Web Design Attributes in Building User Trust, Satisfaction, and Loyalty for a High Uncertainty Avoidance Culture

C. M. Nadeem Faisal, Martin Gonzalez-Rodriguez, Daniel Fernandez-Lanvin, and Javier de Andres-Suarez

***Abstract*—In this study, we attempt to evaluate the user preferences for web design attributes (i.e., typography, color, content quality, interactivity, and navigation) to determine the trust, satisfaction, and loyalty for uncertainty avoidance cultures. Content quality and navigation have been observed as strong factors in building user trust with e-commerce websites. In contrast, interactivity, color, and typography have been observed as strong determinants of user satisfaction. The most relevant and interesting finding is related to typography, which has been rarely discussed in e-commerce literature. A questionnaire was designed to collect data to corroborate the proposed model and hypotheses. Furthermore, the partial least-squares method was adopted to analyze the collected data from the students who participated in the test ($n = 558$). Finally, the results of this study provide strong support to the proposed model and hypotheses. Therefore, all the web design attributes were observed as important design features to develop user trust and satisfaction for uncertainty avoidance cultures. Although both factors seem to be relevant, the relationship between trust and loyalty was observed to be stronger than between satisfaction and loyalty; thus, trust seems to be a stronger determinant of loyalty for risk/high uncertainty avoidance cultures.**

***Index Terms*—Culture, e-commerce, loyalty, satisfaction, trust, website design.**

I. Introduction

IN ELECTRONIC commerce, global reach is an important concept that is defined as the ability to extend a company's reach to a customer through the Internet at low cost. Consequently, websites have become the backbone of business and are considered as a low-cost source of communication to exchange the products and services-related information. Therefore, to generate revenue, websites not only promote the products or services but also offer a superior value to customers, thus attracting more customers. The online selling statistics portals depict remarkable changes with maximum growth, and it has become a profit-oriented business approach through strong customer commitments [1]. Therefore, to promote this online business strategy, websites should be designed in such a way that they look trustworthy and need less cognitive efforts to use; else confusion could incline the visitors to close it. Thus, in a broader spectrum, a well-designed website should ensure clarity, consistency, and the arrangement of critical information on suitable areas of the website, which are easily accessible. In addition to clarity and consistency, website usability in the cultural context is also an important concern, which ensures the appropriateness of a website for all users.

To explore customer satisfaction, trust, and loyalty, Hofstede [2] identified five cultural dimensions that were frequently adopted in various e-commerce studies [3]–[8]. Further, these studies [3]–[8] indicate that users from different countries depicted different acceptance behavior toward design, including security and trust with respect to e-commerce websites. Uncertainty avoidance (UA) is one from Hofstede's cultural dimensions and can be defined as the extent to which a community avoids unknown situations and ambiguity [2]. It is a rarely adopted dimension in comparison with other dimensions used to explain user reactions for IT artifacts, that is, a website. Dinev *et al.* [9] argue that users from high-UA cultures value website security and trust over the users from lower UA cultures. Therefore, in a culture where people do not trust websites, the level of avoidance from uncertainty is observed to be higher [6]. Similarly, Cyr [5] also discussed the value of trust between high- and low-UA cultures, but the too small sample size from high-UA cultures was considered as a limitation by the authors of the study.

In this study, we employed a reasonable sample of students ($n = 558$) to determine key antecedents that potentially influence user trust, satisfaction, and loyalty in a high-UA culture (Pakistan). According to Hofstede's cultural index, Pakistani culture is considered as a high-UA culture or a low-trust culture [2]. Moreover, no potential study is available in the elegant literature that discussed the design consideration in the context of Pakistan. As a result, this study will be helpful to understand the determining factors to consider when developing websites for high-UA cultures to strengthen users' loyalty with the websites. Moreover, the identification of web design attributes that significantly affect the trust and satisfaction in high-UA cultures is also an important consideration to initiate in this study. The

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key antecedents adopted in this study are generally categorized into the aesthetic and organizational structure and layout. Aesthetic aspects further narrowed down into color and typography, which have been rarely discussed in the domain of e-commerce to determine user trust and satisfaction. Therefore, determining the role of typography in building user trust is also an important contribution of this study.

The rest of this paper is organized as follows. Section II presents existing studies related to culture and website design, satisfaction, and trust. Section III is related to the objectives and hypotheses of this study. Section IV is about the methodology, data collection, and analysis. Section V presents the result and analysis section, followed by the conclusion, limitations, and future scope of study.

II. Literature Review

A well-designed website provides active support to users in accessing the preferred information easily and appropriately. Further, it plays a significant role in achieving the desired business goals by compelling customers toward website acceptability and revisit. However, the website revisit rate is associated with user satisfaction, which is built on the user's perception of the system [10], and the design attributes. Accordingly, a well-designed site can be defined by considering the following facets: ease of understanding the contents and structure, simplicity, speed, ease of navigation, and user control. Likewise, Palmer [11] argues that website success is associated with download delay, navigation, information, interactivity, and responsiveness.

Website users can encounter abundant problems when trying to acquire information from it and also when trying to use its functional aspects [12]. Furthermore, these design features considerably affect motivational and cognitive aspects for commercial websites [13]. Hence, the design quality of the commercial websites is critical for the success of e-commerce and to attract new customers for purchase intent [14]. Several authors [3]–[7], [15]–[20] empirically observed the implications of design attributes from both the local and the international perspective. These implications provide effective guidelines for designing trustworthy interfaces to meet user satisfaction and also to retain users' loyalty to the website. Therefore, it is a well-established concept that differences exist for design preferences among cultures [21], [22]. These cultural preferences have significant implications on satisfaction, trust, loyalty, [3]–[6], [15], [17], and success rate. Thus, website success is also associated with culture, which is consistently discussed in the various human–computer-interaction (HCI) studies. In previous studies, several authors [2], [23] defined and discussed culture under different headings and contexts. According to Doney *et al.* [23], "culture is a system of values and norms that are shared among a group of people and that when taken together constitute a design for living." And, Hofstede [2] defined culture as "the collective mental programming of the human mind which distinguishes one group of people from another." Furthermore, Hofstede [2] identified the following culture dimensions normalized to the score of 0–100.

1) Power distance expresses the individual's beliefs that power is unequally distributed in the culture [2].
2) Individualism expresses individual's relationship with each other. Therefore, in individualistic culture, people are expected to consider personal interest over group interest [2], whereas in collectivist cultures, people are integrated into cohesive groups and preferably think for common interests [2].
3) In masculine cultures, the focus is on achievement; material success and assertiveness are considered as more masculine in orientation [2]. In cultures where focus is on cooperation and caring, modesty and quality of life are considered as more feminine in orientation [2].
4) UA expresses community avoidance from unknown situations and ambiguity and demonstrate the lack of tolerance for any personal risk [2].
5) Long-term orientation expresses the extent to which a culture retains or prefers long-term views [2].

Higher UA cultures demonstrate lack of tolerance for personal risk and prefer trustworthy websites [5]. Thus, UA is related to trust and security [3], [24] and is a rarely adopted dimension in the e-commerce research. Marcus [25] theoretically explains the implication of UA on design in several ways, that is, simplicity versus complexity, structured navigation versus less control navigation, and redundant cues (sound, color, typography, etc.), to reduce the risk. Moreover, Singh and Matsuo [26] and Marcus [22] argue that high-UA cultures prefer simple and more structured websites. Thus, guided navigation is an important design attribute to design the websites for higher UA cultures [26]. Isa *et al.* [27] observed the positive influence of UA on user performance and preference. Cyr *et al.* [28] mentioned that user characteristics, cultural differences, and design preferences are important considerations with respect to multicultural audiences. Likewise, Yoon [29] argues that UA is an important cultural value that significantly influences customer e-commerce acceptance. Thus, in a high-UA culture, people hesitate to adopt e-commerce or may decrease their online shopping [29]. Therefore, different culture groups employ different development and usage behavior for website interfaces because of language, social contexts, symbols, and aesthetics. Lee *et al.* [30] empirically observed that help and support on the website and risk are more critical factors for Korean customer's satisfaction over US customers.

Pakistan is a sovereign country in Asia with a total population of approximately 199 million people. Nowadays, IT and e-commerce are rapidly growing sectors and have become a profitable business strategy. According to Ahmad [31], the e-commerce market size in Pakistan is expected to reach 600 million U.S. dollar in 2017. The current GDP of Pakistan is 246.88 billion U.S. dollars with an annual growth rate of 4.1% per year. The culture of Pakistan, in accordance with Hofstede's cultural index [22], is rated high for UA = 70 (risk avoidance), and therefore, it is considered as a low-trust culture. For comparison, the minimum score of UA in Hofstede's cultural index is 08 for Singapore and maximum is 100 for Greece [22]. This difference renders Pakistan a substantial area of research in the domain of e-commerce.

A. Website Satisfaction and Trust

In reality, it is difficult to design a product or website that satisfies all the international and intercultural customers [32]. Therefore, it is important to determine what makes it possible to meet customer satisfaction. Satisfaction is a gauge for system successfulness and is a commonly adopted measure in various technological studies. It highlights the users' personal perception and favorable attitude [33]. Furthermore, it is a critical factor linked to the diverse nature of other related factors [34] and can be assessed by obtaining subjective data from users. In previous studies, satisfaction was discussed under different names and headings, for example, comfort, intent, and a pleasure user feels after use. Thus, the greater the degree of satisfaction with a service, the greater the intention to use or self-regulation [35]. However, the retention of consumers as well as their continuing to use a website is an important challenge for commercial website providers [36], because "websites have different hidden subjective factors that stem from the process of user and system interaction and affect overall user satisfaction, and that they can serve the development and maintenance phases of website creation [34]." Evanschitzkya *et al.* [37] define e-satisfaction as users' positive perceptions of a website design, whereas Petrie and Bevan [38] define satisfaction as an optimistic attitude toward a product.

Similar to satisfaction, trust also received considerable importance in marketing research. It refers to the depth and assurance of customers' feeling based on inconclusive evidence [39]. Moreover, uncertain situations and risk are important conditions that disclose a value of trust [28], [40]. Therefore, it can be defined as a person's faith and belief in another person's trustworthiness and honesty in a transaction [39]. Accordingly, trust is a critical factor similar to satisfaction and is also linked with the related factors to determine the success and customer long-term relationship with sellers/website [28], [39]. Palvia [41] argues that trust is an important factor to enhance company profit and performance. The term online trust also refers to customer's confidence with a website and reduction in risk and uncertainty [42]. As more problems are associated with online business, such as privacy and insecurity, it enforces the website provider to develop a trustworthy site. Therefore, to attract new customer trustworthy appearance of websites is very important under the uncertain situations. In this study, we employed both satisfaction and trust as endogenous variables and also as key antecedents of customer loyalty. Loyalty is described in Section III.

Moreover, there does not seem to exist a clear consensus among scholars about the nature of the relationship between satisfaction and trust. Some authors [43], [44] consider that satisfaction is a determinant of trust. Their tests in the context of online business showed that previous positive shopping experiences result in high customer trust. However, other authors [45], [46] reported just the opposite: trust influences satisfaction. For them, the strong image that customers have about a company helps them to perceive a high level of satisfaction. However, several other relevant demographic studies [4], [7], [15], [17], [47], [48] represent both satisfaction and trust as unrelated variables in their research models. These research efforts are closely focused on the study of cultural differences, and they consider the impact of different design approaches on trust and satisfaction and, in turn, evaluate the relationship of these variables to online loyalty. As our research questions are closer to these studies, we decided to exclude the relationship between satisfaction and trust from our model. However, the consideration of the relationship between satisfaction and trust in the context of different national cultures is an interesting avenue for future research.

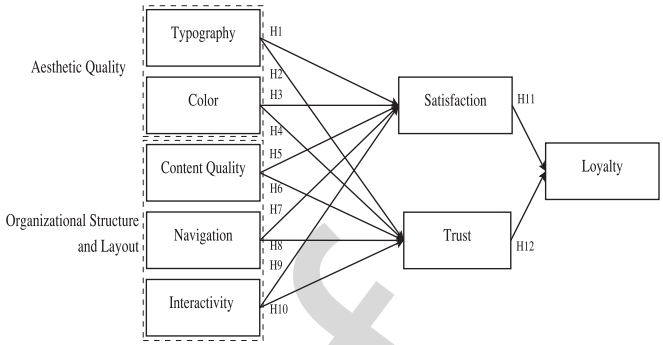

Fig. 1. Research model and hypothesized relationships.

III. Research Model and Hypotheses

Fig. 1 presents the research model guiding this investigation. The proposed research model was developed based on conceptual and theoretical studies in the domain of e-commerce. The model theorizes that web design attributes positively influence the user trust and satisfaction in a high-UA culture. In terms of website design, five design attributes/features suggested by research community (i.e., [4], [11], [22], [49], [50]) include the following.

1) Typography—it is related to appearance, attractiveness, and readability of text on the website to draw user attention.
2) Color— it appeals to the users' emotions, feelings, and helps them to understand the functions of buttons, icons, and boxes.
3) Content quality—the degree to which the provided information is sufficient and complete.
4) Interactivity—how information is presented to enhance the user interaction consistently.
5) Navigation—the extent to which navigational clues and format assist the user to access other sections of a website.

All of these design attributes incorporate both aesthetic and usability aspects. However, both typography and color are associated with aesthetic quality, whereas content, interactivity, and navigation are more related to organizational structure and layout of the website. These design attributes are extensively used in several e-commerce-related studies (i.e., [4], [6], [7], [15], [19], [20], [51], [52]) to assess users' preferences. Likewise, in the cultural context, Cyr and Head [4] examined the implications of design attributes (i.e., content, navigation, and visual design) on trust and satisfaction in masculine versus

feminine-oriented cultures. Besides, design implications on both trust and satisfaction were further used as key antecedents to determine the loyalty. The goal was to examine the relative strength of the relationship of trust versus satisfaction to loyalty for UA culture. Likewise, Casaló *et al.* [53] observed a strong relationship between user satisfaction and loyalty. However, Bilgihan and Bujisic [1] and Cyr *et al.* [16] examined a positive relationship between user trust and loyalty. The research variables and hypotheses are described below.

A. Aesthetic Quality

The significance of aesthetic quality has been acknowledged in the domain of HCI. In recent studies, aesthetics for attractiveness and design consistency of the website appearance have been studied [5], [36], [54]. According to Liao *et al.* [36], aesthetic and attractive features can enhance customer perception of usefulness for a website. These features are related to appearance and can be categorized into color, graphics, font, and so on. Similarly, in the study by Fogg *et al.* [55], the authors argue that consumers made their judgments about the website credibility based on design, "including layout, typography, font size, and color scheme." Several other studies discussed the importance of aesthetic and design quality with respect to satisfaction and trust [17], [30], [54], [56]. In the current study, we narrow down the aesthetic aspects into typography and color suggested by the research community [49].

1) Typography: Typography is related to appearance and attractiveness of text on the website [19]. It is an art to arrange the written language in a readable, appealing, and in a legible manner. As a result, high-quality typography enhances the value of the website, the meaning of words, and how those words can be perceived by the users [57], whereas poor-quality typography negatively affects learnability and comprehension, and as a consequence, it visually confuses the readers [58]. Hence, typography enables the reader to experience the website with pleasure [59] and decreases users' time and efforts to understand and access the required information [60]. Accordingly, the selection of typographic (text) elements (i.e., typefaces, signs, size, spacing, and color) for writing is very important, as it facilitates effective communication and reading [61]. Therefore, typographical preferences are important for e-commerce and web environment to enhance customer satisfaction [62] and trust. Nielsen [63] argues that small font size with low contrast is the cause of criticism in online reading. Therefore, users like the font they appreciate and complain about those they do not like [64]. Another feature that affects the appropriateness of typography is the letters, words, and line spacing [60]. Letter spacing refers to space between two words, whereas line spacing is a value in points that explains the distance between baseline of the upper line and the baseline of the lower line [60]. Therefore, text line spacing at 1.5 facilitates better reading, speed, and comprehension, especially for readers with poor vision due to aging or other factors [63]. Myung [62] empirically observed the users' preferences for typography. The results of this study demonstrated the following: importance of line spacing 56%, style 35%, and 12% for size, respectively [62]. Moreover, Sasidharan *et al.* [65] observed the relation between typeface and trust, but the results of this study were limited and only specific toward typeface. In the domain of e-commerce, insubstantial evidence still exists with respect to determining the role of typography in developing user trust and satisfaction. Therefore, in this study, we hypothesize that typeface, alignment, size, spacing, and color positively influence user trust and satisfaction.

H1: Website typography positively influences user satisfaction in a high-UA culture.

H2: Website typography positively influences user trust in a high-UA culture.

2) Color: The colors are associated with appeal and attractiveness and help users to understand the functions of icons, buttons, and links. In terms of typography, color also plays a very prominent role by enhancing the readability and drawing attention to important information [60]. Bonnardel *et al.* [66] observed the influence of color on website usability. Furthermore, they observed strong association of colors with human emotions and preferences, which alternatively affect the website navigation. Likewise, Cyr *et al.* [67] observed users' preferences for the website visual design. In another study, Cyr *et al.* [17] empirically observed the positive influence of color appeal on user satisfaction and trust for websites.

H3: In a high-UA culture, website color leads to higher user satisfaction toward that same website.

H4: In a high-UA culture, website color leads to higher user trust toward that same website.

B. Organizational Structure and Layout

The website features related to organizational structure and layout (i.e., content quality, interactivity, and navigation) are complementary aspects in the e-commerce website and deal with presentation of information, navigational clues, and the nature of interaction [52]. In short, structure refers to how the information is presented or displayed on the webpage and, further, to how the website is generally organized [68].

1) Content Quality: Web contents are empowered with information and transactional capabilities [69] and depict the overall structure and organization of information that a user requires [3]. Therefore, it is important to ensure that the available information on the website should be accurate, in-depth, and up-to-date [19], [51] to meet the customers need [70]. All these features have been discussed under the heading of content quality [36]. Thus, appropriate and up-to-date information facilitates the customers to compare the product features in order to reach a buying decision [70]. It seems that content quality reduces the uncertainty and risks, which translates into a higher comfort level with a website [71]. Udo *et al.* [72] observed that contents positively influenced the web service quality, which translates into higher satisfaction. In several other studies [13], [15], [39], [73], the results demonstrate the positive relation of content (relevant information) with customer satisfaction [4], [15], [73], trust [4], [15], [39], [73], and loyalty [13]. Cyr [5] argues that users from lower UA cultures score higher for information content compared with high-UA cultures. In the current study, we assume that content quality is a more important factor to determine user trust than satisfaction in UA culture.

H5: High-quality website contents lead to higher user satisfaction in a high-UA culture.

H6: High-quality website contents lead to higher user trust in a high-UA culture.

2) Interactivity: Website interactivity determines how information that is presented is processed by a website user (i.e., customization and control over the contents) [74]. Furthermore, it is the user's experience during his/her interaction [75], and it is considered as an important attribute of a website [76]. Zeithaml *et al.* [77] defined interactivity as "the extent to which website users can 1) communicate with the people behind the website, 2) interactively search for information, and 3) conduct transactions through the website." The features of interactivity that were consistently discussed in the literature include user control [78], [79], personalization/customization [79], [80], responsiveness [78]–[80], connectedness [78]–[80], and playfulness [78], [80]. In several studies [78]–[81], the researchers observed the impact of interactivity features on user satisfaction, trust, and loyalty. Likewise, Cyr *et al.* [16] argue that interactivity (i.e., user control, connectedness, and responsiveness) affect user trust and ultimately loyalty. However, Venkatesh and Ramesh [82] argue that website customization saves customer time by providing them personalized information. Several researchers [71], [83] proved the importance of interactivity, but there is still insufficient evidence on the role of interactivity for e-commerce in the cultural context. Consequently, we employed the following features of interactivity: responsiveness and personalization/customization to seek the users' preferences. Personalization/customization helps customers in tailoring the product features. We theorized that personalization/customization is an important attribute for developing customers' trust and satisfaction by facilitating them to tailor products' features before buying. Similarly, we also assume that responsiveness positively influences the customer satisfaction and trust through consistent feedback and support.

H7: Increased level of web interactivity leads to higher user satisfaction toward that same website.

H8: Increased level of web interactivity leads to higher user trust toward that same website.

3) Navigation: Website users have divergent capabilities and skills in the use of the Internet. Accordingly, focus of companies should not only be on attractive design but also on developing websites that are both easy to use and navigate. Not only does website navigation facilitate users in carrying their tasks in a timely accurate manner [84], it also provides additional ways to access the desired information easily [51]. Likewise, it supports the users while moving in and around a website conveniently [85]. Roy *et al.* [86] claim that "ease of navigation, interface design, and user guidance affect customer establishment for trust." Despite information, users may leave the website if they find it difficult to navigate when searching for the desired information. In several studies [22], [26], the researchers emphasize the use of guided navigation for uncertainty/risk avoidance cultures. Thus, positive correlation exists between navigation and satisfaction, as well as between navigation and trust in the cultural context [4], [5], [15]. Consequently, we believe that besides ease of navigation, reversibility, navigational clues, and obvious buttons support the users for appropriate actions, thus eliminating ambiguity or error.

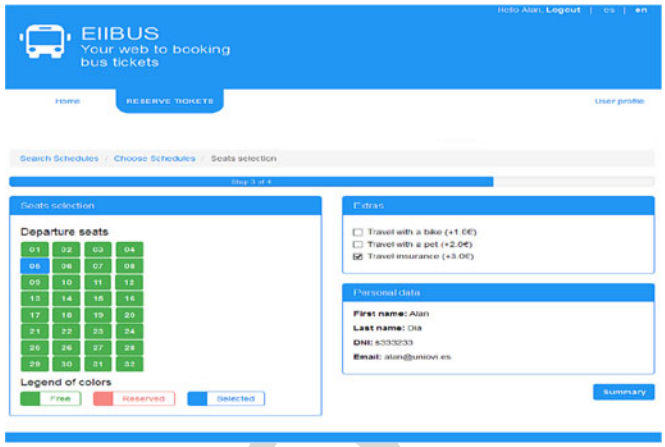

Fig. 2. E-ticket bus website prototype.

H9: In a high-UA culture, guided navigation leads to higher user satisfaction toward that same website.

H10: In a high-UA culture, guided navigation leads to higher user trust toward that same website.

C. Loyalty

The user interface designs for globalization are becoming more important for business success and customer loyalty [32]. Customer loyalty is defined as strong feelings of allegiance or commitments [53]. Therefore, loyal customers are found to have strong commitments and attachments toward the retailers. Moreover, the loyal customers are not easily distracted to slightly more attractive alternatives. Hence, true loyalty demonstrates customers and purchase retention [87], resistance to switch, and willingness to pay more. Besides, companies operating their business online face competition because of rapid growth in this sector. Therefore, trustworthiness, security, and easy-of-use are important aspects to keep the customer loyal to a website [15], [88]. In previous studies [7], [15], [33], [47], [48], both satisfaction and trust were considered as key factors to measure user loyalty to a website. Thus, greater the degree of satisfaction [53] and trust [1], [16], the greater the degree of website loyalty.

H11: Greater website user satisfaction leads to greater user loyalty to that same website.

H12: Greater the website user trust leads to greater user loyalty to that same website.

IV. Methodology and Data Analysis

To refute/validate the former hypotheses, we developed a simple e-commerce website prototype after carefully considering the design features of the three travel ticket booking websites (www.alsa.es, www.swebus.se, and www.daewoo.com.pk) to be tested by the students. The prototype was designed by deploying different colors (i.e., blue, green, pink, and white) (see Fig. 2). The blue color was mainly used in the design of distinct

areas (e.g., header, footer, navigation buttons, and links), whereas white was used as a background and as a logo and graphics color (see Fig. 2). The typographical features used on the website interface include typeface sans-serif (Helvetica), spacing 1.08, size from 12 to 20 px, and color, that is, more frequent (black and white) and less frequent (blue, green, and pink), respectively (see Fig. 2). Furthermore, the website navigation was supported through buttons and links along with navigational clues to take the prospective actions for buying. To enhance the website interactivity, for example, ticket price, travel date and time, preferred destination, and seat location inside the bus were incorporated through customizable features. As shown in Fig. 2, to personalize the seating plan, different colors were used for different buttons (i.e., green for "free," pink for "reserved," and blue for "selected"). Moreover, feedback and help and support were facilitated through pop-up messages and progress bar shown in Fig. 2. Finally, the prototype was carefully developed to avoid additional implications such as website familiarity, reputation [51], [53], and culture markers [89]. Therefore, prior to the start of the current investigation, consultants of usability engineering at the University of Oviedo performed cognitive and pluralistic walkthroughs on the initial mockups of the prototype, which were followed by heuristic evaluation of the resulting wireframes. Once the prototype was developed, a series of user test was conducted with local users to ensure a high usability level of its interactive elements. Thus, the prime objective of the pretest study was to validate that the developed prototype was working well, for example, the searching and booking procedures. The suggestions and feedback were incorporated by eliminating promotional information and banners irrelevant to the current study to keep the prototype design simple. Accordingly, Lee *et al.* [75] argue that interface simplicity is an important precondition for better interaction and usability experiences.

A. Survey Instrument

To evaluate the proposed hypotheses, a survey scale was designed and integrated with the website prototype to obtain subjective data (see the Appendix). The final survey questionnaire consisted of 26 items to assess the impact of web design attributes on users' satisfaction and trust for the developed e-commerce prototype. The survey items for the hypothesized constructs (i.e., typography, color, content quality, interactivity, navigation, satisfaction, trust, and loyalty) were developed and modified from the elegant literature (i.e., [4], [11], [17], [28], [34], [50], [52], [58], [60], [62], [65], [90]–[93]) in the domain of e-commerce. Moreover, to meet the objective of the hypothesized study, each questionnaire item was also reviewed by the research members before conducting the investigation. Consequently, only the appropriate and relevant items were selected. The questionnaire items and source appear in the Appendix. The measurement scale was developed in English. Further, a seven-point Likert-scale ranging from 1 (strongly disagree) to 7 (strongly agree) was used to measure each observed item. Survey instrument tool validation is discussed in Section IV-C.

TABLE I
DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Profile category		Frequency	Percentage
Gender	Male	356	63.8
	Female	202	36.2
Age	<20	175	31.4
	20–30	365	65.4
	>30	18	3.2
Laterality	Left-Hand	136	24.4
	Right-Hand	422	75.6
Browsing Experience	Beginners	83	14.9
	Intermediate	125	22.4
	Advance	211	37.8
	Expert	139	24.9
Buying Experience	No	245	43.9
	Infrequently	67	12.0
	frequently	246	44.0
Total		558	100.0

B. Participants and Data Collection

For this research, the students were recruited in Pakistan and the prototype used for this research supports multiple languages. Data were collected from graduate- and postgraduate-level students with the cooperation of several academic institutions. Mostly, the students have free access to the Internet resources. Therefore, besides academic activities, they also regularly use e-retailing services for searching and buying products online such as books, software, and e-tickets at economical cost. Previous studies [94], [95] suggested university students as an important sample for e-commerce research because they frequently use the Internet for communication and online transactions. Furthermore, the selection of students as a sample is also very much consistent with recent e-commerce research (i.e., [17], [20], [96]). According to Ha and Stoel [97], students constitute a fit sample to observe online shopping behavior of young adults. Additionally, in the current research, students' sample is considered as appropriate because of their high level of confidence in the execution of complex interactive tasks related to buying scenarios. Therefore, to recruit the volunteers, the researchers sent an email to the students and also to colleagues in different universities, who further distributed the email to the students of their respective institutions along with prototype link and study description. Approximately 1500 students from different universities responded with positive consent to participate in this research. A concise description about research investigation and buying scenarios was also included at top of the home page of the prototype website (collapsible content) for review, prior to start the ticket-booking process. The participants were requested to use this prototype to search the bus tickets between two locations on a specified date. The next step was to choose a bus ticket with minimum price from the searched schedule. The participants were also requested to personalize the seating plan inside the bus. Finally, students was requested to login after the booking process through online registration to collect the participants' demographic data followed by survey. Thus, in the two-month data collection process, 662 surveys were obtained. Incomplete and invalid surveys were discarded

TABLE II
UNIDIMENSIONALITY, RELIABILITY, CONVERGENT, AND DISCRIMINANT VALIDITY

Constructs and Items	Unidimensionality				Reliability, Convergent and Discriminant Validity				
	Eigenvalues (first and second component)		Variance explained (first and second component)		Standard deviation	Alpha (α)	CR	AVE	Loadings
	First Comp	Second Comp	First Comp (%)	Second Comp (%)					
Typography	2.384	0.345	79.471	11.511		0.871	0.921	0.795	
TYP1					1.602				0.886
TYP2					1.707				0.881
TYP3					1.616				0.907
Color	1.765	0.235	88.247	11.753		0.867	0.938	0.882	
CLR1					1.608				0.939
CLR2					1.598				0.939
Content quality	2.401	0.352	80.032	11.741		0.875	0.923	0.800	
CNT1					1.574				0.878
CNT2					1.559				0.915
CNT3					1.562				0.891
Interactivity	3.390	0.486	67.799	9.729		0.881	0.913	0.678	
INT1					0.796				0.776
INT2					0.835				0.821
INT3					0.855				0.845
INT4					0.849				0.843
INT5					1.634				0.829
Navigation	3.403	0.495	68.060	9.894		0.882	0.914	0.681	
NAG1					1.678				0.814
NAG2					1.695				0.835
NAG3					1.670				0.860
NAG4					1.650				0.808
NAG5					1.655				0.808
Satisfaction	3.066	0.434	76.645	10.862		0.898	0.929	0.766	
SAT1					1.616				0.878
SAT2					1.596				0.895
SAT3					1.647				0.857
SAT4					1.600				0.871
Trust	1.721	0.279	86.030	13.970		0.838	0.925	0.860	
TST1					1.612				0.928
TST2					1.645				0.928
Loyalty	1.786	.214	89.294	10.706		0.880	0.943	0.893	
LYL1					1.789				0.945
LYL2					1.811				0.945

from the original dataset. Only 558 out of 662 surveys were considered valid and appropriate where the response rate was 44.1%. The students' brief demographic description is given in Table I.

C. Data Analysis

The proposed relationships were tested through a partial least squares structural equation modeling (PLS-SEM) approach. It is a comprehensive multivariate statistical analysis approach that can simultaneously examine relationships among all the variables in a conceptual model, including a measurement component and a structural component in order to build theory [98]–[100]. The software package WarpPLS version 5.0 [98] was used to perform the analysis. We preferred the WarpPLS over other PLS-SEM tools because it applies Herman Wold's original PLS regression algorithm as it reduces the levels of collinearity, thus providing stable weights and no inflated coefficients [98]. WarpPLS version 5.0 is available at http://warppls.com/

The reliability of the constructs was examined through cronbach's alpha (α), which is based on the average intercorrelation of items [99], [101], [102]. Therefore, high intercorrelation between the items results in a higher significance level of α. However, there is no strict cutoff point for α coefficients, but a lower limit of alpha (α) is the generally agreed value of 0.70 [99], [101]. The values for α in current study ranged from 0.838 to 0.898 (see Table II). Furthermore, the reliability was also assessed by analyzing the outer loadings or sample correlations of the observed items with the construct with which they are theoretically associated. The general rule is that the value of composite reliability (CR) should be equal to or greater than 0.70 [99], [101]. In this study, the value for CR ranged from 0.913 to 0.943 (see Table II), which demonstrated good internal consistency.

D. Measurement Model

The measurement model was examined through unidimensionality, standardized factor loadings, CR, convergent validity (CV), and discriminant validity (DV). Initially, the unidimensionality was tested by employing a principal component (factor) analysis. According to Kaiser's criterion, the unidimensionality holds if an eigenvalue higher than 1 is attained in the first principal component [103]. All the employed constructs meet

TABLE III
COMBINED LOADINGS AND CROSS LOADINGS

	1	2	3	4	5	6	7	8
Typography	0.88	−0.19	0.08	−0.02	0.03	−0.07	0.06	−0.00
	0.88	0.24	−0.07	−0.04	0.01	−0.05	0.12	−0.11
	0.90	−0.04	−0.01	0.06	−0.04	0.13	−0.19	0.11
Colors	−0.01	0.93	0.01	−0.05	0.01	0.00	0.00	−0.03
	0.01	0.93	−0.01	0.05	−0.01	−0.00	−0.00	0.03
Content	−0.04	−0.06	0.87	0.09	0.02	−0.04	0.01	−0.05
Quality	−0.06	0.01	0.91	−0.00	0.04	0.00	−0.06	0.11
	0.10	0.05	0.89	−0.08	−0.06	0.04	0.05	−0.06
Interactivity	0.14	0.03	−0.16	0.77	0.20	0.14	0.01	−0.15
	−0.03	0.04	−0.02	0.82	−0.17	0.04	−0.23	0.16
	−0.06	0.08	−0.04	0.84	−0.07	0.07	−0.02	0.03
	−0.17	0.01	0.08	0.84	0.01	−0.13	0.15	−0.06
	0.14	−0.17	0.13	0.82	0.04	−0.13	0.08	−0.00
Navigation	−0.23	0.15	0.06	−0.10	0.81	−0.02	0.09	−0.08
	0.03	−0.09	−0.18	0.01	0.83	0.11	0.14	−0.18
	0.09	0.09	0.10	−0.10	0.86	−0.17	−0.00	0.01
	0.10	−0.04	0.20	−0.07	0.80	0.00	−0.17	0.12
	−0.00	−0.10	−0.18	0.27	0.80	0.08	−0.06	0.13
Satisfaction	−0.01	0.11	−0.04	0.02	0.08	0.87	−0.18	0.02
	−0.03	−0.09	−0.01	−0.04	0.14	0.89	−0.15	0.09
	0.12	−0.13	0.00	−0.03	−0.09	0.85	0.05	−0.01
	−0.07	0.113	0.05	0.05	−0.13	0.87	0.29	−0.09
Trust	0.02	−0.01	0.04	−0.04	−0.00	0.00	0.92	−0.08
	−0.02	0.01	−0.04	0.04	0.00	−0.00	0.92	0.08
Loyalty	0.00	−0.05	0.00	−0.06	0.03	−0.00	0.07	0.94
	−0.00	0.05	−0.00	0.06	−0.03	0.00	-0.07	0.94

TABLE IV
INTERCORRELATIONS AND $\sqrt{\text{AVE}}$ OF LATENT VARIABLES

	1	2	3	4	5	6	7	8
Typography	0.89							
Color	0.76	0.93						
Content-quality	0.74	0.62	0.89					
Interactivity	0.73	0.63	0.74	0.82				
Navigation	0.69	0.61	0.71	0.81	0.82			
Satisfaction	0.75	0.74	0.73	0.72	0.70	0.87		
Trust	0.66	0.63	0.68	0.65	0.65	0.79	0.92	
Loyalty	0.61	0.59	0.57	0.58	0.54	0.72	0.73	0.94

TABLE V
ADDITIONAL COEFFICIENTS

Constructs	Variance Inflation Factor (VIF)	R-squared (R^2)	Adjusted R-squared (R^2)
Typography	3.799		
Color	2.870		
Content quality	3.155		
Interactivity	3.915		
Navigation	3.414		
Satisfaction	4.617	0.707	0.704
Trust	3.454	0.580	0.576
Loyalty	2.523	0.600	0.599

the suggested criteria; moreover, the principal component elucidates the majority of the variances (see Table II). The CV was examined through WarpPLS by observing the outer loadings pattern of the items [101]. The outer loadings for all observed items were greater than 0.70 and ranged from 0.776 to 0.945 (see Tables II and III) along with significant p-value (threshold ≤ 0.05), indicating good CV of all constructs [101]. Second, DV was evaluated according to the criterion suggested in previous research. DV indicates the extent to which a given construct differs from other constructs [100]. Therefore, the DV criterion relies on two important elements. The first element is that the observed items should be weakly correlated with all constructs except the one to which they are hypothetically associated [100]. As Gefen and Straub [104] in their study stated that "correlation of the latent variable scores on the measurement items needs to show an appropriate pattern of loadings, one in which the measurement items load highly on their speculatively assigned factor and not highly on other factors." Table III shows the cross loadings for all adopted constructs. The second criterion of DV assessment is related to average variance extracted (AVE) as AVE presents the percentage of variance taken by a construct. Thus, to ensure the DV, the AVE value of all constructs should be greater than 0.50 (see Table II), and the $\sqrt{\text{AVE}}$ for each construct (off-the-diagonal value) should be greater than the correlation value (on diagonal) between constructs [99]–[101].

Finally, all constructs exhibited enough DV index in this study, as shown in Table IV. We also evaluated the multicollinearity through variance inflation factors (VIF). VIF assessed the multicollinearity among the constructs. The higher VIF index between two latent variables seems to measure similar things. In this particular case, it is required to remove a latent variable from the developed model. It was also suggested that the VIF value for variables should be less than 5, although more relaxed criterion suggested in previous research is the threshold at 10 [105]. In the current study, VIFs are far below 5 (see Table V). Therefore, no latent variable measures the same thing. Even the computed values of both average variation inflation factor $\overline{\text{VIF}} = 3.1$ and average full collinearity variance inflation factor $\overline{\text{FVIF}} = 3.4$ were also observed to be far below the threshold value 5. The ideal suggested value for both $\overline{\text{VIF}}$ and $\overline{\text{FVIF}}$ is 3.3 in the previous research [98]. WarpPLS also reported other model fit indicators such as average R-squared ($\overline{R^2}$) with p-value ($\beta = 0.629, P \leq 0.001$), average adjusted R-squared (AARS) ($\beta = 0.626$) with P-value ≤ 0.001), average path coefficient ($\overline{\beta}$) with p-value ($\beta = 0.221, P \leq 0.001$), and $\overline{\text{VIF}} = 3.1$, respectively. Goodness of Fit was also measured through Tenenhaus [106] GoF $= \sqrt{\overline{(\text{AVE})} X \overline{(\text{ARS})}}$ or $\sqrt{\overline{(\text{Communality})} X \overline{(\text{ARS})}}$ $= \sqrt{(0.794) X (0.629)} = 0.707$. In the recent studies [98], [107], researchers suggested the GoF criteria as follows: small ≥ 0.1, medium ≥ 0.25, and large ≥ 0.36. Finally, as all values indicated good fit, this study fulfills all the above-mentioned conditions to support the analysis. For additional model fit and quality indicators, see Table VI.

E. Structure Model

After having confirmation of the unidimensionality, reliability, and validity of the measurement model, the next step was to analyze the structure model. Therefore, we examined the comprehensive explanatory power (EP) of the structural model, path coefficients, (β) and amount of variance (R^2) [100], [108], for dependent variables explained by independent variables.

TABLE VI
ADDITIONAL MODEL FIT AND QUALITY INDICATORS

Indicators	Value	Acceptable -	Ideal
Sympson's paradox ratio	1.000	>0.7	1
R-squared contribution ratio	1.000	>0.9	1
Statistical suppression ratio	1.000	>0.7	
Nonlinear bivariate causality direction ratio	1.000	>0.7	

TABLE VII
PATH COEFFICIENTS

Path	Coefficients	P-value	Significance
H1: Typography → Satisfaction	$\beta = 0.138$	$P \leq 0.001$	***
H2: Typography → trust	$\beta = 0.091$	$P \leq 0.015$	**
H3: Color → Satisfaction	$\beta = 0.320$	$P \leq 0.001$	***
H4: Color → Trust	$\beta = 0.202$	$P \leq 0.001$	***
H5: Content quality → Satisfaction	$\beta = 0.219$	$P \leq 0.001$	***
H6: Content quality → Trust	$\beta = 0.304$	$P \leq 0.001$	***
H7: Interactivity → Satisfaction	$\beta = 0.153$	$P \leq 0.001$	***
H8: Interactivity → Trust	$\beta = 0.086$	$P \leq 0.020$	**
H9: Navigation → Satisfaction	$\beta = 0.131$	$P \leq 0.001$	***
H10: Navigation → Trust	$\beta = 0.185$	$P \leq 0.001$	***
H11: Satisfaction → Loyalty	$\beta = 0.393$	$P \leq 0.001$	***
H12: Trust → Loyalty	$\beta = 0.424$	$P \leq 0.001$	***

Simply put, R^2 was used to explain the model EP. The results after executing the structural model explained 70% of the variation in satisfaction, and 58% variation in trust, and 60% in loyalty (see Table V). It is demonstrated that the model provided good EP. All path coefficients were observed to be significant in this study to support the hypotheses (see Fig. 1).

V. RESULT AND ANALYSIS

The result of this study provides the support for the research framework (see Fig. 1). The results revealed that web design attributes positively affect user trust and satisfaction, which in turn leads to loyalty. This section depicts some interesting findings related to user trust (see Table VII). *Hypotheses 1 and 2:* In previous literature, typography was rarely discussed with respect to strengthening user relationship with web interfaces. In this study, typography positively influenced user trust and satisfaction. Therefore, proper spacing between lines and between words, font color, and style (typeface) with readable font size leads to loyalty because of its satisfying as well as trustworthy appearance. The relationship between typography and satisfaction ($\beta = 0.138, P \leq 0.001$) was observed to be stronger than the relationship between typography and trust ($\beta = 0.091, P \leq 0.015$). Sasidharanet *et al.* [65] argue that typeface influences the user's trust-related perceptions.

Hypotheses 3 and 4: The website color and graphics observed as influencing features for determining the satisfaction and trust (see Table VII). Furthermore, the use of basic colors with fair contrast not only enhances the users' reading capabilities but also guides them for website navigation. Therefore, choosing a suitable color scheme and graphics for a website ensures the attractiveness, supportiveness, and trustworthiness of the websites. Moreover, the relationship between the color and satisfaction ($\beta = 0.320, P \leq 0.001$) was observed to be stronger than color and trust ($\beta = 0.202, P \leq 0.001$). Similarly, in an empirical investigation, Cyr *et al.* [17] also observed strong relationship between color appeal and satisfaction than color appeal and trust for both high- and low-UA cultures.

Hypotheses 5 and 6: Similar to color, the website content quality is also observed as an influencing factor that significantly affects user trust and satisfaction (see Table VII). Hence, the precise presentation of information not only supports the user for recognition but also facilitates quick comparison between the products/services' features to reach a buying decision. The relationship between content quality and trust ($\beta = 0.304, P \leq 0.001$) was observed to be stronger than content quality and satisfaction ($\beta = 0.219, P \leq 0.001$). In several other studies [4], [5], [7], [39], [73], the results demonstrate the positive relationship between content (relevant information) and customer satisfaction [4], [7], [73], and also between content and trust [4], [5], [39], [73]. In contrast, Eid [7] observed a positive relationship between information quality and satisfaction than between information quality and trust for a high-UA (Saudi Arabia) culture, whereas, in the current study, we specifically observed that for high-UA or low-trust cultures, content quality or information quality is more important factor to determine the user trust than satisfaction. As appropriate and well-presented information reduces the uncertainty and risk that leads to a higher comfort level with the website.

Hypotheses 7 and 8: The website interactivity is an important design attribute that consists of several dimensions. However, these dimensions were rarely discussed in previous studies with respect to culture context. In this study, we include personalization/customization and responsiveness to explain the strength of interactivity relationship with trust and satisfaction. The results of this study demonstrated the participants' preferences to the interactive features that facilitated them to personalize the service and product through customization. Moreover, the versatility in the booking process, responsiveness (timeliness of information)/ feedback, and consistency also enhanced the website interactivity. The relationship between interactivity and satisfaction ($\beta = 0.153, P \leq 0.001$) was observed to be stronger than interactivity and trust ($\beta = 0.086, P \leq 0.020$). In support to our study, Cyr *et al.* [16] observed direct and positive impact of interactivity (user control, connectedness, and responsiveness) on user cognitive affective perceptions (trust and loyalty). Likewise, Lee [79] also observed that the perceived interactivity (user control, responsiveness, personalization, and connectedness) directly influences user trust and indirectly the behavioral intention to use mobile commerce. In short, the website interactivity induces favorable attitudes toward acceptability along with trust and satisfaction.

Hypotheses 9 and 10: In addition to content quality, navigational support was also observed to be an important factor to develop user trust for a high-UA culture. Besides ease to navigate, the participants also preferred clear buttons, simple navigational aids, and reversibility features that enabled avoiding any form of risk and to recover mistakes. As navigational clues and aids serve as a logical roadmap that not only helps the customers

during buying but also helps avoiding any ambiguity. The relationship between navigation and trust ($\beta = 0.185, P \leq 0.001$) was observed to be stronger than navigation and satisfaction ($\beta = 0.131, P \leq 0.001$). Likewise, Yoon [109] and Lim and Dubinsky [110] stated that website navigation is a strong factor to determine customer trust and positive attitude. In several other studies [22], [26], researchers emphasize the use of guided navigation to reduce the uncertainty/error. Thus, positive relationship exists between navigation and user satisfaction and between navigation and user trust in the cultural context [4], [15], [28].

Hypothesis 11 and 12: The study was also initiated to seek what constituent was required to develop loyalty with a website in high-UA culture. In several studies [1], [7], [15]–[17], [48], [53], both satisfaction and trust were observed as strong determinants of loyalty in the domain of e-commerce. Accordingly, Lee *et al.* [75], Brilliant and Achyar [47], and Cyr [15] observed user trust to have a stronger impact than satisfaction on loyalty. On the contrary, Moriuchi and Takahashi [48] and Flavia *et al.* [111] considered satisfaction as more important factor to determine customers' loyalty. Further, Eid [7] observed customer trust as a weak (unsupported) determinant of loyalty in a high-UA culture.

However, in the current study, both satisfaction and trust significantly influence loyalty, but the relationship between trust and loyalty ($\beta = 0.424, P \leq 0.001$) was observed to be stronger than between satisfaction and loyalty ($\beta = 0.393, P \leq 0.001$). In several other studies [8], [29], [112], researchers observed the influencing effect of UA on online customer trust. Thus, to design a website for a high-UA culture, presentation and arrangement of information and design features should be in a credulous manner. Because culturally adopted web design attributes reduce the negative impact of risk. All the adopted design attributes in the present study depicted positive relations with trust and satisfaction. Overall, the finding of this research may also be helpful for website developers in designing the information systems and e-commerce website for low-trust cultures.

VI. Conclusion

The appropriate selection of design elements is important to avoid annoyance toward websites. Thus, diversification in the website designs makes it difficult to classify them for target population. The cultural variations and preferences also underscore the need for a tailored design. In this study, the researchers attempted to examine user preferences for web design attributes to determine trust, satisfaction, and ultimately loyalty. Thus, the prime motivation for this investigation is to identify the role of web design attributes in building trust and satisfaction for UA culture. A questionnaire was designed to collect the data to corroborate the proposed model or hypotheses. The PLS-SEM method was adopted to analyze the collected data from the university students. The results of this study support the proposed model and also the hypotheses. All the web design attributes were observed at a significance level to develop trust and loyalty for UA culture. The unique and interesting finding is related to typography, which was rarely discussed in e-commerce literature. Furthermore, both content quality and navigation were observed to be strong factors in building user trust with a website. In contrast, interactivity, color, and typography were observed as strong determinants of user satisfaction. Finally, the effect of trust is more significant than the effect of satisfaction on loyalty for risk/high-UA cultures.

VII. Limitations and Future Study

A large sample population is a reliable and positive feature of the current research with a total sample of 585 students. The volunteers were from several institutions with different academic backgrounds. The participants were also unfamiliar with the designed prototype, which helps to avoid bias because of a company/website reputation. Some interesting findings related to implications of web design attributes in high-UA culture were obtained. The current study suffers some limitations. First, the sample employed only university students, which may not be illustrative of the overall population of e-retail consumers, although several researchers [94], [95] considered students as an important sample for e-commerce research because they frequently use the Internet for communication and online transactions. Moreover, it has been observed that most online customers tend to be young [96] and considered as appropriate sample because they are more interested in the design and aesthetics aspects [18], which may reduce concern over the use of students as sample. However, the use of university students in an educational setting may impact the external validity of the current study and restrict the applicability of the result to other settings or customers group. Second, the prototype was used for online ticket booking with no real purchase transactions. Although this procedure is consistent with previous e-commerce research (i.e., [17], [20], [96]), this may also limit transferability of the findings to actual e-commerce situations. Finally, we did not include other antecedents, that is, download delay, speed, and interactivity features; consequently, only a questionnaire approach was adopted to collect the subjective data, rather than a multiple methods approach to gather the additional objective measures. As future study, we plan to extend this investigation in several countries to seek the differences and similarities for design preferences. These culture preferences will further help us to verify and generalize the results. We also plan to extend the current investigation to more precisely observe the impact of typography on trust and satisfaction culturally. Typographical attributes for future research will include typeface, size, spacing, alignment, and color. Moreover, we are also interested to identify additional antecedents of loyalty in the cultural context.

Appendix
Constructs and Statements

Typography—(i.e.,[58], [60], [62], [65]).

It is easy to read the text on this website with the used font type and size.

The font color is appealing on this website.

The text alignment and spacing on this website make the text easy to read.

Color—(i.e.,[17], [90]).

The color scheme of this website is appealing.
The use of color or graphics enhances navigation.
Content quality—(i.e.,[4], [52]).
The content helps for buying decision by comparing the information about products or services.
The information content provided by this website meet my needs.
Contents and information support for reading and learning about buying process.
Interactivity—(i.e.,[4], [11], [50], [52]).
This website provides adequate feedback to assess my progression when I perform a task.
This website offers customization.
This website offers versatility of ordering process.
This website provides content tailored to the individual.
In this website, everything is consistent.
Navigation—(i.e.,[34], [50], [52]).
Navigation aids serve as a logical road map for buying.
Obviousness of buying button and links in this website.
It is easy to personalize or to narrow buying process.
It is easy to learn to use the website.
This website supports reversibility of action.
Satisfaction—(i.e.,[4], [91], [92]).
Over all, I am satisfied with the interface of this website.
My current experience with this website is satisfactory.
Overall, I am satisfied with the amount of time it took to complete the tasks for booking a ticket.
Overall, I am satisfied with accuracy for this website related to the buying process.
Trust—(i.e.,[17], [28]).
I trust the information presented on this website.
This website is credible for me.
Loyalty—(i.e.,[17], [93]).
I would visit this website again.
I would recommend this website to my friend.

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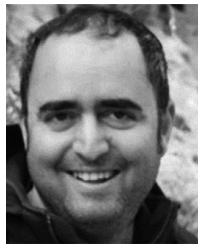

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Web Design Attributes in Building User Trust, Satisfaction, and Loyalty for a High Uncertainty Avoidance Culture

C. M. Nadeem Faisal, Martin Gonzalez-Rodriguez, Daniel Fernandez-Lanvin, and Javier de Andres-Suarez

***Abstract*—In this study, we attempt to evaluate the user preferences for web design attributes (i.e., typography, color, content quality, interactivity, and navigation) to determine the trust, satisfaction, and loyalty for uncertainty avoidance cultures. Content quality and navigation have been observed as strong factors in building user trust with e-commerce websites. In contrast, interactivity, color, and typography have been observed as strong determinants of user satisfaction. The most relevant and interesting finding is related to typography, which has been rarely discussed in e-commerce literature. A questionnaire was designed to collect data to corroborate the proposed model and hypotheses. Furthermore, the partial least-squares method was adopted to analyze the collected data from the students who participated in the test ($n = 558$). Finally, the results of this study provide strong support to the proposed model and hypotheses. Therefore, all the web design attributes were observed as important design features to develop user trust and satisfaction for uncertainty avoidance cultures. Although both factors seem to be relevant, the relationship between trust and loyalty was observed to be stronger than between satisfaction and loyalty; thus, trust seems to be a stronger determinant of loyalty for risk/high uncertainty avoidance cultures.**

***Index Terms*—Culture, e-commerce, loyalty, satisfaction, trust, website design.**

I. Introduction

IN ELECTRONIC commerce, global reach is an important concept that is defined as the ability to extend a company's reach to a customer through the Internet at low cost. Consequently, websites have become the backbone of business and are considered as a low-cost source of communication to exchange the products and services-related information. Therefore, to generate revenue, websites not only promote the products or services but also offer a superior value to customers, thus attracting more customers. The online selling statistics portals depict remarkable changes with maximum growth, and it has become a profit-oriented business approach through strong customer commitments [1]. Therefore, to promote this online business strategy, websites should be designed in such a way that they look trustworthy and need less cognitive efforts to use; else confusion could incline the visitors to close it. Thus, in a broader spectrum, a well-designed website should ensure clarity, consistency, and the arrangement of critical information on suitable areas of the website, which are easily accessible. In addition to clarity and consistency, website usability in the cultural context is also an important concern, which ensures the appropriateness of a website for all users.

To explore customer satisfaction, trust, and loyalty, Hofstede [2] identified five cultural dimensions that were frequently adopted in various e-commerce studies [3]–[8]. Further, these studies [3]–[8] indicate that users from different countries depicted different acceptance behavior toward design, including security and trust with respect to e-commerce websites. Uncertainty avoidance (UA) is one from Hofstede's cultural dimensions and can be defined as the extent to which a community avoids unknown situations and ambiguity [2]. It is a rarely adopted dimension in comparison with other dimensions used to explain user reactions for IT artifacts, that is, a website. Dinev *et al.* [9] argue that users from high-UA cultures value website security and trust over the users from lower UA cultures. Therefore, in a culture where people do not trust websites, the level of avoidance from uncertainty is observed to be higher [6]. Similarly, Cyr [5] also discussed the value of trust between high- and low-UA cultures, but the too small sample size from high-UA cultures was considered as a limitation by the authors of the study.

In this study, we employed a reasonable sample of students ($n = 558$) to determine key antecedents that potentially influence user trust, satisfaction, and loyalty in a high-UA culture (Pakistan). According to Hofstede's cultural index, Pakistani culture is considered as a high-UA culture or a low-trust culture [2]. Moreover, no potential study is available in the elegant literature that discussed the design consideration in the context of Pakistan. As a result, this study will be helpful to understand the determining factors to consider when developing websites for high-UA cultures to strengthen users' loyalty with the websites. Moreover, the identification of web design attributes that significantly affect the trust and satisfaction in high-UA cultures is also an important consideration to initiate in this study. The

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key antecedents adopted in this study are generally categorized into the aesthetic and organizational structure and layout. Aesthetic aspects further narrowed down into color and typography, which have been rarely discussed in the domain of e-commerce to determine user trust and satisfaction. Therefore, determining the role of typography in building user trust is also an important contribution of this study.

The rest of this paper is organized as follows. Section II presents existing studies related to culture and website design, satisfaction, and trust. Section III is related to the objectives and hypotheses of this study. Section IV is about the methodology, data collection, and analysis. Section V presents the result and analysis section, followed by the conclusion, limitations, and future scope of study.

II. Literature Review

A well-designed website provides active support to users in accessing the preferred information easily and appropriately. Further, it plays a significant role in achieving the desired business goals by compelling customers toward website acceptability and revisit. However, the website revisit rate is associated with user satisfaction, which is built on the user's perception of the system [10], and the design attributes. Accordingly, a well-designed site can be defined by considering the following facets: ease of understanding the contents and structure, simplicity, speed, ease of navigation, and user control. Likewise, Palmer [11] argues that website success is associated with download delay, navigation, information, interactivity, and responsiveness.

Website users can encounter abundant problems when trying to acquire information from it and also when trying to use its functional aspects [12]. Furthermore, these design features considerably affect motivational and cognitive aspects for commercial websites [13]. Hence, the design quality of the commercial websites is critical for the success of e-commerce and to attract new customers for purchase intent [14]. Several authors [3]–[7], [15]–[20] empirically observed the implications of design attributes from both the local and the international perspective. These implications provide effective guidelines for designing trustworthy interfaces to meet user satisfaction and also to retain users' loyalty to the website. Therefore, it is a well-established concept that differences exist for design preferences among cultures [21], [22]. These cultural preferences have significant implications on satisfaction, trust, loyalty, [3]–[6], [15], [17], and success rate. Thus, website success is also associated with culture, which is consistently discussed in the various human–computer-interaction (HCI) studies. In previous studies, several authors [2], [23] defined and discussed culture under different headings and contexts. According to Doney *et al.* [23], "culture is a system of values and norms that are shared among a group of people and that when taken together constitute a design for living." And, Hofstede [2] defined culture as "the collective mental programming of the human mind which distinguishes one group of people from another." Furthermore, Hofstede [2] identified the following culture dimensions normalized to the score of 0–100.

1) Power distance expresses the individual's beliefs that power is unequally distributed in the culture [2].
2) Individualism expresses individual's relationship with each other. Therefore, in individualistic culture, people are expected to consider personal interest over group interest [2], whereas in collectivist cultures, people are integrated into cohesive groups and preferably think for common interests [2].
3) In masculine cultures, the focus is on achievement; material success and assertiveness are considered as more masculine in orientation [2]. In cultures where focus is on cooperation and caring, modesty and quality of life are considered as more feminine in orientation [2].
4) UA expresses community avoidance from unknown situations and ambiguity and demonstrate the lack of tolerance for any personal risk [2].
5) Long-term orientation expresses the extent to which a culture retains or prefers long-term views [2].

Higher UA cultures demonstrate lack of tolerance for personal risk and prefer trustworthy websites [5]. Thus, UA is related to trust and security [3], [24] and is a rarely adopted dimension in the e-commerce research. Marcus [25] theoretically explains the implication of UA on design in several ways, that is, simplicity versus complexity, structured navigation versus less control navigation, and redundant cues (sound, color, typography, etc.), to reduce the risk. Moreover, Singh and Matsuo [26] and Marcus [22] argue that high-UA cultures prefer simple and more structured websites. Thus, guided navigation is an important design attribute to design the websites for higher UA cultures [26]. Isa *et al.* [27] observed the positive influence of UA on user performance and preference. Cyr *et al.* [28] mentioned that user characteristics, cultural differences, and design preferences are important considerations with respect to multicultural audiences. Likewise, Yoon [29] argues that UA is an important cultural value that significantly influences customer e-commerce acceptance. Thus, in a high-UA culture, people hesitate to adopt e-commerce or may decrease their online shopping [29]. Therefore, different culture groups employ different development and usage behavior for website interfaces because of language, social contexts, symbols, and aesthetics. Lee *et al.* [30] empirically observed that help and support on the website and risk are more critical factors for Korean customer's satisfaction over US customers.

Pakistan is a sovereign country in Asia with a total population of approximately 199 million people. Nowadays, IT and e-commerce are rapidly growing sectors and have become a profitable business strategy. According to Ahmad [31], the e-commerce market size in Pakistan is expected to reach 600 million U.S. dollar in 2017. The current GDP of Pakistan is 246.88 billion U.S. dollars with an annual growth rate of 4.1% per year. The culture of Pakistan, in accordance with Hofstede's cultural index [22], is rated high for UA = 70 (risk avoidance), and therefore, it is considered as a low-trust culture. For comparison, the minimum score of UA in Hofstede's cultural index is 08 for Singapore and maximum is 100 for Greece [22]. This difference renders Pakistan a substantial area of research in the domain of e-commerce.

A. Website Satisfaction and Trust

In reality, it is difficult to design a product or website that satisfies all the international and intercultural customers [32]. Therefore, it is important to determine what makes it possible to meet customer satisfaction. Satisfaction is a gauge for system successfulness and is a commonly adopted measure in various technological studies. It highlights the users' personal perception and favorable attitude [33]. Furthermore, it is a critical factor linked to the diverse nature of other related factors [34] and can be assessed by obtaining subjective data from users. In previous studies, satisfaction was discussed under different names and headings, for example, comfort, intent, and a pleasure user feels after use. Thus, the greater the degree of satisfaction with a service, the greater the intention to use or self-regulation [35]. However, the retention of consumers as well as their continuing to use a website is an important challenge for commercial website providers [36], because "websites have different hidden subjective factors that stem from the process of user and system interaction and affect overall user satisfaction, and that they can serve the development and maintenance phases of website creation [34]." Evanschitzkya *et al.* [37] define e-satisfaction as users' positive perceptions of a website design, whereas Petrie and Bevan [38] define satisfaction as an optimistic attitude toward a product.

Similar to satisfaction, trust also received considerable importance in marketing research. It refers to the depth and assurance of customers' feeling based on inconclusive evidence [39]. Moreover, uncertain situations and risk are important conditions that disclose a value of trust [28], [40]. Therefore, it can be defined as a person's faith and belief in another person's trustworthiness and honesty in a transaction [39]. Accordingly, trust is a critical factor similar to satisfaction and is also linked with the related factors to determine the success and customer long-term relationship with sellers/website [28], [39]. Palvia [41] argues that trust is an important factor to enhance company profit and performance. The term online trust also refers to customer's confidence with a website and reduction in risk and uncertainty [42]. As more problems are associated with online business, such as privacy and insecurity, it enforces the website provider to develop a trustworthy site. Therefore, to attract new customer trustworthy appearance of websites is very important under the uncertain situations. In this study, we employed both satisfaction and trust as endogenous variables and also as key antecedents of customer loyalty. Loyalty is described in Section III.

Moreover, there does not seem to exist a clear consensus among scholars about the nature of the relationship between satisfaction and trust. Some authors [43], [44] consider that satisfaction is a determinant of trust. Their tests in the context of online business showed that previous positive shopping experiences result in high customer trust. However, other authors [45], [46] reported just the opposite: trust influences satisfaction. For them, the strong image that customers have about a company helps them to perceive a high level of satisfaction. However, several other relevant demographic studies [4], [7], [15], [17], [47], [48] represent both satisfaction and trust as unrelated variables in their research models. These research efforts are closely focused on the study of cultural differences, and they consider the impact of different design approaches on trust and satisfaction and, in turn, evaluate the relationship of these variables to online loyalty. As our research questions are closer to these studies, we decided to exclude the relationship between satisfaction and trust from our model. However, the consideration of the relationship between satisfaction and trust in the context of different national cultures is an interesting avenue for future research.

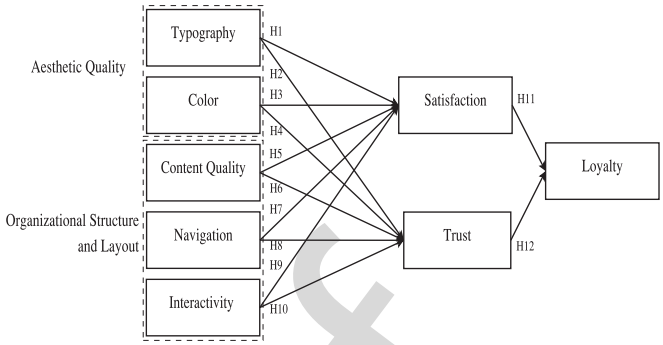

Fig. 1. Research model and hypothesized relationships.

III. Research Model and Hypotheses

Fig. 1 presents the research model guiding this investigation. The proposed research model was developed based on conceptual and theoretical studies in the domain of e-commerce. The model theorizes that web design attributes positively influence the user trust and satisfaction in a high-UA culture. In terms of website design, five design attributes/features suggested by research community (i.e., [4], [11], [22], [49], [50]) include the following.

1) Typography—it is related to appearance, attractiveness, and readability of text on the website to draw user attention.
2) Color— it appeals to the users' emotions, feelings, and helps them to understand the functions of buttons, icons, and boxes.
3) Content quality—the degree to which the provided information is sufficient and complete.
4) Interactivity—how information is presented to enhance the user interaction consistently.
5) Navigation—the extent to which navigational clues and format assist the user to access other sections of a website.

All of these design attributes incorporate both aesthetic and usability aspects. However, both typography and color are associated with aesthetic quality, whereas content, interactivity, and navigation are more related to organizational structure and layout of the website. These design attributes are extensively used in several e-commerce-related studies (i.e., [4], [6], [7], [15], [19], [20], [51], [52]) to assess users' preferences. Likewise, in the cultural context, Cyr and Head [4] examined the implications of design attributes (i.e., content, navigation, and visual design) on trust and satisfaction in masculine versus

feminine-oriented cultures. Besides, design implications on both trust and satisfaction were further used as key antecedents to determine the loyalty. The goal was to examine the relative strength of the relationship of trust versus satisfaction to loyalty for UA culture. Likewise, Casaló *et al.* [53] observed a strong relationship between user satisfaction and loyalty. However, Bilgihan and Bujisic [1] and Cyr *et al.* [16] examined a positive relationship between user trust and loyalty. The research variables and hypotheses are described below.

A. Aesthetic Quality

The significance of aesthetic quality has been acknowledged in the domain of HCI. In recent studies, aesthetics for attractiveness and design consistency of the website appearance have been studied [5], [36], [54]. According to Liao *et al.* [36], aesthetic and attractive features can enhance customer perception of usefulness for a website. These features are related to appearance and can be categorized into color, graphics, font, and so on. Similarly, in the study by Fogg *et al.* [55], the authors argue that consumers made their judgments about the website credibility based on design, "including layout, typography, font size, and color scheme." Several other studies discussed the importance of aesthetic and design quality with respect to satisfaction and trust [17], [30], [54], [56]. In the current study, we narrow down the aesthetic aspects into typography and color suggested by the research community [49].

1) Typography: Typography is related to appearance and attractiveness of text on the website [19]. It is an art to arrange the written language in a readable, appealing, and in a legible manner. As a result, high-quality typography enhances the value of the website, the meaning of words, and how those words can be perceived by the users [57], whereas poor-quality typography negatively affects learnability and comprehension, and as a consequence, it visually confuses the readers [58]. Hence, typography enables the reader to experience the website with pleasure [59] and decreases users' time and efforts to understand and access the required information [60]. Accordingly, the selection of typographic (text) elements (i.e., typefaces, signs, size, spacing, and color) for writing is very important, as it facilitates effective communication and reading [61]. Therefore, typographical preferences are important for e-commerce and web environment to enhance customer satisfaction [62] and trust. Nielsen [63] argues that small font size with low contrast is the cause of criticism in online reading. Therefore, users like the font they appreciate and complain about those they do not like [64]. Another feature that affects the appropriateness of typography is the letters, words, and line spacing [60]. Letter spacing refers to space between two words, whereas line spacing is a value in points that explains the distance between baseline of the upper line and the baseline of the lower line [60]. Therefore, text line spacing at 1.5 facilitates better reading, speed, and comprehension, especially for readers with poor vision due to aging or other factors [63]. Myung [62] empirically observed the users' preferences for typography. The results of this study demonstrated the following: importance of line spacing 56%, style 35%, and 12% for size, respectively [62]. Moreover, Sasidharan *et al.* [65] observed the relation between typeface and trust, but the results of this study were limited and only specific toward typeface. In the domain of e-commerce, insubstantial evidence still exists with respect to determining the role of typography in developing user trust and satisfaction. Therefore, in this study, we hypothesize that typeface, alignment, size, spacing, and color positively influence user trust and satisfaction.

H1: Website typography positively influences user satisfaction in a high-UA culture.

H2: Website typography positively influences user trust in a high-UA culture.

2) Color: The colors are associated with appeal and attractiveness and help users to understand the functions of icons, buttons, and links. In terms of typography, color also plays a very prominent role by enhancing the readability and drawing attention to important information [60]. Bonnardel *et al.* [66] observed the influence of color on website usability. Furthermore, they observed strong association of colors with human emotions and preferences, which alternatively affect the website navigation. Likewise, Cyr *et al.* [67] observed users' preferences for the website visual design. In another study, Cyr *et al.* [17] empirically observed the positive influence of color appeal on user satisfaction and trust for websites.

H3: In a high-UA culture, website color leads to higher user satisfaction toward that same website.

H4: In a high-UA culture, website color leads to higher user trust toward that same website.

B. Organizational Structure and Layout

The website features related to organizational structure and layout (i.e., content quality, interactivity, and navigation) are complementary aspects in the e-commerce website and deal with presentation of information, navigational clues, and the nature of interaction [52]. In short, structure refers to how the information is presented or displayed on the webpage and, further, to how the website is generally organized [68].

1) Content Quality: Web contents are empowered with information and transactional capabilities [69] and depict the overall structure and organization of information that a user requires [3]. Therefore, it is important to ensure that the available information on the website should be accurate, in-depth, and up-to-date [19], [51] to meet the customers need [70]. All these features have been discussed under the heading of content quality [36]. Thus, appropriate and up-to-date information facilitates the customers to compare the product features in order to reach a buying decision [70]. It seems that content quality reduces the uncertainty and risks, which translates into a higher comfort level with a website [71]. Udo *et al.* [72] observed that contents positively influenced the web service quality, which translates into higher satisfaction. In several other studies [13], [15], [39], [73], the results demonstrate the positive relation of content (relevant information) with customer satisfaction [4], [15], [73], trust [4], [15], [39], [73], and loyalty [13]. Cyr [5] argues that users from lower UA cultures score higher for information content compared with high-UA cultures. In the current study, we assume that content quality is a more important factor to determine user trust than satisfaction in UA culture.

H5: High-quality website contents lead to higher user satisfaction in a high-UA culture.

H6: High-quality website contents lead to higher user trust in a high-UA culture.

2) Interactivity: Website interactivity determines how information that is presented is processed by a website user (i.e., customization and control over the contents) [74]. Furthermore, it is the user's experience during his/her interaction [75], and it is considered as an important attribute of a website [76]. Zeithaml *et al.* [77] defined interactivity as "the extent to which website users can 1) communicate with the people behind the website, 2) interactively search for information, and 3) conduct transactions through the website." The features of interactivity that were consistently discussed in the literature include user control [78], [79], personalization/customization [79], [80], responsiveness [78]–[80], connectedness [78]–[80], and playfulness [78], [80]. In several studies [78]–[81], the researchers observed the impact of interactivity features on user satisfaction, trust, and loyalty. Likewise, Cyr *et al.* [16] argue that interactivity (i.e., user control, connectedness, and responsiveness) affect user trust and ultimately loyalty. However, Venkatesh and Ramesh [82] argue that website customization saves customer time by providing them personalized information. Several researchers [71], [83] proved the importance of interactivity, but there is still insufficient evidence on the role of interactivity for e-commerce in the cultural context. Consequently, we employed the following features of interactivity: responsiveness and personalization/customization to seek the users' preferences. Personalization/customization helps customers in tailoring the product features. We theorized that personalization/customization is an important attribute for developing customers' trust and satisfaction by facilitating them to tailor products' features before buying. Similarly, we also assume that responsiveness positively influences the customer satisfaction and trust through consistent feedback and support.

H7: Increased level of web interactivity leads to higher user satisfaction toward that same website.

H8: Increased level of web interactivity leads to higher user trust toward that same website.

3) Navigation: Website users have divergent capabilities and skills in the use of the Internet. Accordingly, focus of companies should not only be on attractive design but also on developing websites that are both easy to use and navigate. Not only does website navigation facilitate users in carrying their tasks in a timely accurate manner [84], it also provides additional ways to access the desired information easily [51]. Likewise, it supports the users while moving in and around a website conveniently [85]. Roy *et al.* [86] claim that "ease of navigation, interface design, and user guidance affect customer establishment for trust." Despite information, users may leave the website if they find it difficult to navigate when searching for the desired information. In several studies [22], [26], the researchers emphasize the use of guided navigation for uncertainty/risk avoidance cultures. Thus, positive correlation exists between navigation and satisfaction, as well as between navigation and trust in the cultural context [4], [5], [15]. Consequently, we believe that besides ease of navigation, reversibility, navigational clues, and obvious buttons support the users for appropriate actions, thus eliminating ambiguity or error.

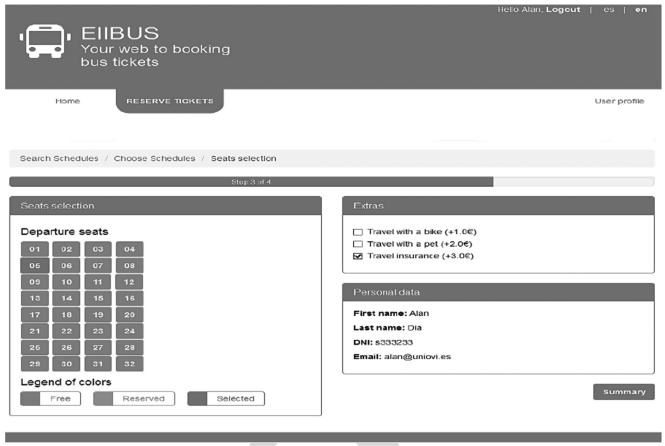

Fig. 2. E-ticket bus website prototype.

H9: In a high-UA culture, guided navigation leads to higher user satisfaction toward that same website.

H10: In a high-UA culture, guided navigation leads to higher user trust toward that same website.

C. Loyalty

The user interface designs for globalization are becoming more important for business success and customer loyalty [32]. Customer loyalty is defined as strong feelings of allegiance or commitments [53]. Therefore, loyal customers are found to have strong commitments and attachments toward the retailers. Moreover, the loyal customers are not easily distracted to slightly more attractive alternatives. Hence, true loyalty demonstrates customers and purchase retention [87], resistance to switch, and willingness to pay more. Besides, companies operating their business online face competition because of rapid growth in this sector. Therefore, trustworthiness, security, and easy-of-use are important aspects to keep the customer loyal to a website [15], [88]. In previous studies [7], [15], [33], [47], [48], both satisfaction and trust were considered as key factors to measure user loyalty to a website. Thus, greater the degree of satisfaction [53] and trust [1], [16], the greater the degree of website loyalty.

H11: Greater website user satisfaction leads to greater user loyalty to that same website.

H12: Greater the website user trust leads to greater user loyalty to that same website.

IV. Methodology and Data Analysis

To refute/validate the former hypotheses, we developed a simple e-commerce website prototype after carefully considering the design features of the three travel ticket booking websites (www.alsa.es, www.swebus.se, and www.daewoo.com.pk) to be tested by the students. The prototype was designed by deploying different colors (i.e., blue, green, pink, and white) (see Fig. 2). The blue color was mainly used in the design of distinct

areas (e.g., header, footer, navigation buttons, and links), whereas white was used as a background and as a logo and graphics color (see Fig. 2). The typographical features used on the website interface include typeface sans-serif (Helvetica), spacing 1.08, size from 12 to 20 px, and color, that is, more frequent (black and white) and less frequent (blue, green, and pink), respectively (see Fig. 2). Furthermore, the website navigation was supported through buttons and links along with navigational clues to take the prospective actions for buying. To enhance the website interactivity, for example, ticket price, travel date and time, preferred destination, and seat location inside the bus were incorporated through customizable features. As shown in Fig. 2, to personalize the seating plan, different colors were used for different buttons (i.e., green for "free," pink for "reserved," and blue for "selected"). Moreover, feedback and help and support were facilitated through pop-up messages and progress bar shown in Fig. 2. Finally, the prototype was carefully developed to avoid additional implications such as website familiarity, reputation [51], [53], and culture markers [89]. Therefore, prior to the start of the current investigation, consultants of usability engineering at the University of Oviedo performed cognitive and pluralistic walkthroughs on the initial mockups of the prototype, which were followed by heuristic evaluation of the resulting wireframes. Once the prototype was developed, a series of user test was conducted with local users to ensure a high usability level of its interactive elements. Thus, the prime objective of the pretest study was to validate that the developed prototype was working well, for example, the searching and booking procedures. The suggestions and feedback were incorporated by eliminating promotional information and banners irrelevant to the current study to keep the prototype design simple. Accordingly, Lee *et al.* [75] argue that interface simplicity is an important precondition for better interaction and usability experiences.

A. Survey Instrument

To evaluate the proposed hypotheses, a survey scale was designed and integrated with the website prototype to obtain subjective data (see the Appendix). The final survey questionnaire consisted of 26 items to assess the impact of web design attributes on users' satisfaction and trust for the developed e-commerce prototype. The survey items for the hypothesized constructs (i.e., typography, color, content quality, interactivity, navigation, satisfaction, trust, and loyalty) were developed and modified from the elegant literature (i.e., [4], [11], [17], [28], [34], [50], [52], [58], [60], [62], [65], [90]–[93]) in the domain of e-commerce. Moreover, to meet the objective of the hypothesized study, each questionnaire item was also reviewed by the research members before conducting the investigation. Consequently, only the appropriate and relevant items were selected. The questionnaire items and source appear in the Appendix. The measurement scale was developed in English. Further, a seven-point Likert-scale ranging from 1 (strongly disagree) to 7 (strongly agree) was used to measure each observed item. Survey instrument tool validation is discussed in Section IV-C.

TABLE I
DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Profile category		Frequency	Percentage
Gender	Male	356	63.8
	Female	202	36.2
Age	<20	175	31.4
	20–30	365	65.4
	>30	18	3.2
Laterality	Left-Hand	136	24.4
	Right-Hand	422	75.6
Browsing Experience	Beginners	83	14.9
	Intermediate	125	22.4
	Advance	211	37.8
	Expert	139	24.9
Buying Experience	No	245	43.9
	Infrequently	67	12.0
	frequently	246	44.0
Total		558	100.0

B. Participants and Data Collection

For this research, the students were recruited in Pakistan and the prototype used for this research supports multiple languages. Data were collected from graduate- and postgraduate-level students with the cooperation of several academic institutions. Mostly, the students have free access to the Internet resources. Therefore, besides academic activities, they also regularly use e-retailing services for searching and buying products online such as books, software, and e-tickets at economical cost. Previous studies [94], [95] suggested university students as an important sample for e-commerce research because they frequently use the Internet for communication and online transactions. Furthermore, the selection of students as a sample is also very much consistent with recent e-commerce research (i.e., [17], [20], [96]). According to Ha and Stoel [97], students constitute a fit sample to observe online shopping behavior of young adults. Additionally, in the current research, students' sample is considered as appropriate because of their high level of confidence in the execution of complex interactive tasks related to buying scenarios. Therefore, to recruit the volunteers, the researchers sent an email to the students and also to colleagues in different universities, who further distributed the email to the students of their respective institutions along with prototype link and study description. Approximately 1500 students from different universities responded with positive consent to participate in this research. A concise description about research investigation and buying scenarios was also included at top of the home page of the prototype website (collapsible content) for review, prior to start the ticket-booking process. The participants were requested to use this prototype to search the bus tickets between two locations on a specified date. The next step was to choose a bus ticket with minimum price from the searched schedule. The participants were also requested to personalize the seating plan inside the bus. Finally, students was requested to login after the booking process through online registration to collect the participants' demographic data followed by survey. Thus, in the two-month data collection process, 662 surveys were obtained. Incomplete and invalid surveys were discarded

TABLE II
UNIDIMENSIONALITY, RELIABILITY, CONVERGENT, AND DISCRIMINANT VALIDITY

Constructs and Items	Unidimensionality				Reliability, Convergent and Discriminant Validity				
	Eigenvalues (first and second component)		Variance explained (first and second component)		Standard deviation	Alpha (α)	CR	AVE	Loadings
	First Comp	Second Comp	First Comp (%)	Second Comp (%)					
Typography	2.384	0.345	79.471	11.511		0.871	0.921	0.795	
TYP1					1.602				0.886
TYP2					1.707				0.881
TYP3					1.616				0.907
Color	1.765	0.235	88.247	11.753		0.867	0.938	0.882	
CLR1					1.608				0.939
CLR2					1.598				0.939
Content quality	2.401	0.352	80.032	11.741		0.875	0.923	0.800	
CNT1					1.574				0.878
CNT2					1.559				0.915
CNT3					1.562				0.891
Interactivity	3.390	0.486	67.799	9.729		0.881	0.913	0.678	
INT1					0.796				0.776
INT2					0.835				0.821
INT3					0.855				0.845
INT4					0.849				0.843
INT5					1.634				0.829
Navigation	3.403	0.495	68.060	9.894		0.882	0.914	0.681	
NAG1					1.678				0.814
NAG2					1.695				0.835
NAG3					1.670				0.860
NAG4					1.650				0.808
NAG5					1.655				0.808
Satisfaction	3.066	0.434	76.645	10.862		0.898	0.929	0.766	
SAT1					1.616				0.878
SAT2					1.596				0.895
SAT3					1.647				0.857
SAT4					1.600				0.871
Trust	1.721	0.279	86.030	13.970		0.838	0.925	0.860	
TST1					1.612				0.928
TST2					1.645				0.928
Loyalty	1.786	.214	89.294	10.706		0.880	0.943	0.893	
LYL1					1.789				0.945
LYL2					1.811				0.945

from the original dataset. Only 558 out of 662 surveys were considered valid and appropriate where the response rate was 44.1%. The students' brief demographic description is given in Table I.

C. Data Analysis

The proposed relationships were tested through a partial least squares structural equation modeling (PLS-SEM) approach. It is a comprehensive multivariate statistical analysis approach that can simultaneously examine relationships among all the variables in a conceptual model, including a measurement component and a structural component in order to build theory [98]–[100]. The software package WarpPLS version 5.0 [98] was used to perform the analysis. We preferred the WarpPLS over other PLS-SEM tools because it applies Herman Wold's original PLS regression algorithm as it reduces the levels of collinearity, thus providing stable weights and no inflated coefficients [98]. WarpPLS version 5.0 is available at http://warppls.com/

The reliability of the constructs was examined through cronbach's alpha (α), which is based on the average intercorrelation of items [99], [101], [102]. Therefore, high intercorrelation between the items results in a higher significance level of α. However, there is no strict cutoff point for α coefficients, but a lower limit of alpha (α) is the generally agreed value of 0.70 [99], [101]. The values for α in current study ranged from 0.838 to 0.898 (see Table II). Furthermore, the reliability was also assessed by analyzing the outer loadings or sample correlations of the observed items with the construct with which they are theoretically associated. The general rule is that the value of composite reliability (CR) should be equal to or greater than 0.70 [99], [101]. In this study, the value for CR ranged from 0.913 to 0.943 (see Table II), which demonstrated good internal consistency.

D. Measurement Model

The measurement model was examined through unidimensionality, standardized factor loadings, CR, convergent validity (CV), and discriminant validity (DV). Initially, the unidimensionality was tested by employing a principal component (factor) analysis. According to Kaiser's criterion, the unidimensionality holds if an eigenvalue higher than 1 is attained in the first principal component [103]. All the employed constructs meet

TABLE III
COMBINED LOADINGS AND CROSS LOADINGS

	1	2	3	4	5	6	7	8
Typography	0.88	−0.19	0.08	−0.02	0.03	−0.07	0.06	−0.00
	0.88	0.24	−0.07	−0.04	0.01	−0.05	0.12	−0.11
	0.90	−0.04	−0.01	0.06	−0.04	0.13	−0.19	0.11
Colors	−0.01	0.93	0.01	−0.05	0.01	0.00	0.00	−0.03
	0.01	0.93	−0.01	0.05	−0.01	−0.00	−0.00	0.03
Content	−0.04	−0.06	0.87	0.09	0.02	−0.04	0.01	−0.05
Quality	−0.06	0.01	0.91	−0.00	0.04	0.00	−0.06	0.11
	0.10	0.05	0.89	−0.08	−0.06	0.04	0.05	−0.06
Interactivity	0.14	0.03	−0.16	0.77	0.20	0.14	0.01	−0.15
	−0.03	0.04	−0.02	0.82	−0.17	0.04	−0.23	0.16
	−0.06	0.08	−0.04	0.84	−0.07	0.07	−0.02	0.03
	−0.17	0.01	0.08	0.84	0.01	−0.13	0.15	−0.06
	0.14	−0.17	0.13	0.82	0.04	−0.13	0.08	−0.00
Navigation	−0.23	0.15	0.06	−0.10	0.81	−0.02	0.09	−0.08
	0.03	−0.09	−0.18	0.01	0.83	0.11	0.14	−0.18
	0.09	0.09	0.10	−0.10	0.86	−0.17	−0.00	0.01
	0.10	−0.04	0.20	−0.07	0.80	0.00	−0.17	0.12
	−0.00	−0.10	−0.18	0.27	0.80	0.08	−0.06	0.13
Satisfaction	−0.01	0.11	−0.04	0.02	0.08	0.87	−0.18	0.02
	−0.03	−0.09	−0.01	−0.04	0.14	0.89	−0.15	0.09
	0.12	−0.13	0.00	−0.03	−0.09	0.85	0.05	−0.01
	−0.07	0.113	0.05	0.05	−0.13	0.87	0.29	−0.09
Trust	0.02	−0.01	0.04	−0.04	−0.00	0.00	0.92	−0.08
	−0.02	0.01	−0.04	0.04	0.00	−0.00	0.92	0.08
Loyalty	0.00	−0.05	0.00	−0.06	0.03	−0.00	0.07	0.94
	−0.00	0.05	−0.00	0.06	−0.03	0.00	-0.07	0.94

TABLE IV
INTERCORRELATIONS AND $\sqrt{\text{AVE}}$ OF LATENT VARIABLES

	1	2	3	4	5	6	7	8
Typography	0.89							
Color	0.76	0.93						
Content-quality	0.74	0.62	0.89					
Interactivity	0.73	0.63	0.74	0.82				
Navigation	0.69	0.61	0.71	0.81	0.82			
Satisfaction	0.75	0.74	0.73	0.72	0.70	0.87		
Trust	0.66	0.63	0.68	0.65	0.65	0.79	0.92	
Loyalty	0.61	0.59	0.57	0.58	0.54	0.72	0.73	0.94

TABLE V
ADDITIONAL COEFFICIENTS

Constructs	Variance Inflation Factor (VIF)	R-squared (R^2)	Adjusted R-squared (R^2)
Typography	3.799		
Color	2.870		
Content quality	3.155		
Interactivity	3.915		
Navigation	3.414		
Satisfaction	4.617	0.707	0.704
Trust	3.454	0.580	0.576
Loyalty	2.523	0.600	0.599

the suggested criteria; moreover, the principal component elucidates the majority of the variances (see Table II). The CV was examined through WarpPLS by observing the outer loadings pattern of the items [101]. The outer loadings for all observed items were greater than 0.70 and ranged from 0.776 to 0.945 (see Tables II and III) along with significant p-value (threshold ≤ 0.05), indicating good CV of all constructs [101]. Second, DV was evaluated according to the criterion suggested in previous research. DV indicates the extent to which a given construct differs from other constructs [100]. Therefore, the DV criterion relies on two important elements. The first element is that the observed items should be weakly correlated with all constructs except the one to which they are hypothetically associated [100]. As Gefen and Straub [104] in their study stated that "correlation of the latent variable scores on the measurement items needs to show an appropriate pattern of loadings, one in which the measurement items load highly on their speculatively assigned factor and not highly on other factors." Table III shows the cross loadings for all adopted constructs. The second criterion of DV assessment is related to average variance extracted (AVE) as AVE presents the percentage of variance taken by a construct. Thus, to ensure the DV, the AVE value of all constructs should be greater than 0.50 (see Table II), and the $\sqrt{\text{AVE}}$ for each construct (off-the-diagonal value) should be greater than the correlation value (on diagonal) between constructs [99]–[101].

Finally, all constructs exhibited enough DV index in this study, as shown in Table IV. We also evaluated the multicollinearity through variance inflation factors (VIF). VIF assessed the multicollinearity among the constructs. The higher VIF index between two latent variables seems to measure similar things. In this particular case, it is required to remove a latent variable from the developed model. It was also suggested that the VIF value for variables should be less than 5, although more relaxed criterion suggested in previous research is the threshold at 10 [105]. In the current study, VIFs are far below 5 (see Table V). Therefore, no latent variable measures the same thing. Even the computed values of both average variation inflation factor $\overline{\text{VIF}} = 3.1$ and average full collinearity variance inflation factor $\overline{\text{FVIF}} = 3.4$ were also observed to be far below the threshold value 5. The ideal suggested value for both $\overline{\text{VIF}}$ and $\overline{\text{FVIF}}$ is 3.3 in the previous research [98]. WarpPLS also reported other model fit indicators such as average R-squared ($\overline{R^2}$) with p-value ($\beta = 0.629, P \leq 0.001$), average adjusted R-squared (AARS) ($\beta = 0.626$) with P-value ≤ 0.001), average path coefficient ($\overline{\beta}$) with p-value ($\beta = 0.221, P \leq 0.001$), and $\overline{\text{VIF}} = 3.1$, respectively. Goodness of Fit was also measured through Tenenhaus [106] GoF $= \sqrt{\overline{(\text{AVE})} X \overline{(\text{ARS})}}$ or $\sqrt{\overline{(\text{Communality})} X \overline{(\text{ARS})}}$ $= \sqrt{(0.794) X (0.629)} = 0.707$. In the recent studies [98], [107], researchers suggested the GoF criteria as follows: small ≥ 0.1, medium ≥ 0.25, and large ≥ 0.36. Finally, as all values indicated good fit, this study fulfills all the above-mentioned conditions to support the analysis. For additional model fit and quality indicators, see Table VI.

E. Structure Model

After having confirmation of the unidimensionality, reliability, and validity of the measurement model, the next step was to analyze the structure model. Therefore, we examined the comprehensive explanatory power (EP) of the structural model, path coefficients, (β) and amount of variance (R^2) [100], [108], for dependent variables explained by independent variables.

TABLE VI
ADDITIONAL MODEL FIT AND QUALITY INDICATORS

Indicators	Value	Acceptable -	Ideal
Sympson's paradox ratio	1.000	>0.7	1
R-squared contribution ratio	1.000	>0.9	1
Statistical suppression ratio	1.000	>0.7	
Nonlinear bivariate causality direction ratio	1.000	>0.7	

TABLE VII
PATH COEFFICIENTS

Path	Coefficients	P-value	Significance
H1: Typography → Satisfaction	$\beta = 0.138$	$P \leq 0.001$	***
H2: Typography → trust	$\beta = 0.091$	$P \leq 0.015$	**
H3: Color → Satisfaction	$\beta = 0.320$	$P \leq 0.001$	***
H4: Color → Trust	$\beta = 0.202$	$P \leq 0.001$	***
H5: Content quality → Satisfaction	$\beta = 0.219$	$P \leq 0.001$	***
H6: Content quality → Trust	$\beta = 0.304$	$P \leq 0.001$	***
H7: Interactivity → Satisfaction	$\beta = 0.153$	$P \leq 0.001$	***
H8: Interactivity → Trust	$\beta = 0.086$	$P \leq 0.020$	**
H9: Navigation → Satisfaction	$\beta = 0.131$	$P \leq 0.001$	***
H10: Navigation → Trust	$\beta = 0.185$	$P \leq 0.001$	***
H11: Satisfaction → Loyalty	$\beta = 0.393$	$P \leq 0.001$	***
H12: Trust → Loyalty	$\beta = 0.424$	$P \leq 0.001$	***

Simply put, R^2 was used to explain the model EP. The results after executing the structural model explained 70% of the variation in satisfaction, and 58% variation in trust, and 60% in loyalty (see Table V). It is demonstrated that the model provided good EP. All path coefficients were observed to be significant in this study to support the hypotheses (see Fig. 1).

V. RESULT AND ANALYSIS

The result of this study provides the support for the research framework (see Fig. 1). The results revealed that web design attributes positively affect user trust and satisfaction, which in turn leads to loyalty. This section depicts some interesting findings related to user trust (see Table VII). *Hypotheses 1 and 2:* In previous literature, typography was rarely discussed with respect to strengthening user relationship with web interfaces. In this study, typography positively influenced user trust and satisfaction. Therefore, proper spacing between lines and between words, font color, and style (typeface) with readable font size leads to loyalty because of its satisfying as well as trustworthy appearance. The relationship between typography and satisfaction ($\beta = 0.138, P \leq 0.001$) was observed to be stronger than the relationship between typography and trust ($\beta = 0.091, P \leq 0.015$). Sasidharanet *et al.* [65] argue that typeface influences the user's trust-related perceptions.

Hypotheses 3 and 4: The website color and graphics observed as influencing features for determining the satisfaction and trust (see Table VII). Furthermore, the use of basic colors with fair contrast not only enhances the users' reading capabilities but also guides them for website navigation. Therefore, choosing a suitable color scheme and graphics for a website ensures the attractiveness, supportiveness, and trustworthiness of the websites. Moreover, the relationship between the color and satisfaction ($\beta = 0.320, P \leq 0.001$) was observed to be stronger than color and trust ($\beta = 0.202, P \leq 0.001$). Similarly, in an empirical investigation, Cyr *et al.* [17] also observed strong relationship between color appeal and satisfaction than color appeal and trust for both high- and low-UA cultures.

Hypotheses 5 and 6: Similar to color, the website content quality is also observed as an influencing factor that significantly affects user trust and satisfaction (see Table VII). Hence, the precise presentation of information not only supports the user for recognition but also facilitates quick comparison between the products/services' features to reach a buying decision. The relationship between content quality and trust ($\beta = 0.304, P \leq 0.001$) was observed to be stronger than content quality and satisfaction ($\beta = 0.219, P \leq 0.001$). In several other studies [4], [5], [7], [39], [73], the results demonstrate the positive relationship between content (relevant information) and customer satisfaction [4], [7], [73], and also between content and trust [4], [5], [39], [73]. In contrast, Eid [7] observed a positive relationship between information quality and satisfaction than between information quality and trust for a high-UA (Saudi Arabia) culture, whereas, in the current study, we specifically observed that for high-UA or low-trust cultures, content quality or information quality is more important factor to determine the user trust than satisfaction. As appropriate and well-presented information reduces the uncertainty and risk that leads to a higher comfort level with the website.

Hypotheses 7 and 8: The website interactivity is an important design attribute that consists of several dimensions. However, these dimensions were rarely discussed in previous studies with respect to culture context. In this study, we include personalization/customization and responsiveness to explain the strength of interactivity relationship with trust and satisfaction. The results of this study demonstrated the participants' preferences to the interactive features that facilitated them to personalize the service and product through customization. Moreover, the versatility in the booking process, responsiveness (timeliness of information)/ feedback, and consistency also enhanced the website interactivity. The relationship between interactivity and satisfaction ($\beta = 0.153, P \leq 0.001$) was observed to be stronger than interactivity and trust ($\beta = 0.086, P \leq 0.020$). In support to our study, Cyr *et al.* [16] observed direct and positive impact of interactivity (user control, connectedness, and responsiveness) on user cognitive affective perceptions (trust and loyalty). Likewise, Lee [79] also observed that the perceived interactivity (user control, responsiveness, personalization, and connectedness) directly influences user trust and indirectly the behavioral intention to use mobile commerce. In short, the website interactivity induces favorable attitudes toward acceptability along with trust and satisfaction.

Hypotheses 9 and 10: In addition to content quality, navigational support was also observed to be an important factor to develop user trust for a high-UA culture. Besides ease to navigate, the participants also preferred clear buttons, simple navigational aids, and reversibility features that enabled avoiding any form of risk and to recover mistakes. As navigational clues and aids serve as a logical roadmap that not only helps the customers

during buying but also helps avoiding any ambiguity. The relationship between navigation and trust ($\beta = 0.185, P \leq 0.001$) was observed to be stronger than navigation and satisfaction ($\beta = 0.131, P \leq 0.001$). Likewise, Yoon [109] and Lim and Dubinsky [110] stated that website navigation is a strong factor to determine customer trust and positive attitude. In several other studies [22], [26], researchers emphasize the use of guided navigation to reduce the uncertainty/error. Thus, positive relationship exists between navigation and user satisfaction and between navigation and user trust in the cultural context [4], [15], [28].

Hypothesis 11 and 12: The study was also initiated to seek what constituent was required to develop loyalty with a website in high-UA culture. In several studies [1], [7], [15]–[17], [48], [53], both satisfaction and trust were observed as strong determinants of loyalty in the domain of e-commerce. Accordingly, Lee *et al.* [75], Brilliant and Achyar [47], and Cyr [15] observed user trust to have a stronger impact than satisfaction on loyalty. On the contrary, Moriuchi and Takahashi [48] and Flavia *et al.* [111] considered satisfaction as more important factor to determine customers' loyalty. Further, Eid [7] observed customer trust as a weak (unsupported) determinant of loyalty in a high-UA culture.

However, in the current study, both satisfaction and trust significantly influence loyalty, but the relationship between trust and loyalty ($\beta = 0.424, P \leq 0.001$) was observed to be stronger than between satisfaction and loyalty ($\beta = 0.393, P \leq 0.001$). In several other studies [8], [29], [112], researchers observed the influencing effect of UA on online customer trust. Thus, to design a website for a high-UA culture, presentation and arrangement of information and design features should be in a credulous manner. Because culturally adopted web design attributes reduce the negative impact of risk. All the adopted design attributes in the present study depicted positive relations with trust and satisfaction. Overall, the finding of this research may also be helpful for website developers in designing the information systems and e-commerce website for low-trust cultures.

VI. Conclusion

The appropriate selection of design elements is important to avoid annoyance toward websites. Thus, diversification in the website designs makes it difficult to classify them for target population. The cultural variations and preferences also underscore the need for a tailored design. In this study, the researchers attempted to examine user preferences for web design attributes to determine trust, satisfaction, and ultimately loyalty. Thus, the prime motivation for this investigation is to identify the role of web design attributes in building trust and satisfaction for UA culture. A questionnaire was designed to collect the data to corroborate the proposed model or hypotheses. The PLS-SEM method was adopted to analyze the collected data from the university students. The results of this study support the proposed model and also the hypotheses. All the web design attributes were observed at a significance level to develop trust and loyalty for UA culture. The unique and interesting finding is related to typography, which was rarely discussed in e-commerce literature. Furthermore, both content quality and navigation were observed to be strong factors in building user trust with a website. In contrast, interactivity, color, and typography were observed as strong determinants of user satisfaction. Finally, the effect of trust is more significant than the effect of satisfaction on loyalty for risk/high-UA cultures.

VII. Limitations and Future Study

A large sample population is a reliable and positive feature of the current research with a total sample of 585 students. The volunteers were from several institutions with different academic backgrounds. The participants were also unfamiliar with the designed prototype, which helps to avoid bias because of a company/website reputation. Some interesting findings related to implications of web design attributes in high-UA culture were obtained. The current study suffers some limitations. First, the sample employed only university students, which may not be illustrative of the overall population of e-retail consumers, although several researchers [94], [95] considered students as an important sample for e-commerce research because they frequently use the Internet for communication and online transactions. Moreover, it has been observed that most online customers tend to be young [96] and considered as appropriate sample because they are more interested in the design and aesthetics aspects [18], which may reduce concern over the use of students as sample. However, the use of university students in an educational setting may impact the external validity of the current study and restrict the applicability of the result to other settings or customers group. Second, the prototype was used for online ticket booking with no real purchase transactions. Although this procedure is consistent with previous e-commerce research (i.e., [17], [20], [96]), this may also limit transferability of the findings to actual e-commerce situations. Finally, we did not include other antecedents, that is, download delay, speed, and interactivity features; consequently, only a questionnaire approach was adopted to collect the subjective data, rather than a multiple methods approach to gather the additional objective measures. As future study, we plan to extend this investigation in several countries to seek the differences and similarities for design preferences. These culture preferences will further help us to verify and generalize the results. We also plan to extend the current investigation to more precisely observe the impact of typography on trust and satisfaction culturally. Typographical attributes for future research will include typeface, size, spacing, alignment, and color. Moreover, we are also interested to identify additional antecedents of loyalty in the cultural context.

Appendix
Constructs and Statements

Typography—(i.e.,[58], [60], [62], [65]).

It is easy to read the text on this website with the used font type and size.

The font color is appealing on this website.

The text alignment and spacing on this website make the text easy to read.

Color—(i.e.,[17], [90]).

The color scheme of this website is appealing.
The use of color or graphics enhances navigation.
Content quality—(i.e.,[4], [52]).
The content helps for buying decision by comparing the information about products or services.
The information content provided by this website meet my needs.
Contents and information support for reading and learning about buying process.
Interactivity—(i.e.,[4], [11], [50], [52]).
This website provides adequate feedback to assess my progression when I perform a task.
This website offers customization.
This website offers versatility of ordering process.
This website provides content tailored to the individual.
In this website, everything is consistent.
Navigation—(i.e.,[34], [50], [52]).
Navigation aids serve as a logical road map for buying.
Obviousness of buying button and links in this website.
It is easy to personalize or to narrow buying process.
It is easy to learn to use the website.
This website supports reversibility of action.
Satisfaction—(i.e.,[4], [91], [92]).
Over all, I am satisfied with the interface of this website.
My current experience with this website is satisfactory.
Overall, I am satisfied with the amount of time it took to complete the tasks for booking a ticket.
Overall, I am satisfied with accuracy for this website related to the buying process.
Trust—(i.e.,[17], [28]).
I trust the information presented on this website.
This website is credible for me.
Loyalty—(i.e.,[17], [93]).
I would visit this website again.
I would recommend this website to my friend.

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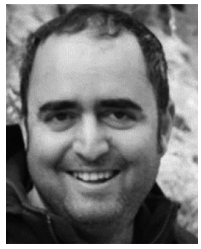

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