

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

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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

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.

195 A. Website Satisfaction and Trust

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

219 Similar to satisfaction, trust also received considerable im-
 220 portance in marketing research. It refers to the depth and as-
 221 surance of customers' feeling based on inconclusive evidence
 222 [39]. Moreover, uncertain situations and risk are important con-
 223 ditions that disclose a value of trust [28], [40]. Therefore, it
 224 can be defined as a person's faith and belief in another person's
 225 trustworthiness and honesty in a transaction [39]. Accordingly,
 226 trust is a critical factor similar to satisfaction and is also linked
 227 with the related factors to determine the success and customer
 228 long-term relationship with sellers/website [28], [39]. Palvia
 229 [41] argues that trust is an important factor to enhance com-
 230 pany profit and performance. The term online trust also refers
 231 to customer's confidence with a website and reduction in risk
 232 and uncertainty [42]. As more problems are associated with
 233 online business, such as privacy and insecurity, it enforces the
 234 website provider to develop a trustworthy site. Therefore, to at-
 235 tract new customer trustworthy appearance of websites is very
 236 important under the uncertain situations. In this study, we em-
 237 ployed both satisfaction and trust as endogenous variables and
 238 also as key antecedents of customer loyalty. Loyalty is described
 239 in Section III.

240 Moreover, there does not seem to exist a clear consensus
 241 among scholars about the nature of the relationship between
 242 satisfaction and trust. Some authors [43], [44] consider that sat-
 243 isfaction is a determinant of trust. Their tests in the context
 244 of online business showed that previous positive shopping ex-
 245 periences result in high customer trust. However, other authors
 246 [45], [46] reported just the opposite: trust influences satisfaction.
 247 For them, the strong image that customers have about a com-
 248 pany helps them to perceive a high level of satisfaction. How-
 249 ever, several other relevant demographic studies [4], [7], [15],
 250 [17], [47], [48] represent both satisfaction and trust as unrelated

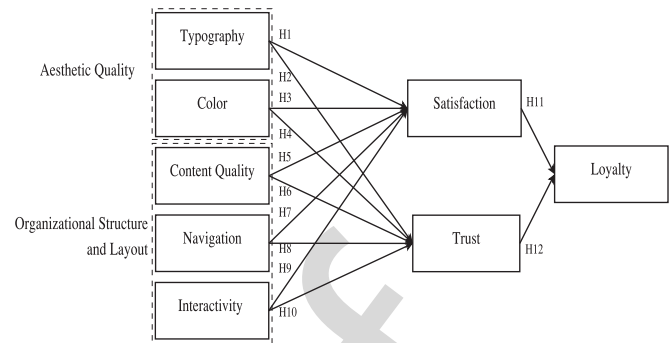


Fig. 1. Research model and hypothesized relationships.

251 variables in their research models. These research efforts are
 252 closely focused on the study of cultural differences, and they
 253 consider the impact of different design approaches on trust and
 254 satisfaction and, in turn, evaluate the relationship of these vari-
 255 ables to online loyalty. As our research questions are closer to
 256 these studies, we decided to exclude the relationship between
 257 satisfaction and trust from our model. However, the consider-
 258 ation of the relationship between satisfaction and trust in the
 259 context of different national cultures is an interesting avenue for
 260 future research.

261 III. RESEARCH MODEL AND HYPOTHESES

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

- 270 1) Typography—it is related to appearance, attractiveness,
 271 and readability of text on the website to draw user atten-
 272 tion.
- 273 2) Color—it appeals to the users' emotions, feelings, and
 274 helps them to understand the functions of buttons, icons,
 275 and boxes.
- 276 3) Content quality—the degree to which the provided infor-
 277 mation is sufficient and complete.
- 278 4) Interactivity—how information is presented to enhance
 279 the user interaction consistently.
- 280 5) Navigation—the extent to which navigational clues and
 281 format assist the user to access other sections of a website.

282 All of these design attributes incorporate both aesthetic and
 283 usability aspects. However, both typography and color are as-
 284 sociated with aesthetic quality, whereas content, interactivity,
 285 and navigation are more related to organizational structure and
 286 layout of the website. These design attributes are extensively
 287 used in several e-commerce-related studies (i.e., [4], [6], [7],
 288 [15], [19], [20], [51], [52]) to assess users' preferences. Like-
 289 wise, in the cultural context, Cyr and Head [4] examined the
 290 implications of design attributes (i.e., content, navigation, and
 291 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.

403 *H5*: High-quality website contents lead to higher user satisfac-
404 tion in a high-UA culture.

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

407 2) *Interactivity*: Website interactivity determines how informa-
408 tion that is presented is processed by a website user (i.e., custo-
409 mization and control over the contents) [74]. Furthermore, it
410 is the user's experience during his/her interaction [75], and it is
411 considered as an important attribute of a website [76]. Zeithaml
412 *et al.* [77] defined interactivity as "the extent to which website
413 users can 1) communicate with the people behind the website,
414 2) interactively search for information, and 3) conduct transac-
415 tions through the website." The features of interactivity that were
416 consistently discussed in the literature include user control [78],
417 [79], personalization/customization [79], [80], responsiveness
418 [78]–[80], connectedness [78]–[80], and playfulness [78], [80].
419 In several studies [78]–[81], the researchers observed the impact
420 of interactivity features on user satisfaction, trust, and loyalty.
421 Likewise, Cyr *et al.* [16] argue that interactivity (i.e., user con-
422 trol, connectedness, and responsiveness) affect user trust and
423 ultimately loyalty. However, Venkatesh and Ramesh [82] argue
424 that website customization saves customer time by providing
425 them personalized information. Several researchers [71], [83]
426 proved the importance of interactivity, but there is still insuffi-
427 cient evidence on the role of interactivity for e-commerce in
428 the cultural context. Consequently, we employed the following
429 features of interactivity: responsiveness and personalization/customization
430 to seek the users' preferences. Personalization/customization helps
431 customers in tailoring the product features. We theorized that personalization/customization is
432 an important attribute for developing customers' trust and satisfac-
433 tion by facilitating them to tailor products' features before
434 buying. Similarly, we also assume that responsiveness positively
435 influences the customer satisfaction and trust through consistent
436 feedback and support.

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

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

441 3) *Navigation*: Website users have divergent capabilities
442 and skills in the use of the Internet. Accordingly, focus of compa-
443 nies should not only be on attractive design but also on develo-
444 ping websites that are both easy to use and navigate. Not only
445 does website navigation facilitate users in carrying their tasks in
446 a timely accurate manner [84], it also provides additional ways to
447 access the desired information easily [51]. Likewise, it supports
448 the users while moving in and around a website conveniently
449 [85]. Roy *et al.* [86] claim that "ease of navigation, interface de-
450 sign, and user guidance affect customer establishment for trust."
451 Despite information, users may leave the website if they find it
452 difficult to navigate when searching for the desired informa-
453 tion. In several studies [22], [26], the researchers emphasize the
454 use of guided navigation for uncertainty/risk avoidance cultures.
455 Thus, positive correlation exists between navigation and satisfac-
456 tion, as well as between navigation and trust in the cultural
457 context [4], [5], [15]. Consequently, we believe that besides
458 ease of navigation, reversibility, navigational clues, and obvious
459

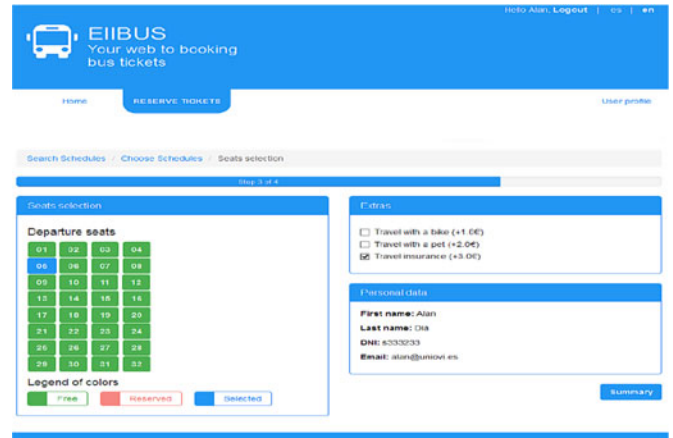


Fig. 2. E-ticket bus website prototype.

buttons support the users for appropriate actions, thus eliminat- 460
ing ambiguity or error. 461

H9: In a high-UA culture, guided navigation leads to higher 462
user satisfaction toward that same website. 463

H10: In a high-UA culture, guided navigation leads to higher 464
user trust toward that same website. 465

C. Loyalty 466

The user interface designs for globalization are becoming 467
more important for business success and customer loyalty [32]. 468
Customer loyalty is defined as strong feelings of allegiance or 469
commitments [53]. Therefore, loyal customers are found to have 470
strong commitments and attachments toward the retailers. More- 471
over, the loyal customers are not easily distracted to slightly 472
more attractive alternatives. Hence, true loyalty demonstrates 473
customers and purchase retention [87], resistance to switch, and 474
willingness to pay more. Besides, companies operating their 475
business online face competition because of rapid growth in 476
this sector. Therefore, trustworthiness, security, and easy-of-use 477
are important aspects to keep the customer loyal to a website 478
[15], [88]. In previous studies [7], [15], [33], [47], [48], both 479
satisfaction and trust were considered as key factors to measure 480
user loyalty to a website. Thus, greater the degree of satisfac- 481
tion [53] and trust [1], [16], the greater the degree of website 482
loyalty. 483

H11: Greater website user satisfaction leads to greater user 484
loyalty to that same website. 485

H12: Greater the website user trust leads to greater user loy- 486
alty to that same website. 487

IV. METHODOLOGY AND DATA ANALYSIS 488

To refute/validate the former hypotheses, we developed a 489
simple e-commerce website prototype after carefully consider- 490
ing the design features of the three travel ticket booking web- 491
sites (www.alsa.es, www.swebus.se, and www.daewoo.com.pk) 492
to be tested by the students. The prototype was designed by de- 493
ploying different colors (i.e., blue, green, pink, and white) (see 494
Fig. 2). The blue color was mainly used in the design of distinct 495

496 areas (e.g., header, footer, navigation buttons, and links),
 497 whereas white was used as a background and as a logo and
 498 graphics color (see Fig. 2). The typographical features used on
 499 the website interface include typeface sans-serif (Helvetica),
 500 spacing 1.08, size from 12 to 20 px, and color, that is, more
 501 frequent (black and white) and less frequent (blue, green, and
 502 pink), respectively (see Fig. 2). Furthermore, the website nav-
 503 igation was supported through buttons and links along with
 504 navigational clues to take the prospective actions for buying.
 505 To enhance the website interactivity, for example, ticket price,
 506 travel date and time, preferred destination, and seat location in-
 507 side the bus were incorporated through customizable features.
 508 As shown in Fig. 2, to personalize the seating plan, different col-
 509 ors were used for different buttons (i.e., green for “free,” pink
 510 for “reserved,” and blue for “selected”). Moreover, feedback
 511 and help and support were facilitated through pop-up messages
 512 and progress bar shown in Fig. 2. Finally, the prototype was
 513 carefully developed to avoid additional implications such as
 514 website familiarity, reputation [51], [53], and culture markers
 515 [89]. Therefore, prior to the start of the current investigation,
 516 consultants of usability engineering at the University of Oviedo
 517 performed cognitive and pluralistic walkthroughs on the initial
 518 mockups of the prototype, which were followed by heuristic
 519 evaluation of the resulting wireframes. Once the prototype was
 520 developed, a series of user test was conducted with local users to
 521 ensure a high usability level of its interactive elements. Thus, the
 522 prime objective of the pretest study was to validate that the de-
 523 veloped prototype was working well, for example, the searching
 524 and booking procedures. The suggestions and feedback were in-
 525 corporated by eliminating promotional information and banners
 526 irrelevant to the current study to keep the prototype design sim-
 527 ple. Accordingly, Lee *et al.* [75] argue that interface simplicity
 528 is an important precondition for better interaction and usability
 529 experiences.

530 A. Survey Instrument

531 To evaluate the proposed hypotheses, a survey scale was
 532 designed and integrated with the website prototype to obtain
 533 subjective data (see the Appendix). The final survey question-
 534 naire consisted of 26 items to assess the impact of web design
 535 attributes on users’ satisfaction and trust for the developed e-
 536 commerce prototype. The survey items for the hypothesized
 537 constructs (i.e., typography, color, content quality, interactiv-
 538 ity, navigation, satisfaction, trust, and loyalty) were developed
 539 and modified from the elegant literature (i.e., [4], [11], [17],
 540 [28], [34], [50], [52], [58], [60], [62], [65], [90]–[93]) in the
 541 domain of e-commerce. Moreover, to meet the objective of
 542 the hypothesized study, each questionnaire item was also re-
 543 viewed by the research members before conducting the investi-
 544 gation. Consequently, only the appropriate and relevant items
 545 were selected. The questionnaire items and source appear in the
 546 Appendix. The measurement scale was developed in English.
 547 Further, a seven-point Likert-scale ranging from 1 (strongly
 548 disagree) to 7 (strongly agree) was used to measure each ob-
 549 served item. Survey instrument tool validation is discussed
 550 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

551 For this research, the students were recruited in Pakistan and
 552 the prototype used for this research supports multiple languages.
 553 Data were collected from graduate- and postgraduate-level stu-
 554 dents with the cooperation of several academic institutions.
 555 Mostly, the students have free access to the Internet resources.
 556 Therefore, besides academic activities, they also regularly use e-
 557 retailing services for searching and buying products online such
 558 as books, software, and e-tickets at economical cost. Previous
 559 studies [94], [95] suggested university students as an important
 560 sample for e-commerce research because they frequently use
 561 the Internet for communication and online transactions. Fur-
 562 thermore, the selection of students as a sample is also very
 563 much consistent with recent e-commerce research (i.e., [17],
 564 [20], [96]). According to Ha and Stoel [97], students consti-
 565 tute a fit sample to observe online shopping behavior of young
 566 adults. Additionally, in the current research, students’ sample is
 567 considered as appropriate because of their high level of confi-
 568 dence in the execution of complex interactive tasks related to
 569 buying scenarios. Therefore, to recruit the volunteers, the re-
 570 searchers sent an email to the students and also to colleagues
 571 in different universities, who further distributed the email to the
 572 students of their respective institutions along with prototype link
 573 and study description. Approximately 1500 students from dif-
 574 ferent universities responded with positive consent to participate
 575 in this research. A concise description about research investi-
 576 gation and buying scenarios was also included at top of the
 577 home page of the prototype website (collapsible content) for re-
 578 view, prior to start the ticket-booking process. The participants
 579 were requested to use this prototype to search the bus tickets
 580 between two locations on a specified date. The next step was
 581 to choose a bus ticket with minimum price from the searched
 582 schedule. The participants were also requested to personalize
 583 the seating plan inside the bus. Finally, students was requested
 584 to login after the booking process through online registration to
 585 collect the participants’ demographic data followed by survey.
 586 Thus, in the two-month data collection process, 662 surveys
 587 were obtained. Incomplete and invalid surveys were discarded
 588

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	1.602	0.871	0.921	0.795	0.886
TYP1					1.707				0.881
TYP2					1.616				0.907
TYP3									
Color	1.765	0.235	88.247	11.753	1.608	0.867	0.938	0.882	0.939
CLR1					1.598				0.939
CLR2									
Content quality	2.401	0.352	80.032	11.741	1.574	0.875	0.923	0.800	0.878
CNT1					1.559				0.915
CNT2					1.562				0.891
CNT3									
Interactivity	3.390	0.486	67.799	9.729	0.796	0.881	0.913	0.678	0.776
INT1					0.835				0.821
INT2					0.855				0.845
INT3					0.849				0.843
INT4					1.634				0.829
INT5									
Navigation	3.403	0.495	68.060	9.894	1.678	0.882	0.914	0.681	0.814
NAG1					1.695				0.835
NAG2					1.670				0.860
NAG3					1.650				0.808
NAG4					1.655				0.808
NAG5									
Satisfaction	3.066	0.434	76.645	10.862	1.616	0.898	0.929	0.766	0.878
SAT1					1.596				0.895
SAT2					1.647				0.857
SAT3					1.600				0.871
SAT4									
Trust	1.721	0.279	86.030	13.970	1.612	0.838	0.925	0.860	0.928
TST1					1.645				0.928
TST2									
Loyalty	1.786	.214	89.294	10.706	1.789	0.880	0.943	0.893	0.945
LYL1					1.811				0.945
LYL2									

589 from the original dataset. Only 558 out of 662 surveys were
 590 considered valid and appropriate where the response rate was
 591 44.1%. The students' brief demographic description is given in
 592 Table I.

593 *C. Data Analysis*

594 The proposed relationships were tested through a partial least
 595 squares structural equation modeling (PLS-SEM) approach. It is
 596 a comprehensive multivariate statistical analysis approach that
 597 can simultaneously examine relationships among all the vari-
 598 ables in a conceptual model, including a measurement com-
 599 ponent and a structural component in order to build theory
 600 [98]–[100]. The software package WarpPLS version 5.0 [98]
 601 was used to perform the analysis. We preferred the Warp-
 602 PLS over other PLS-SEM tools because it applies Herman
 603 Wold's original PLS regression algorithm as it reduces the
 604 levels of collinearity, thus providing stable weights and no
 605 inflated coefficients [98]. WarpPLS version 5.0 is available at
 606 <http://warppls.com/>

607 The reliability of the constructs was examined through cron-
 608 bach's alpha (α), which is based on the average intercorrela-
 609 tion 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.

622 *D. Measurement Model*

623 The measurement model was examined through unidimen-
 624 sionality, standardized factor loadings, CR, convergent validity
 625 (CV), and discriminant validity (DV). Initially, the unidimen-
 626 sionality was tested by employing a principal component (fac-
 627 tor) analysis. According to Kaiser's criterion, the unidimension-
 628 ality holds if an eigenvalue higher than 1 is attained in the first
 629 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
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 Quality	-0.04	-0.06	0.87	0.09	0.02	-0.04	0.01	-0.05
	-0.06	0.01	0.91	-0.00	0.04	0.00	-0.06	0.11
Interactivity	0.10	0.05	0.89	-0.08	-0.06	0.04	0.05	-0.06
	0.14	0.03	-0.16	0.77	0.20	0.14	0.01	-0.15
Navigation	-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
Satisfaction	-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
Trust	-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
Loyalty	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
Typography	-0.00	-0.10	-0.18	0.27	0.80	0.08	-0.06	0.13
	-0.01	0.11	-0.04	0.02	0.08	0.87	-0.18	0.02
Color	-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
Content quality	-0.07	0.113	0.05	0.05	-0.13	0.87	0.29	-0.09
	0.02	-0.01	0.04	-0.04	-0.00	0.00	0.92	-0.08
Interactivity	-0.02	0.01	-0.04	0.04	0.00	-0.00	0.92	0.08
	0.00	-0.05	0.00	-0.06	0.03	-0.00	0.07	0.94
Navigation	-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

630 the suggested criteria; moreover, the principal component elu- 661
631 cidates the majority of the variances (see Table II). The CV was 662
632 examined through WarpPLS by observing the outer loadings 663
633 pattern of the items [101]. The outer loadings for all observed 664
634 items were greater than 0.70 and ranged from 0.776 to 0.945 665
635 (see Tables II and III) along with significant p -value (threshold 666
636 ≤ 0.05), indicating good CV of all constructs [101]. Second, 667
637 DV was evaluated according to the criterion suggested in previ- 668
638 ous research. DV indicates the extent to which a given construct 669
639 differs from other constructs [100]. Therefore, the DV criterion 670
640 relies on two important elements. The first element is that the 671
641 observed items should be weakly correlated with all constructs 672
642 except the one to which they are hypothetically associated [100]. 673
643 As Gefen and Straub [104] in their study stated that “correlation 674
644 of the latent variable scores on the measurement items needs 675
645 to show an appropriate pattern of loadings, one in which the 676
646 measurement items load highly on their speculatively assigned 677
647 factor and not highly on other factors.” Table III shows the cross 678
648 loadings for all adopted constructs. The second criterion of DV 679
649 assessment is related to average variance extracted (AVE) as 680
650 AVE presents the percentage of variance taken by a construct. 681
651 Thus, to ensure the DV, the AVE value of all constructs should 682
652 be greater than 0.50 (see Table II), and the $\sqrt{\text{AVE}}$ for each 683
653 construct (off-the-diagonal value) should be greater than the 684
654 correlation value (on diagonal) between constructs [99]–[101].

655 Finally, all constructs exhibited enough DV index in this 685
656 study, as shown in Table IV. We also evaluated the multi- 686
657 collinearity through variance inflation factors (VIF). VIF as- 687
658 sessed the multicollinearity among the constructs. The higher 688
659 VIF index between two latent variables seems to measure simi- 689
660 lar things. In this particular case, it is required to remove a latent

661 variable from the developed model. It was also suggested that 662
663 the VIF value for variables should be less than 5, although more 664
665 relaxed criterion suggested in previous research is the threshold 666
666 at 10 [105]. In the current study, VIFs are far below 5 (see Table 667
668 V). Therefore, no latent variable measures the same thing. 669
670 Even the computed values of both average variation inflation 671
671 factor $\overline{\text{VIF}} = 3.1$ and average full collinearity variance inflation 672
672 factor $\overline{\text{FVIF}} = 3.4$ were also observed to be far below the thresh- 673
673 old value 5. The ideal suggested value for both $\overline{\text{VIF}}$ and $\overline{\text{FVIF}}$ is 674
674 3.3 in the previous research [98]. WarpPLS also reported other 675
675 model fit indicators such as average R-squared ($\overline{R^2}$) with p -value 676
676 ($\beta = 0.629$, $P \leq 0.001$), average adjusted R-squared (AARS) 677
677 ($\beta = 0.626$) with P -value ≤ 0.001 , average path coefficient ($\overline{\beta}$) 678
678 with p -value ($\beta = 0.221$, $P \leq 0.001$), and $\overline{\text{VIF}} = 3.1$, respec- 679
679 tively. Goodness of Fit was also measured through Tenenhaus 680
680 [106] $\text{GoF} = \sqrt{(\text{AVE})X(\text{ARS})}$ or $\sqrt{(\text{Communality})X(\text{ARS})}$ 681
681 $= \sqrt{(0.794)X(0.629)} = 0.707$. In the recent studies [98], [107], 682
682 researchers suggested the GoF criteria as follows: small ≥ 0.1 , 683
683 medium ≥ 0.25 , and large ≥ 0.36 . Finally, as all values indi- 684
684 cated good fit, this study fulfills all the above-mentioned condi- 685
685 tions to support the analysis. For additional model fit and quality 686
686 indicators, see Table VI. 687

E. Structure Model

688 After having confirmation of the unidimensionality, reliabil- 689
689 ity, and validity of the measurement model, the next step was 690
690 to analyze the structure model. Therefore, we examined the 691
691 comprehensive explanatory power (EP) of the structural model, 692
692 path coefficients, (β) and amount of variance (R^2) [100], [108], 693
693 for dependent variables explained by independent variables. 694

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	$\beta = 0.424$	$P \leq 0.001$	***

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

696 V. RESULT AND ANALYSIS

697 The result of this study provides the support for the research
 698 framework (see Fig. 1). The results revealed that web design
 699 attributes positively affect user trust and satisfaction, which in
 700 turn leads to loyalty. This section depicts some interesting find-
 701 ings related to user trust (see Table VII). *Hypotheses 1 and*
 702 *2*: In previous literature, typography was rarely discussed with
 703 respect to strengthening user relationship with web interfaces.
 704 In this study, typography positively influenced user trust and
 705 satisfaction. Therefore, proper spacing between lines and be-
 706 tween words, font color, and style (typeface) with readable
 707 font size leads to loyalty because of its satisfying as well as
 708 trustworthy appearance. The relationship between typography
 709 and satisfaction ($\beta = 0.138, P \leq 0.001$) was observed to be
 710 stronger than the relationship between typography and trust
 711 ($\beta = 0.091, P \leq 0.015$). Sasidharan *et al.* [65] argue that
 712 typeface influences the user's trust-related perceptions.

713 *Hypotheses 3 and 4*: The website color and graphics observed
 714 as influencing features for determining the satisfaction and trust
 715 (see Table VII). Furthermore, the use of basic colors with fair
 716 contrast not only enhances the users' reading capabilities but
 717 also guides them for website navigation. Therefore, choosing
 718 a suitable color scheme and graphics for a website ensures
 719 the attractiveness, supportiveness, and trustworthiness of the

websites. Moreover, the relationship between the color and sat- 720
 721 isfaction ($\beta = 0.320, P \leq 0.001$) was observed to be stronger
 722 than color and trust ($\beta = 0.202, P \leq 0.001$). Similarly, in an
 723 empirical investigation, Cyr *et al.* [17] also observed strong
 724 relationship between color appeal and satisfaction than color
 725 appeal and trust for both high- and low-UA cultures.

726 *Hypotheses 5 and 6*: Similar to color, the website con-
 727 tent quality is also observed as an influencing factor that sig-
 728 nificantly affects user trust and satisfaction (see Table VII).
 729 Hence, the precise presentation of information not only
 730 supports the user for recognition but also facilitates quick
 731 comparison between the products/services' features to reach
 732 a buying decision. The relationship between content quality and
 733 trust ($\beta = 0.304, P \leq 0.001$) was observed to be stronger than
 734 content quality and satisfaction ($\beta = 0.219, P \leq 0.001$). In sev-
 735 eral other studies [4], [5], [7], [39], [73], the results demonstrate
 736 the positive relationship between content (relevant information)
 737 and customer satisfaction [4], [7], [73], and also between content
 738 and trust [4], [5], [39], [73]. In contrast, Eid [7] observed a posi-
 739 tive relationship between information quality and satisfaction
 740 than between information quality and trust for a high-UA (Saudi
 741 Arabia) culture, whereas, in the current study, we specifically
 742 observed that for high-UA or low-trust cultures, content quality
 743 or information quality is more important factor to determine the
 744 user trust than satisfaction. As appropriate and well-presented
 745 information reduces the uncertainty and risk that leads to a
 746 higher comfort level with the website.

747 *Hypotheses 7 and 8*: The website interactivity is an important
 748 design attribute that consists of several dimensions. However,
 749 these dimensions were rarely discussed in previous studies with
 750 respect to culture context. In this study, we include personaliza-
 751 tion/customization and responsiveness to explain the strength
 752 of interactivity relationship with trust and satisfaction. The re-
 753 sults of this study demonstrated the participants' preferences
 754 to the interactive features that facilitated them to personalize
 755 the service and product through customization. Moreover, the
 756 versatility in the booking process, responsiveness (timeliness of
 757 information)/ feedback, and consistency also enhanced the web-
 758 site interactivity. The relationship between interactivity and sat-
 759 isfaction ($\beta = 0.153, P \leq 0.001$) was observed to be stronger
 760 than interactivity and trust ($\beta = 0.086, P \leq 0.020$). In support
 761 to our study, Cyr *et al.* [16] observed direct and positive impact
 762 of interactivity (user control, connectedness, and responsive-
 763 ness) on user cognitive affective perceptions (trust and loyalty).
 764 Likewise, Lee [79] also observed that the perceived interactivity
 765 (user control, responsiveness, personalization, and connected-
 766 ness) directly influences user trust and indirectly the behavioral
 767 intention to use mobile commerce. In short, the website inter-
 768 activity induces favorable attitudes toward acceptability along
 769 with trust and satisfaction.

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

Q3 777 during buying but also helps avoiding any ambiguity. The rela- 833
 778 tionship between navigation and trust ($\beta = 0.185, P \leq 0.001$) 834
 779 was observed to be stronger than navigation and satisfaction 835
 780 ($\beta = 0.131, P \leq 0.001$). Likewise, Yoon [109] and Lim and 836
 781 Dubinsky [110] stated that website navigation is a strong fac- 837
 782 tor to determine customer trust and positive attitude. In several 838
 783 other studies [22], [26], researchers emphasize the use of guided 839
 784 navigation to reduce the uncertainty/error. Thus, positive rela- 840
 785 tionship exists between navigation and user satisfaction and 841
 786 between navigation and user trust in the cultural context [4], 842
 787 [15], [28]. 843

788 *Hypothesis 11 and 12:* The study was also initiated to seek 844
 789 what constituent was required to develop loyalty with a web- 845
 790 site in high-UA culture. In several studies [1], [7], [15]–[17], 846
 791 [48], [53], both satisfaction and trust were observed as strong 847
 792 determinants of loyalty in the domain of e-commerce. Accord- 848
 793 ingly, Lee *et al.* [75], Brilliant and Achyar [47], and Cyr [15] 849
 794 observed user trust to have a stronger impact than satisfaction 850
 795 on loyalty. On the contrary, Moriuchi and Takahashi [48] and 851
 796 Flavia *et al.* [111] considered satisfaction as more important fac- 852
 797 tor to determine customers' loyalty. Further, Eid [7] observed 853
 798 customer trust as a weak (unsupported) determinant of loyalty 854
 799 in a high-UA culture. 855

800 However, in the current study, both satisfaction and trust 856
 801 significantly influence loyalty, but the relationship between 857
 802 trust and loyalty ($\beta = 0.424, P \leq 0.001$) was observed to be 858
 803 stronger than between satisfaction and loyalty ($\beta = 0.393, P \leq$ 859
 804 0.001). In several other studies [8], [29], [112], researchers ob- 860
 805 served the influencing effect of UA on online customer trust. 861
 806 Thus, to design a website for a high-UA culture, presentation 862
 807 and arrangement of information and design features should be 863
 808 in a credulous manner. Because culturally adopted web design 864
 Q4 809 attributes reduce the negative impact of risk. All the adopted 865
 810 design attributes in the present study depicted positive rela- 866
 811 tions with trust and satisfaction. Overall, the finding of this re- 867
 812 search may also be helpful for website developers in designing 868
 813 the information systems and e-commerce website for low-trust 869
 814 cultures. 870

815 VI. CONCLUSION 871

816 The appropriate selection of design elements is important to 872
 817 avoid annoyance toward websites. Thus, diversification in the 873
 818 website designs makes it difficult to classify them for target 874
 819 population. The cultural variations and preferences also under- 875
 820 score the need for a tailored design. In this study, the researchers 876
 821 attempted to examine user preferences for web design attributes 877
 822 to determine trust, satisfaction, and ultimately loyalty. Thus, the 878
 823 prime motivation for this investigation is to identify the role 879
 824 of web design attributes in building trust and satisfaction for 880
 825 UA culture. A questionnaire was designed to collect the data to 881
 826 corroborate the proposed model or hypotheses. The PLS-SEM 882
 827 method was adopted to analyze the collected data from the uni- 883
 828 versity students. The results of this study support the proposed 884
 829 model and also the hypotheses. All the web design attributes 885
 830 were observed at a significance level to develop trust and loy- 886
 831 alty for UA culture. The unique and interesting finding is re- 887
 832 lated to typography, which was rarely discussed in e-commerce

literature. Furthermore, both content quality and navigation 833
 were observed to be strong factors in building user trust with 834
 a website. In contrast, interactivity, color, and typography were 835
 observed as strong determinants of user satisfaction. Finally, the 836
 effect of trust is more significant than the effect of satisfaction 837
 on loyalty for risk/high-UA cultures. 838

839 VII. LIMITATIONS AND FUTURE STUDY 840

841 A large sample population is a reliable and positive feature 842
 of the current research with a total sample of 585 students. The 843
 volunteers were from several institutions with different aca- 844
 demic backgrounds. The participants were also unfamiliar with 845
 the designed prototype, which helps to avoid bias because of a 846
 company/website reputation. Some interesting findings related 847
 to implications of web design attributes in high-UA culture were 848
 obtained. The current study suffers some limitations. First, the 849
 sample employed only university students, which may not be 850
 illustrative of the overall population of e-retail consumers, al- 851
 though several researchers [94], [95] considered students as an 852
 important sample for e-commerce research because they fre- 853
 quently use the Internet for communication and online trans- 854
 actions. Moreover, it has been observed that most online cus- 855
 tomers tend to be young [96] and considered as appropriate 856
 sample because they are more interested in the design and aes- 857
 thetics aspects [18], which may reduce concern over the use of 858
 students as sample. However, the use of university students in 859
 an educational setting may impact the external validity of the 860
 current study and restrict the applicability of the result to other 861
 settings or customers group. Second, the prototype was used for 862
 online ticket booking with no real purchase transactions. Al- 863
 though this procedure is consistent with previous e-commerce 864
 research (i.e., [17], [20], [96]), this may also limit transferability 865
 of the findings to actual e-commerce situations. Finally, we did 866
 not include other antecedents, that is, download delay, speed, 867
 and interactivity features; consequently, only a questionnaire 868
 approach was adopted to collect the subjective data, rather than 869
 a multiple methods approach to gather the additional objective 870
 measures. As future study, we plan to extend this investigation 871
 in several countries to seek the differences and similarities for 872
 design preferences. These culture preferences will further help 873
 us to verify and generalize the results. We also plan to extend 874
 the current investigation to more precisely observe the impact 875
 of typography on trust and satisfaction culturally. Typographical 876
 attributes for future research will include typeface, size, spac- 877
 ing, alignment, and color. Moreover, we are also interested to 878
 identify additional antecedents of loyalty in the cultural context. 879

880 APPENDIX 881

882 CONSTRUCTS AND STATEMENTS 883

884 Typography—(i.e.,[58], [60], [62], [65]). 885
 886 It is easy to read the text on this website with the used font 887
 type and size. 888
 889 The font color is appealing on this website. 889
 890 The text alignment and spacing on this website make the text 890
 easy to read. 891
 892 Color—(i.e.,[17], [90]). 892

886 The color scheme of this website is appealing.
 887 The use of color or graphics enhances navigation.
 888 Content quality—(i.e.,[4], [52]).
 889 The content helps for buying decision by comparing the in-
 890 formation about products or services.
 891 The information content provided by this website meet my
 892 needs.
 893 Contents and information support for reading and learning
 894 about buying process.
 895 Interactivity—(i.e.,[4], [11], [50], [52]).
 896 This website provides adequate feedback to assess my pro-
 897 gression when I perform a task.
 898 This website offers customization.
 899 This website offers versatility of ordering process.
 900 This website provides content tailored to the individual.
 901 In this website, everything is consistent.
 902 Navigation—(i.e.,[34], [50], [52]).
 903 Navigation aids serve as a logical road map for buying.
 904 Obviousness of buying button and links in this website.
 905 It is easy to personalize or to narrow buying process.
 906 It is easy to learn to use the website.
 907 This website supports reversibility of action.
 908 Satisfaction—(i.e.,[4], [91], [92]).
 909 Over all, I am satisfied with the interface of this website.
 910 My current experience with this website is satisfactory.
 911 Overall, I am satisfied with the amount of time it took to
 912 complete the tasks for booking a ticket.
 913 Overall, I am satisfied with accuracy for this website related
 914 to the buying process.
 915 Trust—(i.e.,[17], [28]).
 916 I trust the information presented on this website.
 917 This website is credible for me.
 918 Loyalty—(i.e.,[17], [93]).
 919 I would visit this website again.
 920 I would recommend this website to my friend.

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- 1302 Q1. Author: The affiliation of the author “CM Nadeem Faisal” has been modified as per the information given in the biography.
1303 Please check.
- 1304 Q2. Author: The sense of the sentence “As appropriate and well-presented information...” seems to be unclear. Please check.
- 1305 Q3. Author: The sense of the sentence “As navigational clues and aids serve as...” seems to be unclear. Please check.
- 1306 Q4. Author: The sense of the sentence “Because culturally adopted web design attributes...” seems to be unclear. Please check.
- 1307 Q5. Author: Please provide the page range in Refs. [32] and [89].
- 1308 Q6. Author: Please provide full bibliographic details in Ref. [80].
- 1309 Q7. Author: Please provide educational details of the author “Martin Gonzalez-Rodriguez.”
- 1310 Q8. Author: Please provide the subjects in which the author “Daniel Fernandez-Lanvin” received the Ph.D. degree.
- 1311 Q9. Author: Please provide the name(s) of the institution(s) where the author “Javier de Andres-Suarez” received the B.S. and
1312 Ph.D. degrees.

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

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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

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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

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.

195 A. Website Satisfaction and Trust

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

219 Similar to satisfaction, trust also received considerable im-
 220 portance in marketing research. It refers to the depth and as-
 221 surance of customers' feeling based on inconclusive evidence
 222 [39]. Moreover, uncertain situations and risk are important con-
 223 ditions that disclose a value of trust [28], [40]. Therefore, it
 224 can be defined as a person's faith and belief in another person's
 225 trustworthiness and honesty in a transaction [39]. Accordingly,
 226 trust is a critical factor similar to satisfaction and is also linked
 227 with the related factors to determine the success and customer
 228 long-term relationship with sellers/website [28], [39]. Palvia
 229 [41] argues that trust is an important factor to enhance com-
 230 pany profit and performance. The term online trust also refers
 231 to customer's confidence with a website and reduction in risk
 232 and uncertainty [42]. As more problems are associated with
 233 online business, such as privacy and insecurity, it enforces the
 234 website provider to develop a trustworthy site. Therefore, to at-
 235 tract new customer trustworthy appearance of websites is very
 236 important under the uncertain situations. In this study, we em-
 237 ployed both satisfaction and trust as endogenous variables and
 238 also as key antecedents of customer loyalty. Loyalty is described
 239 in Section III.

240 Moreover, there does not seem to exist a clear consensus
 241 among scholars about the nature of the relationship between
 242 satisfaction and trust. Some authors [43], [44] consider that sat-
 243 isfaction is a determinant of trust. Their tests in the context
 244 of online business showed that previous positive shopping ex-
 245 periences result in high customer trust. However, other authors
 246 [45], [46] reported just the opposite: trust influences satisfaction.
 247 For them, the strong image that customers have about a com-
 248 pany helps them to perceive a high level of satisfaction. How-
 249 ever, several other relevant demographic studies [4], [7], [15],
 250 [17], [47], [48] represent both satisfaction and trust as unrelated

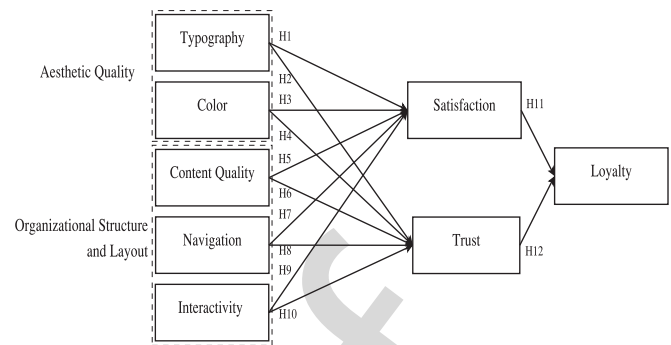


Fig. 1. Research model and hypothesized relationships.

251 variables in their research models. These research efforts are
 252 closely focused on the study of cultural differences, and they
 253 consider the impact of different design approaches on trust and
 254 satisfaction and, in turn, evaluate the relationship of these vari-
 255 ables to online loyalty. As our research questions are closer to
 256 these studies, we decided to exclude the relationship between
 257 satisfaction and trust from our model. However, the consider-
 258 ation of the relationship between satisfaction and trust in the
 259 context of different national cultures is an interesting avenue for
 260 future research.

261 III. RESEARCH MODEL AND HYPOTHESES

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

- 270 1) Typography—it is related to appearance, attractiveness,
 271 and readability of text on the website to draw user atten-
 272 tion.
- 273 2) Color—it appeals to the users' emotions, feelings, and
 274 helps them to understand the functions of buttons, icons,
 275 and boxes.
- 276 3) Content quality—the degree to which the provided infor-
 277 mation is sufficient and complete.
- 278 4) Interactivity—how information is presented to enhance
 279 the user interaction consistently.
- 280 5) Navigation—the extent to which navigational clues and
 281 format assist the user to access other sections of a website.

282 All of these design attributes incorporate both aesthetic and
 283 usability aspects. However, both typography and color are as-
 284 sociated with aesthetic quality, whereas content, interactivity,
 285 and navigation are more related to organizational structure and
 286 layout of the website. These design attributes are extensively
 287 used in several e-commerce-related studies (i.e., [4], [6], [7],
 288 [15], [19], [20], [51], [52]) to assess users' preferences. Like-
 289 wise, in the cultural context, Cyr and Head [4] examined the
 290 implications of design attributes (i.e., content, navigation, and
 291 visual design) on trust and satisfaction in masculine versus

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

301 A. Aesthetic Quality

302 The significance of aesthetic quality has been acknowledged
 303 in the domain of HCI. In recent studies, aesthetics for attrac-
 304 tiveness and design consistency of the website appearance have
 305 been studied [5], [36], [54]. According to Liao *et al.* [36], aes-
 306 thetic and attractive features can enhance customer perception
 307 of usefulness for a website. These features are related to appear-
 308 ance and can be categorized into color, graphics, font, and so on.
 309 Similarly, in the study by Fogg *et al.* [55], the authors argue that
 310 consumers made their judgments about the website credibility
 311 based on design, “including layout, typography, font size, and
 312 color scheme.” Several other studies discussed the importance
 313 of aesthetic and design quality with respect to satisfaction and
 314 trust [17], [30], [54], [56]. In the current study, we narrow down
 315 the aesthetic aspects into typography and color suggested by the
 316 research community [49].

317 1) *Typography*: Typography is related to appearance and at-
 318 tractiveness of text on the website [19]. It is an art to arrange
 319 the written language in a readable, appealing, and in a legible
 320 manner. As a result, high-quality typography enhances the value
 321 of the website, the meaning of words, and how those words can
 322 be perceived by the users [57], whereas poor-quality typography
 323 negatively affects learnability and comprehension, and as a con-
 324 sequence, it visually confuses the readers [58]. Hence, typogra-
 325 phy enables the reader to experience the website with pleasure
 326 [59] and decreases users’ time and efforts to understand and ac-
 327 cess the required information [60]. Accordingly, the selection of
 328 typographic (text) elements (i.e., typefaces, signs, size, spacing,
 329 and color) for writing is very important, as it facilitates effective
 330 communication and reading [61]. Therefore, typographical pref-
 331 erences are important for e-commerce and web environment to
 332 enhance customer satisfaction [62] and trust. Nielsen [63] argues
 333 that small font size with low contrast is the cause of criticism
 334 in online reading. Therefore, users like the font they appreciate
 335 and complain about those they do not like [64]. Another fea-
 336 ture that affects the appropriateness of typography is the letters,
 337 words, and line spacing [60]. Letter spacing refers to space be-
 338 tween two words, whereas line spacing is a value in points that
 339 explains the distance between baseline of the upper line and the
 340 baseline of the lower line [60]. Therefore, text line spacing at 1.5
 341 facilitates better reading, speed, and comprehension, especially
 342 for readers with poor vision due to aging or other factors [63].
 343 Myung [62] empirically observed the users’ preferences for ty-
 344 pography. The results of this study demonstrated the following:
 345 importance of line spacing 56%, style 35%, and 12% for size,
 346 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 type-
 face, alignment, size, spacing, and color positively influence
 user trust and satisfaction.

H1: Website typography positively influences user satisfac-
 tion 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 attrac-
 tiveness 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] ob-
 served the influence of color on website usability. Furthermore,
 they observed strong association of colors with human emotions
 and preferences, which alternatively affect the website naviga-
 tion. Likewise, Cyr *et al.* [67] observed users’ preferences for
 the website visual design. In another study, Cyr *et al.* [17] em-
 pirically 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 in-
 formation and transactional capabilities [69] and depict the over-
 all structure and organization of information that a user requires
 [3]. Therefore, it is important to ensure that the available in-
 formation 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 qual-
 ity [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 com-
 fort 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 infor-
 mation 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.

403 *H5*: High-quality website contents lead to higher user satisfac-
404 tion in a high-UA culture.

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

407 2) *Interactivity*: Website interactivity determines how informa-
408 tion that is presented is processed by a website user (i.e., custom-
409 ization and control over the contents) [74]. Furthermore, it
410 is the user's experience during his/her interaction [75], and it is
411 considered as an important attribute of a website [76]. Zeithaml
412 *et al.* [77] defined interactivity as "the extent to which website
413 users can 1) communicate with the people behind the website,
414 2) interactively search for information, and 3) conduct transac-
415 tions through the website." The features of interactivity that were
416 consistently discussed in the literature include user control [78],
417 [79], personalization/customization [79], [80], responsiveness
418 [78]–[80], connectedness [78]–[80], and playfulness [78], [80].
419 In several studies [78]–[81], the researchers observed the impact
420 of interactivity features on user satisfaction, trust, and loyalty.
421 Likewise, Cyr *et al.* [16] argue that interactivity (i.e., user con-
422 trol, connectedness, and responsiveness) affect user trust and
423 ultimately loyalty. However, Venkatesh and Ramesh [82] argue
424 that website customization saves customer time by providing
425 them personalized information. Several researchers [71], [83]
426 proved the importance of interactivity, but there is still insuffi-
427 cient evidence on the role of interactivity for e-commerce
428 in the cultural context. Consequently, we employed the
429 following features of interactivity: responsiveness and person-
430 alization/customization to seek the users' preferences. Person-
431 alization/customization helps customers in tailoring the product
432 features. We theorized that personalization/customization is an
433 important attribute for developing customers' trust and satisfac-
434 tion by facilitating them to tailor products' features before
435 buying. Similarly, we also assume that responsiveness positively
436 influences the customer satisfaction and trust through consistent
437 feedback and support.

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

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

442 3) *Navigation*: Website users have divergent capabilities
443 and skills in the use of the Internet. Accordingly, focus of compa-
444 nies should not only be on attractive design but also on devel-
445 oping websites that are both easy to use and navigate. Not only
446 does website navigation facilitate users in carrying their tasks in
447 a timely accurate manner [84], it also provides additional ways to
448 access the desired information easily [51]. Likewise, it supports
449 the users while moving in and around a website conveniently
450 [85]. Roy *et al.* [86] claim that "ease of navigation, interface de-
451 sign, and user guidance affect customer establishment for trust."
452 Despite information, users may leave the website if they find it
453 difficult to navigate when searching for the desired informa-
454 tion. In several studies [22], [26], the researchers emphasize the
455 use of guided navigation for uncertainty/risk avoidance cultures.
456 Thus, positive correlation exists between navigation and satisfac-
457 tion, as well as between navigation and trust in the cultural
458 context [4], [5], [15]. Consequently, we believe that besides
459 ease of navigation, reversibility, navigational clues, and obvious

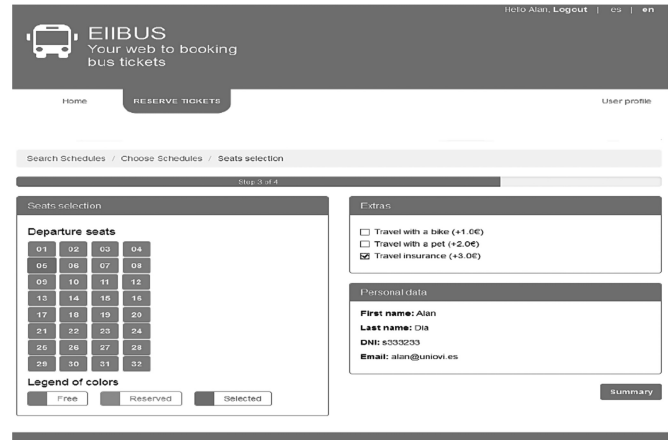


Fig. 2. E-ticket bus website prototype.

buttons support the users for appropriate actions, thus eliminat- 460
ing ambiguity or error. 461

H9: In a high-UA culture, guided navigation leads to higher 462
user satisfaction toward that same website. 463

H10: In a high-UA culture, guided navigation leads to higher 464
user trust toward that same website. 465

C. Loyalty 466

The user interface designs for globalization are becoming 467
more important for business success and customer loyalty [32]. 468
Customer loyalty is defined as strong feelings of allegiance or 469
commitments [53]. Therefore, loyal customers are found to have 470
strong commitments and attachments toward the retailers. More- 471
over, the loyal customers are not easily distracted to slightly 472
more attractive alternatives. Hence, true loyalty demonstrates 473
customers and purchase retention [87], resistance to switch, and 474
willingness to pay more. Besides, companies operating their 475
business online face competition because of rapid growth in 476
this sector. Therefore, trustworthiness, security, and easy-of-use 477
are important aspects to keep the customer loyal to a website 478
[15], [88]. In previous studies [7], [15], [33], [47], [48], both 479
satisfaction and trust were considered as key factors to measure 480
user loyalty to a website. Thus, greater the degree of satisfac- 481
tion [53] and trust [1], [16], the greater the degree of website 482
loyalty. 483

H11: Greater website user satisfaction leads to greater user 484
loyalty to that same website. 485

H12: Greater the website user trust leads to greater user loy- 486
alty to that same website. 487

IV. METHODOLOGY AND DATA ANALYSIS 488

To refute/validate the former hypotheses, we developed a 489
simple e-commerce website prototype after carefully consider- 490
ing the design features of the three travel ticket booking web- 491
sites (www.alsa.es, www.swebus.se, and www.daewoo.com.pk) 492
to be tested by the students. The prototype was designed by de- 493
ploying different colors (i.e., blue, green, pink, and white) (see 494
Fig. 2). The blue color was mainly used in the design of distinct 495

496 areas (e.g., header, footer, navigation buttons, and links),
 497 whereas white was used as a background and as a logo and
 498 graphics color (see Fig. 2). The typographical features used on
 499 the website interface include typeface sans-serif (Helvetica),
 500 spacing 1.08, size from 12 to 20 px, and color, that is, more
 501 frequent (black and white) and less frequent (blue, green, and
 502 pink), respectively (see Fig. 2). Furthermore, the website nav-
 503 igation was supported through buttons and links along with
 504 navigational clues to take the prospective actions for buying.
 505 To enhance the website interactivity, for example, ticket price,
 506 travel date and time, preferred destination, and seat location in-
 507 side the bus were incorporated through customizable features.
 508 As shown in Fig. 2, to personalize the seating plan, different col-
 509 ors were used for different buttons (i.e., green for “free,” pink
 510 for “reserved,” and blue for “selected”). Moreover, feedback
 511 and help and support were facilitated through pop-up messages
 512 and progress bar shown in Fig. 2. Finally, the prototype was
 513 carefully developed to avoid additional implications such as
 514 website familiarity, reputation [51], [53], and culture markers
 515 [89]. Therefore, prior to the start of the current investigation,
 516 consultants of usability engineering at the University of Oviedo
 517 performed cognitive and pluralistic walkthroughs on the initial
 518 mockups of the prototype, which were followed by heuristic
 519 evaluation of the resulting wireframes. Once the prototype was
 520 developed, a series of user test was conducted with local users to
 521 ensure a high usability level of its interactive elements. Thus, the
 522 prime objective of the pretest study was to validate that the de-
 523 veloped prototype was working well, for example, the searching
 524 and booking procedures. The suggestions and feedback were in-
 525 corporated by eliminating promotional information and banners
 526 irrelevant to the current study to keep the prototype design sim-
 527 ple. Accordingly, Lee *et al.* [75] argue that interface simplicity
 528 is an important precondition for better interaction and usability
 529 experiences.

530 A. Survey Instrument

531 To evaluate the proposed hypotheses, a survey scale was
 532 designed and integrated with the website prototype to obtain
 533 subjective data (see the Appendix). The final survey question-
 534 naire consisted of 26 items to assess the impact of web design
 535 attributes on users’ satisfaction and trust for the developed e-
 536 commerce prototype. The survey items for the hypothesized
 537 constructs (i.e., typography, color, content quality, interactiv-
 538 ity, navigation, satisfaction, trust, and loyalty) were developed
 539 and modified from the elegant literature (i.e., [4], [11], [17],
 540 [28], [34], [50], [52], [58], [60], [62], [65], [90]–[93]) in the
 541 domain of e-commerce. Moreover, to meet the objective of
 542 the hypothesized study, each questionnaire item was also re-
 543 viewed by the research members before conducting the investi-
 544 gation. Consequently, only the appropriate and relevant items
 545 were selected. The questionnaire items and source appear in the
 546 Appendix. The measurement scale was developed in English.
 547 Further, a seven-point Likert-scale ranging from 1 (strongly
 548 disagree) to 7 (strongly agree) was used to measure each ob-
 549 served item. Survey instrument tool validation is discussed
 550 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

551 For this research, the students were recruited in Pakistan and
 552 the prototype used for this research supports multiple languages.
 553 Data were collected from graduate- and postgraduate-level stu-
 554 dents with the cooperation of several academic institutions.
 555 Mostly, the students have free access to the Internet resources.
 556 Therefore, besides academic activities, they also regularly use
 557 e-retailing services for searching and buying products online such
 558 as books, software, and e-tickets at economical cost. Previous
 559 studies [94], [95] suggested university students as an important
 560 sample for e-commerce research because they frequently use
 561 the Internet for communication and online transactions. Fur-
 562 thermore, the selection of students as a sample is also very
 563 much consistent with recent e-commerce research (i.e., [17],
 564 [20], [96]). According to Ha and Stoel [97], students consti-
 565 tute a fit sample to observe online shopping behavior of young
 566 adults. Additionally, in the current research, students’ sample is
 567 considered as appropriate because of their high level of confi-
 568 dence in the execution of complex interactive tasks related to
 569 buying scenarios. Therefore, to recruit the volunteers, the re-
 570 searchers sent an email to the students and also to colleagues
 571 in different universities, who further distributed the email to the
 572 students of their respective institutions along with prototype link
 573 and study description. Approximately 1500 students from dif-
 574 ferent universities responded with positive consent to participate
 575 in this research. A concise description about research investi-
 576 gation and buying scenarios was also included at top of the
 577 home page of the prototype website (collapsible content) for re-
 578 view, prior to start the ticket-booking process. The participants
 579 were requested to use this prototype to search the bus tickets
 580 between two locations on a specified date. The next step was
 581 to choose a bus ticket with minimum price from the searched
 582 schedule. The participants were also requested to personalize
 583 the seating plan inside the bus. Finally, students was requested
 584 to login after the booking process through online registration to
 585 collect the participants’ demographic data followed by survey.
 586 Thus, in the two-month data collection process, 662 surveys
 587 were obtained. Incomplete and invalid surveys were discarded
 588

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

589 from the original dataset. Only 558 out of 662 surveys were
590 considered valid and appropriate where the response rate was
591 44.1%. The students' brief demographic description is given
592 in Table I.

593 C. Data Analysis

594 The proposed relationships were tested through a partial least
595 squares structural equation modeling (PLS-SEM) approach. It is
596 a comprehensive multivariate statistical analysis approach that
597 can simultaneously examine relationships among all the vari-
598 ables in a conceptual model, including a measurement com-
599 ponent and a structural component in order to build theory
600 [98]–[100]. The software package WarpPLS version 5.0 [98]
601 was used to perform the analysis. We preferred the Warp-
602 PLS over other PLS-SEM tools because it applies Herman
603 Wold's original PLS regression algorithm as it reduces the
604 levels of collinearity, thus providing stable weights and no
605 inflated coefficients [98]. WarpPLS version 5.0 is available at
606 <http://warppls.com/>

607 The reliability of the constructs was examined through cron-
608 bach's alpha (α), which is based on the average intercorrela-
609 tion of items [99], [101], [102]. Therefore, high intercorrelation

between the items results in a higher significance level of α . 610
However, there is no strict cutoff point for α coefficients, but a 611
lower limit of alpha (α) is the generally agreed value of 0.70 612
[99], [101]. The values for α in current study ranged from 0.838 613
to 0.898 (see Table II). Furthermore, the reliability was also 614
assessed by analyzing the outer loadings or sample correlations 615
of the observed items with the construct with which they are 616
theoretically associated. The general rule is that the value of 617
composite reliability (CR) should be equal to or greater than 618
0.70 [99], [101]. In this study, the value for CR ranged from 619
0.913 to 0.943 (see Table II), which demonstrated good internal 620
consistency. 621

622 D. Measurement Model

623 The measurement model was examined through unidimen-
624 sionality, standardized factor loadings, CR, convergent validity
625 (CV), and discriminant validity (DV). Initially, the unidimen-
626 sionality was tested by employing a principal component (fac-
627 tor) analysis. According to Kaiser's criterion, the unidimen-
628 sionality holds if an eigenvalue higher than 1 is attained in the first
629 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
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 Quality	-0.04	-0.06	0.87	0.09	0.02	-0.04	0.01	-0.05
	-0.06	0.01	0.91	-0.00	0.04	0.00	-0.06	0.11
Interactivity	0.10	0.05	0.89	-0.08	-0.06	0.04	0.05	-0.06
	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
	-0.01	0.11	-0.04	0.02	0.88	0.87	-0.18	0.02
Satisfaction	-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
	0.02	-0.01	0.04	-0.04	-0.00	0.00	0.92	-0.08
Trust	-0.02	0.01	-0.04	0.04	0.00	-0.00	0.92	0.08
	0.00	-0.05	0.00	-0.06	0.03	-0.00	0.07	0.94
Loyalty	-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

630 the suggested criteria; moreover, the principal component elu- 661
631 cidates the majority of the variances (see Table II). The CV was 662
632 examined through WarpPLS by observing the outer loadings 663
633 pattern of the items [101]. The outer loadings for all observed 664
634 items were greater than 0.70 and ranged from 0.776 to 0.945 665
635 (see Tables II and III) along with significant p -value (threshold 666
636 ≤ 0.05), indicating good CV of all constructs [101]. Second, 667
637 DV was evaluated according to the criterion suggested in previ- 668
638 ous research. DV indicates the extent to which a given construct 669
639 differs from other constructs [100]. Therefore, the DV criterion 670
640 relies on two important elements. The first element is that the 671
641 observed items should be weakly correlated with all constructs 672
642 except the one to which they are hypothetically associated [100]. 673
643 As Gefen and Straub [104] in their study stated that “correlation 674
644 of the latent variable scores on the measurement items needs 675
645 to show an appropriate pattern of loadings, one in which the 676
646 measurement items load highly on their speculatively assigned 677
647 factor and not highly on other factors.” Table III shows the cross 678
648 loadings for all adopted constructs. The second criterion of DV 679
649 assessment is related to average variance extracted (AVE) as 680
650 AVE presents the percentage of variance taken by a construct. 681
651 Thus, to ensure the DV, the AVE value of all constructs should 682
652 be greater than 0.50 (see Table II), and the $\sqrt{\text{AVE}}$ for each 683
653 construct (off-the-diagonal value) should be greater than the 684
654 correlation value (on diagonal) between constructs [99]–[101].

655 Finally, all constructs exhibited enough DV index in this 685
656 study, as shown in Table IV. We also evaluated the multi- 686
657 collinearity through variance inflation factors (VIF). VIF as- 687
658 sessed the multicollinearity among the constructs. The higher 688
659 VIF index between two latent variables seems to measure simi- 689
660 lar things. In this particular case, it is required to remove a latent

661 variable from the developed model. It was also suggested that 662
663 the VIF value for variables should be less than 5, although more 664
665 relaxed criterion suggested in previous research is the threshold 666
666 at 10 [105]. In the current study, VIFs are far below 5 (see Table 667
668 V). Therefore, no latent variable measures the same thing. 669
670 Even the computed values of both average variation inflation 671
671 factor $\overline{\text{VIF}} = 3.1$ and average full collinearity variance inflation 672
672 factor $\overline{\text{FVIF}} = 3.4$ were also observed to be far below the thresh- 673
673 old value 5. The ideal suggested value for both $\overline{\text{VIF}}$ and $\overline{\text{FVIF}}$ is 674
674 3.3 in the previous research [98]. WarpPLS also reported other 675
675 model fit indicators such as average R-squared ($\overline{R^2}$) with p -value 676
676 ($\beta = 0.629$, $P \leq 0.001$), average adjusted R-squared (AARS) 677
677 ($\beta = 0.626$) with P -value ≤ 0.001 , average path coefficient ($\overline{\beta}$) 678
678 with p -value ($\beta = 0.221$, $P \leq 0.001$), and $\overline{\text{VIF}} = 3.1$, respec- 679
679 tively. Goodness of Fit was also measured through Tenenhaus 680
680 [106] $\text{GoF} = \sqrt{(\text{AVE})X(\text{ARS})}$ or $\sqrt{(\text{Communality})X(\text{ARS})}$ 681
681 $= \sqrt{(0.794)X(0.629)} = 0.707$. In the recent studies [98], [107], 682
682 researchers suggested the GoF criteria as follows: small ≥ 0.1 , 683
683 medium ≥ 0.25 , and large ≥ 0.36 . Finally, as all values indi- 684
684 cated good fit, this study fulfills all the above-mentioned condi- 685
685 tions to support the analysis. For additional model fit and quality 686
686 indicators, see Table VI. 687

683 E. Structure Model 684

685 After having confirmation of the unidimensionality, reliabil- 686
686 ity, and validity of the measurement model, the next step was 687
687 to analyze the structure model. Therefore, we examined the 688
688 comprehensive explanatory power (EP) of the structural model, 689
689 path coefficients, (β) and amount of variance (R^2) [100], [108], 690
690 for dependent variables explained by independent variables. 691

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	$\beta = 0.424$	$P \leq 0.001$	***

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

696 V. RESULT AND ANALYSIS

697 The result of this study provides the support for the research
 698 framework (see Fig. 1). The results revealed that web design
 699 attributes positively affect user trust and satisfaction, which in
 700 turn leads to loyalty. This section depicts some interesting find-
 701 ings related to user trust (see Table VII). *Hypotheses 1 and*
 702 *2*: In previous literature, typography was rarely discussed with
 703 respect to strengthening user relationship with web interfaces.
 704 In this study, typography positively influenced user trust and
 705 satisfaction. Therefore, proper spacing between lines and be-
 706 tween words, font color, and style (typeface) with readable
 707 font size leads to loyalty because of its satisfying as well as
 708 trustworthy appearance. The relationship between typography
 709 and satisfaction ($\beta = 0.138, P \leq 0.001$) was observed to be
 710 stronger than the relationship between typography and trust
 711 ($\beta = 0.091, P \leq 0.015$). Sasidharan *et al.* [65] argue that
 712 typeface influences the user's trust-related perceptions.

713 *Hypotheses 3 and 4*: The website color and graphics observed
 714 as influencing features for determining the satisfaction and trust
 715 (see Table VII). Furthermore, the use of basic colors with fair
 716 contrast not only enhances the users' reading capabilities but
 717 also guides them for website navigation. Therefore, choosing
 718 a suitable color scheme and graphics for a website ensures
 719 the attractiveness, supportiveness, and trustworthiness of the

websites. Moreover, the relationship between the color and sat- 720
 721 isfaction ($\beta = 0.320, P \leq 0.001$) was observed to be stronger
 722 than color and trust ($\beta = 0.202, P \leq 0.001$). Similarly, in an
 723 empirical investigation, Cyr *et al.* [17] also observed strong
 724 relationship between color appeal and satisfaction than color
 725 appeal and trust for both high- and low-UA cultures.

726 *Hypotheses 5 and 6*: Similar to color, the website con-
 727 tent quality is also observed as an influencing factor that sig-
 728 nificantly affects user trust and satisfaction (see Table VII).
 729 Hence, the precise presentation of information not only
 730 supports the user for recognition but also facilitates quick
 731 comparison between the products/services' features to reach
 732 a buying decision. The relationship between content quality and
 733 trust ($\beta = 0.304, P \leq 0.001$) was observed to be stronger than
 734 content quality and satisfaction ($\beta = 0.219, P \leq 0.001$). In sev-
 735 eral other studies [4], [5], [7], [39], [73], the results demonstrate
 736 the positive relationship between content (relevant information)
 737 and customer satisfaction [4], [7], [73], and also between content
 738 and trust [4], [5], [39], [73]. In contrast, Eid [7] observed a posi-
 739 tive relationship between information quality and satisfaction
 740 than between information quality and trust for a high-UA (Saudi
 741 Arabia) culture, whereas, in the current study, we specifically
 742 observed that for high-UA or low-trust cultures, content quality
 743 or information quality is more important factor to determine the
 744 user trust than satisfaction. As appropriate and well-presented
 745 information reduces the uncertainty and risk that leads to a
 746 higher comfort level with the website.

747 *Hypotheses 7 and 8*: The website interactivity is an important
 748 design attribute that consists of several dimensions. However,
 749 these dimensions were rarely discussed in previous studies with
 750 respect to culture context. In this study, we include personaliza-
 751 tion/customization and responsiveness to explain the strength
 752 of interactivity relationship with trust and satisfaction. The re-
 753 sults of this study demonstrated the participants' preferences
 754 to the interactive features that facilitated them to personalize
 755 the service and product through customization. Moreover, the
 756 versatility in the booking process, responsiveness (timeliness of
 757 information)/ feedback, and consistency also enhanced the web-
 758 site interactivity. The relationship between interactivity and sat-
 759 isfaction ($\beta = 0.153, P \leq 0.001$) was observed to be stronger
 760 than interactivity and trust ($\beta = 0.086, P \leq 0.020$). In support
 761 to our study, Cyr *et al.* [16] observed direct and positive impact
 762 of interactivity (user control, connectedness, and responsive-
 763 ness) on user cognitive affective perceptions (trust and loyalty).
 764 Likewise, Lee [79] also observed that the perceived interactivity
 765 (user control, responsiveness, personalization, and connected-
 766 ness) directly influences user trust and indirectly the behavioral
 767 intention to use mobile commerce. In short, the website inter-
 768 activity induces favorable attitudes toward acceptability along
 769 with trust and satisfaction.

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

Q3 777 during buying but also helps avoiding any ambiguity. The rela- 833
 778 tionship between navigation and trust ($\beta = 0.185, P \leq 0.001$) 834
 779 was observed to be stronger than navigation and satisfaction 835
 780 ($\beta = 0.131, P \leq 0.001$). Likewise, Yoon [109] and Lim and 836
 781 Dubinsky [110] stated that website navigation is a strong fac- 837
 782 tor to determine customer trust and positive attitude. In several 838
 783 other studies [22], [26], researchers emphasize the use of guided 839
 784 navigation to reduce the uncertainty/error. Thus, positive rela- 840
 785 tionship exists between navigation and user satisfaction and 841
 786 between navigation and user trust in the cultural context [4], 842
 787 [15], [28]. 843

788 *Hypothesis 11 and 12:* The study was also initiated to seek 844
 789 what constituent was required to develop loyalty with a web- 845
 790 site in high-UA culture. In several studies [1], [7], [15]–[17], 846
 791 [48], [53], both satisfaction and trust were observed as strong 847
 792 determinants of loyalty in the domain of e-commerce. Accord- 848
 793 ingly, Lee *et al.* [75], Brilliant and Achyar [47], and Cyr [15] 849
 794 observed user trust to have a stronger impact than satisfaction 850
 795 on loyalty. On the contrary, Moriuchi and Takahashi [48] and 851
 796 Flavia *et al.* [111] considered satisfaction as more important fac- 852
 797 tor to determine customers' loyalty. Further, Eid [7] observed 853
 798 customer trust as a weak (unsupported) determinant of loyalty 854
 799 in a high-UA culture. 855

800 However, in the current study, both satisfaction and trust 856
 801 significantly influence loyalty, but the relationship between 857
 802 trust and loyalty ($\beta = 0.424, P \leq 0.001$) was observed to be 858
 803 stronger than between satisfaction and loyalty ($\beta = 0.393, P \leq$ 859
 804 0.001). In several other studies [8], [29], [112], researchers ob- 860
 805 served the influencing effect of UA on online customer trust. 861
 806 Thus, to design a website for a high-UA culture, presentation 862
 807 and arrangement of information and design features should be 863
 808 in a credulous manner. Because culturally adopted web design 864
 Q4 809 attributes reduce the negative impact of risk. All the adopted 865
 810 design attributes in the present study depicted positive rela- 866
 811 tions with trust and satisfaction. Overall, the finding of this re- 867
 812 search may also be helpful for website developers in designing 868
 813 the information systems and e-commerce website for low-trust 869
 814 cultures. 870

815 VI. CONCLUSION 871

816 The appropriate selection of design elements is important to 872
 817 avoid annoyance toward websites. Thus, diversification in the 873
 818 website designs makes it difficult to classify them for target 874
 819 population. The cultural variations and preferences also under- 875
 820 score the need for a tailored design. In this study, the researchers 876
 821 attempted to examine user preferences for web design attributes 877
 822 to determine trust, satisfaction, and ultimately loyalty. Thus, the 878
 823 prime motivation for this investigation is to identify the role 879
 824 of web design attributes in building trust and satisfaction for 880
 825 UA culture. A questionnaire was designed to collect the data to 881
 826 corroborate the proposed model or hypotheses. The PLS-SEM 882
 827 method was adopted to analyze the collected data from the uni- 883
 828 versity students. The results of this study support the proposed 884
 829 model and also the hypotheses. All the web design attributes 885
 830 were observed at a significance level to develop trust and loy- 886
 831 alty for UA culture. The unique and interesting finding is re- 887
 832 lated to typography, which was rarely discussed in e-commerce

literature. Furthermore, both content quality and navigation 833
 were observed to be strong factors in building user trust with 834
 a website. In contrast, interactivity, color, and typography were 835
 observed as strong determinants of user satisfaction. Finally, the 836
 effect of trust is more significant than the effect of satisfaction 837
 on loyalty for risk/high-UA cultures. 838

839 VII. LIMITATIONS AND FUTURE STUDY 840

841 A large sample population is a reliable and positive feature 842
 of the current research with a total sample of 585 students. The 843
 volunteers were from several institutions with different aca- 844
 demic backgrounds. The participants were also unfamiliar with 845
 the designed prototype, which helps to avoid bias because of a 846
 company/website reputation. Some interesting findings related 847
 to implications of web design attributes in high-UA culture were 848
 obtained. The current study suffers some limitations. First, the 849
 sample employed only university students, which may not be 850
 illustrative of the overall population of e-retail consumers, al- 851
 though several researchers [94], [95] considered students as an 852
 important sample for e-commerce research because they fre- 853
 quently use the Internet for communication and online trans- 854
 actions. Moreover, it has been observed that most online cus- 855
 tomers tend to be young [96] and considered as appropriate 856
 sample because they are more interested in the design and aes- 857
 thetics aspects [18], which may reduce concern over the use of 858
 students as sample. However, the use of university students in 859
 an educational setting may impact the external validity of the 860
 current study and restrict the applicability of the result to other 861
 settings or customers group. Second, the prototype was used for 862
 online ticket booking with no real purchase transactions. Al- 863
 though this procedure is consistent with previous e-commerce 864
 research (i.e., [17], [20], [96]), this may also limit transferability 865
 of the findings to actual e-commerce situations. Finally, we did 866
 not include other antecedents, that is, download delay, speed, 867
 and interactivity features; consequently, only a questionnaire 868
 approach was adopted to collect the subjective data, rather than 869
 a multiple methods approach to gather the additional objective 870
 measures. As future study, we plan to extend this investigation 871
 in several countries to seek the differences and similarities for 872
 design preferences. These culture preferences will further help 873
 us to verify and generalize the results. We also plan to extend 874
 the current investigation to more precisely observe the impact 875
 of typography on trust and satisfaction culturally. Typographical 876
 attributes for future research will include typeface, size, spac- 877
 ing, alignment, and color. Moreover, we are also interested to 878
 identify additional antecedents of loyalty in the cultural context. 879

880 APPENDIX 881

882 CONSTRUCTS AND STATEMENTS 883

884 Typography—(i.e.,[58], [60], [62], [65]). 885
 886 It is easy to read the text on this website with the used font 887
 type and size. 888
 889 The font color is appealing on this website. 889
 890 The text alignment and spacing on this website make the text 890
 easy to read. 891
 892 Color—(i.e.,[17], [90]). 892

886 The color scheme of this website is appealing.
 887 The use of color or graphics enhances navigation.
 888 Content quality—(i.e.,[4], [52]).
 889 The content helps for buying decision by comparing the in-
 890 formation about products or services.
 891 The information content provided by this website meet my
 892 needs.
 893 Contents and information support for reading and learning
 894 about buying process.
 895 Interactivity—(i.e.,[4], [11], [50], [52]).
 896 This website provides adequate feedback to assess my pro-
 897 gression when I perform a task.
 898 This website offers customization.
 899 This website offers versatility of ordering process.
 900 This website provides content tailored to the individual.
 901 In this website, everything is consistent.
 902 Navigation—(i.e.,[34], [50], [52]).
 903 Navigation aids serve as a logical road map for buying.
 904 Obviousness of buying button and links in this website.
 905 It is easy to personalize or to narrow buying process.
 906 It is easy to learn to use the website.
 907 This website supports reversibility of action.
 908 Satisfaction—(i.e.,[4], [91], [92]).
 909 Over all, I am satisfied with the interface of this website.
 910 My current experience with this website is satisfactory.
 911 Overall, I am satisfied with the amount of time it took to
 912 complete the tasks for booking a ticket.
 913 Overall, I am satisfied with accuracy for this website related
 914 to the buying process.
 915 Trust—(i.e.,[17], [28]).
 916 I trust the information presented on this website.
 917 This website is credible for me.
 918 Loyalty—(i.e.,[17], [93]).
 919 I would visit this website again.
 920 I would recommend this website to my friend.

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- 1302 Q1. Author: The affiliation of the author “CM Nadeem Faisal” has been modified as per the information given in the biography.
1303 Please check.
- 1304 Q2. Author: The sense of the sentence “As appropriate and well-presented information...” seems to be unclear. Please check.
- 1305 Q3. Author: The sense of the sentence “As navigational clues and aids serve as...” seems to be unclear. Please check.
- 1306 Q4. Author: The sense of the sentence “Because culturally adopted web design attributes...” seems to be unclear. Please check.
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