

The System Quality and Customer Satisfaction with Website Quality as Mediator in Online Purchasing: A Developing Country Perspectives

Journal of Operations
and Strategic Planning
4(1) 7–26, 2021
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permissions-india
DOI: 10.1177/2516600X21991945
journals.sagepub.com/home/osp



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Abstract

The present era sees an increasing trend of online purchasing all over the globe, and India is no more an exception. India is likely to become the hub for online market because it is second in terms of population in the world. The study is an effort to understand whether system quality really matters for customer satisfaction, particularly in developing countries, and the website quality works as a mediator or not. The study proposes the theoretical framework of the impact of system quality on customer satisfaction after a rigor literature review. With the help of purposive sampling, data were collected and model tested using partial least square structural equation modeling (PLS-SEM). The results show that system quality and website quality have a direct and positive impact on customer satisfaction and website quality partially mediated. Based on these empirical findings, managerial implications, limitations, and recommendations for further future research are given in the study.

Keywords

Website quality, system quality, information quality, service quality, perceived ease of use, perceived security, customer satisfaction

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Introduction

The wider use of the Internet in the present scenario, e-commerce websites, and websites of other organizations have played important roles as a communication medium for the customers as well as business houses (Liu et al., 1997). The business organizations around the globe invest a huge amount of money and time to develop and maintain their websites as per customers' need. The previous studies suggest that websites facilitate to sell goods and services online to promote the business (Palmer, 2002; Torkzadeh & Dhillon, 2002). The importance of the websites can also be seen by the previous research on various dimensions of the websites and the responsiveness toward the customers (Agarwal & Venkatesh, 2002; Rice, 1997). Various features, structures, and the kind of services provided by websites in the present era can be seen, and the assessment helps in the development and operations of websites. The assessment of websites serves the customer needs and meets the expectations up to an optimum level and helps in the maximum utilization of the resources invested (Adelman, 1991).

The scholars in past studies identified the importance of system quality, perceived ease of use, perceived security, information quality, and service quality for customer satisfaction. Security and privacy are considered key elements for customer satisfaction (Chen et al., 2010). Most of the previous frameworks for online purchasing were derived from the Western or developed countries. These research frameworks are applicable to only developed and Western countries (Palvia, 2013). The developing nations completely differ from developed countries in terms of their needs and culture and these frameworks are not suitable for emerging economies. Therefore, the models developed in Western nations need to be verified in the context of emerging countries for their global acceptance (Palvia, 2013).

In recent time, India witnesses a sharp growth in online purchasing, but the related research is not at par with Western countries. This research would be useful for online businesses to understand the customers and suggest how the offline customers could be converted into regular online customers because online retailing in India is only 0.1% of the total retail business (Singh et al., 2012). Against this disparity, the main objective of the current study is to understand whether the system quality, website quality and customer satisfaction have any relationship or not in emerging economies in general and particular in the context of India. The focal point of the study is to analyze and assess the key aspects of system quality, the website's features that affect the overall user satisfaction (Zhang & von Dran, 2001). Thus, the study would be a value addition in existing literature through the proposed framework of customer satisfaction and identifying factors that may motivate Indian consumers to shop online.

The article is organized into six sections. The second section, Theoretical Background and Hypothesis Formulation, explains the theoretical background and development of the hypothesis. The third section, Research Methodology, explains the research methodology employed in the study. The fourth section, Result Analysis, provides the analysis of the result and in the fifth section, Discussion, major research findings of the study were discussed. The sixth section, Conclusion, Limitations and Future Research Scope, presented the conclusion with the limitations and future research scope of the study.

Theoretical Background and Hypothesis Formulation

The study meticulously reviewed the literature related to information systems and website design. The information system enables the customers to carry out different transactions independently to fulfill its primary objective. Researchers in the past viewed quality of information quality in two different dimensions: (a) systems quality and (b) information quality. System quality refers 'to software development capability, while information quality embraces accuracy, timeliness, currency, and reliability of information' (DeLone & McLean, 1992). Various other studies were conducted in the past to identify key dimensions of web service quality in the context of online businesses, such as online banks, postal services and travel agencies (Jun & Cai, 2001; Kaynama & Black, 2000; Van Riel et al., 2001). In the previous research work information quality and system quality reveal key quality concerns in information exchange, and it was found that information and system quality directly affect user satisfaction (Zheng et al., 2013).

Websites are used to examine the visitor satisfaction; the visitors feel much satisfied with the websites when it provides useful information and easily navigate (Sundeen et al., 2016). The user perception of the different organizations and e-commerce websites were made based on how users felt about the information quality, service quality, ease of use and security provisions. These reactions were reflected in remarks addressing both positive and frustrating experiences. Thus, e-commerce and other organization website designers and stakeholders must work in collaboration to develop user-friendly and customer centric websites. There were various studies conducted in the past to measure the user satisfaction experience in different research areas. The research shows the positive and negative results in different fields with respect to customer satisfaction. In the next paragraph, the detailed literature review is presented for each construct.

System Quality, Information Quality, and Customer Satisfaction

Information systems quality refers to an entity whose different dimensions reflect the interest of a different category of customers (Kuo, 2009). The information system provides not only accessibility but also ensures the satisfaction of a diverse set of customers in providing the quality services (Kim & Ong, 2005). The system quality helps to smooth and reward the purchase experience of bricks and mortar as suggested in past study (McKinney et al., 2002) and bring loyalty to the end users (Zhou et al., 2010). The efficiency in system quality is crucial to smooth the online shopping experience and basic needs to ensure quality services (Aladwani & Palvia, 2002). There were several previous studies presented the significant and positive relationship between system quality, information quality and customer satisfaction in e-purchasing (Gorla et al., 2010; Hsu et al., 2012; Song et al., 2012). The above discussion helps to perceive that customers get satisfied with information system and service quality provided by online retailers and other organizations. Thus, it can be proposed as

H1: System quality and information quality have a significant relationship.

H2: Information quality and customer satisfaction have a significant relationship.

System Quality, Service Quality, and Customer Satisfaction

In the e-commerce and general web use environment, service quality is the key determinant to understand the behavior intention (Parasuraman et al., 2005). Service quality can be defined in terms of service reliability, efficiency, responsiveness, etc., and previous studies suggested that service quality dimensions are keys to provide satisfactory services to the customers in an online purchasing (Gupta & Bansal, 2012; Kadir et al., 2011; Khan et al., 2009). The users who have previous good experience with any of the e-commerce websites or general web portal are more interested in visiting it again (Kang & Lee, 2018). Previous empirical studies presented the significant and positive association between service quality and customer satisfaction and service quality considered as the determinant of customer satisfaction (Culiberg & Rojsek, 2010; Yang et al., 2004; Yavas et al., 2004). Thus following hypotheses were proposed:

H3: System quality and service quality have a significant relationship.

H4: Service quality and customer satisfaction have a significant relationship.

System Quality and Customer Satisfaction

In the study, system quality used as an interacting medium between customers and organizations and played a key role in e-commerce success (Hsu et al., 2017). The system quality of websites is total sum of individual consumers' perceptions about website availability, adaptability and response time. If the system is available when it required and provided quick response to the end users, the customer feels satisfied and trustworthy. Trust is an important indicator and existing literature suggest positive relationship between trust and system quality (Filieri, 2015; Wang et al., 2015). Thus, following hypothesis was proposed:

H5: System quality and customer satisfaction have a significant association.

System Quality, Ease of Use, and Customer Satisfaction

The ease of use is a key construct in information system research field. In the context of online shopping through website, easy navigation is essential to attract both experienced and new online customers. System quality and ease of use are frequently connected in information system research and ease of use considered as the consequence of system quality. The direct and indirect association between system quality and ease of use was also found (Wixom & Todd, 2005). In online purchasing, mass penetration can be achieved through making navigation, and

locate information or contents easier to the customers (Rice, 1997). The customer positively influenced with ease of use of the information system (Yang et al., 2004). The previous study suggests that perceived ease of use influenced customer satisfaction in online banking positively (George & Kumar, 2013). Thus, following hypotheses were proposed:

H6: System quality and perceived ease of use have a significant relationship.

H7: Perceived ease of use and customer satisfaction have a significant relationship.

System Quality, Perceived Security, and Customer Satisfaction

Perceived security shows the perception of the online users that the vendors would be able to adhere to various security features related to online purchasing. The customers are very particular and concious toward personal security of the information. The customers are very much concerned about privacy of their personal information and the risk associated with online transactions. The users must be reassured about nonsharing of their personal information to others through the security and privacy features (Wright, 2002; Peha & Khamitov, 2004). The security is a matter of trust and prime concern for online companies and a hindrance if customers perceive lack of security on public networks (Farquhar et al., 1998). The customers need privacy or anonymity in online platforms to certain extent and the websites which do not provide clear privacy and security statements explicitly matters a lot to online customers. The user's attitude toward online transaction security depends on the expectations and experiences of individuals. This is also true in case of providing consumer's security guarantee for digital payments (Stroborn et al., 2004). This is possible through clear-cut policies on storage, utilization and protection of consumer's information (Pilioura, 1998). Thus, following hypotheses were proposed (Figure 1):

H8: System quality and perceived security have a significant relationship.

H9: Perceived security and customer satisfaction have a significant relationship.

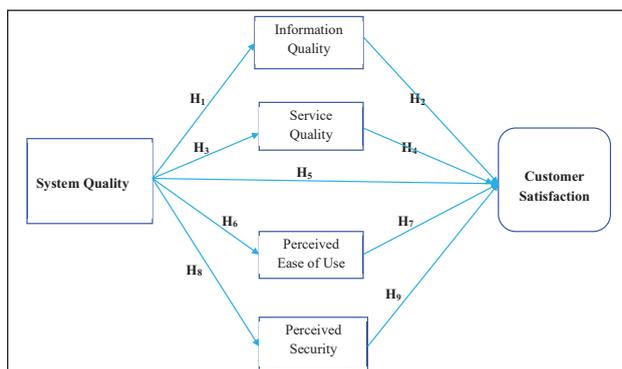


Figure 1. Proposed Theoretical Framework.

Source: The authors.

Research Methodology

This study explores e-commerce websites and other websites, that is, travel and tourism websites, Indian railways (i.e., IRCTC website), airlines websites, etc., to test the satisfaction among the people residing in India. The data were collected from those respondents who showed their interest to participate in the survey. Therefore, purposive sampling was used as sampling technique for data collection. The screening questions were used to know that individuals had previously used these websites in India. Also to minimize the risk of sample biased, the study follows Bhattacharjee and Premkumar (2004) guidelines. Only those respondents who had experienced of online transactions for at least 6 months were included. In order to empirically test the proposed theoretical model, this study developed the structured questionnaire consisting of 34 items taken from different previous studies (Bhattacharjee, 2001; Chang & Chen, 2009; Davis, 1989; de Lone & McLean, 1992; Iivari & Koskela, 1987; McKinney et al., 2002; Moore & Benbasat, 1991; Parasuraman et al., 1988; Pitt et al., 1995; Taylor & Todd, 1995; Wixom & Todd, 2005; Zhang & Prybutok, 2005). These items were based on a five-point Likert scale (i.e., 1 = strongly disagree to 5 = strongly agree). The model and nine proposed hypotheses were tested using partial least square structural equation modeling (PLS-SEM) and SPSS 20 software packages.

This study selected respondents with experience of using online service transactions with any of these websites and give them to evaluate the 34 questionnaire items in all the major cities in India since October 2019 to the mid of December 2019. Total 1,000 questionnaires were delivered randomly to the targeted respondents. Out of 1,000, only 366 were received usable with a response rate of 36.6%. The sample size is justified by the previous study as indicated that the response rate in such study ranges between 30% and 50% (Saunders et al., 2007). Table 1 shows the respondents' profile. From Table 1, it is clear that most of the respondents are having more than 5 years' experience and a major percentage of respondents are graduate and young. The female respondents were reluctant to participate, thus less number of female respondents in the demographic profile. The nontechnical savvy people were below graduate and not very friendly in online transactions and this affect in their participation in the survey.

Result Analysis

The proposed research model was tested using PLS-SEM. The PLS-SEM is applied here because not required normally distributed data and easily work on low sample (Chin, 1998). As suggested by Anderson and Gerbing (1988), we followed two steps: in step first, measurement model assess to test the construct reliability and validity; in step 2, structural model assess to test the hypotheses.

Table 1. Demographic Profile of the Respondents.

Attributes	Frequency	Percentage
Gender		
Male	294	86.47
Female	72	21.18
Total	366	
Age		
Under 25	52	15.29
26–35	227	66.76
36–45	67	19.71
46–55	16	4.71
Above 55	4	1.18
Total	366	
Marital Status		
Married	297	87.35
Unmarried	69	20.29
Total	366	
Education		
Below graduation	57	16.76
Graduation	263	77.35
Above graduation	46	13.53
Occupation		
Employed	157	46.18
Self-employed	209	61.47
Online Purchase Experience		
Less than 1 year	34	9.29
1–5 years	119	32.51
Above 5 years	213	58.20

Source: The authors.

Measurement Model

The reliability of the instrument examined through Cronbach's alpha and composite reliability (CR). The values of Cronbach's alpha and composite reliability for all the constructs were above the cutoff 0.7 as suggested in literature and shown in Table 2.

Table 2. Construct Reliability and Validity.

Constructs	Items	Loadings	CR	AVE	Cronbach Alpha
System quality (SQ)	SQ1	0.752	0.86	0.51	0.81
	SQ2	0.729			
	SQ3	0.755			
	SQ4	0.700			
	SQ5	0.704			
	SQ6	0.633			
Information quality (IQ)	IQ1	0.613	0.83	0.45	0.75
	IQ2	0.697			
	IQ3	0.627			
	IQ4	0.745			
	IQ5	0.762			
	IQ6	0.566			
Service quality	SERQ1	0.733	0.83	0.50	0.75
	SERQ2	0.775			
	SERQ3	0.700			
	SERQ4	0.681			
	SERQ5	0.642			
Perceived easy to use	PU1	0.696	0.84	0.52	0.78
	PU2	0.700			
	PU3	0.624			
	PU4	0.798			
	PU5	0.768			
Perceived security	PS1	0.634	0.82	0.53	0.71
	PS2	0.683			
	PS3	0.833			
	PS4	0.750			
Customer satisfaction	CS1	0.520	0.83	0.50	0.75
	CS2	0.779			
	CS3	0.721			
	CS4	0.765			
	CS5	0.736			

Source: The authors.

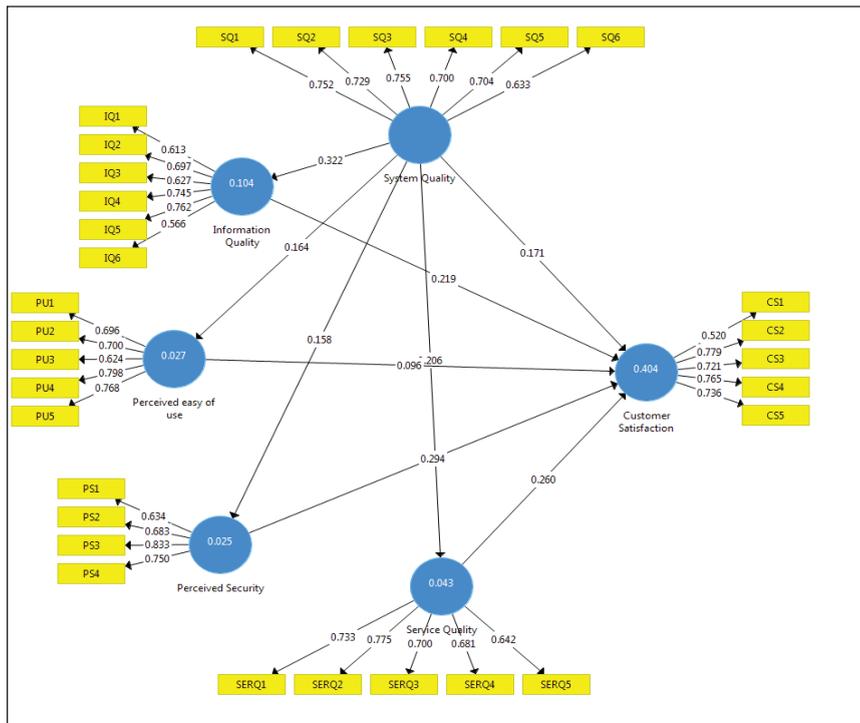


Figure 2. Path Model.

Source: The authors.

In addition, all the constructs have average variance extracted (AVE) values above 0.5 except one construct. The value of AVE is acceptable below 0.5 if the composite reliability is above 0.7. Convergent validity said to be existed when the items of a construct are more correlated with each other and the item loadings on their reflective constructs are greater than 0.50 (Petter et al., 2007; Wixom & Watson, 2001). The results, as shown in Table 2 and Figure 2, establish the convergent validity.

Discriminant validity is an indicator to determine how the different study constructs differs from each other (Hulland, 1999). In this study, discriminant validity was tested using AVE as suggested by Fornell and Larcker (1981). The prime condition to establish the discriminant validity depends on the AVE shared on itself should be higher than variance shared with other constructs (Chin, 1998). The results, as shown in Table 3, establish discriminant validity.

The Multicollinearity

To examine the multicollinearity, the variance inflation factor (VIF) values were figure out. The cutoff values for VIF should not be greater than 3.33 (Cenfetelli &

Bassellier, 2009). In our case, none of the VIF values were above this benchmark. Thus, it is clear that multicollinearity issue is not present.

Common Method Variance

To examine the potential common method variance (CMV) bias, we performed Harman's one-factor test to determine the level of common method bias. For this purpose, Podsakoff et al. (2003) method is adopted. The results showed that the most covariance through one factor is 37.91%. Thus, it is clear that CMV bias is not a problem in the dataset because the variance explained by the single factor is less than 50%.

Structural Model

We next assessed the structural model. Figure 3 and Table 4 present the results. We used the bootstrapping procedure to test the significance of all paths and findings justified our research model. As shown in Figure 3 and Table 4, all the proposed hypotheses H1 to H9 were found to be satisfied at the $p \leq 0.05$ level.

Table 3. Discriminant Validity.

	Customer Satisfaction	Information Quality	Perceived Security	Perceived Ease of Use	Service Quality	System Quality
Customer satisfaction	0.710					
Information quality	0.422	0.672				
Perceived security	0.415	0.215	0.729			
Perceived ease of use	0.297	0.125	0.368	0.720		
Service quality	0.382	0.276	0.041	0.140	0.708	
System quality	0.358	0.322	0.158	0.164	0.206	0.713

Source: The authors.

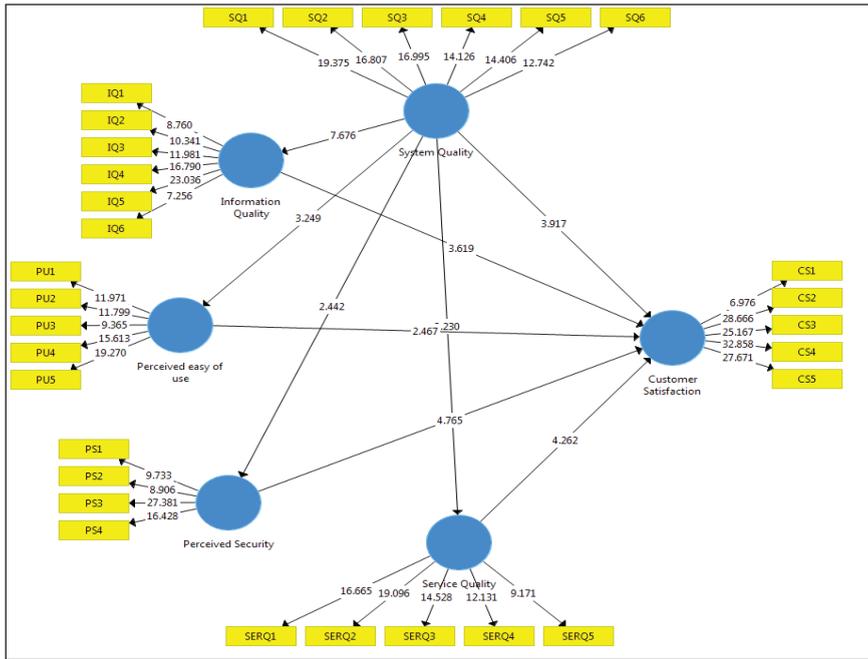


Figure 3. Bootstrapping Results.

Source: The authors.

Table 4. Hypothesis Testing ($p \leq .05$).

Hypothesis	Relationship	Path Coefficient β	T Statistics	P-values	Results
H1	System quality→Information quality	0.322	7.676	0.000	Accepted
H2	Information quality→Customer satisfaction	0.219	3.619	0.000	Accepted
H3	System quality→Service quality	0.206	3.230	0.001	Accepted
H4	Service quality→Customer satisfaction	0.260	4.262	0.000	Accepted
H5	System quality→Customer satisfaction	0.171	3.917	0.000	Accepted

(Table 4 Continued)

(Table 4 Continued)

Hypothesis	Relationship	Path Coefficient β	T Statistics	P-values	Results
H6	System quality→Perceived ease of use	0.164	3.249	0.001	Accepted
H7	Perceived ease of use→Customer satisfaction	0.096	2.467	0.014	Accepted
H8	System quality→Perceived security	0.158	2.442	0.015	Accepted
H9	Perceived security→Customer satisfaction	0.294	4.765	0.000	Accepted

Source: The authors.

The Mediation Effect

The mediation is examined with the help of method suggested by Baron and Kenny (1986) and used the term equation (EQ) in place of model. The suggested method followed following steps—initially the mediating effect of information quality is examined.

Step 1 shows the direct relationship between system quality (SQ) as an independent variable and customer satisfaction (CS) as dependent variable. In mathematical equation form, it will be as follow:

$$CS = a + b (SQ) \quad (1)$$

Step 1 will be common to all.

The second step shows that SQ, as an independent variable, is directly related with the mediating variable information quality (IQ). In equation form it will be as follow:

$$IQ = a + b (SQ) \quad (2)$$

Step 3 shows that the mediating variable IQ affects the dependent variable CS and controlling the independent variable SQ. In equation form it will be as follow:

$$CS = a + b (IQ) + c (SQ) \quad (3)$$

Now, the mediating effect of service quality is assessed.

Step 1, same as above.

Step 2 shows that the SQ as an independent variable and mediating variable SERQ correlated. In equation form it will be as follow:

$$SERQ = a + b (SQ) \quad (4)$$

Step 3 shows that the mediating variable service quality (SERQ) affects the dependent variable CS and controls the independent variable SQ. In equation form it will be as follow:

$$CS = a + b (SERQ) + c (SQ) \quad (5)$$

Now we examine the mediating effect of perceived ease of use.

Step 1, same as above.

Step 2 shows that the SQ as an independent variable and mediating variable perceived ease of use (PU) is correlated with each other. In equation form it will be as follow:

$$PU = a + b (SQ) \quad (6)$$

Step 3 shows that the mediating variable PU affects the dependent variable CS and controlling the independent variable SQ. In equation form it will be as follow:

$$CS = a + b (PU) + c (SQ) \quad (7)$$

In the last, now we test the mediating effect of perceived security.

Step 1, same as above.

Step 2 shows that the SQ as an independent variable and mediating variable PS are correlated. In equation form it will be as follow:

$$PS = a + b (SQ) \quad (8)$$

Step 3 shows that the mediating variable PS affects the dependent variable CS and controls the independent variable SQ. In equation form it will be as follow:

$$CS = a + b (PS) + c (SQ) \quad (9)$$

The results of the regression analysis of all the equations are shown in Table 5. Equations 1, 2, 4, and 6 depict that independent variable system quality (SQ) has significant relationship with the dependent variable CS. It also has significant relationship with the mediating variables IQ, SERQ and PU, respectively. Equation 3 shows that both SQ and IQ have significant influence on CS, it means that the relationship between SQ and CS partially mediates through IQ. Similarly, Equation 5 shows that CS significantly influenced by both SQ and SERQ. It means that the relationship between SQ and CS is partially mediated by SERQ. Equation 7 shows that CS is significantly influenced by both SQ and PU. It means the relationship between SQ and CS partially mediates through PU. From Equation 8 it is clear that system quality (SQ) and perceived security (PS) relationship is insignificant. Equation 9 shows that CS is influenced significantly by both SQ and PS. It means the relationship between SQ and CS partially mediates through PS.

Discussion

The main objective of the present study was to investigate whether system quality really matters for customer satisfaction and mediated by website quality or not. The study proposes the theoretical framework through five major constructs of

Table 5. Testing the Mediation Effects.

EQ	Dependent Variable	Independent Variable	B	Standard Error	T	P-value	Adj R ²	F
1	CS	SQ	0.379	0.04	7.802	0.00	0.141	60.873
2	IQ	SQ	0.319	0.041	6.429	0.00	0.100	41.338
3	CS	SQ	0.266	0.039	5.567	0.00	0.250	61.842
		IQ	0.351	0.048	7.345	0.00		
4	SERQ	SQ	0.189	0.036	3.672	0.00	0.033	13.486
5	CS	SQ	0.323	0.039	6.873	0.00	0.221	52.85
		SERQ	0.292	0.057	6.209	0.00		
6	PU	SQ	0.133	0.035	2.555	0.011	0.015	6.528
7	CS	SQ	0.346	0.039	7.315	0.00	0.198	46.111
		PU	0.246	0.057	5.196			
8	PS	SQ	0.093	0.046	1.781	0.076	0.006	3.171
9	CS	SQ	0.345	0.037	7.674	0.00	0.269	68.263
		PS	0.362	0.041	8.060	0.00		

Source: The authors.

website quality features that influence the satisfaction of the customers. The results direct that the web elements that we have identified influence customers' satisfaction significantly. First, the measurement model obtained through Smart PLS presented the validity and reliability of the constructs and research instrument. Second, the structural model presented the hypotheses relationship.

First, the study proposed that system quality and other characteristics of the websites, that is, information quality, service quality; perceived ease of use and perceived security is significantly associated. All the hypotheses H1, H3, H6 and H8 are significant and have a positive relationship. The results match with the previous studies (Kuo et al., 2009; Yang et al., 2005). The study reveals that system quality and the information is having highest beta value and, thus, has a very strong relationship (Table 4). The system efficiency helps in quality retrieval of the information. The users need complete information in detail. Thus, websites should provide all the information such as history of the company, available products, guidelines on payment and post purchase services. The users are always concerned about their security while using any of the websites, and this is also clear from the results having the second highest beta value (Table 4). The highly secure websites provide higher satisfaction to the customers.

Second, the study proposed that different qualities of the websites, that is, information quality, service quality, system quality, perceived ease of use and perceived security are significantly associated with customer satisfaction. Further, the perceived service quality of online environment affects the customers' intention to continuous use of the website (Manganari et al., 2011). Perceived ease of use and intention to purchase online has been proved positive and significant association in the previous study (Yadav & Mahara, 2017), which implied that customers are satisfied and wish to purchase again. The customers are although unable to evaluate the security of the website directly and mostly use the other clues such as word of mouth recommendations or experience from others whom they trust. The respondents feel satisfied because they were experienced and well versed with the online websites from security point of view. Perceived security considered that customer will use the website for transactions (Kim et al., 2010). All the hypotheses H2, H4, H5, H7 and H9 are significant and well supported by previous studies (Chang, & Chen, 2009; George & Kumar, 2013; Hsu et al., 2017; Kang & Lee, 2018; Wang et al., 2015). Perceived ease of use is having lowest beta value because in the present era most of the people are computer literate or using the smartphones so well versed in operation and thus low importance to ease of use associated with satisfaction. Third, the study also presented the mediating role of website quality and found that website quality partially mediates between system quality and customer satisfaction.

Conclusion, Limitations, and Future Research Scope

In the present era, the advanced technology empowers the customers to use websites easily without the interruption of service providers. The user feels positive with smooth purchasing experience when the websites are user friendly.

This helps firms to retain the customers through well-designed customer centric websites. There are certain major contributions of the present study along with direction for future research. The most important finding of this study is that all the three constructs, namely, systems quality, information quality and service quality have a direct influence on satisfaction, which is against the previous study (Song et al., 2012). Service quality, as a construct, assimilates many of the facets of system quality and information quality as suggested in the present study. Lacking in information or usability or both brings dissatisfied customers. This is an important outcome of the study because (Song et al., 2012) it asks for further research on this to generalize the findings. Further, the study helps to understand how the different changes in website features impact the users' online shopping satisfaction. Examining system quality and other features of the websites has provided new insights.

The future research could be based on the types of products/services (e.g., financial services, apparel, electronic gadgets, transport related, etc.) and contribute in obtaining each component of website quality: system quality, information quality, service quality, ease of use and security. The study cannot be said without limitations. First, the sample may be biased as it includes mostly educated people. Second, the sample is small, and the results may not be applied universally to all. The findings may be generalized with the help of bigger sample size. Furthermore, the future study could also be possible based on types of customers and their characteristics to enhance the framework of this study. Future studies could also be possible by taking product features on different websites and validate the constructs used in the present study. One more avenue for further research could be by taking transaction cost or sales promotion as variables to get new insight into this type of research. Furthermore, the respondents' base can also be expanded from one state to other parts of the country, and data should be collected from the other parts of the country also.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Funding

The authors received no financial support for the research, authorship and/or publication of this article.

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