

# Service Quality and Customer Satisfaction in the Electronic Banking

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## Abstract

The present study aims to assess the degree of service quality and customer satisfaction in the electronic banking context in Batticaloa district. To achieve these objectives a questionnaire was developed with item measures that capture the service quality and customer satisfaction constructs. In a study of 231 respondents (51 percent of response rate), unidimensionality, reliability and validity assessments were conducted to validate the key constructs and one sample t-test was performed to test the hypotheses. The results indicated that service quality and customer satisfaction were at high degree in the electronic banking in Batticaloa district. The findings of this study assist the bank managers, academics and practitioners to develop and implement service quality and customer satisfaction related strategies in the electronic banking. Further, this study makes a contribution to the existing literature by comprehensively examining the notions of service quality and customer satisfaction in the electronic banking.

**Keyword:** customer satisfaction, electronic banking, reliability, service quality, unidimensionality, validity

## 1. Introduction

In Sri Lanka, banking industry contributes 58 percent of the country's financial requirement, and this is one of the significant industries (Thusyanthy & Senthilnathan, 2012; The official government news portal of Sri Lanka, 2013; Central Bank of Sri Lanka, 2014). In fact, the banks (i.e., 24 licensed commercial banks) are increasingly becoming turbulent and competitive, since they are trying to target on 20.5 million population in Sri Lanka and 0.5 million population in Batticaloa district (Central Bank of Sri Lanka, 2014). Due to the intensive competition these banks are using telecommunication systems and technologies, and revolutionizing the whole banking industry through the adoption of electronic banking (Sohail & Shanmugham, 2003; Jayasiri & Weerathunga, 2008). Notably, six prominent banks in Sri Lanka-Bank of Ceylon, People's Bank, Commercial Bank of Ceylon Plc, Hatton National Bank Plc, Sampath Bank Plc and Seylan Bank Plc have adopted the electronic banking (e-banking) to get the competitive advantage and to give the convenient services to their customers, and this is true for Batticaloa district in particular. (Note 1) Nevertheless, many firms use service quality as an effective and essential tool to compete successfully within the industry (Stuart & Tax, 1996; Hartono, 2012; Chen, Cheng & Hsu, 2015) and this is particularly appropriate for the banks, which are delivering their products and services via online (Yang, Jun & Peterson, 2004; Zarei, 2010; Mahfooz, Al-Motairi, Ahmad & Khan, 2013).

Service quality in the e-banking context is the key determinant in differentiating service offering from the competitors and building competitive advantage and thus, service quality becomes as a crucial issue in e-banking (Santos, 2003; Bauer, Hammerschmidt & Falk, 2005; Zarei, 2010; Ariff, Yun, Zakuan & Jusoh, 2012), but what is the degree of service quality in the e-banking in Batticaloa district? Extant published researches do not answer this question.

Even though service quality has become necessary in e-banking (Santos, 2003; Al-Hawari & Ward, 2006), Herington and Weaven (2009) argue that customer satisfaction of e-banking is also a critical issue due to the intensive competition in the banking industry. Bauer et al. (2005) imply that banks invest billions in the internet infrastructure owing to satisfy the customers. For example, Deutsche Bank invests on e-banking about half a billion \$US per year to satisfy their customers (Bauer et al., 2005). Clearly, in the e-banking context, customer

satisfaction is essential, but what is the degree of customer satisfaction in the e-banking in Batticaloa district? Previous published researches do not answer this question. Moreover, these preceding two main questions convey two gaps in the relevant literature. Therefore, this study attempts to empirically answer these two questions and aims to fill these two gaps in the e-banking context.

The rest of this study is organized as follows: the next section literature review, followed by methodology, data analysis and results, and discussion. The final section offers the limitations and further research directions.

## 2. Literature Review

### 2.1 Service Quality in E-Banking

Delivering a higher service quality better than competitors gives an opportunity for the banks to achieve competitive differentiation and advantage (Ranganathan & Ganapathy, 2002). Akinci, Atilgan-Inan and Aksoy (2010) argue that the survival of an online related firm depends on the understanding the perception and assessment of electronic service quality (e-service quality) by consumers, and this is mainly true for e-banking. Indeed, Santos (2003) defines e-service quality as ‘the consumers’ overall evaluation and judgment of the excellence and quality of e-service offering in the virtual market place’, and this definition describe the e-service quality in general as well as service quality in e-banking in particular.

Analysis of scientific literature remarks that the topic of e-service quality rest on Dabholkar (1996), Loiacono, Watson, and Goodhue (2000 & 2007), Yoo and Douthu (2001), Barnes and Vidgen (2002), Wolfinbarger and Gilly (2003), Yang et al. (2004), Parasuraman, Zeithaml and Malhotra (2005), Yang, Caib, Zhouc and Zhou (2005), Barnes and Vidgen (2006), Bressolles (2006), Cristobal, Flavián and Guinalú (2007), Akinci et al. (2010), Ding, Hu and Sheng (2011), and Kaisara and Pather (2011) e-service quality models (See Table 1).

Table 1. E-service quality models and dimensions for various contexts

Authors/ models	Dimensions	Context
Dabholkar (1996)	Web site design, reliability, delivery, ease of use, enjoyment and control	E-service
Loiacono et al. (2000 & 2007)/ WebQual	Task-setting information, intuitive operations, easy to understand, intuitive appearance, capacity for innovation, personalized communication, trust, relative advantage, response time, emotional appeal, consistent image and full online service	Online retailing
Yoo and Douthu (2001)/ SiteQual	Ease of use, aesthetic design, processing speed, and security	Online retailing
Barnes and Vidgen (2002)/ WebQual	Usability, design, information, trust and empathy	Online retailing
Wolfinbarger and Gilly (2003)/ ETailQ	Web site design, fulfillment/ reliability, security/privacy and customer service	Online retailing
Yang et al. (2004)	Reliability, responsiveness, competence, ease of use, security and product portfolio	Online retailing
Parasuraman et al. (2005)/ E-S-Qual and e-RecS-Qual	Efficiency, system availability, fulfillment, privacy, responsiveness, compensation and contact	E-service
Yang et al. (2005)	Usability, usefulness of content, adequacy of information, accessibility and interaction	Web portals
Barnes and Vidgen (2006)	Usability, information quality, interaction in services and overview	E-services government
Bressolles (2006)/ NetQual	Information, ease of use, aesthetic elements, reliability and security/privacy	E-commerce
Cristobal et al. (2007)/ PeSq	Web design, customer service, assurance and order management	E-commerce
Akinci et al. (2010)	Based on Parasuraman et al. (2005) e-service quality model: efficiency, system availability, fulfillment, privacy, responsiveness, compensation and contact	E-banking
Ding et al. (2011)/e-SELFQUAL	Perceived control, service convenience, client support and service fulfillment	Online retailing
Kaisara and Pather (2011)	Information quality, security, communication, website aesthetics, website design and access	E-government

Even though many authors have developed e-service quality models, this study uses Parasuraman et al. (2005) e-service quality model, since this model used by many e-service quality related previous studies (e.g., Bauer,

Falk & Hammerschmidt, 2006; Li & Suomi, 2007; Akinci et al., 2010; Sandhu & Bala, 2011; Janita & Miranda, 2013; Kim & Nitecki, 2014).

Parasuraman et al. (2005) e-service quality model is rooted from mean-end framework, and they develop E-S-QUAL (e-service quality) with four dimensions: efficiency, system availability, fulfillment and privacy, and E-RecS-QUAL (quality of recovery service provided by firm's web sites) with three dimensions: responsiveness, compensation and contact for measuring the service quality delivered by Web sites on which customers shop electronically (See Figure 1). Importantly, Parasuraman et al. (2005) e-service quality model is used by Akinci et al. (2010) in Journal of Business Research, where this model is ensured to be suitable for e-banking context. Further, the preceding seven dimensions of e-service quality (Parasuraman et al., 2005) are also used by many recent e-banking related studies (e.g., Yang & Tsai, 2007; Akinci et al., 2010; Zarei, 2010; Marimon, Yaya & Fa, 2012; Ariff et al., 2013; Sanayei & Jokar, 2013; Zhang, 2013; Dhurup, Surujlal & Redda, 2014; Doost & Ashraf, 2014; Nathan, 2014; Paschaloudis, 2014; Cetinsoz, 2015) to measure the construct of service quality in e-banking. Hence, this study also considers efficiency, system availability, fulfillment, privacy, responsiveness, compensation and contact are the dimensions of service quality for e-banking as replication to the existing literature.

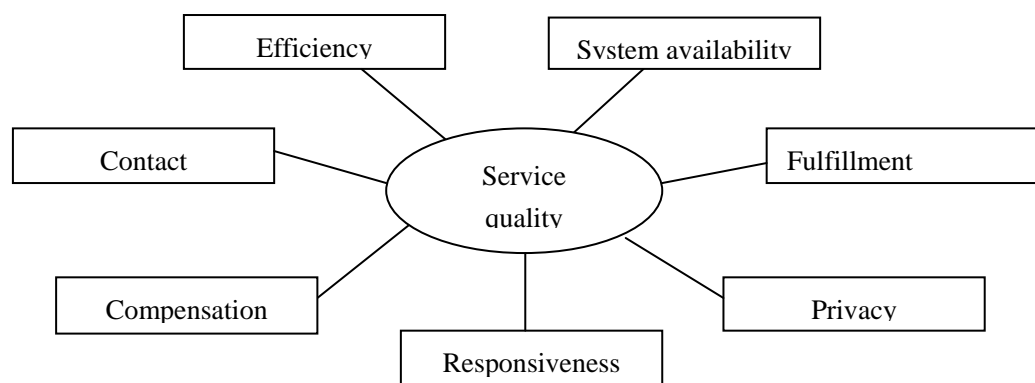


Figure 1. Parasuraman et al. (2005) e-service quality model for e-banking

Many companies use service quality as one of the effective strategies to get the competitive advantage (Maclaran & McGowan, 1999; Chang & Yeh, 2002; Park, Robertson & Wu, 2004; Liou & Tzeng, 2007; Dominic, Goh, Wong & Chen, 2010), especially banks, which are delivering services via online (i.e., e-banking) consider this service quality is a critical issue (Han & Beak, 2004; Jayawardhena, 2004; Bauer et al., 2006; Wong, Rexha & Phau, 2008; Akinci et al., 2010; Ariff et al., 2012). Even though, there has been no recent statistics available to show the growth of service quality in the e-banking in Sri Lanka, especially in Batticaloa district, and generally the service quality is high degree in e-banking in the other countries (e.g., Li & Suomi, 2007; Ariff et al., 2012; Paschaloudis, 2014) and thus, the researcher assumes that the service quality is high degree in e-banking in Batticaloa district. Based on the above argument the first hypothesis is advanced.

H1: *The degree of service quality is at a high level in the e-banking in Batticaloa district.*

While the service quality has become necessary in e-banking (Santos, 2003; Al-Hawari & Ward, 2006), customer satisfaction of e-banking is also a critical issue due to the intensive competition in the banking industry (Herington & Weaven, 2009; Gounaris, Dimitriadis & Stathakopoulos, 2010; Kassim & Abdullah, 2010; Ankit, 2011; Chen, Hsiao & Hwang, 2012; Ganiyu, Uche & Elizabeth, 2012; Thusyanthy, 2014; Kundu & Datta, 2015; Karunakaran & Thusyanthy, 2016).

### 2.1 Customer Satisfaction in E-Banking

Customer satisfaction is considered as the enduring success aspect for an organization's competitiveness (Hennig-Thurau & Alexander, 1997; Berry, Seiders & Grewal, 2002; Garver & Gagnon, 2002; Jamal & Naser, 2002). Ankit (2011) indicates that customer satisfaction become an important factor for the firms, which are delivering the services via online. In fact, the electronic satisfaction (e-satisfaction) of the customers is significant for e-banking. Anderson and Srinivasan (2003) define e-satisfaction of the customers as 'the contentment of the customer with respect to his or her prior purchasing experience with a given electronic commerce firm'.

Analyzing the past studies have found that e-customer satisfaction rest on various models: Horan and

Abhichandani (2006) e-customer satisfaction model, Schaupp and Belanger (2005) e-customer satisfaction model, Liu, Zhou and Chen (2010) e-customer satisfaction model, and Chen et al. (2012) e-customer satisfaction model (See Table 2).

Table 2. E-customer satisfaction models and dimensions for various contexts

Authors/models	Dimensions	Context
Horan and Abhichandani (2006)	Utility, efficiency and customization	E-government
Schaupp and Belanger (2005)	Technology, shopping and product	E-commerce
Liu et al. (2010)	Perceived usefulness, perceived ease of use, perceived reliability and perceived personalization	E-government
Chen et al. (2012)	Content, accuracy, format, ease of use, timeliness and safety	E-banking

Although many authors have developed e-customer satisfaction models this study uses Chen et al. (2012) e-customer satisfaction model, which model is suitable for the customer satisfaction in e-banking. In fact, this model operationalizes customer satisfaction for e-banking as a multidimensional construct, which includes dimensions are content, accuracy, format, ease of use, timeliness and safety (See Figure 2). Notably, this model is rooted from user satisfaction literature, especially previous studies from Doll, Xia and Torzadeh (1994), Ratnasingham (1998), McHaney, Hightower and Pearson (2002) and Somers, Nelson and Karimi (2003).

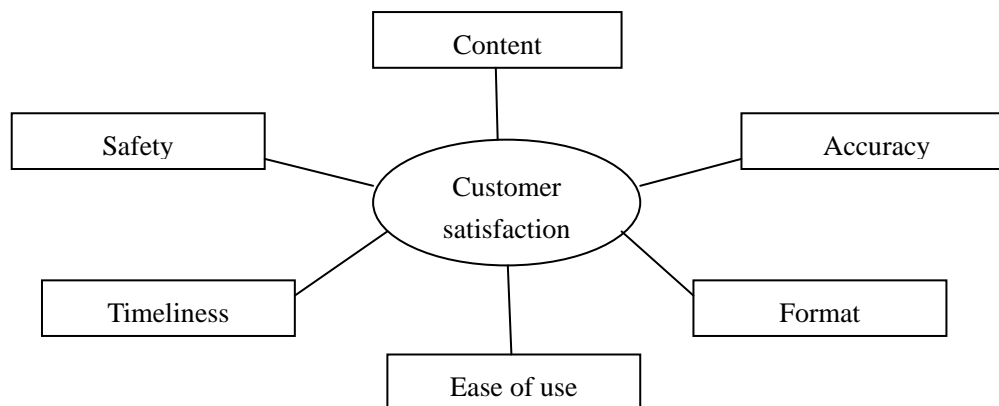


Figure 2. Chen et al. (2012) e-customer satisfaction model for e-banking

Customer satisfaction is performed a vital role for the e-banking context (Chen et al., 2012; Al-Hawari, 2014). Indeed, there has been no recent data available related to the growth of customer satisfaction in the e-banking in Sri Lanka, especially in Batticaloa district. However, generally e-banking represent high degree of customer satisfaction in the other countries (e.g., Chavosh, Halimi & Espahbodi, 2011; Ma, 2012; Ma & Zhao, 2012; Sharma, 2012) and therefore, the researcher assumes that the customer satisfaction is high degree in e-banking in Batticaloa district. According to the above argument the second hypothesis is advanced.

H2: *The degree of customer satisfaction is at a high level in the e-banking in Batticaloa district.*

### 3. Methodology

#### 3.1 Sample

Six largest domestic licensed commercial banks identified as being systematically important in Sri Lanka and especially in Batticaloa district-Bank of Ceylon, People's Bank, Commercial Bank of Ceylon Plc, Hatton National Bank Plc, Sampath Bank Plc and Seylan Bank Plc, and these six prominent banks are providing e-banking to customers (Fitch Ratings Lanka Limited, 2012 & 2015). Therefore, the population was defined as 'males and females between the age of 18 and 69 who had been living in Batticaloa district and who have used e-banking products and services'.

In fact, these six important banks in Batticaloa district were not willing to share the list of e-banking users due to the security reasons. Therefore, the final sample was selected using a convenient sampling design of the e-banking users from different convenient locations-mainly, university, colleges and bank branches-at various times in Batticaloa district, and previous e-banking related studies have also used convenience sample as a sampling method (e.g., Poon, 2008; Herington & Weaven, 2009; Foon & Fah, 2011; Ismail, 2012; Butt & Aftab, 2013). Notably, any customer not using e-banking products and services was discarded from the study. This study used sample size was 450 and this sample size consistent with e-banking related studies (e.g., Al-Hawari, 2014; Kundu & Datta, 2015).

### 3.2 Measures and Measurement

Measurements of service quality and customer satisfaction in e-banking context were adopted and modified from the previous studies (See Table 3), and a five-point Likert scale ranging from 1=Strongly Disagree to 5=Strongly Agree were used. In the e-banking context, service quality measures consisted of 27 item scale (Parasuraman et al., 2005; Akinci et al., 2010), and customer satisfaction was measures with 18 item scale (Chen et al., 2012). Further, the questionnaire developed in English and it was divided into three sections (Section A-C). The sections A and B were developed to measure service quality and customer satisfaction, respectively, whilst section C was developed to measure demographics, including gender, age, income and occupation.

Table 3. Measurement scales

Code	Scale items	Source
	<b>Service quality</b>	
	<b>(i) Efficiency</b>	Parasuraman et al. (2005)
EF01	The bank's web site makes easy to find what the user need	
EF02	The bank's web site makes easy to get anywhere	
EF03	The bank's web site enables to complete a transaction quickly	
EF04	Information at the bank's web site is well organized	
EF05	The bank's web site loads its pages fast	
EF06	The bank's web site is simple to use	
EF07	The bank's web site enables the user to get on to it quickly	
EF08	The bank's web site is well organized	
	<b>(ii) System availability</b>	Parasuraman et al. (2005)
SA01	The bank's web site is always available for business	
SA02	The bank's web site launches and runs right away	
SA03	The bank's web site does not crash	
SA04	Pages at the bank's web site do not freeze after enter order information	
	<b>(iii) Fulfillment</b>	Parasuraman, et al. (2005); Akinci et al. (2010)
FU01	The bank's web site delivers services when promised	
FU02	Records at bank's web site are always accurate	
FU03	Bank's web site makes accurate promises about delivery of service	
FU04	Bank's web site promptly informs about important situations (payments, balance and etc.)	
	<b>(iv) Privacy</b>	Parasuraman, et al. (2005)
PR01	The bank protects information about the web-shopping behaviour	
PR02	The bank does not share the personal information with other sites	
PR03	The bank's web site protects information about the credit card	
	<b>(v) Responsiveness</b>	Parasuraman et

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RE01	The bank's web site promptly responds to the requests and questions which made by e-mail or other channels	al. (2005); Akinci et al. (2010)
RE02	The bank's web site tells what to do if the transaction is not processed	
RE03	The bank's web site takes care of problems promptly	
	<b>(vi) Compensation</b>	Parasuraman et al. (2005)
CO01	The bank's web site compensates for problems it creates	
CO02	The bank's web site compensates when the transactions are not completed on time	
	<b>(vii) Contact</b>	
CT01	The bank's web site provides a telephone numbers to reach branches	Parasuraman et al. (2005)
CT02	The bank's web site has customer service representatives available online as a helpdesk	
CT03	The bank's web site facilitates to speak and clarify problem with an official	
	<b>Customer satisfaction</b>	
	<b>(i) Content</b>	Chen et al. (2012)
CN01	The bank's web site provides the precise information that the user need	
CN02	The information content of e-banking meets the user needs	
CN03	E-banking provides transaction reports that seem to be just about exactly what the user need	
CN04	E-banking sufficient information that need	
	<b>(ii) Accuracy</b>	Chen et al. (2012)
AC01	The data in e- banking are accurate	
AC02	The users are satisfied with the accuracy of data in e-banking	
	<b>(iii) Format</b>	Chen et al. (2012)
FO01	The output of e- banking is presented in a useful format	
FO02	The report information extracted from e- banking is clear	
	<b>(iv) Ease of use</b>	Chen et al. (2012)
EU01	E- banking is user friendly	
EU02	E- banking is easy to use	
	<b>(v) Timeliness</b>	Chen et al. (2012)
TI01	The user get the information in time from e- banking	
TI02	E- banking provides up-to-date information	
	<b>(vi) Safety</b>	Chen et al. (2012)
SF01	E-banking systems provide sufficient security	
SF02	The users are satisfied with the security of e-banking systems	
SF03	The adoption of security mechanism of e- banking will increase the data security on transactions	
SF04	The users are satisfied with the security mechanisms of e-banking	
SF05	The users are satisfied with the assurance of online transaction on e-banking	
SF06	The users are satisfied with e-banking while the involvement of trusted third-party in dealing with online	

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### 3.3 Pre-test and Data Collection

The developed questionnaire was subjected to critical review by nine academicians and four managers of bank branches, all of which were approached by direct contact. In fact, the panels of expert were making sure that the items in the questionnaire fit the context of this study. Further, based on the input and suggestions of expert panels, the wording of the questions rearrange, and developed a final questionnaire to conduct the main study.

Questionnaires were distributed to 450 e-banking users and 231 completed questionnaires were received after excluding the incomplete ones, yielding 51 percent response rate.

### 3.4 Statistical Treatment of Data

The mean scores of the 5- point Likert scale measurement (mean scores for low, moderate and high levels) were adopted from Hair, Black, Babin, Anderson and Tatham (2006) to determine the degree of service quality and customer satisfaction in e-banking (e.g., Thusyanthy & Senthilnathan, 2013; Thusyanthy & Tharanikaran, 2015). These mean scores as decision criteria were used in the one sample t-test statistical analysis in order to test the hypotheses H1 and H2 (See Table 4).

Table 4. Decision criteria

Mean value	Decision
Between 1 and 2.49	Low level
Between 2.5 and 3.49	Moderate level
Between 3.5 and 5	High level

Note. Decision criteria were adopted from Hair et al. (2006).

## 4. Data analysis and results

### 4.1 Sample Profile

Descriptive statistics is used to have an overview of the demographic profile of the respondents in terms of gender, age, income level, and occupation. Result shows that out of the 231 respondents, approximately 59 percent of the respondents were male, whereas 41 percent of them were female. The age group portion shows that the higher portion of the respondents was aged between 31 and 43 years (45.89 percent), while 18.61 percent, 18-30; 30.74 percent, 44-56; and 4.76 percent 57-69. Regarding the income level, nearly 14 percent of the respondents had monthly income below 30000; 24 percent, 30000-99000; 42 percent, 100000-169000; and 20 percent, above 170000. In terms of occupation, mostly respondents were business people and few respondents were students.

### 4.2 Validation of Key Constructs

#### 4.2.1 Unidimensionality Assessment

Exploratory factor analysis (EFA-principal component analysis with Varimax rotation procedure) was performed with 231 samples to explore the unidimensionality of each scale by applying SPSS 19 software (See Table 5 and Table 6). (Note 2) As a preliminary to conduct a factor analysis, the sampling adequacy and the appropriateness of the factor analysis were established through Kaiser-Meyer-Olkin (KMO) test (service quality=0.843; customer satisfaction=0.823) and Bartlett's test of Sphericity (service quality= $\chi^2=4258.28$ ,  $P<0.000$ ,  $df=351$ ; customer satisfaction= $\chi^2=3620.59$ ,  $P<0.000$ ,  $df=153$ ), respectively.

Table 5. Factor analysis results of the service quality construct

Service quality items	Component						
	1	2	3	4	5	6	7
Efficiency 1	<b>0.763</b>	-0.065	0.322	0.021	0.140	0.050	0.261
Efficiency 2	<b>0.783</b>	-0.039	0.274	0.020	0.126	-0.011	0.228
Efficiency 3	<b>0.763</b>	0.053	0.289	0.008	0.133	-0.049	0.218
Efficiency 4	<b>0.731</b>	0.164	0.212	0.137	-0.048	0.160	0.302
Efficiency 5	<b>0.752</b>	0.226	-0.121	0.127	0.103	0.241	-0.020
Efficiency 6	<b>0.769</b>	0.136	-0.097	0.048	0.218	0.241	-0.126
Efficiency 7	<b>0.781</b>	0.196	-0.137	0.151	0.090	0.135	-0.051

Efficiency 8	<b>0.776</b>	0.200	-0.027	0.097	0.163	0.184	-0.104
System availability 1	0.125	0.224	0.134	<b>0.745</b>	-0.156	0.088	0.047
System availability 2	0.097	0.197	0.268	<b>0.757</b>	0.032	0.109	0.067
System availability 3	0.092	0.073	0.001	<b>0.754</b>	0.276	0.006	0.023
System availability 4	0.055	0.157	-0.073	<b>0.788</b>	0.146	0.126	0.166
Fulfillment 1	0.166	<b>0.793</b>	0.013	0.221	0.131	-0.074	0.056
Fulfillment 2	0.194	<b>0.821</b>	-0.038	0.162	0.058	0.125	-0.004
Fulfillment 3	0.110	<b>0.773</b>	0.344	0.170	0.086	0.121	0.161
Fulfillment 4	0.115	<b>0.776</b>	0.349	0.153	0.118	0.109	0.187
Privacy 1	0.093	0.209	<b>0.827</b>	0.077	0.131	0.041	-0.045
Privacy 2	0.077	0.142	<b>0.858</b>	0.100	0.090	0.090	-0.071
Privacy 3	0.088	0.030	<b>0.813</b>	0.060	0.207	0.173	-0.065
Responsiveness 1	0.214	0.162	0.158	0.075	<b>0.789</b>	0.163	0.085
Responsiveness 2	0.191	0.140	0.193	0.062	<b>0.758</b>	-0.021	0.240
Responsiveness 3	0.177	0.043	0.140	0.133	<b>0.775</b>	0.173	0.109
Compensation 1	0.104	0.134	-0.141	0.100	0.268	0.226	<b>0.785</b>
Compensation 2	0.170	0.164	-0.094	0.195	0.168	0.218	<b>0.752</b>
Contact 1	0.237	0.044	0.121	0.141	0.304	<b>0.680</b>	-0.030
Contact 2	0.202	0.083	0.145	0.098	0.076	<b>0.844</b>	0.190
Contact 3	0.176	0.092	0.104	0.090	0.006	<b>0.756</b>	0.348
Eigenvalues	8.735	2.936	2.410	1.966	1.502	1.434	1.102
VE (%)	32.351	10.872	8.927	7.281	5.563	5.310	4.081
AV (%)	32.351	43.223	52.150	59.431	64.994	70.304	74.385

Note. VE=variance explained; AV=accumulated variance; Factor loadings after Varimax with Kaiser normalization of seven components extracted by principal components extraction by using SPSS 19 software; factor loadings of far above 0.40 are presented in bold-face type.

Table 6. Factor analysis results of the customer satisfaction construct

Customer satisfaction items	Component					
	1	2	3	4	5	6
Content 1	0.266	<b>0.662</b>	0.257	0.107	-0.031	0.143
Content 2	0.261	<b>0.762</b>	0.176	0.237	0.029	0.120
Content 3	0.139	<b>0.784</b>	0.029	0.114	0.284	0.046
Content 4	0.087	<b>0.757</b>	0.064	0.105	0.348	0.068
Accuracy 1	0.087	0.140	0.160	0.092	0.010	<b>0.919</b>
Accuracy 2	0.150	0.104	0.043	0.039	0.102	<b>0.928</b>
Format 1	0.198	0.210	0.202	0.160	<b>0.888</b>	0.088
Format 2	0.208	0.277	0.144	0.200	<b>0.870</b>	0.042
Ease of use 1	0.116	0.222	0.078	<b>0.932</b>	0.152	0.082
Ease of use 2	0.120	0.185	0.052	<b>0.937</b>	0.167	0.058
Timeliness 1	0.252	0.193	<b>0.905</b>	0.070	0.158	0.126
Timeliness 2	0.242	0.173	<b>0.911</b>	0.059	0.180	0.105
Safety 1	<b>0.766</b>	0.130	0.299	0.088	0.043	0.053
Safety 2	<b>0.726</b>	0.133	0.331	0.159	0.064	0.076
Safety 3	<b>0.890</b>	0.161	0.035	0.115	0.066	0.036
Safety 4	<b>0.873</b>	0.148	0.074	0.074	0.109	0.053
Safety 5	<b>0.819</b>	0.132	0.107	0.001	0.212	0.103
Safety 6	<b>0.813</b>	0.148	0.048	0.012	0.098	0.104
Eigenvalues	7.311	2.323	1.615	1.378	1.176	1.063
VE (%)	40.619	12.908	8.973	7.657	6.536	5.905
AV (%)	40.619	53.528	62.500	70.158	76.694	82.599

Note. VE=variance explained; AV=accumulated variance; Factor loadings after Varimax with Kaiser normalization of six components/factors extracted by principal components extraction by using SPSS 19 software; factor loadings of far above 0.40 are presented in bold-face type.



The factors/components 1, 2, 3, 4, 5, 6 and 7 in Table 5 were interpreted as efficiency, fulfillment, privacy, system availability, responsiveness, contact and compensation respectively, whilst factors/components 1, 2, 3, 4, 5 and 6 in Table 6 were defined as safety, content, timeliness, ease of use, format, and accuracy, respectively.

It is notable that factors needed eigenvalue greater than one, and number of factors extracted should account for as a minimum 50% or 60% of the total variance interpreted (Kaiser, 1960; Hair, Anderson, Tatham & Black, 1998; Streiner, 1994) (Note 3). As consistent with these criteria, the results of factor analysis revealed that a seven factor with 27 items (Table 5) and a six factor with 18 items (Table 6) representing the eigenvalues greater than one, and a seven factor accounted for 74.4% of the accumulated variance, whereas a six factor explained 82.3% of the total variance. Accordingly, as suggested in eigenvalue rule by Kaiser (1960), the seven factors in Table 5 and the six factors in Table 6 were selected.

Specifically, all individual item factor loading for their respective components were above the cut-off value of 0.4 (Bagozzi & Baumgartner, 1994; Clark & Watson, 1995), which ranging from, 0.731 to 0.858 in Table 5 and 0.662 to 0.937 in Table 6 and thus, there was no necessity for eliminating any items. Accordingly, the preceding results in Table 5 and Table 6 lead to an acceptance of unidimensionality of service quality and customer satisfaction in the e-banking context.

#### 4.2.2 Reliability and Validity

Beckstead (2013) suggested that Cronbach's alpha coefficient is most commonly used index of reliability. Cronbach's alpha coefficient for dimensions ranged from 0.810 to 0.985, well above the recommended standard of 0.70 (Nunnally, 1978) and hence, satisfactory reliability for the dimensions achieved (See Table 7).

Ashton (2013) defines validity as '... a measurement is the extent to which it assesses variation in the same characteristic that it is supposed to assess'. Most of the previous studies used construct validity to test the goodness of measures (Rossiter, 2011; Larkina et al., 2014), and this construct validity is assessed through convergent and discriminant validity (Cristobal et al., 2007). Construct Reliability (CR) and Average Variance Extracted (AVE) can be used to assess the convergent validity (Fornell & Larcker, 1981; Kim & Hyun, 2011; Choi, Huang, Jeffrey & Baek, 2013; Wei & Lu, 2013). The CR values are for seven service quality and six customer satisfaction dimensions, ranging from 0.74 to 0.93, whilst AVE scores for these 13 dimensions, ranging from 0.55 to 0.87. Since, the values of CR and AVE exceeded the benchmark values of 0.70 and 0.50, respectively (Fornell & Larcker, 1981; Hair et al., 1998), thereby indicating adequate convergent validity (See Table 7). Moreover, Table 7 also reported the means and standard deviations for all dimensions and constructs. The means for the dimensions range from 3.92 to 4.23 (out of 5) and corresponding standard deviation range from 0.36 to 0.67.

Table 7. Reliability and convergent validity assessment results

Items	Mean score	Standard deviation	Cronbach's alpha	Convergent validity	
				CR	AVE
Efficiency	4.21	0.52	0.922	0.92	0.59
System availability	3.94	0.55	0.814	0.85	0.58
Fulfillment	4.11	0.50	0.884	0.87	0.63
Privacy	4.20	0.58	0.895	0.87	0.69
Responsiveness	4.01	0.57	0.836	0.82	0.60
Compensation	3.92	0.67	0.868	0.74	0.59
Contact	4.14	0.56	0.810	0.81	0.58
Content	4.01	0.51	0.825	0.83	0.55
Accuracy	4.17	0.65	0.889	0.92	0.85
Format	4.13	0.64	0.966	0.87	0.77
Ease of use	4.18	0.65	0.967	0.93	0.87
Timeliness	4.21	0.65	0.985	0.90	0.82
Safety	4.23	0.56	0.925	0.92	0.67
Service quality	4.07	0.36			
Customer satisfaction	4.17	0.41			

Note. CR=construct reliability; AVE=average variance extracted; mean score, standard deviation and Cronbach's alpha calculation by using SPSS 19 software.

In accordance with Fornell and Larcker (1981) the discriminant validity can be established if the AVE value for a construct/dimension should be substantially higher than the squared correlation of two constructs/dimensions. As consistent with Fornell and Larcker (1981) the discriminant validity was established (See Table 8), where the AVE values associated with all dimensions ( $0.55 < \text{AVE value} < 0.87$ ) were greater than the squared correlation between dimensions (e.g.,  $0.28^2 = 0.07$ ).

Table 8. Discriminant validity assessment results

D	EF	SA	FU	PR	RE	CO	CT	CN	AC	FO	EU	TI	SF
<b>EF</b>	<b>0.59</b>												
<b>SA</b>	0.28**	<b>0.58</b>											
<b>FU</b>	0.37**	0.46**	<b>0.63</b>										
<b>PR</b>	0.25**	0.23**	0.34**	<b>0.69</b>									
<b>RE</b>	0.43**	0.28**	0.35**	0.34**	<b>0.60</b>								
<b>CO</b>	0.32**	0.29**	0.30**	0.03 <sup>n.s.</sup>	0.38**	<b>0.59</b>							
<b>CT</b>	0.44**	0.31**	0.31**	0.25**	0.38**	0.41**	<b>0.58</b>						
<b>CN</b>	0.31**	0.38**	0.41**	0.29**	0.33**	0.31**	0.49**	<b>0.55</b>					
<b>AC</b>	0.25**	0.07 <sup>n.s.</sup>	0.24**	0.26**	0.28**	0.09 <sup>n.s.</sup>	0.20**	0.30**	<b>0.85</b>				
<b>FO</b>	0.21**	0.25**	0.30**	0.23**	0.21**	0.20**	0.32**	0.52**	0.20**	<b>0.77</b>			
<b>EU</b>	0.14*	0.16*	0.25**	0.11 <sup>n.s.</sup>	0.20**	0.19**	0.28**	0.43**	0.19**	0.40**	<b>0.87</b>		
<b>TI</b>	0.18**	0.24**	0.21**	0.25**	0.27**	0.12**	0.29**	0.43**	0.28**	0.41**	0.23**	<b>0.82</b>	
<b>SF</b>	0.36**	0.36**	0.43**	0.49**	0.46**	0.21**	0.43**	0.45**	0.25**	0.39**	0.27**	0.46**	<b>0.67</b>

Note. D=dimension; EF=efficiency; SA=system availability; FU=fulfillment; PR=privacy; RE=responsiveness; CO=compensation; CT=contact; CN=content; AC=accuracy; FO=format; EU=ease of use; TI=timeliness; SF=safety; n.s.=not significant; values on the diagonal in bold indicate the average variance extracted for the dimensions; the scores in the lower diagonal are Pearson correlations and \*\* $P < 0.01$ , \* $P < 0.05$  (two-tailed); discriminant validity calculation gathered from SPSS 19 software.

#### 4.3 Hypothesis Testing and Results

One sample t-test was used to test H1 and H2 (See Table 9). As can be seen in Table 4 the decision criteria were adopted to determine the degree of service quality and customer satisfaction in the e-banking in Batticaloa district.

Table 9. One sample t-test results

Variable	Assumed mean		Observed mean	t-value		Sig. level	
	LB	UB		LB	UB	LB	UB
Service quality	3.5	5	4.07	24.05	-38.78	0.000	0.000
Customer satisfaction	3.5	5	4.17	24.72	-30.83	0.000	0.000

Note. LB=lower boundary; UB= upper boundary; one sample t-test calculation gathered from SPSS 19 software.

As indicated in the Table 9, significance values of 0.000 for both lower and upper boundaries (i.e.,  $p < 0.05$ ) in service quality and customer satisfaction shows that there are significance differences between assumed means and observed means. Clearly, the observed means 4.07 and 4.17 for service quality and customer satisfaction, respectively have fallen the high level range of 3.5-5. Therefore, the degrees of service quality and customer satisfaction are at high degree in the e-banking in Batticaloa district. Notably, the one sample- t-test offer support for H1 and H2.

## 5. Discussion

### 5.1 Theoretical Implications

H1 predicted that the degree of service quality is at a high level in the e-banking in Batticaloa district and this

hypothesis was supported. In the other words, the literature revealed that generally service quality is high degree in the context of e-banking in the other countries (e.g., Li & Suomi, 2007; Ariff et al., 2012; Paschaloudis, 2014) and the finding of this study also consistent with the existing literature. Notably, there have been no recent studies available to show the level of service quality in the e-banking in Batticaloa district and therefore, this was considered as first gap in the relevant literature. Since, the H1 supported the literature and the first gap of this study filled and thus, the answer gets for the first research question.

Previous studies (e.g., Chavosh et al., 2011; Ma, 2012; Ma & Zhao, 2012; Sharma, 2012) suggested that e-banking represent high degree of customer satisfaction in the other countries. Indeed, the results of this study also indicated that the degree of customer satisfaction is at a high level in the e-banking in Batticaloa district, and provided support for H2. Thus, the results of this study in line with the literature and assist to close the second gap. Consequently, the answer gets for the second research question.

### 5.2 Managerial Implications

Since, there have not been published studies undertaken in e-banking context in Sri Lanka, especially in Batticaloa district, the useful findings of this study can be utilized by bank managers (i.e., six prominent banks managers in Sri Lanka as well as in Batticaloa-Bank of Ceylon, People's Bank, Commercial Bank of Ceylon Plc, Hatton National Bank Plc, Sampath Bank Plc and Seylan Bank Plc), academics and practitioners to develop and implement service quality and customer satisfaction related strategies in e-banking. Further, findings indicate that in the e-banking context, the degree of service quality and customer satisfaction are at a high degree and therefore, branch managers in Batticaloa district must try to maintain and ensure these high levels via enhancement of service quality dimensions (i.e., efficiency, system availability, fulfillment, privacy, responsiveness, compensation and contact) and customer satisfaction dimensions (i.e., content, accuracy, format, ease of use, timeliness and safety).

### 6. Limitations and Future Research Directions

As with any study effort, this study could have been improved. Indeed, these limitations serve as avenues for future studies. First, this study is conducted in one area (i.e., Batticaloa district) and therefore, the study findings may not necessarily be generalizable for e-banking sector in whole Sri Lanka or in other countries. Future studies can corroborate this study finding by conducting parallel studies in whole Sri Lanka and in various countries.

Finally, this study mainly focuses on e-banking sector. However, this study framework could use with the other online and traditional industries to increase the generalizability of the results, where previous studies suggests that in online and traditional context, service quality and customer satisfaction are significant across various industries, namely retailing, insurance, tourism, transportation, real estate, hospital, hotel and advertising (e.g., Mehta, Lalwani & Han, 2000; Joseph, Stone & Anderson, 2003; Pawitra & Tan, 2003; Hill, 2006; Tsoukatos & Rand, 2006; Narayan, Rajendran & Sai, 2008; Thai, 2008; Naidu, 2009; Tuzovic, 2009; Alhemoud, 2010; Pai & Chary, 2013; Pantouvakis & Bouranta, 2013; Rauch, Collins, Nale & Barr, 2015).

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## Note

Note 1. E-banking can be defined as the bank provides information and/or services to its customers over the Internet (Daniel, 1999). According to Jun and Cai (2001) e-banking refers that banks use internet as a delivery channel for banking services such as, opening deposit account, transferring funds, and e-bill presentment and payment.

Note 2. Unidimensionality refers that all items forming an instrument are measuring the same thing in common (Lumsden, 1961; Hattie, 1985; Cortina, 1993).

Note 3. Kaiser (1960) defines eigenvalue as the amount of information captured by a factor. In other words, the total variance accounted for by each underlying factor. According to the eigenvalue rule as suggested by Kaiser (1960), factor with eigenvalues more than one should be retained.

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