceived visual appeal influences perceived ease of use and perceived usefulness. To further analyze the mediation effects of trust on the relationship between perceived ease of use and behavioral intention (Hypothesis H6), which is not supported in this study, we tested the TAM model consisting of the original constructs—perceived ease of use, perceived usefulness, and behavioral intention (Davis, 1989; Davis et al., 1989). TAM posits that intention to use technology can be explained by perceived usefulness and perceived ease of use, and that perceived ease of use can be a causal antecedent to perceived usefulness (Davis, 1989; Davis et al., 1989). The TAM model was analyzed in PLS and the results are presented in Table 3. All path coefficients as predicted by TAM are significant while the path between perceived ease of use and behavioral intention is not statistically significant in our research model. Therefore, the effect of ease of use on intention to purchase appears to be conditioned by trust and visual appeal. In addition, an analysis was conducted separately for examining the

mediating effect of trust on perceived ease of use and intention. The results from the Sobel test for mediation (Baron & Kenny, 1986; MacKinnon, Warsi, & Dwyer, 1995) supported the mediating effect of trust on perceived ease of use and intention (Sobel statistic value = 4.35, $p < 0.01$). Therefore, when trust is included in the model, the effect of perceived ease of use is mediated by trust. In all, the model can explain 46.4% of the variance in perceived usefulness and 51.7% of the variance in behavioral intention.

5.5. Effect of gender on website evaluation

Descriptive statistics of the demographic data based on gender are presented in Appendix. The data set contains a larger portion of males than females. Therefore, we conducted an additional analysis for the effect of gender in the demographic data. Based on gender, we performed independent samples t -test analysis to investigate significant differences in demographic variables. There are no significant differences between males and females with regard to online shopping experience, sending/receiving email, and reading online newspapers. In addition, the number of individuals in the age range of 18–24 in the male data set is much higher than the same age range in the female data set (61.6% vs. 32.5%). Consequently, we carried out additional PLS analyses on the proposed research model by including age as well as online experience as control variables. The results indicate that excluding age and online experience will not lead to biased conclusions.

Exploring further, we performed additional analysis focusing on the effects of gender on trust antecedents. Separate PLS models which included perceived visual appeal and perceived ease of use

Table 3
Results of TAM model analysis.

	Perceived ease of use to behavioral intention	Perceived ease of use to perceived usefulness	Perceived usefulness to behavioral intention
$n = 192$			
Path coefficient	0.143	0.681	0.613
t	2.015*	15.196*	9.110*
R^2	—	0.464	0.517

* $p < 0.05$.

as exogenous variables and trust as an endogenous variable were analyzed for each gender. Table 4 illustrates PLS results comparing the full sample with male ($n = 112$) and female ($n = 80$) subjects including effect size from R^2 different test where f^2 values of 0.02, 0.15, and 0.35 have been suggested as small, medium, and large effect respectively (Carter & Russell, 2003). For the full sample and for female subjects, only the causal path from visual appeal to trust is significant ($p < 0.001$). On the other hand, for the model with male subjects, both causal paths—from visual appeal to trust and perceived ease of use to trust—are significant ($p < 0.001$). The variance in trust explained by both website features is 28% for the full model, 31% for the male model, and 25% for the female model. Note that while perceived ease of use does not have significant effect on trust in the female subjects, its effect size is below the threshold of 0.02 for small effects.

Concerning the analysis of PLS in separate models, according to Chin (1998) and Gefen, Straub, and Boudreau (2000), the minimum sample size for a PLS analysis should be the larger of 10 times the number of items for the most complex construct, or 10 times the largest number of independent variables impacting a dependent variable. In this study, the most complex construct is perceived ease of use with six items and the largest number of independent variables predicting a dependent variable (intention) is three. Therefore, the sample size of 80 used in the female subject model is adequate for PLS estimation procedures.

5.6. The influence of different levels of website design features on trust

Some interesting findings are revealed in the analysis of the influence of perceived visual appeal and perceived ease of use on trust. Table 5 shows the average of perceived visual appeal, perceived ease of use, and trust for each of the website conditions. Considering trust, the results from ANOVA indicate that there are statistically significant differences in trust ratings among some of the website conditions. The website condition with high visual appeal and high ease of use received the highest trust rating, while the website condition with low visual appeal and low ease of use received the lowest trust rating.

6. Discussion and conclusions

6.1. Summary of findings

In this study, we conducted an experiment to investigate website design features that influence trust and examine their effects

on subsequent user behaviors within an unfamiliar website environment. The results of the experiment confirm the proposition that website trust can be evoked by website design features, and consequently, behavioral intention is then shaped by trust.

The results of the study reveal several important implications for the online commerce context. The results of analysis of the entire dataset indicate that perceived visual appeal significantly influences perceived ease of use which was previously hypothesized based on the emotional design framework (Norman, 2004). Regarding trust, we found that perceived visual appeal produces a much stronger effect on trust than perceived ease of use (std. coefficient = 0.410, $t = 5.368$ vs. std. coefficient = 0.163, $t = 1.752$). These results do not agree with those in previous studies where the relationships between perceived visual appeal and perceived ease of use were tested in the familiar website context. In previous studies, both perceived visual appeal and perceived ease of use were found to be statistically significant predictors of trust, and perceived ease of use represented a stronger effect (higher std. coefficient) than perceived visual appeal in determining trust as shown in Table 6 (Cyr, 2008; Vance et al., 2008; Zhang et al., 2009).

Another interesting point in the findings of this study is that trust has a mediating effect on the relationship between perceived ease of use and behavioral intention ($t = 1.44$). These findings disagree with earlier research by Gefen et al. (2003), who found that website trust and perceived ease of use affect intention approximately equally (the standardized path coefficient of trust on intention is 0.26 while the standardized path coefficient of perceived ease of use on intention is 0.25). Therefore, perceived ease of use as proposed in TAM appears to lose its predictive value in favor of visual appeal. This disagreement with earlier findings could be attributed to the different nature of the website use (e.g. utilitarian vs. hedonic) and the product being studied (e.g. airline tickets vs. apartment rent), which is an important boundary condition to the validity of TAM (van der Heijden, 2004).

In addition, according to the results from the gender effect analysis, website design features play a significant role in website trust evaluation for both genders with a slightly higher proportion of the variance explained in trust for the male model (31.0% vs. 25.5%). However, it is interesting that, in the male subjects model, both website visual appeal and ease of use are significant determinants of online trust formation, while in the female subjects model, only the visual appeal is significant. Although our focus of this study is on unfamiliar websites, the results are in line with previous work on gender effects in the context of familiar websites. Cyr and Bonanni (2005) found significant differences in perceptions of website design and website satisfaction between genders and

Table 4
PLS analysis on overall, male, and female samples.

	Path	Path-B	t	f^2	Sig. ($p < 0.05$)	Effect size
Full sample ($R^2 = 0.28$)	Perceived visual appeal \rightarrow trust	0.410	5.368	0.12	Yes	Medium
	Perceived ease of use \rightarrow trust	0.163	1.752	0.02	No	Small
Male sample ($R^2 = 0.31$)	Perceived visual appeal \rightarrow trust	0.378	3.935	0.11	Yes	Medium
	Perceived ease of use \rightarrow trust	0.234	2.110	0.03	Yes	Small
Female sample ($R^2 = 0.25$)	Perceived visual appeal \rightarrow trust	0.493	4.192	0.16	Yes	Medium
	Perceived ease of use \rightarrow trust	0.019	0.123	0.01	No	—

Table 5

Mean and standard deviation for perceived visual appeal, perceived ease of use, and trust.

Condition	Perceived visual appeal		Perceived ease of use		Trust	
	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
High visual appeal – high ease of use	5.717	0.763	5.772	1.003	4.387	0.665
High visual appeal – low ease of use	4.352	1.509	4.172	1.651	4.314	0.884
Low visual appeal – high ease of use	3.614	1.350	5.219	1.039	4.035	0.932
Low visual appeal – low ease of use	2.446	1.299	3.485	1.575	3.588	0.941
All conditions	4.049	1.718	4.747	1.576	4.081	0.908

Table 6

Perceived ease of use and perceived visual appeal path coefficients comparison.

Study	Website prior knowledge	Perceived ease of use → trust	Perceived visual appeal → trust
Cyr (2008)	Yes	0.33*	0.21*
Vance et al. (2008)	Yes	0.37*	0.29*
Zhang et al. (2009)	Yes	0.48*	0.43*
Our study	No	0.16 (not sig.)	0.41*

* $p < 0.05$.

Zhang et al. (2009) found moderating effects of gender on the relationship between website design and trust. Our results reveal that males considered both visual design and navigation of the website when evaluating trust while females paid more attention to the visual design and significantly less to website ease of use.

6.2. Research contributions

The contribution of the research is both theoretical and practical. In general, this study has relatively strong both internal and external validities since an experiment was conducted to minimize the effects of uncontrollable factors and the data were collected over not only third and fourth year undergraduate students, but also graduate students, faculty, and staff. Thus, the inferences from the findings possess higher validity and can be better generalized to the population, and thus lead to a better understanding of online customers' behavior.

The first theoretical contribution of this study is the development of a research model based on Norman's (2004) emotional design model of how website visual appeal and ease of use sequentially influence usefulness, trust and intention to use in the context of unfamiliar websites. Trust and usefulness are confirmed as antecedents to behavioral intention. While these relationships have been supported by others (e.g., Davis, 1989; Davis et al., 1989; Flavián et al., 2006; Gefen et al., 2003), within the context of initial trust in unfamiliar websites, this study confirms such relationships in an experimental design with various website characteristic manipulations.

Second, our research goes beyond TAM by incorporating an experiential factor associated with website user experience. TAM has been validated and used to predict the attitude and behavior of users toward information technology in various contexts. However, TAM primarily focuses on system characteristics rather than on users' emotional responses to the sensory features of systems (Deng & Poole, 2010). This study provides empirical evidence that the visual appearance of a website can affectively evoke website trust and desirable user behaviors.

Third, in addition to the results suggesting that perceived visual appeal and perceived ease of use are determinants for website

trust, our findings also reveal that perceived visual appeal produces a much stronger impact than perceived ease of use on trust. These findings are not consistent with previous studies in this research area when users have prior knowledge of websites, where both users' perceptions of visual appeal and ease of use are significant predictors of trust; and perceived ease of use has been reported to be a more important determinant that generates greater impact on trust (Cyr, 2008; Vance et al., 2008; Zhang et al., 2009). Thus, findings of this study provide additional evidence of the effects of website design features in the literature by extending the findings of previous work into the area of unfamiliar website context.

Fourth, according to the additional analysis regarding the effects of gender, the results of our study support the consideration of gender in website design research, as has also been suggested in previous work by Cyr and Bonanni (2005) and Zhang et al. (2009). In this study, we found that gender moderated the effect of website design features on trust. The results revealed that only perceived visual appeal was a significant determinant of trust for women. However, both perceived visual appeal and perceived ease of use were significant determinants of trust for men. Speculating as to why this occurred, it may be that the underlying reason women engage in e-commerce is emotional involvement (Dittmer, Long, & Meek, 2004; Rodgers & Harris, 2003), and that women are likely to be more responsive than men to affective features of website design, as noted by Rodgers and Harris (2003).

In regard to practical contributions, our study provides important managerial implications that are of interest to online vendors, especially for newly established or unknown websites. First, our findings suggest that, if customers are not familiar with a website, the effects of visual appeal and trust on intention to use the website tend to override the effect of ease of use. Moreover, the findings suggest that even though websites have minor usability features that are inferior to their competitors', this inferiority can be alleviated by the visual appeal of the websites, especially for females. Therefore, creating a visually appealing website can help an online vendor gain a competitive advantage, which is one of the most important features of business success.

In addition, the results reveal that men have different responses from women based on website features. Therefore, online vendor

managers and website designers will need to be more careful when designing as well as providing features in websites. A better understanding of vendors' target groups' profiles, individual differences, and preferences will have profound commercial value to vendors since it allows vendors to design their websites to meet customers' needs, especially with the increased numbers of women shopping online (Miley & Mack, 2009).

6.3. Limitations and future research

We acknowledge that some limitations should be considered when interpreting the results of this study and point to directions for future research that may address some of these limitations. First, our study was conducted on an experimental apartment rental website, where observed behavior may differ from behavior on real websites since there was no actual risk of using the website. Future research could explore customer behavior related to both trust and intention using actual e-Commerce websites. Another limitation is that our study was conducted with the assumption that the website has a certain level of security and privacy protection such as data encryption, a privacy policy, and anti-virus software. Future studies could also investigate the influence of website design features and website assurance features since the results may be different from websites without those assurance mechanisms. In addition, while the current research mainly focuses on website design features in creating trust, future research can investigate how visual appeal and ease of use influence other trust-building features, such as design of user reviews, features supporting user-vendor interaction, or display of third-party seals. Furthermore, future studies can explore how website design features impact the reflective level of the emotional design model (perceived usefulness). Such investigation can be conducted in the context of familiar website since it requires users' prior experience with the website to evaluate website usefulness. The use of student subjects may also be considered a limitation of this study, though our experimental task (using a website for apartment rentals) is a fairly representative task for the subjects. Regarding the analysis

method, one of the limitations of the study is its cross-sectional nature. Future research may benefit from using longitudinal approaches to the problem that may require techniques other than the cross-sectional SEM used in this paper. Finally, future research could explore the interaction of the three levels of emotional design model in a variety of online commerce contexts. This could provide a better understanding of how website design features interact with users, which one is the most important, and how do these emotional design levels influence each other. Our goal was to provide a parsimonious model that incorporates Norman's (2004) emotional design framework, and as such our study can be considered a first step in this direction.

In conclusion, the impact of website design appears to be an increasingly important topic of investigation for researchers. In previous IS studies, researchers have examined website visual appeal and ease of use. Our research confirms that website visual appeal and ease of use have a direct and positive relationship on the degree of customer trust, especially when users have no prior knowledge about websites. We used a rigorous experimental setting to observe how different levels of visual appeal and ease of use influence trust. We found that perceived visual appeal produces a stronger impact on trust than does perceived ease of use. Furthermore, the results demonstrate that the effect of the degree of ease of use on the degree of trust does not follow a direct path but is conditioned by gender. It is recommended that online commerce organizations pay attention to the emotional impact of website design generated by its visual appeal, in addition to perceived ease of use. They should aim to provide users with a system that is visually pleasing in addition to being simple to understand, and easy to use.

Appendix

Summary of demographic data.

	Male (n = 112, 58.33%)		Female (n = 80, 41.67%)		F
	Frequency	Percent	Frequency	Percent	
Age					—
• 18–24	69	61.6%	26	32.5%	
• 25–34	25	22.3%	20	25.0%	
• 35–50	10	8.9%	17	21.25%	
• >50	8	7.1%	17	21.25%	
Online shopping experience					0.633
• Under once a month	23	20.5%	17	21.3%	
• Once a month	24	21.4%	9	11.3%	
• 2–3 times a month	41	36.6%	27	33.8%	
• Once a week	14	12.5%	13	16.3%	
• 2–3 times a week	6	5.4%	10	12.5%	
• Daily	4	3.6%	4	5.0%	
Checking email messages					2.023
• Once a week	3	2.7%	1	1.3%	
• 2–3 times a week	5	4.5%	3	3.8%	
• Daily	104	92.9%	76	95.0%	
Reading online newspaper					0.666
• Not at all	9	8.0%	8	10.0%	
• Under once a month	7	6.3%	7	8.8%	
• Once a month	5	4.5%	3	3.8%	
• 2–3 times a month	4	3.6%	9	11.3%	
• Once a week	23	20.5%	15	18.8%	
• 2–3 times a week	24	21.4%	13	16.3%	
• Daily	40	35.7%	25	31.3%	

Summary of factor loadings for the instrument (loading values for each item are shown in bold font).

Construct	Var	Factor				
		1	2	3	4	5
Perceived visual appeal (Cyr et al., 2006)						
The website is visually attractive.	PV1	0.799	0.334	0.246	0.200	0.103
The way that website displays the apartment information is attractive.	PV3	0.644	0.343	0.277	0.240	0.283
The overall look and feel of the website is visually appealing.	PV4	0.844	0.297	0.191	0.254	0.178
I like the way this website looks.	PV5	0.878	0.319	0.222	0.206	0.148
Perceived ease of use (Davis, 1989; Davis et al., 1989)						
The website is easy to use.	PE1	0.275	0.704	0.402	0.113	0.175
It is easy to become skillful at using the website.	PE2	0.261	0.820	0.294	0.178	0.066
Learning to operate the website is easy.	PE3	0.194	0.876	0.266	0.032	0.139
The website is flexible to interact with.	PE4	0.300	0.631	0.363	0.148	0.251
My interaction with the website is clear and understandable.	PE5	0.268	0.769	0.278	0.231	0.155
It is easy to interact with the website.	PE6	0.289	0.805	0.302	0.193	0.164
Perceived usefulness (Davis, 1989; Davis et al., 1989)						
The website is useful for finding apartment for rent.	PU1	0.214	0.266	0.707	0.221	0.332
The website improves my performance in finding apartment for rent.	PU2	0.187	0.305	0.782	0.255	0.284
The website enables me to find apartments for rent faster.	PU3	0.236	0.248	0.800	0.044	0.174
The website enhances my effectiveness in finding apartments for rent.	PU4	0.191	0.324	0.794	0.084	0.271
The website makes it easier to find apartments for rent.	PU5	0.175	0.394	0.811	0.154	0.198
The website increases my productivity in finding apartments for rent.	PU6	0.165	0.361	0.834	0.192	0.230
Trust (McKnight & Chervany, 2001; McKnight et al., 1998)						
I believe that the apartment rental company keeps its promises and commitments.	TR1	0.098	0.172	0.121	0.761	0.049
I trust the apartment rental company keeps customers' best interests in mind.	TR2	0.239	0.107	0.198	0.805	0.218
The apartment rental company is trustworthy.	TR3	0.176	0.100	0.150	0.877	0.136
I think that the apartment rental company will not do anything to take advantage of its customers.	TR4	0.130	0.103	0.054	0.783	0.120
Intention (Jarvenpaa et al., 2000)						
The header for the three items read: "If I were to make a reservation for an apartment for rent, ..."						
I would consider making it from this apartment rental company.	IT1	0.235	0.260	0.356	0.182	0.719
I would make the reservation from this rental company.	IT2	0.178	0.182	0.397	0.233	0.770
I would expect to make the reservation from this rental company.	IT3	0.186	0.178	0.461	0.251	0.741

References

- Bagozzi, R. P., Yi, Y., & Phillips, L. W. (1991). Assessing construct validity in organizational research. *Administrative Science Quarterly*, 36(3), 421–458.
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173–1182.
- Becker, S. A., & Mottay, F. E. (2001). A global perspective on web site usability. *Software, IEEE*, 18(1), 54–61.
- Carte, T. A., & Russell, C. J. (2003). In pursuit of moderation: Nine common errors and their solutions. *MIS Quarterly*, 27(3), 479–501.
- Chin, W. W. (1998). The partial least squares approach for structural equation modeling. In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295–336). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.
- Coursaris, C. K., & van Osch, W. (2016). A cognitive-affective model of perceived user satisfaction (CAMPUS): The complementary effects and interdependence of usability and aesthetics in is design. *Information & Management*, 53(2), 252–264.
- Creswell, J. W. (2002). *Research design: Qualitative, quantitative, and mixed methods approaches* (second ed.). London: Sage Publications.
- Cyr, D. (2008). Modeling web site design across cultures: Relationships to trust, satisfaction, and e-loyalty. *Journal of Management Information Systems*, 24(4), 47–72.
- Cyr, D., & Bonanni, C. (2005). Gender and website design in e-business. *International Journal of Electronic Business*, 3(6), 565–582.
- Cyr, D., Head, M., & Ivanov, A. (2006). Design aesthetics leading to m-loyalty in mobile commerce. *Information & Management*, 43(8), 950–963.
- Cyr, D., Head, M., & Larios, H. (2010). Colour appeal in website design within and across cultures: A multi-method evaluation. *International Journal of Human-Computer Studies*, 68(1–2), 1–21.
- Cyr, D., Head, M., Larios, H., & Pan, B. (2009). Exploring human images in website design: A multi-method approach. *MIS Quarterly*, 33(3), 539–566.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319.
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35(8), 982–1003.
- Deng, L., & Poole, M. S. (2010). Affect in web interfaces: A study of the impacts of web page visual complexity and order. *MIS Quarterly*, 34(4), 711–730.
- Dittmer, H., Long, K., & Meek, R. (2004). Buying on the internet: Gender difference in on-line and conventional buying motivations. *Sex Roles*, 50, 423–444.
- Éthier, J., Hadaya, P., Talbot, J., & Cadieux, J. (2006). B2C website quality and emotions during online shopping episodes: An empirical study. *Information & Management*, 43, 627–639.
- Falk, R. F., & Miller, N. B. (1992). *A primer for soft modeling* (1st ed.). Akron, OH: University of Akron Press.
- Flavián, C., Guinalíu, M., & Gurrea, R. (2006). The role played by perceived usability, satisfaction and consumer trust on website loyalty. *Information & Management*, 43(1), 1–14.
- Garrett, J. J. (2003). *The elements of user experience: User-centered design for the web* (first ed.). Indianapolis, IN: New Riders.
- Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly*, 27(1), 51–90.
- Gefen, D., & Straub, D. W. (2003). Managing user trust in B2C e-services. *e-Service Journal*, 2(2), 7–24.
- Gefen, D., Straub, D., & Boudreau, M.-C. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the Association for Information Systems*, 4(7).
- Geissler, G. L., Zinkhan, G. M., & Watson, R. T. (2006). The influence of home page complexity on consumer attention, attitudes, and purchase intent. *Journal of Advertising*, 35(2), 69–80.
- Hair, J. F., Tatham, R. L., Anderson, R. E., & Black, W. C. (1995). *Multivariate data analysis* (First ed.). Englewood Cliffs, NJ: Prentice Hall.
- Hampton-Sosa, W., & Koufaris, M. (2005). The effect of web site perceptions on initial trust in the owner company. *International Journal of Electronic Commerce*, 10(1), 55–81.
- Hasan, B. (2016). Perceived irritation in online shopping: The impact of website design characteristics. *Computers in Human Behavior*, 54, 224–230.
- Hassanein, K. S., & Milena, H. M. (2004). Building online trust through socially rich web interfaces. In *Proceedings of the 2nd annual conference on privacy, security and trust*, Fredericton, New Brunswick, Canada (pp. 15–22).
- Hassenzahl, M. (2004). The interplay of beauty, goodness, and usability in interactive products. *Human-Computer Interaction*, 19(4), 319–349.
- Hassenzahl, M., & Monk, A. (2010). The inference of perceived usability from beauty. *Human-Computer Interaction*, 25(3), 235–260.
- van der Heijden, H. (2004). User acceptance of hedonic information systems. *MIS Quarterly*, 28(4), 695–704.
- Hong, W., Thong, J. Y. L., & Tam, K. Y. (2004). Does animation attract online users' attention? The effects of flash on information search performance and perceptions. *Information Systems Research*, 15(1), 60–86.
- Hu, X., Wu, G., Wu, Y., & Zhang, H. (2010). The effects of web assurance seals on consumers' initial trust in an online vendor: A functional perspective. *Decision Support Systems*, 48(2), 407–418.
- Hwang, Y., & Kim, D. J. (2007). Customer self-service systems: The effects of

- perceived web quality with service contents on enjoyment, anxiety, and e-trust. *Decision Support Systems*, 43(3), 746–760.
- Jarvenpaa, S., Tractinsky, N., & Vitale, M. (2000). Consumer trust in an Internet store. *Information Technology and Management*, 1(1), 45–71.
- Jeffries, F. L., & Reed, R. (2000). Trust and adaptation in relational contracting. *The Academy of Management Review*, 25(4), 873–882.
- Karimov, F. P., Brengman, M., & Van Hove, L. (2011). The effect of website design dimensions on initial trust: A synthesis of the empirical literature. *Journal of Electronic Commerce Research*, 12(4), 272–280, 282–301.
- Kim, D. J., Ferrin, D. L., & Rao, H. R. (2009). Trust and satisfaction, two stepping stones for successful e-commerce relationships: A longitudinal exploration. *Information Systems Research*, 20(2), 237–257.
- Kim, J., & Moon, J. Y. (1998). Designing towards emotional usability in customer interfaces—trustworthiness of cyber-banking system interfaces. *Interacting with Computers*, 10(1), 1–29.
- Kim, E., & Tadisina, S. (2010). A model of customers' initial trust in unknown online retailers: An empirical study. *International Journal of Business Information Systems*, 6(4), 419–443.
- de Kunder, M. (2012). *The size of the world wide web (the internet)* (Accessed 16 October 2009) <http://www.worldwidewebsite.com/>.
- Lankton, N., McKnight, D. H., & Thatcher, J. B. (2014). Incorporating trust-in-technology into expectation disconfirmation theory. *The Journal of Strategic Information Systems*, 23(2), 128–145.
- Lavie, T., & Tractinsky, N. (2004). Assessing dimensions of perceived visual aesthetics of web sites. *International Journal of Human-Computer Studies*, 60(3), 269–298.
- Lim, K., Sia, C., Lee, M., & Benbasat, I. (2006). Do I trust you online, and if so, will I buy? An empirical study of two trust-building strategies. *Journal of Management Information Systems*, 23(2), 233–266.
- Lindgaard, G., & Dudek, C. (2002). User satisfaction, aesthetics and usability. In J. Hammond, T. Gross, & J. Wesson (Eds.), *Usability: Gaining a competitive edge*. Dordrecht: Kluwer Academic Publishers.
- Lindgaard, G., Dudek, C., Sen, D., Sumegi, L., & Noonan, P. (2011). An exploration of relations between visual appeal, trustworthiness and perceived usability of homepages. *ACM Trans. Computer-Human Interaction*, 18(1), 1–30.
- Lindgaard, G., Fernandes, G., Dudek, C., & Brown, J. (2006). Attention web designers: You have 50 milliseconds to make a good first impression! *Behaviour & Information Technology*, 25(2), 115–126.
- Li, H., Sarathy, R., & Xu, H. (2011). The role of affect and cognition on online consumers' decision to disclose personal information to unfamiliar online vendors. *Decision Support Systems*, 51(3), 434–445.
- Liu, B. Q., & Goodhue, D. L. (2012). Two worlds of trust for potential e-commerce users: Humans as cognitive misers. *Information Systems Research*, 23(4), 1246–1262.
- Li, Y.-M., & Yeh, Y.-S. (2010). Increasing trust in mobile commerce through design aesthetics. *Computers in Human Behavior*, 26(4), 673–684.
- Loiacono, E. T., Watson, R. T., & Goodhue, D. L. (2007). WebQual: An instrument for consumer evaluation of web sites. *International Journal of Electronic Commerce*, 11(3), 51–87.
- MacInnis, D. J., Moorman, C., & Jaworski, B. J. (1991). Enhancing and measuring consumers' motivation, opportunity, and ability to process brand information from ads. *Journal of Marketing*, 55(4), 32–53.
- Mackinnon, D. P., Warsi, G., & Dwyer, J. H. (1995). A simulation study of mediated effect measures. *Multivariate Behavioral Research*, 30(1), 41.
- Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *The Academy of Management Review*, 20(3), 709–734.
- McAllister, D. J. (1995). Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. *The Academy of Management Journal*, 38(1), 24–59.
- McKnight, D. H., & Chervany, N. L. (2001). What trust means in e-commerce customer relationships: An interdisciplinary conceptual typology. *International Journal of Electronic Commerce*, 6(2), 35–59.
- McKnight, D. H., Cummings, L. L., & Chervany, N. L. (1998). Initial trust formation in new organizational relationships. *The Academy of Management Review*, 23(3), 473–490.
- Miley, M., & Mack, A. (2009). *The new female consumer: The rise of the real mom* (Accessed 16 October 2009) <http://adage.com/images/random/1109/aa-newfemale-whitepaper.pdf>.
- Nielsen, J., & Loranger, H. (2006). *Prioritizing web usability*. CA: New Riders Press.
- Nisbett, R. E., & Wilson, T. D. (1977). The halo effect: Evidence for unconscious alteration of judgments. *Journal of Personality and Social Psychology*, 35(4), 250–256.
- Norman, D. A. (2004). *Emotional design: Why we love (or hate) everyday things* (first ed.). New York: Basic Books.
- Palmer, J. W. (2002). Web site usability, design, and performance metrics. *Information Systems Research*, 13(2).
- Pedhazur, E. J., & Schmelkin, L. P. (1991). *Measurement, design, and analysis: An integrated approach* (first ed.). Hillsdale, NJ: Erlbaum.
- Pennington, R., Wilcox, H. D., & Grover, V. (2003). The role of system trust in business-to-consumer transactions. *Journal of Management Information Systems*, 20(3), 197–226.
- Ratnasingham, P. (1998). The importance of trust in electronic commerce. *Internet Research: Electronic Networking Applications and Policy*, 8(4), 313–321.
- Reinecke, K., Yeh, T., Miratrix, L., Mardiko, R., Zhao, Y., Liu, J., et al. (2013). Predicting users' first impressions of website aesthetics with a quantification of perceived visual complexity and colorfulness. In *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 2049–2058). Paris, France: ACM.
- Robins, D., & Holmes, J. (2008). Aesthetics and credibility in web site design. *Information Processing & Management*, 44(1), 386–399.
- Rodgers, S., & Harris, M. A. (2003). Gender and e-commerce: An exploratory study. *Journal of Advertising Research*, 43(3), 322–329.
- Schlosser, A. E., White, T. B., & Lloyd, S. M. (2006). Converting web site visitors into buyers: How web site investment increases consumer trusting beliefs and online purchase intentions. *Journal of Marketing*, 70, 133–148.
- Schwarz, N. (1986). Feelings as information: Informational and motivational functions of affective states. In T. Higgins, & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition* (Vol. 2, pp. 527–561). New York: The Guilford Press.
- Sharp, H., Rogers, Y., & Preece, J. (2007). *Interaction design: Beyond human-computer interaction*. Hoboken, NJ: Wiley.
- Siau, K., & Shen, Z. (2003). Building customer trust in mobile commerce. *Communications of the ACM*, 46(4), 91–94.
- Skulmowski, A., Augustin, Y., Pradel, S., Nebel, S., Schneider, S., & Rey, G. D. (2016). The negative impact of saturation on website trustworthiness and appeal: A temporal model of aesthetic website perception. *Computers in Human Behavior*, 61, 386–393.
- Straub, D. W. (1989). Validating instruments in MIS research. *MIS Quarterly*, 13(2), 147–169.
- Subramaniam, C., Shaw, M. J., & Gardner, D. M. (2000). Product marketing and channel management in electronic commerce. *Information Systems Frontiers*, 1(4), 363–378.
- Sweller, J., van Merriënboer, J., & Paas, F. (1998). Cognitive architecture and instructional design. *Educational Psychology Review*, 10(3), 251–296.
- Tractinsky, N., Cokhavi, A., Kirschenbaum, M., & Sharfi, T. (2006). Evaluating the consistency of immediate aesthetic perceptions of web pages. *International Journal of Human-Computer Studies*, 64(11), 1071–1083.
- Tractinsky, N., & Lowengart, O. (2007). Web-store aesthetics in e-retailing: A conceptual framework and some theoretical implications. *Academy of Marketing Science Review*, 11(1).
- Vance, A., Elie-Dit-Cosaque, C., & Straub, D. W. (2008). Examining trust in information technology artifacts: The effects of system quality and culture. *Journal of Management Information Systems*, 24(4), 73–100.
- Wang, Y. D., & Emurian, H. H. (2005). Trust in e-commerce: Consideration of interface design factors. *Journal of Electronic Commerce in Organizations*, 3(4), 42–60.
- Zhang, X., Prybutok, V. R., Ryan, S., & Pavur, R. (2009). A model of the relationship among consumer trust, web design and user attributes. *Journal of Organizational and End User Computing*, 21(2), 44–66.