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Measuring electronic service quality in India using E-S-QUAL instrument

Abstract

Purpose - The purpose of this research paper was to examine the applicability of electronic service quality instrument, E-S-QUAL, in e-commerce industry in India. Additionally, the efficacy of the instrument was also examined for two sub-groups of users based on frequency of usage.

Design/methodology/approach – Field research was conducted with a modified version of the instrument. The data collected were analysed using multivariate techniques.

Findings – The study confirms the validity of the four dimensions (efficiency, fulfillment, system availability, and privacy) of E-S-QUAL instrument. All four dimensions were found to be significant predictors of perceived value. Efficiency and fulfillment were significant predictors of overall perceived quality. Perceived value had a positive and significant relationship with loyalty. The two relationships were further examined for two sub-groups of web users based on the frequency of usage. For heavy users of web sites, all four dimensions were significant predictors of perceived value. For predicting perceived value in respect of light users of web site, efficiency, fulfillment, and privacy were important determinants. The relationships among latent constructs were checked using structural equation modeling and the model was found to be acceptable. The result showed that electronic service quality affected perceived value, which in turn affected loyalty toward a web site.

Originality/value – This paper makes an attempt to replicate the four dimensions structure of E-S-QUAL instrument on online shopping sites in India thus enhancing its external

generalizability. Additionally, the paper investigates the association of the four aforesaid dimensions with perceived value and overall perceived quality for two sub-groups of users: frequent and non-frequent. The cornerstone of this particular study was to examine the frequency of usage as deterministic parameter for perceived value and overall perceived quality.

Keywords India, electronic commerce, web sites, E-S-QUAL, electronic service quality

Paper type Research paper

1. Introduction

The number of customers buying online is increasing every day and so is the proportionate increase in the amount spent (Wolfenbarger and Gilly, 2001; 2003). E-commerce refers to business processes for buying and selling of goods and services over internet. It has been growing steadily worldwide (Fang *et al.*, 2014; Santouridis *et al.*, 2012; Sharma and Lijuan, 2015; Sun *et al.*, 2015, Chang *et al.*, 2009, Mohanty *et al.*, 2007; Yang and Fang, 2004). Use of e-commerce is not just limited to the developed world. Using internet to buy or sell goods has become common in most developing countries including India (Kandulapati and Bellamkonda, 2014). This was not the scenario a decade back -- Indians preferred the traditional way of visiting brick-and-mortar stores for almost all of their purchases/return of goods. They preferred to touch and feel products before buying. With the burgeoning growth in population of India's tech-savvy young generation, the general interest of the buyers to scout for discounts to bring their shopping bills down, convenience, ease of use, and the propensity to buy and sell goods over internet have gained more prominence in recent years than ever before. As a result, many brick-and-mortar stores started adding an online leg to their offline operations. According to Forrester Research report, India's online buyer population will grow at a 28 per cent compounded annual growth rate (CAGR) over the next five years (Business Standard, 5 March, 2016). Additionally, increased usage of broadband and logistics services has further propelled more consumers to buy online. There are incredible number of e-commerce players today operating in India such as Amazon, Flipkart, Snapdeal, Jabong, Myntra, Fashionandyou, Shopclues, Limeroad, Pepperfry, Infibeam, AliExpress, Banggood, and many others who have seen their businesses growing at an unprecedented rate in the last few years.

Even though e-commerce industry has grown by leaps and bounds in recent times in India, its service quality came under the scanner. Many consumers reported late delivery or

non-delivery of goods, sub-standard goods, damaged goods, buyer receiving goods that are less valuable than those advertised on the web sites, incomplete transactions while transacting over the electronic platform, cyber security issues, long delays in fixing problems, and a host of other issues thus questioning the service quality of some E-commerce players. The problems seem to persist even today (Bhasin, 2016; Sree, 2015).

Before e-commerce came into existence, customers visited brick-and-mortar facilities, and were used to face-to-face interaction with the store clerks for requirements. As industries became more technology driven and customers started having less free time to visit physical stores, one-to-one interaction started losing its shine. Customers started interacting with the firm through its web site (screen-to-face) for all business transactions including purchases. However, many firms who were more accustomed to the traditional ways of measuring service quality, i.e., in a brick-and-mortar environment, failed to understand how to measure service quality on electronic channels. Parasuraman, Ziethaml and Malhotra's (2005) research study, though confined to two US firms, attempted to answer the important question of measuring electronic service quality. Since E-S-QUAL was developed in US, many researchers have attempted to replicate the model in other contexts. Hubbard *et al.* (1998) argued that replication of an instrument helps in determining its reliability, validity, scope, and generalizability in other contexts. Rafiq *et al.* (2012) contended that E-S-QUAL was developed in US, but testing it in a different country (UK) helps in assessing its robustness in cross-national contexts. Santouridis *et al.* (2012) investigated the applicability of E-S-QUAL on e-commerce sites in Greece, and its impact on customer perceived overall service quality, customer perceived value, and customer loyalty.

Some scholars (Paschaloudis and Tsourela, 2014) argued that life style and cultural setup of different countries greatly affect the perception of online services. Kandulapati and Bellamkonda (2014) studied 160 respondents and validated the four factor structure of E-S-

QUAL model in India and found that electronic service quality had significant effect on perceived service value. Their work appears to be the only published work in the academic literature on India e-commerce sector dealing with online shopping sites. Therefore, there is a serious dearth of additional research work on use of E-S-QUAL despite the fact that India represents a significant and emerging market and is growing at a phenomenal rate.

Furthermore, most research studies have investigated the quality dimensions for electronic service quality using E-S-QUAL at an aggregate level. Little is known about the effect of these dimensions based on an important demographic variable, i.e., frequency of web site usage. Sheth *et al.* (1991) argued that consumers experience the benefits of a good or service functionally, emotionally, and socially. However, functional value has often been considered to be a major determinant of consumer choice (McFadden, 1986). Tanner and Carlson (1991) contended that an important component of the functional value is the frequency of usage of the product. Moreover, from an economic stand point higher frequency of usage leads to higher perceived value (Hamilton *et al.*, 2011). Weinstein (2004) contended that usage segmentation can be an important determinant in developing marketing strategies, resource planning, customer retention, and profit planning. Therefore, importance of this study is immense because the dimensions of E-S-QUAL for less frequent users (light users) may or may not map the same way for frequent users, and therefore warrants investigation. For example, a frequent user of a web site would expect system availability feature (correct technical functioning of the site) of a web site to be a major factor for usage, which may not be so for a non-frequent user. Furthermore, perceived value could vary depending on usage frequency.

The remainder of the paper is organized as follows. The next section presents the extant literature on web site quality. Following the literature review section, the methodology section describes the design of the empirical study. Next, the results are

presented and discussed, followed by managerial implications. The paper ends with limitations of this research, and some concluding remarks.

2. Literature review

2.1 Electronic service quality

SERVQUAL, a multi-item instrument developed by Parasuraman *et al.* (1988) for measuring service quality in a non-internet based business environment has been in existence for almost two-and-half decades now. Extant literature is replete with studies done by scholars using SERVQUAL. However, scholars (Yoo and Donthu, 2001) have argued that since electronic channels are very different from physical stores, they require a different instrument for measuring service quality.

E-commerce refers to conducting business transactions using internet services (Mohanty *et al.*, 2007), and web sites act as the medium of such business transactions. As interest in service quality grew over the years, researchers started developing different scales for measuring web site quality. Work on web site quality dates back to the research work done by Zeithaml *et al.* (2000). They developed electronic service quality (e-SQ), which captures all phases of customer's interaction with a web site. Loiacono *et al.* (2002) and others studied the responses of undergraduate business students to a selected group of web sites, and created WebQual – a web site quality measurement instrument. It is based on twelve dimensions: informational fit to task, interaction, trust, response time, design, intuitiveness, visual appeal, innovativeness, flow, integrated communication, business processes, and sustainability. Barnes and Vidgen (2002) developed WebQual that consists of five factors: usability, design, information, trust, and empathy. Yoo and Donthu (2001) developed a web site quality measuring instrument (SITEQUAL) based on four dimensions:

ease of use, aesthetic design, processing speed, and security. Scholars have argued that some of these prior studies, though insightful, were too narrow in focus. For example, Loiacono *et al.*'s (2002) study focused on undergraduate business students and not all web users, and focused mainly on giving feedback to web site designers (Zeithaml *et al.*, 2002). Likewise, Barnes and Vidgen (2002) studied university students and staff who visited one of the three book stores (as directed by the authors) and rated their experience, even without performing a single transaction. Similarly, SITEQUAL developed by Yoo and Donthu (2001) studied only college students in the marketing class for online shopping behaviour. Furthermore, SITEQUAL did not capture all aspects of the purchasing process, and therefore, was not a comprehensive instrument to measure web site service quality (Parasuraman *et al.*, 2005). Wolfinbarger and Gilly's (2003) work resulted in a 14-item scale called eTailQ. The scale contains four dimensions: web site design, reliability/fulfillment, privacy/security, and customer service that went beyond the web site interface. But two of the four dimensions lacked internal consistency (Parasuraman *et al.*, 2005). Thus, many of these studies lacked commonality in terms of service quality dimension, and as a consequence, provided a fragmented view of web site service quality (Kim *et al.*, 2006). To circumvent some of these weaknesses of prior research, Parasuraman *et al.* (2005) refined the prior work of Zeithaml *et al.* (2000) that captures all phases of customer's interaction with a web site. In other words, web site's quality includes not only experiences during his or her interactions with the web site but also post interaction service aspects (for example, fulfillment, returns). Initially, they identified 11 web site attributes: reliability, responsiveness, access, flexibility, ease of navigation, efficiency, assurance/trust, security/privacy, price knowledge, site aesthetics, and customization/personalization. Later, through a rigorous scale development exercise, Parasuraman *et al.* (2005) refined the initial e-SQ scale to develop an e-core service quality

scale called E-S-QUAL. Additionally, they also created an e-recovery service quality scale E-Recs-QUAL comprising three dimensions – responsiveness, compensation, and contact.

E-S-QUAL captures all phases of customer's interaction with a web site. The developed scale is based on the shopping experience of actual web users of two online stores – amazon.com and walmart.com. The scale consists of 22 items on four dimensions that customers considered critical to web site service quality: *efficiency* (ease and speed of accessing and using the site, eight items); *system availability* (correct technical functioning of the site, four items); *fulfillment* (the extent to which the site's promises about order delivery and item availability are fulfilled, seven items); and *privacy* (degree to which the site is safe and protects customer information, three items). The effects of the four dimensions were measured on *perceived value*, *loyalty intentions*, and *overall perceived quality*. *Perceived value* is the value for money --what is received for what is paid (Chang *et al.*, 2009; Heskett *et al.*, 2008; Zeithaml, 1988). Oliver (1999) defined customer *loyalty* as “commitment to re-buy or re-patronize a preferred product/service consistently in the future”. *Overall perceived quality* refers to the overall assessment of e-service quality by the customers (Santouridis *et al.*, 2012).

E-S-QUAL's focus on a comprehensive assessment of electronic service quality stands out from the rest because of its rigorous conceptualization and testing (Rafiq *et al.*, 2012). Additionally, it is appealing to many researchers because of its holistic assessment of internet service quality since it captures both pre and post e-service quality aspects. In the words of the scale developers, “all cues and encounters that occur, before, during, and after the transactions.” However, Rafiq *et al.* (2012) argued that E-S-QUAL lacked external validation, thus limiting its potential generalizability in other contexts. Rafiq and others tested the instrument on the online grocery shoppers in UK. They found *efficiency*, *system availability*, and *fulfillment* as three core dimensions of electronic service quality, and

privacy as just an order qualifying criteria. Stated differently, *privacy* was considered as a pre-requisite for purchasing from a web site. Santouridis *et al.* (2012) examined the applicability of E-S-QUAL instrument in Greece. Their research confirmed the four factor structure of the original E-S-QUAL model and claimed similar results to those of the initial study. Boshoff (2007) examined the factor structure of E-S-QUAL model and argued that his six factor model comprising efficiency, delivery, privacy, speed, system availability, and reliability proved to be superior to the four factor model developed by Parasuraman *et al.* (2005). Kim *et al.* (2006) used E-S-QUAL to measure performance of 111 apparel retail web sites. They found low level of online service attributes by the web sites. In a recent study, Kandulapati and Bellamkonda (2014) used E-S-QUAL to study service quality of online shops in India. Their research on 160 online shoppers confirmed the validity of the four factor model of the original E-S-QUAL instrument. In addition, significant impact of electronic service quality on perceived value was established. However, their study included certain e-shops such as e-Bay, which exists not only for shopping but also for purposes other than online shopping.

Despite noteworthy contributions by most researchers that have worked on use of E-S-QUAL, little is known about the impact of the four dimensions on perceived value and overall perception of quality by *frequency of usage (frequent versus non-frequent)*. Studying this issue was considered important because all the four dimensions may not have the same level of importance to a non-frequent user as to a frequent user. Thus, this research not only addressed the responses for all web users at an aggregate level, but also compared the results for two specific user types: those who frequently shopped and those who did not. Additionally, relationship between *perceived value* and *loyalty* was also examined because prior research (Chang *et al.*, 2009, Chang and Wildt, 1994; Bolton and Drew, 1991) asserted that there is a positive association between *perceived value* and *loyalty*.

The detailed objectives of this research were as follows:

- (1) To empirically re-examine the E-S-QUAL instrument in India at an aggregate level, thus reinforcing its external generalizability in other contexts;
- (2) To examine the effects of these variables on *perceived value* and *overall perceived quality* for two sub groups of web users (frequent versus non-frequent);
- (3) To examine the relationship between *perceived value* and *loyalty*; and
- (4) To check the higher-order relationships among the latent constructs – electronic service quality, perceived value, and loyalty.

3. Research methodology

3.1 Research instrument

Field research was conducted using the E-S-QUAL questionnaire items framed by Parasuraman *et al.* (2005) with minimum modifications to suit the Indian context. Each item in the original E-S-QUAL questionnaire was picked for its suitability in the Indian context, and three items (two from *efficiency* and one from *fulfillment*) were not considered to minimize redundancy in survey responses and also to make the instrument parsimonious. Babbie (1998) claimed that lengthy questionnaires lead to lower response rate. Thus, in the present study, nineteen items in the questionnaire were used for all the four dimensions (Appendix A) against twenty two items used by Parasuraman *et al.* (2005). The present instrument contained six items for *efficiency*, four items for *system availability*, six items for *fulfillment*, and three items for *privacy*. The items for the dimensions were essentially drawn from the original E-S-QUAL instrument. Additionally, there were four items to measure *perceived value*, five items to measure *loyalty*, and one item was used to measure *overall perceived quality* of the respondents about electronic service quality. The four items used for

perceived value and five items for *loyalty* were also drawn from the E-S-QUAL instrument. There was a single question that captured the *overall perceived quality* of the respondents. Finally, questions were asked to the respondents about their age, level of education, occupation, annual family income, length of web site usage, and frequency of web site use.

A five-point Likert scale (1 = strongly disagree, 5 = strongly agree) was used for all the questions in the instrument. Qualtrics software was used to develop the web-based questionnaire. The online questionnaire was administered randomly between June and August 2015 to respondents who had some online shopping experience. Since young Indians are the active web users, they became the main subject of this study. The random sample was drawn from university bound students as well as working executives. Fifteen hundred respondents were contacted for the survey. A total of two hundred and eight one (281) valid responses were received over a three-month period, thus indicating a low response rate of around 18.73 per cent. Low response rates with electronic surveys have been observed by many scholars (Karlsson, 2009; Malhotra and Grover, 1998). The survey was not aimed at capturing opinion of respondents for a specific shopping web site, but the study sought opinion of respondents on the online shopping site they used most frequently. This was done due to non-availability of site specific customer lists. This e-survey was preferred over traditional paper-based survey because of its low cost of administration and ease of securing information (Miller, 1991; Tan and Teo, 2000; Dillman, 2007). In fact, electronic surveys have been widely used in recent times (Chang *et al.*, 2009). Additionally, tech-savvy young population find increased confidence with web instruments (Karlsson, 2009) in comparison to other ways of collecting survey data.

4. Data analysis and results

The Excel response sheet from Qualtrics was imported to SPSS version 20 statistical software for data analysis. The survey responses were first checked for missing data. Since all respondents were requested to answer all questions in the questionnaire, fewer missing data were observed. Missing data were imputed using SPSS. Principal component analysis with varimax rotation was done to identify loading of each variable on each extracted factor. Four factors with eigen values greater than one emerged after extraction, and accounted for 63 per cent of the total variation in the data. Principal component analysis maximizes the loading of a variable on one factor and low loading on all other factors, thus augmenting the interpretability of factors (Hair *et al.*, 2013). All the items were loaded reasonably well on the appropriate dimensions. One variable was found to be cross-loaded on two factors, and therefore, was eliminated from the analysis. The scale was rechecked for cross loading after elimination. The final scale thus comprised eighteen items measuring four dimensions or factors: *efficiency* (5 items), *system availability* (4 items), *fulfillment* (6 items), and *privacy* (3 items). Additionally, reliability check was done to determine how strongly the items were related to each other. The Cronbach coefficient alpha values for *efficiency*, *system availability*, *fulfillment*, and *privacy* were found to be 0.82, 0.79, 0.86, and 0.79 respectively, well above the threshold value of 0.70 (Nunnally and Bernstein, 1994). The corrected item-to-total correlation was computed and was found to be greater than 0.3 (the threshold value for an item for inclusion in the scale). Table I presents the loadings of each variable on the four identified factors.

INSERT TABLE I HERE

Common method variance (CMV) becomes problematic in survey research when a single individual responds to all items in the measurement scale (Chang *et al.*, 2010). In such a situation all the items in the measurement scale lead to a single factor (Podsakoff and Organ, 1986). Harman's one factor test was performed. Using SPSS, factor analysis was done

with no rotation, and restraining the number of factors to 1, resulted in a single factor that explained only 38.68 % of the total variance which is less than the threshold value of 50%. While this result may not necessarily confirm the absence of the common method variance, but it does indicate that CMV was not problematic in this study.

Table II presents the mean scores and the standard deviations of *efficiency, system availability, fulfillment, privacy, perceived value, loyalty, and overall perceived quality*.

INSERT TABLE II HERE

Table III indicates the demographic profile of the respondents. As expected, the young group, i.e., those respondents less than 25 years and those between twenty five and forty years mostly used web sites for their online purchases. This observation is in accordance with what other studies (Santouridis *et al.*, 2012; Parasuraman *et al.*, 2005; Kandulapati and Bellamkonda, 2014) have found reaffirming that young group is the primary user of online shopping sites. Ninety five per cent of them had a bachelor's or a master's degree. This observation is similar to Parasuraman *et al.*'s (2005) results that educated class is the primary user of online shopping sites. Seventy one per cent of the respondents were students. Almost 72 per cent of the respondents were found using e-commerce web site for more than a year, and frequency of usage varied between four or less times a month (48%) and five or more times a month (52%).

INSERT TABLE III HERE

4.1 *Multiple regression analyses*

Regression analysis is done when a single dependent variable is presumed to be related to one or more independent variables. Prior to conducting regression analysis, multicollinearity was checked. To ensure that it was not problematic "variation inflation factor" or VIF was

examined. Hair *et al.* (2013) suggested that VIF greater than 10 is an indication of multicollinearity. In this study, the VIF was found to be less than 2.0 indicating a very low level of multicollinearity. Two regression analyses were performed as shown in Table IV for all web users at an aggregate level.

In model 1, *perceived value* was considered as dependent variable and *efficiency*, *system availability*, *fulfillment*, and *loyalty* were considered independent variables. All the variables were found to be very significant and positive predictors of *perceived value* as shown in the table. The overall model was highly significant ($F=86.62$, $p < 0.001$) and explained 55% variance in *perceived value*. In model 2, *overall perceived quality* was considered to be the dependent variable, and the aforesaid four variables were considered independent. Only *efficiency* and *fulfillment* measures were found to have highly significant positive effects ($p < 0.001$). Other two variables were found to be insignificant predictors. The overall model was significant ($F=50.096$, $p < 0.001$) and explained for 41% variability in *overall perceived quality*.

INSERT TABLE IV HERE

In Table V, two regression models are presented for web users who used web site *four or less times in a month (non-frequent or light users)*. In model 3, *perceived value* was considered dependent variable and *efficiency*, *system availability*, *fulfillment*, and *privacy* were considered independent variables. *Efficiency* was found to be the most significant predictor ($p < 0.001$). *Fulfillment* and *privacy* had positive influences on *perceived value*. The effect of *system availability* on *perceived value* was found to be non-significant. The overall model was highly significant ($F=27.53$, $p < 0.001$) and explained 44% variance in *perceived value*. In model 4, *overall perceived quality* was used as the dependent variable

and the aforesaid four dimensions as independent variables. *Efficiency* was found to be the most significant predictor ($p < 0.001$). *Fulfillment* had a significant positive relationship with overall perceived quality. *System availability* and *privacy* were found non-predictors. The overall model was highly significant ($F=16.32, p < 0.001$) and explained 32% variance in web users' overall perceived quality.

INSERT TABLE V HERE

In Table VI, two regression models are presented for web users who used web site five or more times in a month (frequent or heavy users). In model 5, *perceived value* was considered dependent variable and *efficiency*, *system availability*, *fulfillment*, and *privacy* were considered as independent variables. *Efficiency* and *privacy* were found to be the most significant predictors ($p < 0.001$). *Fulfillment* had a positive influence on *perceived value*, and *system availability* had weak positive influence. The overall model was highly significant ($F=58.14, p < 0.001$) and explained 61% variance in *perceived value*. In model 6, *overall perceived quality* was used as dependent variable and the four dimensions as independent variables. *Efficiency* was found to be most significant ($p < 0.001$) predictor, and *fulfillment* had somewhat significant effect. *System availability* and *privacy* were adjudged non-significant predictors. The overall model was highly significant ($F=33.25, p < 0.001$) and explained 47% variance in web site users' overall perceived quality.

INSERT TABLE VI HERE

In Model 7, *loyalty* was the dependent variable and *perceived value* was considered as the independent variable (Table VII). *Perceived value* was found to be a very significant and positive predictor of loyalty. The overall model was highly significant ($F=294.93, p < 0.001$) and explained 51% variability in the dependent variable.

INSERT TABLE VII HERE

4.1.1 Structural Equation Modeling (SEM)

The nomological validity of the modified E-S-QUAL instrument was tested with the present dataset by constructing a structural model using AMOS 20 software. One of the aims of the study was to check the relationships among three higher-order constructs: e-service quality (eSQ), perceived value, and loyalty. For eSQ, the average values for efficiency, system availability, fulfillment, and privacy were considered. For the other two latent constructs, their individual scale items served as indicator variables. The chi-square value (122.21) to degree of freedom (62) ratio was found to be 1.97, which was less than the generally accepted cutoff value of 3:1 with better-fitting models (Hair *et al.*, 2013). The following table presents the absolute and incremental fit indices. All the values derived from the analysis made, met the generally recommended threshold levels suggesting a model that fits well (Hair *et al.*, 2013).

INSERT TABLE VIII HERE

Table IX provides the standardized factor loadings, average variance extracted (AVE), and composite reliability (CR) estimates. The individual standardized factor loadings were found to be much higher than the cutoff value of 0.5. The factors ranged from 0.64 to 0.88. The AVE estimates should be 0.5 or higher. The AVEs ranged between 0.50 and 0.58 suggesting adequate convergence. The CRs ranged between 0.80 and 0.86 well above the threshold level of 0.70. The discriminant validity of the model was checked by comparing the AVE estimates of each factor with the squared values of inter-construct correlations. All AVE estimates were found to be higher than the squared inter-construct correlations suggesting no problem with the discriminant validity issues (Hair *et al.*, 2013).

INSERT TABLE IX HERE

Figure 1 shows the path diagram. The path-coefficients indicated that electronic service quality had a significant ($p < 0.001$) positive effect on perceived value, which in turn positively and significantly ($p < 0.001$) affected the loyalty of a customer for a web site. Electronic service quality did not affect loyalty directly in a positive way. These results were in agreement with prior studies (Parasuraman *et al.*, 2005; Kandulapati and Bellamkonda, 2014).

INSERT FIGURE 1 HERE

5. Discussion

This research makes two major contributions to the existing body of knowledge. First, it offers the practitioners and the researchers with an adapted version of E-S-QUAL instrument that could be used to measure web site service quality in India for online shoppers. The study confirms the validity and robustness of the E-S-QUAL model, and also advances its external generalizability. At an aggregate level, the study shows that *efficiency, fulfillment, system availability, and privacy* were the most critical factors and have the strongest positive effects on *perceived value*. This is consistent with the findings of Parasuraman *et al.* (2005) study. The findings of this research are also consistent with the results of Santouridis *et al.* (2012). In particular, *privacy* is a major dimension that determines to a large extent the web site usage in India. Customers, in general, are fearful to use a web site because of the possibility of leakage of confidential financial data (Mohanty *et al.*, 2007) such as debit card or credit details or other personal information. Because of risk avoidance and resistance to pay online many Indian customers prefer to pay by cash on delivery (Kandulapati and Bellamkonda, 2014). *System availability* and *privacy* were found to have insignificant effect on *overall perceived quality*.

The second contribution of this research was to explore the influence of all the dimensions based on frequency of web site usage. This has not been explored in prior research with E-S-QUAL. This study highlights the importance of usage frequency as a major determinant of higher perceived value, and this finding is consistent with the findings of prior research (Hamilton *et al.*, 2011). When the results are viewed sub-group wise, it is observed that those who used web site more frequently considered both *efficiency* and *privacy* to be the most critical dimensions for *perceived value*. Those who use web sites regularly want faster transactions, and therefore, efficiency is important for them. Online

frauds do happen resulting in leakage of personal data, and therefore, security aspects of a web site are considered critical for web site selection in India. For *overall perceived quality*, *efficiency* and *fulfillment* were the major determinants. In case of non-frequent users of web site, *efficiency* was the most important dimension of *perceived value*. *Privacy* and *fulfillment* were somewhat important. *System availability* had no significant effect on perceived value. For *overall perceived quality*, *efficiency* turned out to be the most important dimension. *Fulfillment* appeared important. *System availability* and *privacy* proved to be insignificant predictors.

Finally, at an aggregate level, *perceived value* had a significant positive effect on *loyalty*. This finding is consistent with the findings of other researchers (Chang *et al.*, 2009; Dodds *et al.*, 1991; Chang and Wildt, 1994; Bolton and Drew, 1991).

6. Managerial implications

From a managerial perspective, this research work provides valuable insights to the e-commerce players. For web site design, efficiency, system availability, fulfillment and privacy all need to be considered. However, among these four, efficiency turned out to be the most important dimension. Many web site users may not even go any further with the online buying process with a particular site unless they find it to be user friendly and saves them valuable time. A manager of an e-commerce firm needs to look into this aspect. Availability of the web site for online shopping without the site crashing or freezing is also an important criterion. Managers need to understand the frustration of the customers when the system gets hung up for technical reasons. However, this criterion is possibly more important to a frequent user than to a less frequent user. The web site's ability to deliver goods to its customers on time and to their fullest satisfaction is a critical factor in online shopping. Often customers observe that what gets displayed on the web site for an item does not match

with what gets actually delivered to them and can be a source of disappointment and frustration. Additionally, time taken to deliver a good often exceeds the time promised to deliver. Managers need to look into these aspects and take corrective actions. Privacy is also a key evaluative factor in online shopping. Customers will shop only when they find it is safe to share confidential data, else not. Therefore, managers need to make their sites safe and secure and prevent any fraudulent transactions. Finally, the study demonstrated that electronic service quality positively affects perceived value, which in turn positively affects loyalty. Those firms that are consistently able to offer superior service through web are likely to have loyal customers. Some scholars have asserted that today's online customers show clear inclination towards loyalty, and proper web technologies can reinforce that loyalty. Acquiring customers over the internet is very expensive and unless those customers remain loyal and make repeat purchases over the years, profits may remain elusive (Reichheld and Scheffer, 2000)

7. Limitations and Conclusions

Like any other research, this work is not without limitations. Most respondents in the present study were young and represented a substantial body of web-users, yet they were not representative of all web-users. Hence, findings should be viewed with extreme caution. Also, the present study was not conducted for any particular web site rather the respondents expressed their reaction to the most favoured web site they used for shopping. It would be interesting to note if future researchers could investigate the appropriateness of the E-S-QUAL model by industry type or by product type.

Indian e-commerce industry is still in its nascent stage and is evolving. From a managerial perspective, providing high levels of e-service quality is extremely critical and important to succeed in the e-commerce space today. Therefore, better understanding of

customer preferences for web site usage is required. Indian customers consider *efficiency*, *fulfillment*, *system availability*, and *privacy* as important dimensions of E-S-QUAL for assessing electronic service quality. However, among all dimensions investigated, *efficiency* was adjudged the most important determinant of electronic service quality in India. The present study also revealed that customers who perceive electronic service quality to be high are more likely to have higher perceived value, become loyal, and shop regularly. Also, those who use web site frequently consider its privacy feature to be very important, and are likely to purchase more from their favoured web site. In sum, the findings of this research may help the researchers and practitioners understand on how electronic service quality in India is perceived by the users, and what is necessary to make appropriate e-service quality strategies for different categories of customers for enhanced web usage, customer retention, and profit planning.

INSERT APPENDIX A HERE

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Table I. Factor loadings of E-S-QUAL

<i>Factor</i>	<i>Efficiency</i>	Factor Loadings		
		<i>System availability</i>	<i>Fulfillment</i>	<i>Privacy</i>
Efficiency (Cronbach's $\alpha = 0.82$)				
EFF 1	0.75			
EFF2	0.81			
EFF3	0.60			
EFF4	0.65			
EFF5	0.68			
System availability (Cronbach's $\alpha = 0.79$)				
SYS1		0.68		
SYS2		0.85		
SYS3		0.77		
SYS4		0.57		
Fulfillment (Cronbach's $\alpha = 0.86$)				
FUL1			0.79	
FUL2			0.75	
FUL3			0.73	
FUL4			0.56	
FUL5			0.68	
FUL6			0.64	
Privacy (Cronbach's $\alpha = 0.79$)				
PRI1				0.87
PRI2				0.84
PRI3				0.67
Eigen values	6.96	1.76	1.39	1.31
Per cent of total variation	38.67	9.77	7.74	7.28
Cumulative per cent	38.67	48.44	56.18	63.46

Extraction method: Principal component analysis;
 Rotation method: Varimax with Kaiser normalization

Table II. Descriptive statistics of E-S-QUAL dimensions

E-S-QUAL dimensions	Mean	Standard deviation
Efficiency	3.89	0.61
System availability	3.64	0.73
Fulfillment	3.63	0.72
Privacy	3.56	0.90
Perceived value	3.83	0.61
Loyalty	3.84	0.68
Overall perceived quality	3.90	0.65

Table III. Demographic profile of the sample respondents

Variable	Frequency	Per cent
<i>Age in years</i>		
<25	139	49.5
25-40	131	46.6
41-55	7	2.5
>55	4	1.4
<i>Education</i>		
High school or less	1	0.4
Bachelors	99	35.2
Masters	171	60.9
Ph.D.	10	3.6
<i>Occupation</i>		
Student	200	71.2
Service	64	22.8
Self Employed	10	3.6
Others	7	2.4
<i>Annual family income</i> (1 Lakh = INR 100,000)		
<5 Lakhs	61	21.7
5-10 Lakhs	100	35.6
10-15 Lakhs	59	21.0
>15 Lakhs	61	21.7
<i>Length of web site use</i>		
<3 months	29	10.3
3 to less than 6 months	21	7.5
6 to less than 12 months	29	10.3
12 months or more	202	71.9
<i>Frequency of web site use</i>		
4 or less times a month	134	47.7
5 to 8 times a month	66	23.5
9 to 12 times a month	23	8.2
13 or more times a month	58	20.6

Table IV. Regression analyses of perceived value and overall perceived quality for E-S-QUAL dimensions (aggregate analysis)

Independent variables	Model 1	Model 2
	Perceived value (Std. β)	Overall perceived quality (Std. β)
Efficiency	0.359***	0.350***
System availability	0.156**	0.070
Fulfillment	0.229***	0.288***
Privacy	0.205***	0.070
Adjusted R ²	0.55	0.41
F-Value	86.62***	50.09***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table V. Regression analyses of perceived value and overall perceived quality for E-S-QUAL dimensions (less frequent users – 4 or less times a month)

Independent variables	Model 3	Model 4
	Perceived value (Std. β)	Overall perceived quality (Std. β)
Efficiency	0.373***	0.317***
System availability	0.083	0.056
Fulfillment	0.255**	0.261**
Privacy	0.146**	0.078
Adjusted R ²	0.44	0.32
F-Value	27.53***	16.32***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table VI. Regression analyses of perceived value and overall perceived quality for E-S-QUAL dimensions (frequent users – 5 or more times a month)

Independent variables	Model 5 Perceived value (Std. β)	Model 6 Overall perceived quality (Std. β)
Efficiency	0.331***	0.399***
System availability	0.175*	0.041
Fulfillment	0.217**	0.303**
Privacy	0.260***	0.060
Adjusted R ²	0.61	0.47
F-Value	58.14***	33.25***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table VII. Regression analysis of loyalty with respect to perceived value (aggregate analysis)

Independent variable	Model 7 Loyalty (Std β)
Perceived value	0.72***
Adjusted R ²	0.51
F-Value	294.93***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table VIII: Absolute and incremental fit indices

Chi-square (χ^2)	122.21
Goodness-of-Fit Index (GFI)	0.94
Root Mean Square Error of Approximation (RMSEA)	0.06
Normed Fit Index (NFI)	0.94
Tucker Lewis Index (TLI)	0.96
Comparative Fit Index (CFI)	0.97

Table IX: Standardized factor loadings, average variance extracted and reliability estimates

	Efficiency	System Availability	Fulfillment	Privacy
EEF1	0.73			
EEF2	0.76			
EEF3	0.69			
EEF4	0.66			
EEF5	0.69			
SYS1		0.66		
SYS2		0.68		
SYS3		0.81		
SYS4		0.67		
FUL1			0.78	
FUL2			0.72	
FUL3			0.73	
FUL4			0.68	
FUL5			0.72	
FUL6			0.67	
PRI1				0.88
PRI2				0.75
PRI3				0.64
AVE	0.50	0.50	0.51	0.58
CR	0.83	0.80	0.86	0.80

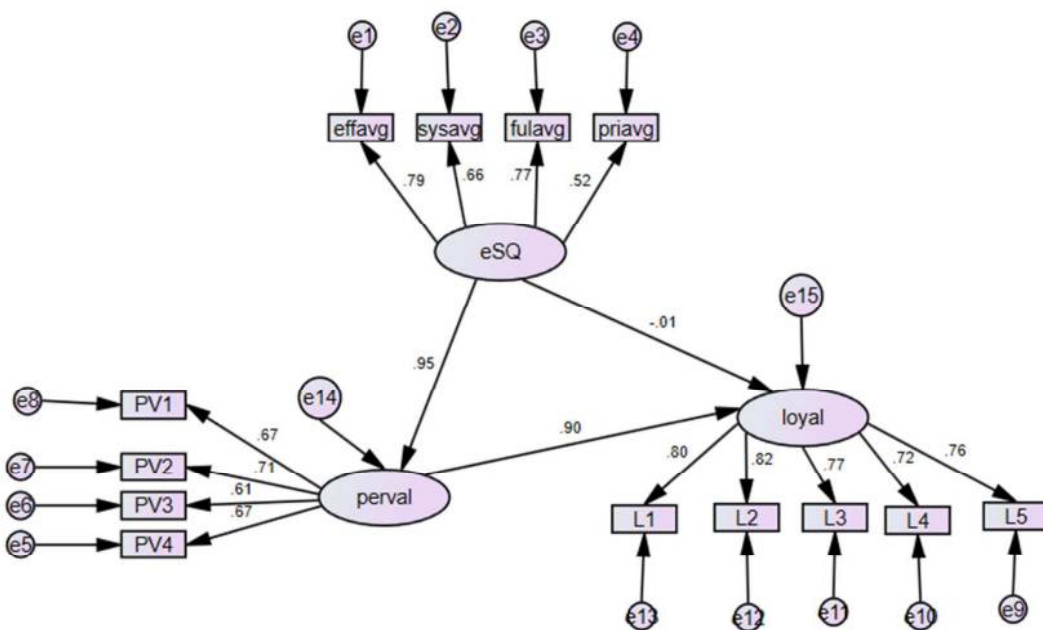


Figure 1. Path Diagram using AMOS