Journal of Internet Commerce

ISSN: 1533-2861 (Print) 1533-287X (Online) Journal homepage: http://www.tandfonline.com/loi/wico20

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To cite this article: Ting Chi (2018): Mobile Commerce Website Success: Antecedents of Consumer Satisfaction and Purchase Intention, Journal of Internet Commerce, DOI: 10.1080/15332861.2018.1451970

To link to this article: https://doi.org/10.1080/15332861.2018.1451970

Published online: 18 May 2018.

JOURNAL OF INTERNET COMMERCE
https://doi.org/10.1080/15332861.2018.1451970

Routledge
Taylor & Francis Group

Mobile Commerce Website Success: Antecedents of Consumer Satisfaction and Purchase Intention

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ABSTRACT

With the rapid development of apparel mobile commerce in the United States, more companies view mobile commerce as a new source of competitive advantage. Despite the importance of apparel mobile website quality and its effect on consumer satisfaction and future purchase stimulus, extant research has paid little attention to these topics. This study proposes a website quality–consumer satisfaction–purchase intention research model based on the self-regulatory process theory. Six dimensions of apparel mobile website quality—website visual appeal, apparel visual appeal, brand trust, website information quality, website response time, and website security—were investigated. In all, 293 eligible responses were collected via an online survey. Multiple regression analysis was utilized to test the proposed relationships. Results reveal that website information quality, website visual appeal, apparel visual appeal, and website security positively affect consumer satisfaction toward apparel mobile commerce websites, while website response time and brand trust show insignificant impacts on consumer satisfaction. With higher satisfaction on an apparel mobile commerce website, consumers are more likely to purchase apparel through the website.

KEYWORDS

Apparel mobile commerce; consumer satisfaction; purchase intention; website quality

Introduction

The emergence of mobile commerce (m-commerce) has attracted wide attention from both practitioners and academics due to its great impact on business and industry (Marriott, Williams, and Dwivedi 2017). Unlike traditional desktop computer–based electronic commerce (e-commerce), m-commerce allows transactions to be conducted anywhere and anytime through mobile devices over a wireless telecommunication network (Holmes, Byrne, and Rowley 2013). This unique feature has provided consumers unprecedented convenience and flexibility in online shopping. In 2016, m-commerce sales accounted for 24% of a total $394.9 billion e-commerce sales in the United States, a significant increase from 11%

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in 2012. M-commerce grew nearly three times faster than e-commerce overall in the United States (Saleh 2017). Business Insider projects that by 2020 m-commerce will make up at least 45% of total e-commerce in the United States, equaling $284 billion in sales (Business Insider 2015). Boston Consulting Group (2013) views m-commerce as the driving force for the next wave of retail revolution and a new source of competitive advantage for companies.

Compared to prior studies that analyzed m-commerce as a whole, Holmes, Byrne, and Rowley (2013) suggested that product-specific m-commerce studies could generate more applicable findings while avoiding confounding effects caused by product differences. As apparel is one of the most popular consumer product categories, 19% of apparel sales in the United States were made through the online channel in 2016, a significant increase from 11% in 2011 (Deena 2017). According to Euromonitor International's 2016 Global Consumer Trends Survey, approximately 60% of U.S. consumers preferred the online channel to the in-person experience for both research and purchase of apparel.

Apparel m-commerce is a division of the m-commerce channel with a special focus on apparel and related accessories. The trends in apparel online shopping indicate substantial growth in the amount of time spent on retail mobile platforms and overall retail spending on the mobile channel (Bertram and Chi 2018; Bilgihan, Kandampully, and Zhang 2016). Apparel retailers are offering greater product acquisition options, competitive prices, and a user-friendly shopping experience via their mobile websites to attract more consumers with the purpose of revenue generation. However, the performances of these apparel mobile retailers are quite distinct. Big investment in m-commerce is not automatically translated to satisfied customers and desired returns (Swilley 2015).

Park, Jeon, and Sullivan (2015) state that in the brick-and-mortar channel, store image and interior quality have an enormous impact on consumer apparel buying decisions, and apparel online retail websites are similarly important as website quality affects consumer satisfaction and consequently purchase intention. Despite the importance of apparel mobile website quality and its effect on positive consumer shopping experience and future purchase stimulus, extant research has yet to focus on these topics (Sanakulov and Karjaluoto 2015). Thus, in order to gain a better understanding of these critical issues regarding apparel m-commerce, this study aims to empirically determine the effects of key features of apparel mobile websites on U.S. consumer satisfaction, which in turn affects their intentions to shop apparel via mobile websites. Specifically, the objectives of this study are threefold: First, through identifying the key features of apparel mobile websites, this study proposes a research model illustrating the

relationships among apparel website quality, consumer satisfaction, and consumer purchase intention; second, the psychometric properties of the developed model are examined using the primary consumer survey data gathered in the United States. The significant factors influencing U.S. consumer satisfaction and further intent to use apparel m-commerce are statistically determined. Finally, based on the results, some managerial implications for marketers and companies are provided.

The remainder of this article is organized as follows. The next section reviews the relevant literature and proposes the hypotheses. The research model is then introduced, with the corresponding measures and scales for each construct in the model. In the methodology section, the survey participants, data sets, and statistical methods are described respectively. The results and discussion follow thereafter. Next, the conclusions are drawn based on the findings, and the implications for both academic researchers and industrial practitioners are presented. Finally, some limitations of this study are addressed and some directions for future research are offered.

Literature review and hypothesis development

In this section, we review the relevant literature on the theory of self-regulatory process, justifying the relationships among m-commerce website quality, consumer satisfaction, and purchase intention. The measures of mobile website quality including website visual appeal, apparel visual appeal, brand trust, website information quality, website response time, and website security are reviewed respectively. The hypotheses are proposed based on the review of the literature.

The theory of self-regulatory process

The self-regulatory process theory was originally proposed by Bagozzi (1992) to explain the relationship between consumer attitude and behavioral intention. Previous theories, such as the theory of reasoned action (Ajzen and Fishbein 1977) and the theory of planned behavior (Ajzen 1991), suggested that consumer attitude could affect his/her behavioral intention directly. However, Bagozzi (1992) contended that consumers' attitudes did not determine their intentions sufficiently but that the self-regulatory process plays a more sophisticated role in predicting consumer behavioral intentions.

Attitude is defined as an appraisal of the consequences of acting or simply as an appraisal process (Ajzen 1991). Bagozzi (1992) argued that the appraisal process would stimulate emotional reactions, which in turn lead to coping response of intention. Thus, attitude does not influence intention directly. Emotion could mediate the relationship between consumer attitude

and behavioral intention. Appraisal would lead to a particular emotion, such as satisfaction. In this situation, this emotion will lead to specific intentions, such as maintaining or increasing satisfaction (Tsai and Bagozzi 2014). In contrast, if a consumer experiences an unpleasant event or fails to achieve a desired goal, an outcome–desire conflict will occur. A particular emotion, such as dissatisfaction, results. This emotion, in turn, stimulates the intention of avoidance (Nielsen 2017).

Self-regulatory process theory has been widely applied in consumer behavior research in the context of e-commerce or m-commerce. DeLone and McLean (2003), Loiacono, Watson, and Goodhue (2007), Ng and Kwahk (2010), Polites et al. (2012), Shin et al. (2013), and Lin, Fan, and Chau (2014) identified a wide array of website features that could affect consumers' evaluation of website quality and result in positive or negative emotions. These investigated website quality features include informational fit-to-task, tailored communications, trust, response time, ease to understand, intuitive operations, visual appeal, innovativeness, emotional appeal, image consistence, and online completeness. Polites et al. (2012) used the theory of self-regulatory process as a framework to explore the antecedents of consumer satisfaction toward mobile websites and the relationship between consumer satisfaction and website loyalty. The result showed that satisfaction mediated the relationship between website stickiness and consumers' appraisal of information quality, system quality, usefulness, and perceived value of the website. Using the theory, Lin, Fan, and Chau (2014) empirically demonstrated that appraisal factors (e.g., pleasure, awareness, connectedness, and system quality) determined emotional reaction (i.e., user satisfaction), and user satisfaction positively influenced continuance intention.

Measures of website quality

Website quality is defined as a multidimensional interface, stimulating positive or negative user attitude that results from the interaction between user and website (Gao and Bai 2014; Kim and Niehm 2009). Given the importance of website quality in influencing consumers' satisfaction with online shopping experience, there have been a number of scales developed to measure it. The SERVQUAL scale, which was originally developed by Parasuraman et al. (1985, 1988) to measure an organization's service quality performance, has been used to measure online service quality (Devaraj, Fan, and Kohli 2002; Kim and Lee 2002; Negash, Ryab, and Igbaria 2003). However, some researchers have argued that the SERVQUAL scale in its unmodified form cannot capture all the attributes of e-commerce websites (Gefen 2002). The SITEQUAL scale proposed by Yoo and Donthu (2001) uses nine items to measure four aggregate dimensions of a web site—design,

speed, ease of use, and security. The SITEQUAL scale has been questioned lack of essential web attributes for evaluation of website service quality (Connolly, Bannister, and Kearney 2010). Similarly, the eTailQ scale proposed by Wolfinbarger and Gilly (2003) for four aggregate dimensions—fulfillment/reliability, website design, privacy/security, and customer service—has raised concern among scholars regarding the consistency and appropriateness of its dimensions (Parasuraman, Zeithaml, and Malhotra 2005).

Based on the work of Zeithaml, Parasuraman, and Malhotra (2002), who identified a set of website features at the perceptual-attribute level and categorized them into 11 e-service quality dimensions (i.e., reliability, responsiveness, access, flexibility, ease of navigation, efficiency, assurance/trust, security/privacy, price knowledge, site aesthetics, and customization/personalization), Parasuraman, Zeithaml, and Malhotra (2005) developed a four-dimensional 22-item scale called E-S-QUAL, which endeavors to capture the critical dimensions of website service quality. The four dimensions are efficiency, measuring the ease and speed of accessing and using a website; fulfillment, capturing the extent to which a website's promises about order delivery and item availability are fulfilled; system availability, measuring the correct technical functioning of the site; and privacy, determining the degree to which a website is safe and protects customer information. E-S-QUAL has an accompanying subscale called E-RecS-Qual, which contains items focused on handling service problems (Connolly, Bannister, and Kearney 2010). E-RecS-Qual is a three-dimensional 11-item scale, including responsiveness, effective handling of problems and returns through a website; compensation, the degree to which a website compensates customers for problems; and contact, the availability of assistance through telephone or online representatives. Both the E-S-QUAL and E-RecS-Qual scales have shown good psychometric properties in evaluating website service quality (Andreassen et al. 2016; Connolly, Bannister, and Kearney 2010; Paschaloudis and Tsourela 2015).

Expanding from the technology acceptance model (TAM), Loiacono et al. (2002; Loiacono, Watson, and Goodhue 2007) developed a 12-dimensional 36-item scale called WebQual, aiming to systematically determine the key attributes of a quality website desired by users. TAM was established to measure consumer acceptance of new information technology through examination of two primary variables, namely the perceived ease of use and perceived usefulness (Davis 1989). The WebQual scale has expanded the TAM consumer measurements through introducing new variables to more accurately identify the effects of specific website features on consumers' website use intention (Chang and Wang 2011; Li et al. 2015).

The WebQual's 12 dimensions measuring website quality have been widely applied to the studies of business-to-consumer websites, which

represent the major online interaction between retailers and consumers (Ahmad and Khan 2017). The studies that applied the WebQual scale reported that the 12 original dimensions could be effectively represented by a lower number of higher-order dimensions (Kim and Niehm 2009; Kim and Stoel 2004; Loiacono, Watson, and Goodhue 2007). In a study of apparel retail website quality, Kim and Stoel (2004) indicated that the 12 WebQual dimensions could be grouped into 5 dimensions: usefulness, entertainment, ease of use, response time, and trust. This finding from Kim and Stoel (2004) was further supported by a later study on apparel website quality from Kim and Niehm (2009). These dimensions capture the key features of retail website quality (Kemény et al. 2016; Li et al. 2015), providing updated empirical support for m-commerce consumer research (Ahmad and Khan 2017; Hasanov and Khalid 2015). As the present research focused on understanding the effects of apparel mobile website features on consumer satisfaction and consequent use intention and providing apparel mobile website developers with needed information regarding website design, WebQual is the most suitable scale for this study.

Entertainment: Website visual appeal and apparel visual appeal

Visual cues are a significant influence among consumers within the apparel industry. Consumers shopping apparel products perceive desire through the visual displays of apparel and store layout and make consumption decisions based on these visual sensory details (Khakimdjanova and Park 2005; Ji and Pang 2006). Prior studies on apparel online shopping indicate that visual appeal is an important influencing factor and can determine the business success of a company (Ha and Lennon 2010). In online shopping, this appeal is described by website balance, aesthetics, consistency, and response (Gao and Bai 2014). Visual aspects are powerful in dictating consumer satisfaction and intent to purchase when they are elicited and experienced by the consumer. Kemény et al. (2016) found that the interface design of a mobile website could significantly affect whether a person stays to continue shopping or not. Visual displays on an apparel mobile website therefore must entice the visitors, who integrate visual website appeal with perceived website quality.

The apparel industry also relies heavily on imagery to promote the quality of goods for sale (Menon et al. 2016). While visual merchandising plays a significant role in brick-and-mortar shopping, the effect of visual merchandising in mobile apparel shopping is often overlooked. Moayery, Zamani, and Vazifehdoost (2014) indicated that visual merchandising in brick-and-mortar shopping influenced impulsive buying behaviors among female consumers, while younger consumers were more responsive to visual

merchandising techniques. Visual merchandising in online apparel shopping was revealed to influence consumer pleasure and arousal among both online shoppers and browsers (Ha and Lennon 2010; Khakimdjanova and Park 2005).

An empirical study by Lindström et al. (2016) proved a strong need for improved visual merchandising of apparel in online business. Researching the variables of apparel presentation and aesthetics online, the study found that online retailers needed to create a setting similar to brick-and-mortar apparel shopping to achieve the best shopping results. In another study, Flavian et al. (2010) affirmed that website design is a key factor for apparel retailers to obtain positive outcomes, as it significantly affects users' perceptions and behaviors. In order to improve the online shopping experience, apparel visual display and website structure and design were two important areas that demand attention and development. Thus, we propose the following hypotheses:

H1: Mobile website visual appeal positively affects U.S. consumer website satisfaction.

H2: Apparel visual appeal positively affects U.S. consumer website satisfaction.

Ease of use: Perceived information quality

Online shopping provides new channels for consumers to experience visual and information stimuli, which supports or discourages consumption intentions through product search. One of the main disadvantages of the m-commerce channel is the lack of information quality sought by consumers (Hausman and Siekpe 2009; Melián Alzola and Padrón Robaina 2006). Maity and Dass (2014) explored the retailer-to-consumer communication process across the three shopping channels (i.e., brick-and-mortar stores, e-commerce, and m-commerce). Low media richness was observed among m-commerce websites, which included limitation in screen size and communication and influenced the superiority of the desktop computer–based e-commerce shopping channel over the m-commerce alternative (Maity and Dass 2014).

Kim and Stoel (2004) asserted that informativeness of an m-commerce website was a significant factor in predicting consumer satisfaction. Design quality of a mobile website influenced consumer traffic, whereas information quality encouraged purchase (Kim and Stoel 2004). According to Hausman and Siekpe (2009), acceptance of a website depends on informativeness, which is viewed as a human factor influencing overall purchase intention. Perceived value of a mobile website is also a result of provided

product information (Keramati et al. 2012; Kim and Niehm 2009). Thus, the following hypothesis is proposed.

H3: Information quality on mobile websites positively affects U.S. consumer website satisfaction.

Response time: Response time of website applications

In order for consumers to perceive a website as useful in making transactions, response time must be factored as a variable for website quality (Salehan and Negahban 2013). Website response time is defined as the delay a consumer experiences during the attempt to observe online information (Galletta et al. 2006). In the study examining the impact of website delay on consumer satisfaction, Galletta et al. (2006) asserted that unfamiliar websites had a greater impact on decreasing consumer patience and intent to return. Response time was applied to apparel m-commerce in the study by Kim and Stoel (2004), and response time was proven to significantly affect the consumer perception of transaction-related website qualities. In this study, satisfaction with an apparel m-commerce website was related to transaction capabilities. Therefore, we propose the following hypothesis.

H4: Response time positively affects U.S. consumer website satisfaction.

Website security

Website security involves protecting consumers from fraud and monetary losses (Bressolles, Durrieu, and Senecal 2014). Loiacono, Watson, and Goodhue (2007) indicated that transactions via websites should be trusted by users, as trust in website security significantly affected reuse intention. The concept of trust was developed to reflect the outcome from consumers' perceived safety and privacy of website processes. Website security has become one of the most important values desired by consumers during online shopping due to the recent lack of protective measures concerning retail customer security and privacy.

In a study conducted by Chen and Kao (2010), website security and privacy measures were indicated to be most influential among online consumers in Taiwan. Individuals in the study noted that control over the transaction process can improve perceived security and privacy. Complexity of online interactions can enhance consumers' feelings of security when shopping online, which in turn leads to greater online shopping satisfaction (Chen and Kao 2010). Barrera and Carrión (2014) found that website security is one of the key dimensions of website quality perceived by users.

In December 2013, Target, a big box retailer and one of the current leaders in online shopping, was hacked by outside sources (Isidore 2014). During this event, Target lost details regarding monetary (credit card) and personal information of consumers who shopped during the holiday season. Shortly after the Target credit card breach, security hacks of other major retailers, including Neiman Marcus, Michaels, and the Home Depot, took place. The security hacks were made public through news releases, instilling fear among consumers regarding online and in-store security measures (Smitch 2014). Following these events and based on the findings from prior studies, we suggest that security features among apparel m-commerce retailers gained importance among consumers. This leads to the hypothesis below.

H5: Security features of mobile websites positively affect U.S. consumer website satisfaction.

Brand trust

Brand trust is described as the relationship developed between consumers and retailers as a result of learned expectations the consumer relates to the brand (Jones and Kim 2010). This relationship is often associated with visual cues the consumer interprets when shopping online and affects the consumer's intention to shop on a particular retailer's website (Loiacono 2000). As digital-only stores become more prevalent in online shopping, developing brand trust can be problematic for consumers. Brick-and-mortar stores have a greater chance at developing brand trust in person, transitioning this consumer connection through a well-built online channel. Hahn and Kim (2009) claimed that consumers who had previously developed trust through a brick-and-mortar retailer experience could more easily accept the retailer's online shopping channel to meet their needs. While brick-and-mortar stores have a greater ability to develop brand trust in their stores, online retailers face problems developing trust.

According to Shiue and Li (2013), consumers who perceived a brand positively from past experience were more likely to show positive attitudes toward the website and reuse the website. Ling, Chai, and Piew (2010) studied brand orientation and discovered that stronger brand names and images led to greater levels of consumer satisfaction with online purchase decisions. Wang, Ngamsiriudom, and Hsieh (2015) indicated that brand trust is critical for fostering successful relationships, reducing uncertainty and risk, and increasing consumer willingness to purchase through the mobile channel. Higher levels of comfort associated with brand trust can

therefore influence consumer perceptions of website quality, leading to the hypothesis proposed below.

H6: Previously developed brand trust positively affects U.S. consumer website satisfaction.

Consumer website satisfaction and intent to use

Website satisfaction can be the result of different determining factors with changes of website application (Schaupp 2010). As the website under focus changes, so do the constructs that factor into determining consumer satisfaction. In a study of the impact of website satisfaction on consumer website reuse intention, Schaupp (2010) found that website satisfaction must be achieved before consumers intend to return.

Based on the theory of self-regulatory process, Cristobal, Flavián, and Guinaliu (2007) identified a wide array of website features including ease of use, response time, visual appeal, and trust that could affect consumers' evaluation of website quality and result in satisfaction or dissatisfaction outcome. In a similar fashion, the empirical findings from Lin, Fan, and Chau (2014) supported the website quality–satisfaction–behavioral intention relationship. Furthermore, the findings from both Wakefield et al. (2011) and Al-Qeisi et al. (2014) indicated that consumers related their satisfaction to an enhanced website interface and showed greater intent to reuse the website if satisfaction was achieved. Following the findings of prior relevant studies, we propose the hypothesis below.

H7: Mobile website satisfaction positively affects future intent to use among U.S. consumers.

Proposed research model

Based on the literature review above, a conceptual model including all the proposed relationships is illustrated in Figure 1. Perceived apparel mobile website quality affects consumers' satisfaction, which in turn influences their intent to purchase.

Website quality constructs were derived from the WebQual scale that has been widely applied in prior studies (Ahmad and Khan 2017). Specifically, the scale for website visual appeal was adapted from Wang and Liao (2008). Apparel visual appeal was measured by the scale developed by Khakimdjanova and Park (2005). The scale for website response time was adapted from Kim and Stoel (2004). The scale for website information quality was adapted from Kim and Niehm (2009). Website security was captured by the scale from Bressolles, Durrieu, and Giraud (2007). The scale

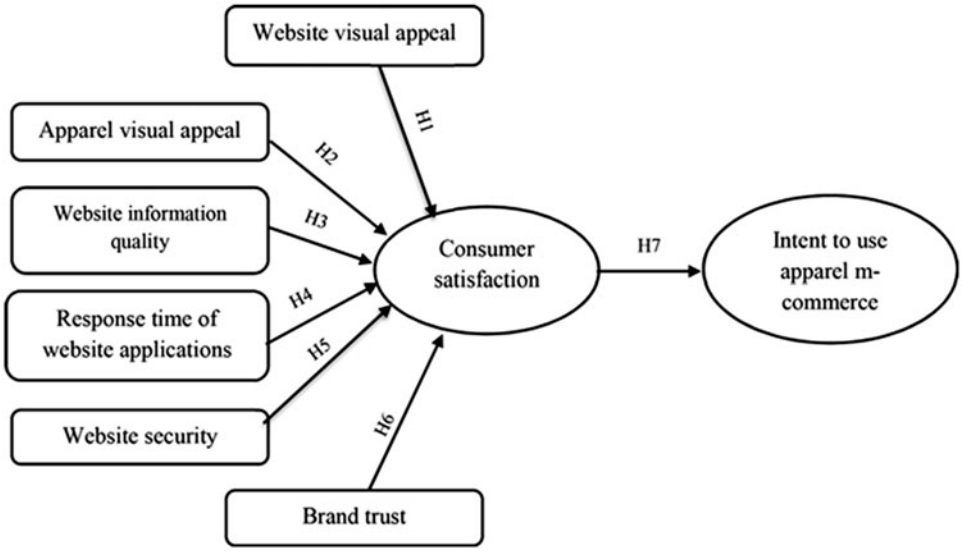

Figure 1. Proposed mobile website quality–satisfaction–behavioral intention model.

for brand trust was adapted from Jones and Kim (2010). The scale for consumer satisfaction was adapted from Zhou (2011). The scale for intent to use apparel m-commerce was adapted from Hausman and Siekpe (2009). The appendix lists all the constructs and their corresponding measurement scales Appendix. Constructs and corresponding measurement scales.

Methodology

In this section, we introduce survey instrument development and the data collection procedure. Then data analysis methods are explained in detail.

Survey instrument development and data collection

The developed survey instrument was first reviewed by three professors who were familiar with the research topic and survey techniques. Then the instrument was tested through a pilot study with 10 U.S. consumers. The suggestions from the participants were used to refine the instrument with regard to arrangement, wording accuracy, and relevance (Chi and Sun 2013). This process helped to make the final survey instrument more valid and clear (Mariadoss et al. 2016).

The primary data were collected in an online survey of U.S. consumers. The professional survey website used is Amazon Mechanical Turk (https://www.mturk.com), which can reach a wide range of consumers with high reliability (Goodman et al. 2013). Compared with conventional survey methods, web surveys have their advantages, including lower time and

Table 1. Profile of the Survey Respondents.

	Percentage		Percentage
Gender		Education level	
Male	52.2%	High school	18.1%
Female	47.8%	Some college	42.3%
		Bachelor's degree	36.2%
Age (years)		Master's degree	2.7%
18–25	18.1%	Doctorate	0.7%
26–30	23.5%	Annual household income (before taxation)	
31–35	20.5%	Less than $5,000	3.8%
36–40	15.7%	$5,000–$9, 999	3.4%
41–45	10.2%	$10,000–$14,999	6.5%
46–50	6.5%	$15,000–$24,999	10.6%
51 or older	5.5%	$25,000–$34,999	15.0%
Ethnicity		$35,000–$49,999	18.1%
White/Caucasian	77.4%	$50,000–$74,999	25.3%
African American/Black	7.2%	$75,000–$99,999	11.5%
Hispanic/Latino	4.1%	$100,000 or more	5.8%
Asian/Pacific Islander	8.9%	Annual expenditure on apparel via mobile websites	
Other	2.4%	$0–$49	15.0%
Annual expenditure on apparel		$50–$99	17.3%
$0–$299	26.3%	$100–$299	30.4%
$300–$499	22.5%	$300–$499	20.8%
$500–$899	29.0%	$500–$899	13.3%
$900–$1,499	14.0%	$900–$1,499	2.2%
$1,500 or more	8.2%	$1,500 or more	1%

Note. 293 eligible responses.

money costs, convenience for respondents, and automation (Schmidt 1997). Particularly, this study aimed to collect responses from consumers who have used apparel m-commerce. A total of 293 eligible responses were received. The profile of survey respondents is presented in Table 1.

Of 293 respondents, 47.8% were female and 52.2% were male. The ages of the respondents varied from 18 years to older than 50 years, mainly distributing (88%) in the range of 18 to 40 years. Most of the respondents had some college education or a bachelor's degree (78.5%), followed by high school (18.1%), a master's degree (2.7%), and a doctorate (0.7%). In terms of ethnicity, a majority of the respondents were White/Caucasian at 77.4%, followed by Asian/Pacific Islanders at 8.9%, Black/African American at 7.2%, Hispanic/Latino at 4.1%, and other at 2.4%.

It was observed that 58.4% of the respondents' personal pretax income ranged from $25,000 to $74,999, followed by 5.8% at $100,000 or more, 10.6% at $15,000 to $24,999, 6.5% at $10,000 to $14,999, 3.8% at less than $5,000, and 3.4% at $5,000 to $9,999. With regard to annual total expenditure on apparel, 29% of the respondents indicated that they spent between $500 and $899, followed by 26.3% at $0 to $299, 22.5% at $300 to $499, 14% at $900 to $1,499, and 8.2% at $1,500 or more. In contrast, the respondents generally spent less on apparel via mobile websites; 30.4% of the respondents indicated that they spent $100 to $299 on apparel

m-commerce, with 20.8% at $300 to $499, 17.3% at $50 to $99, 15% at $0 to $49, 13.3% at $500 to $899, and 3.2% at $900 or more.

Data analysis methods

The statistical assumptions including multivariate normality, multicollinearity, and correlations were first examined. Multivariate normality is when each variable under consideration is normally distributed with respect to each other variable. Multivariate normality can be assessed through the inspection of skewness and kurtosis for each variable. There is violation of the normality assumption if the results are greater than +1.0 or less than −1.0. Multicollinearity is a statistical phenomenon in which two or more predictor variables in a multiple regression model are highly correlated, meaning that one can be linearly predicted from the others with a nontrivial degree of accuracy. In order to test multicollinearity among the predictor variables, variance-inflation factor (VIF) was calculated. The VIF values less than 5.0 indicate there are no multicollinearity problems among the predictor variables (Ott, Longnecker, and Ott 2001). Since each construct was measured by multiple items, the average score of the multi-items for a construct was computed and used in further analysis such as correlation analysis and multiple regression analysis (Chi and Sun 2013; Morgan, Vorhies, and Mason 2009). Pearson's correlation analysis was applied to examine the relationship between the constructs. The correlation coefficient value (r) range from 0.10 to 0.29 is considered weak, from 0.30 to 0.49 is considered medium-strength, and from 0.50 to 1.0 is considered strong. According to Field (2009), the correlation coefficient should not go beyond 0.8 to avoid multicollinearity. Exploratory factor analysis and confirmatory factor analysis were employed to test the constructs in the proposed model in terms of reliability, unidimensionality, and construct validity including both convergent validity and discriminant validity.

For factor analysis, the extraction criterion is set as an eigenvalue greater than 1.0. Items with low factor loadings (<0.50) are dropped (Yoo and Donthu 2001). The deduction of certain measurement variables requires the reexamination of factor loadings, coefficient alphas, item-to-total correlations, and factor structure (Chi and Sun 2013). This iterative procedure is repeated until all requirements are met.

Unidimensionality, reliability, convergent validity, and discriminant validity were tested for proving model adequacy. First, unidimensionality refers to the existence of one underlying measurement construct that accounts for variation in examinee responses. Second, Cronbach's alpha is a coefficient of internal consistency. It is commonly used as an estimate of the reliability of a psychometric test for a sample of examinees. Third, convergent validity

refers to the extent to which indicators of a specific construct "converge" or share a high proportion of variance in common. Convergent validity exists when average variance extracted (AVE) scores for all latent constructs are above the desired threshold of 0.50. AVE is a summary measure of convergence among a set of items representing a construct. It is the average percentage of variation explained among the items. Fourth, discriminant validity refers to the extent to which a construct is truly distinct from other constructs. Comparing the AVEs to the squared correlation between the two latent constructs of interest, the AVEs should be greater than the squared correlation in order to demonstrate satisfactory discriminant validity (Nunnally and Bernstein 1978). If the AVEs by the correlated latent constructs are greater than the square of the correlation between the latent constructs, discriminant validity is obtained (Fornell and Larcker 1981).

Multiple regression analysis is applied to analyze the relationship between the dependent variable and independent variable(s) (Cohen and Cohen 1975). Therefore, multiple regression analysis was selected as an appropriate method for this study to test the hypotheses. SPSS software was used for statistical assumption tests, model adequacy examinations, and multiple regression analysis.

Results and discussion

Statistical assumption examination, factor analysis, and construct adequacy

Table 2 presents correlations and properties of all constructs. All skewness and kurtosis scores are between +1.0 and −1.0, which suggests that there are no violations of the normality assumption. All VIF values are below

Table 2. Correlations and Properties of All Constructs and Demographic Variables.

	WIQ	RT	S	T	WVA	AVA	SA	IU
WIQ	1	.078	.130*	.232**	.265**	.162**	.207**	.248**
RT	*.006*	1	.435**	.313**	.390**	.196**	.297**	.291**
S	*.017*	*.189*	1	.496**	.466**	.299**	.542**	.431**
T	*.054*	*.098*	*.170*	1	.445**	.262**	.419**	.431**
WVA	*.070*	*.152*	*.217*	*.198*	1	.332**	.507**	.404**
AVA	*.026*	*.038*	*.089*	*.069*	*.110*	1	.355**	.356**
SA	*.043*	*.088*	*.294*	*.176*	*.257*	*.126*	1	.558**
IU	*.062*	*.085*	*.186*	*.186*	*.163*	*.127*	*.311*	1
Mean	4.15	3.71	3.95	3.79	4.19	3.98	4.16	4.07
SD	.411	.933	.722	.544	.579	.552	.556	.704
Cronbach's alpha	.890	.911	.878	.730	.843	.706	.913	.950
AVE	.506	.744	.538	.559	.500	.501	.567	.677
Chi-square test *p* value	.092	.107	.097	.103	.105	.088	.091	.136
Skewness	.855	−.766	−.526	−.349	−.254	−.009	−.072	−.393
Kurtosis	.562	.116	.440	.413	.746	.317	.550	.001

Note. Italic numbers are the squared corresponding correlations.
WIQ: Website Information Quality; RT: Web Response Time; S: Website Security; T: Brand Trust; WVA: Website Visual Appeal; AVA: Apparel Visual Appeal; SA: Consumer Satisfaction Usefulness; IU: Intent to Use.
*Correlation is significant at the .05 level (2-tailed).
**Correlation is significant at the .01 level (2-tailed).

five, suggesting that there are no multicollinearity issues among constructs and variables. After exploratory factor analysis, the measurement variables labeled WIQ7, WVA3, AVA2, AVA5, AVA7, T1, T2, T4, T5, T8, T10, and T11 are dropped due to low factor loading (see Appendix. Constructs and corresponding measurement scales). All the factor loadings of the remaining measurement items to their respective constructs are high ($\geq$0.6) and statistically significant, while their loadings to other constructs are very low ($\leq$0.3). This also shows unidimensionality for the constructs. In addition, results of chi-square tests of all constructs were insignificant, which established the evidence of unidimensionality. Cronbach's alphas of all constructs are greater than 0.70, indicating that reliability is rigorously achieved (Nunnally and Bernstein 1978). The AVE scores for all constructs are above the desired threshold of 0.50, suggesting convergent validity. All AVE scores are greater than the squared corresponding correlations, which demonstrates satisfactory discriminant validity.

Hypothesis testing results and discussion

Once the adequacies of all constructs were demonstrated, the proposed hypotheses were tested using the multiple regression technique. A single score was obtained for each construct by averaging across the measurement items (Chi and Sun 2013; Morgan, Vorhies, and Mason 2009). Table 3 presents the results of hypothesis testing. Among seven hypotheses, five (H1, H2, H3, H5, and H7) were statically significant at the $p < .05$ level and two (H4 and H6) were insignificant. The effects of demographic variables on consumer satisfaction toward apparel mobile websites and their intent to use apparel m-commerce were all insignificant at the $p < .05$ level.

Hypotheses 1, 2, 3, 4, 5, and 6 examined the impacts of website visual appeal (WVA), apparel visual appeal (AVA), website information quality (WIQ), response time of website applications (RT), website security (S), and brand trust (T) on U.S. consumer satisfaction toward apparel mobile websites (SA). Results show that SA is significantly affected by WVA, AVA, WIQ, and S, but not by RT or T.

Specifically, WVA positively affects SA ($\beta = 0.373$, $t = 2.974$), supporting H1. This indicates that mobile website visual appeal significantly affects website quality perceived by U.S. consumers. Similarly, AVA positively influences SA ($\beta = 0.199$, $t = 3.787$), supporting H2. This shows that apparel presentation and aesthetics online significantly affect website quality perceived by U.S. consumers. The relationship between WIQ and SA is positively significant ($\beta = 0.192$, $t = 2.615$), supporting H3. This reveals that perceived value of a mobile website is a result of provided product information online. Finally, the relationship between website security and SA is

Table 3. Results of Hypothesis Testing.

Hypothesis		DV	IDV	Std. Coef. (β)	t value	Significant at $p < .05$	Control variable	Std. Coef. (β)	t value	Significant at $p < .05$	Total R^2	F value ($df1/df2$)	Significant at $p < .05$
		SA	Constant	–	2.974	.003	Age	.027	.525	.600	.567	12.12 (11/281)	<.001
H1	Y		WVA	.373	6.419	<.001	Gender	.039	.789	.431			
H2	Y		AVA	.199	3.787	<.001	Ethnicity	−.057	−1.145	.253			
H3	Y		WIQ	.192	2.615	.008	Education	−.064	−1.228	.220			
H4	N		RT	.101	1.846	.066	Income	.035	.675	.500			
H5	Y		S	.331	5.703	<.001							
H6	N		T	.034	.591	.555							
		IU	Constant	–	3.285	<.001	Age	.034	.693	.489	.565	22.38 (6/286)	<.001
H7	Y		SA	.549	11.071	<.001	Gender	.001	.011	.991			
							Ethnicity	−.037	−.751	.453			
							Education	−.028	−.543	.587			
							Income	.070	1.376	.170			

Note. Y: hypothesis supported; N: hypothesis not supported; IU: intent to use; WVA: website visual appeal; AVA: apparel visual appeal; WIQ: website information quality; RT: response time of website applications; S: website security; T: brand trust; SA: consumer satisfaction; Std. Coef.: standardized coefficients; DV: dependent variable; IDV: independent variable.

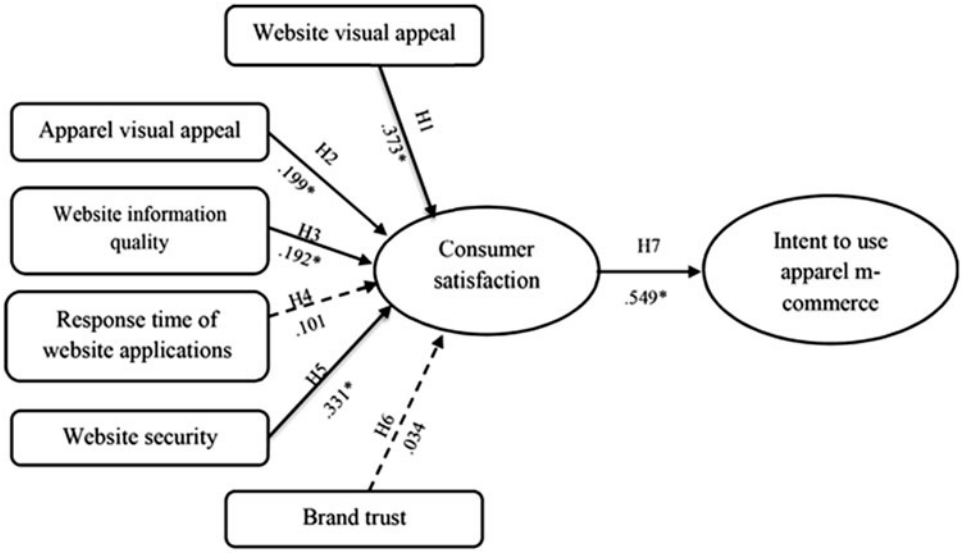

Figure 2. Identified relationships in the research model. *Note*. *Statistical relationship is significant at the $p < .05$ level.

positively significant ($\beta = 0.331$, $t = 5.703$), supporting H5. This suggests that website security is one of the most important values desired by U.S. consumers.

Hypothesis 7 examines the effect of consumers' website satisfaction (SA) on their intent to use apparel mobile commerce (IU). Result shows that IU is significantly affected by SA ($\beta = 0.549$, $t = 11.071$), supporting H7. This indicates that U.S. consumers exhibit greater intent to use apparel mobile commerce if website satisfaction is achieved.

Figure 2 illustrates the identified relationships in the proposed research model. Website information quality, website visual appeal, apparel visual appeal, and website security positively affect U.S. consumer satisfaction toward apparel mobile websites, while the impacts of response time of website applications and brand trust on consumer satisfaction are insignificant. There are no significant differences among age groups, genders, ethnic groups, education levels, or income levels among U.S. consumers in regard to their satisfaction toward apparel mobile websites. These constructs and demographic factors collectively exhibit good explanatory power, accounting for 56.7% of variance in consumer satisfaction with apparel mobile websites. Consequently, consumer satisfaction with apparel mobile websites positively affects their intent to purchase apparel through the mobile websites and accounts for 56.5% of variance in purchase intention. Consumer satisfaction shows good predictability for their behavioral intentions.

Conclusions

In recent years, m-commerce has been developing rapidly in the United States. As apparel is one of most popular product categories in desktop computer–based e-commerce, academics and marketers have argued that m-commerce could provide another lucrative sales channel for apparel (Kim, Ma, and Park 2009; Sun and Chi 2018). As one of the initial efforts made to understand the emerging apparel m-commerce phenomenon in the United States, this study empirically determined the effects of the key features of apparel mobile websites on consumer satisfaction and consequently the impact of consumer satisfaction on their intent to use apparel mobile commerce. The findings reveal how an apparel mobile website should be designed to enhance the U.S. consumer satisfaction that in turn leads to purchase outcomes. The applicability and usefulness of the WebQual scale were proven with the adaptation to the apparel context.

Overall, the main contributions of this study to the existing body of literature are threefold. First, building on the theory of self-regulatory process, this study proposed a mobile website quality–satisfaction–behavioral intention model. The model shows high explanatory power for U.S. consumer satisfaction toward apparel m-commerce websites ($R^2 = 56.7\%$) and demonstrates the significant causal relationship between consumer satisfaction and their intent to use apparel mobile commerce ($R^2 = 56.5\%$). Second, the psychometric properties of the proposed model were examined using the gathered primary U.S. consumer survey data. All the latent constructs met the criteria of unidimensionality, reliability, and construct validity. Significant factors influencing U.S. consumer satisfaction toward apparel m-commerce websites include website information quality, website visual appeal, apparel visual appeal, and website security. Finally, although the investigated demographic factors did not significantly affect either U.S. consumer satisfaction toward apparel m-commerce websites or their intent to use apparel m-commerce, some noteworthy patterns between consumer segments emerged. U.S. consumers who were older, were male, had lower education levels, or had higher income levels tend to show a higher level of satisfaction toward apparel m-commerce websites and consequently are more likely to make purchases via apparel m-commerce websites.

Implications

This study also imparted some managerial implications. Given the accelerating competition facing apparel mobile retailers in the United States, attracting more consumers to visit their websites and enhancing consumer satisfaction toward the websites, leading to use and reuse, have become crucial. Based on the consumer-desired features of an apparel m-commerce

website identified in this study, apparel mobile retailers can create or modify their websites with clear direction and targeted outcomes. Investment decisions may thus be made in a more effective manner.

Mobile website interface design with balance, aesthetics, and consistency appeals to U.S. consumers. Given the characteristics of apparel products, visual merchandising plays a critical role in apparel online shopping, which influences consumer pleasure and arousal. Mobile retailers need to create a setting similar to brick-and-mortar apparel shopping to achieve the best shopping results. Apparel presentation and aesthetics on the mobile website should promote the quality of goods. Compared to the desktop computer–based e-commerce channel, low media richness has been one of most prominent disadvantages for m-commerce websites due to the limitation in screen size, although recent popularity of big-screen smartphones partially addresses the issue. Providing relatively simple but sufficient product and service information for consumers to make purchase decisions is the principle for any m-commerce web design. Consumer trust is the outcome of consumers' perceived safety and privacy of website processes. Website security is one of the most important values desired by consumers during online shopping due to the recent reported lack of protective measures concerning retail customer security and privacy. As lack of website security can be fatal for mobile retailers, investment in website security should always be a top priority.

With the rapid proliferation of the 4G wireless network and decreased cost of mobile data, website response time is no longer a concern to U.S. consumers. The continuous upgrading of mobile Internet infrastructure is one of the key factors driving the growth of m-commerce in the United States (Deena 2017). According to a recent study from Business Insider, most m-commerce users in the United States are satisfied with the speed of mobile Internet connections and business transactions (Meola 2016). Most U.S. apparel brands sell products through their own mobile websites or nationally reputable digital online platforms such as Amazon, Macy's, Nordstrom, or Neiman Marcus. A great percentage of U.S. m-commerce users are used to search and find what they want through these websites. In the United States, online purchases usually come with consumer-friendly warranties and return shipping policies. This might explain the reason that brand trust does not significantly affect the U.S. consumer satisfaction toward apparel m-commerce websites.

Moreover, based on the findings of this study, certain types of consumers are worth more attention from companies or should weigh more in companies' m-commerce marketing strategies or investments. First of all, older, male U.S. consumers with lower education levels or higher income tend to be more receptive to the new shopping channel of m-commerce.

Apparel mobile retailers can rapidly expand their customer bases through attracting these consumers. Second, for apparel mobile retailers to develop a long-term customer base, younger, female consumers with higher education levels or lower income could provide room for future growth. Finally, with the rapid development of m-commerce in the United States, some market segments are becoming saturated. Targeting consumers who are more challenging to please and who have higher expectations of the shopping experience could help apparel mobile retailers create a unique market niche.

Limitations and future studies

Although this study has provided a better understanding of the effects of the key features of apparel m-commerce websites on consumer satisfaction and the impact of consumer satisfaction on their intent to use apparel m-commerce in the United States, there are some limitations that should be mentioned and could be addressed in the future studies. First, this study used a quantitative research method. Although the quantitative approach allows examination of the casual relationships between independent factors and consumer satisfaction and consequently intent to use apparel m-commerce, it is considered weak in discovering the underlying reasons for the phenomenon. Qualitative methods used in future studies might provide more detailed reasoning about the relationships identified in the quantitative analysis. Second, additional features of mobile websites such as service quality could be added to the model in future studies to achieve greater explanatory power in consumer website satisfaction. Third, as this study was focused on U.S. consumers, generalization of the findings of this study should be made with caution. In the future, cross-country comparison studies on the website quality–consumer satisfaction–purchase intention relationship could be conducted. Although the use of a single indicant for multi-item latent construct in data analysis is valid and has been applied extensively in prior studies, this approach could lose certain information about the construct. In the future, other methods such as structural equation modeling could be applied for data analysis.

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Appendix. Constructs and corresponding measurement scales

Construct	Measure and scale [factor loading]	Source
Intent to use (IU)	IU1: I will definitely buy apparel from this mobile website in the near future. [.814] IU2: I intend to purchase apparel through this mobile website in the near future. [.822] IU3: It is likely that I will purchase apparel through this mobile website in the near future. [.784] IU4: I expect to purchase apparel through this mobile website in the near future. [.870]	Hausman and Siekpe 2009
Consumer satisfaction usefulness (SA)	SA1: I feel satisfied with the services provided by this mobile website. [.709] SA2: I feel contented with the services provided by this mobile website. [.787] SA3: I like the services provided by this mobile website. [.760]	Zhou 2011
Website information quality (WIQ)	WIQ1: The mobile website provides accurate information. [.707] WIQ2: The mobile website is informative. [.768] WIQ3: The mobile website provides updated information. [.750] WIQ4: The mobile website provides high quality information. [.679] WIQ5: The mobile website provides timely information. [.734] WIQ6: The mobile information on the website is relevant to me. [.629] WIQ7: I can find what I need in the mobile website. [Dropped due to low factor loading] WIQ8: The mobile website provides relevant information. [0.704]	Kim and Niehm 2009
Website visual appeal (WVA)	WVA1: The mobile website uses colors properly. [.737] WVA2: The mobile website uses fonts properly. [.753] WVA3: The mobile website uses multimedia features properly. [Dropped due to low factor loading] WVA4: The layout of the mobile website is appropriate. [.629] WVA5: The mobile website looks organized. [.695] WVA6: The mobile website is user-friendly. [.705]	Wang and Liao 2008
Apparel visual appeal (AVA)	AVA1: Apparel displayed on a mannequin is visually pleasing. [.782] AVA2: Apparel displayed on a human model is visually pleasing. [Dropped due to low factor loading] AVA3: Viewing apparel color options on mannequin/model is visually pleasing. [.799] AVA4: White apparel backdrops are visually pleasing. [.602] AVA5: Apparel backdrops are visually pleasing. [Dropped due to low factor loading] AVA6: Apparel item coordination is important. [.663] AVA7: The visual display of apparel items is easy to understand. [Dropped due to low factor loading] AVA8: Desirable visual display of apparel items includes: 2D product, 360° garment view, picture enlargement, visual color swatch, changeable garment color on mannequin/model. [.674]	Khakimdjanova and Park 2005

(*continued*)

Continued

Construct	Measure and scale [factor loading]	Source
Brand trust (T)	T1: I trust the retailer owning the apparel mobile website. [Dropped due to low factor loading] T2: The retailer's apparel is not consistent in its quality.* [Dropped due to low factor loading] T3: The retailer's apparel performs consistently. [.693] T4: I feel secure when I buy apparel from this retailer's mobile website because I know it will never let me down. [Dropped due to low factor loading] T5: The retailer is reputed to perform well. [Dropped due to low factor loading] T6: I have heard negative comments about this retailer.* [.919] T7: This retailer has a reputation for being unreliable.* [.818] T8: This retailer has a reputation for being good. [Dropped due to low factor loading] T9: I feel I can trust this retailer completely. [.647] T10: This retailer's apparel performance tends to be quite variable.* [Dropped due to low factor loading] T11: I can't always be sure how it will perform the next time I buy it.* [Dropped due to low factor loading] T12: I can always anticipate correctly how this retailer's apparel will perform. [.721] T13: When I buy apparel from this retailer's mobile website I know exactly what to expect. [.649]	Jones and Kim 2010
Web response time (RT)	RT1: The mobile website takes long to load.* [.838] RT2: The mobile website loads quickly. [.882] RT3: When I use the mobile website there is very little waiting time between my actions and the website's response. [.867]	Kim and Stoel 2004
Website security (S)	S1: Generally, I have confidence in the website's security. [.787] S2: The mobile website guarantees security in navigation. [.534] S3: I think my personal details are safe on this mobile website. [.823] S4: I have confidence that the mobile website will not use my personal information for undesirable purposes. [.756]	Bressolles et al. 2007

Note. Five-point Likert scale from 1 = strongly disagree to 5 = strongly agree.
*Reversed measures.
WIQ7, WVA3, AVA2, AVA5, AVA7, T1, T2, T4, T5, T8, T10, and T11 are dropped due to due to low factor loading.