Redefining Service Quality Dimensions in Electronic Banking from Extant Theories

**Aboagye Michael Osei[1*], Antwi Collins Opoku[1], Ampadu Seth[1]
and Antwi Owusu Justice[1]**

[1]*School of Management Science and Economics, University of Electronic Science & Technology of China (UESTC), China.*

Authors' contributions

This academic document was created through the concerted efforts of the respective authors. Author AMO handled the research design of the study, the processing of data and data analysis. The first draft of the manuscript was developed by author OAS. Author AC thoroughly reviewed all relevant literature in the topic area with respect to content and scope. Author AJ undertook all processes concerned with data collection. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

In the literature, sufficient attention and interests have been given to electronic banking service quality dimensions and redefined antecedents. Its contributions, however, have a visible expression on banks' electronic banking service quality development from customers' perspective. The intent of this study is to find the extent e-banking service quality dimensions could be modified and develop all-encompassing electronic banking service quality dimensions and constructs. In a quantitative approach, this study made use of survey method with structured questionnaires in collecting primary data from 600 purposively sampled customers of the Ghana Commercial Bank Ltd. Utilising Microsoft excel, excel tool packages, SPSS (version 22) and AMOS, the research analysis was done in stages to satisfy underlined assumptions in quantitative studies. With PCA and CFA techniques, the findings from retrieved views of 556 respondents show that e-banking service quality could be well modified on a three factor model. The upshot evinces system performance, system security and system existence quality as redefined e-banking service quality

Corresponding author: E-mail: aoseimichaelaboagye@yahoo.com;

themed as Re-EBankQual. Although this study showcases interesting ideas, it suffers several limitations. The constraints of this study are that, it did not rely on broader sample size to represent the entire population and hence the results could be viewed as just the perception of clients interviewed but not the general populace of the bank. Also the study was restricted to a specific geographic region belonging to a single commercial city in the eastern region of Ghana. For these limitations, theoretical and managerial recommendations have been noted for scholars and bank stakeholders to eliminate the bottlenecks that hinder the development of redefining e-banking service quality dimensions. The imports from this study sight on the themed areas of electronic banking service quality for both management and scholars to take note and affect decisions to improve services. It also adds to literature on the electronic banking service quality conceptualization and brings to light a new perspective in electronic banking service quality.

1. INTRODUCTION AND MATERIAL DEVELOPMENT

Quality as a concept requires particular attention of both product and service providing firms [1-3]. At present, the strategic and tactical approaches for the pursuance of effectiveness and customer satisfaction, to attain competitive advantage among both products and service firms are geared toward the provision of quality services and products [4-6].

According to the findings of [7], service quality encapsulates how well a service meets or exceeds customers' expectations on a consistent basis. It is the characteristics of a service or product that attract and retain the customers of that product or service providing firm [2]. This claim by [2] is reverberated by [8] who posits that, "service quality is the totality of features and characteristics of a product, process or service". In this same context, [9] affirms that, service quality consist of the attributes of a product or service that focus on meeting the needs, requirement and how well service delivered matches the expectations of customers.

Contemporary, the service landscape has witnessed remarkable changes and that service quality has become important issue for discussion among scholars and management practitioners in recent market approaches [10-15].

The concept has received great deal of interests and concerns from authors and organizations that operate in current dynamic and fiercely competitive environment [16-18].

Service quality is indispensably important that, organizations, companies, authors and other business stakeholders concerned have considerably channeled efforts to evaluate and keep records of its levels [11,13,14,19].

According to [20] and [21], it is substantially important in determining how a firm can achieve high service quality and to communicate its benefits. As such, service quality has extreme benefits on diverse areas of organizational development and success [7,22-24].

Phillips et al. [25] indicates that, service quality has the capacity to make impressive contributions to growth in market shares and investors' returns. It is further reaffirmed in 1984, that several products and services perceived as having or related with high service quality attract the attention and interest of the consuming public [26-28]. Additionally, [11,29,30] have all emphasized in comprehensive terms that, service quality has an apparently significant relationship with profitability.

In the course of identifying and satisfying customers' service requirements, service quality is a salient denominator to be given thoughtful consideration [20,31]. In the views of [23], positive word of mouth that attracts new customers and facilitates customer retention cannot be left out when jotting the relevance of service quality. Firms providing services, including the banking sector are well acquainted with the significance of service quality and have received tremendous rewards/benefits for their diligence in providing quality services to their customers. Hence, the provision of quality services in the banking industry is paramount to all the stakeholders involved [32-34]. In consistent terms, service quality is found to be strongly associated with several factors that underpin the success of banks and that, issues regarding banking service quality have been well dealt with as a matter of urgency [35-38]. [2]

asserts that, the key to success and survival of any business is the deliverance of quality service to its customers such that, service quality is found to be fundamental in the success stories of well-established banks, [32] affirms. According to [39] banks enjoy benefits ranging from high returns on invested capitals and profits, to gaining competitive advantage by providing quality services to their clients. In this modern times, service quality is found to augment banks' success in its operation in fiercely competitive environment [1,5,15,40-42].

Service quality is noted as an antecedent of customer satisfaction and retention [24,43-49]. According to [50] the rethinking and re-direction of production-led philosophies to customer-focused approach have led banks and other organizations to deliver diverse services and that service quality has extremely aroused the interests and concerns of business stakeholders and authors as well, in the banking sector. It is identified to be influencing customer satisfaction and their intention to stay in bank services, delivered through electronic medium [36,51]. Similarly, the research outcomes of [5,37,52-54] have evinced that, as banks exist to meet the sophisticated needs of their customers whose needs are dynamic, service quality has been greatly confided upon as a strategic tool to satisfy and retain customers of banks.

Consequently, it has been vehemently demonstrated that, service quality, customer satisfaction and customer retention are amply interrelated, in that satisfaction is augmented by service quality and they both determine to a considerable degree the extent of customer retention [2,55]. [56,57] corroborate this with the realization that, service quality is fundamental to customer satisfaction and retention. And in the strongest of terms, [13,58] establishes that, service quality is an important tool for the dual pursuit of customer satisfaction and retention. Therefore, in the quest to attain profitability and competitiveness, service quality shows itself as an important decider or facilitator of customer satisfaction and retention which are demonstrably interrelated in the accomplishments of service firms such as banks [56,59,60].

In review of useful documents by several authors and their contributions on the definition and exact dimensions of service quality, concerns have been raised on the aspects and dimensions in measuring service quality of a firm. [2,28,61-63]

are but few with pioneering works on service quality conceptualization.

The triggering concerns and contentions on service quality can be traced to the literature authored by [64]. According to them, service quality has two dimensions; "What" and "How". The "what" relates to service evaluation after performance. From [2] perspective, the "What" dimension is classified as outcome dimension of service quality which was referred as technical quality by [28] and physical quality by [61]. The "How" relates to the evaluation of services during delivery. It is regarded as process quality by [2], functionality quality by [28] and interactive quality by [61]. Subsequent to the views expressed, The SERVQUAL model by [2], The Nordic model by [28], The Three-Component model by [62], SERVPERF by [65], The Multilevel model by [66], SERVPEX by [67], Hierarchical model by [68] and several other conceptualization of service quality approach for measuring service quality dimensions by authors including [6,69-71] and [72] were formulated. These perspectives and formulated models of service quality have been verified by subsequent studies [6,11,73,74].

The Nordic model from [4] and [28], compares "perceived with expected performance" of a service as the salient factors that affect service quality. A two dimension measurement namely; functional quality and technical quality were identified to impact on perceived service and expected service which were placed against each other. The functional quality defines customers' perception of interactions that exist during service delivery (Ibid). In other words how the service is delivered [75]. Similarly, the technical quality replicates the outcome of the service performance [28]. Thus what the customer receives in service encounter [68].

The three-Component model by [62] identifies three dimensions of service quality namely: the service product (i.e. Technical quality), the service delivery (i.e. functional quality) and the service environment. Generally service quality is obtained through these service quality dimension measurements (ibid).

In the Multilevel model by [66], service quality is explained to be achieved in a hierarchical form. Customers overall perceptions of service quality, primary dimensions and sub dimensions were hierarchically outlined to facilitate general service quality of an organization or a system. In this model, the primary dimensions as outlined by the

authors are physical aspects, reliability, personal interaction, policy and problem solving, while the sub dimensions involves appearance, convenience, promises, doing it right, inspiring confidence and courteous helpful.

The SERVQUAL model developed by [2] explains the extent of discrepancies between consumers' normative expectations and the service performance. A 22-item scale was used to measure five service quality dimensions namely: reliability, responsiveness, tangibles, assurance and empathy. The items in SERVQUAL dimensions are vehemently recommended for modification to suit particular context regarding service quality of an organization (ibid).

In the SERVPERF model constructed by [65], the authors based their views on performance-only conceptualization of service quality. Perceived quality is best conceptualized as an attitude. Nevertheless, they claimed it to be far better measurement model for service quality than the SERVQUAL. In that, the relative importance of the SERVQUAL dimensions is subjected to situational difference [76,65,67,76,77]. [78] Describes SERVQUAL model as paradigmatically flawed as it solely embedded on expectation disconfirmation rather than attitudinal model. Notwithstanding, [68] criticized the SERVQUAL model for been process oriented rather than service and that, it focuses on the process of service not the outcome of the service encounter. The Hierarchical model therefore came into inception. [68] combined several models to elicit service quality dimensions as interaction quality, physical environment quality and outcome quality which is practically based on customers' evaluation of service quality.

From forgone discussions, indubitably, service quality conceptualization and measurement of service quality perception still hinge on controversial topics and debates in service marketing literature [68,79-83].

In argument, [67] presents both SERVQUAL and SERVPERF as inefficient measurement scale and that an alternative scale called SERVPEX, which claims to factor the concerns raised against SERVQUAL and SERVPERF into consideration. SERVPEX possesses 26 attributes and 3-factor structure namely: tangibles, reliability and customer care. It investigates perceived service quality and expectation. SERVPEX is developed to suit

airline service quality and after several stringent scrutiny, it is identified to be of great convergent and predictive validity than other service quality measurement models and dimensions [84].

Nonetheless, the concept still proves to be elusive and that the argument yet continues till recent times [2,81,85-88].

Matters of service quality conceptualization and the measurement dimensions of service quality in general and IS applications as well as electronic banking adoption in financial transactions have been discussed in multiples of studies [41,89]. However, despite the fact that bunch of studies have extensively relied upon several service quality measurement constructs including the SERVQUAL, SERVPERF, SERVPEX in service providing firms, electronic banking and other IS application context, an appreciable number of researchers or authors have argued that, they are not applicable for measuring service quality in electronic based environment [39,63,90]. Regarding the absence of staff and traditional tangible elements in electronic based environment, there is the need for developing new measurement scale to suit this context of service quality [63,90-94]. As such, several theories and models have been postulated, championed and extensively used to conceptualize service quality dimensions in IS application and electronic banking deployment.

Subsequent to that, are the developments of the eTailQ by [91], E-RecSQUAL by [95], E-S-QUAL by [96], WebQual by [97], SITEQUAL from [98], , LibQual from [99], DigiQual by [100], E-governance by [101], WEB-QUAL (modified) by [102], WEB-QUAL (alternative) by [103] and several other electronic service quality measurement dimensions identified by [43,89, 93,104,105-108].

The E-S-QUAL model developed by [96] classifies e-service quality into 11-dimension for measuring e-service quality; efficiency, reliability, flexibility, security/privacy, responsiveness, compensation, ease of navigation, assurance, price knowledge, site aesthetics, customization/personalization were mainly emphasized by the authors.

In the SITEQUAL model from [98] conceptualizes e-service quality into four dimensions namely; ease of use, aesthetics, processing speed and security.

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According to [95], the E-Recovery model of Service Quality referred as "E-RecSQUAL" condensed [96] dimensions of e-service quality into 9 items on 3 dimensions, namely; responsiveness, compensation and contact.

Following the WebQual by [97], consists of 12 dimensions: informational fit to task, interaction, trust, response, time, design, intuitiveness, visual appeal, innovativeness, flow-emotional appeal, integrated communication, business process and substitutability. This construct was mainly focused on website service quality.

Regarding this same trend, [102] contribution is acknowledged. Their study condenses the original WebQual 11 dimensions into 5 dimensions namely: usability, design, information, trust and empathy.

Other contributions to the concept from different authors who relied on existing models and theories includes [105] study that identifies web site design, reliability, security and customer service as salient electronic service quality dimensions in online studies.

Comparably, [92] constructs electronic service quality dimensions as web site design, reliability, responsiveness, trust and personalization in a study of online retailing.

Kim et al. [93] expands existing dimensions of electronic service quality into 9 dimensions referred to as: efficiency, fulfillment, system availability, privacy, responsiveness, compensation, contact, information and graphic style in online retailing study.

A study conducted by [109] proposes 8 dimensions of electronic service quality, drawing relevant knowledge and ideas from existing models and theories from service quality pioneers. Website design, reliability, responsiveness, security, fulfillment, personalization, information and empathy are the main dimensions outlined in the study.

Regarding situations of electronic banking service quality dimensions and measurement, the views and ideas forwarded by the founding fathers of service quality measurement dimensions cannot be less valued. As such, several constructs have been established by authors and researchers where ideas, knowledge and references were tapped from extant literatures since time immemorial.

Again, in [110], website design, information, ease of use, courtesy, responsiveness and reliability were outlined as relevant dimensions of service quality in a study conducted in online banking.

In likeness, [104] constructs a five-dimension of service quality, drawing their elements from the original service quality constructs from [2] and [28]. In the study, customer expectation, customer participation, image and reputation, service encounter and service setting were espoused as the significant determinants of internet banking service quality.

Equally, [33] proposes six dimensions in a study of online banking service quality: convenience, accuracy, feedback/complaint management, efficiency, queue management, accessibility and customization are the main service quality dimensions proffered in the study.

In addition, [111] spells out 6-dimensions of service quality in relation to online banking service quality measurement, namely: reliability, responsiveness, competence, ease of use, security and product portfolio.

[112] study on internet banking service quality reflects ten dimensions in online retail banking service quality. Notably, web usability, security, information quality, access, trust, reliability, flexibility, responsiveness, self-recovery and personalization/customization.

In [94], views are based on [113] to conceptualize online retail banking service quality dimensions, reflected as: web design, customer service, assurance, preferential treatment and information provision. From [114] study in internet banking service quality of Iranian banking customers, six dimensions were identified namely: accessibility, accuracy, security, usefulness, bank image and convenience.

Concerning the area of mobile banking, [108] in a mobile banking study describes responsiveness, assurance, security, convenience, efficiency and easy to operate as the salient mobile banking service quality dimensions.

Similarly, [115] applied the traditional SERVQUAL dimensions in testing mobile banking service quality dimensions on Isfahan Iranian banking customers. The dimensions adopted in this study, thus: tangible, reliability, responsiveness, assurance and empathy

recorded reliability Cronbach's Alpha ranging from 0.788 to 0.826, depicting high-internal consistency and reliability for drawing analysis and conclusion for the study.

In matters related to electronic banking service quality measurement models and dimensions, most of the extant literatures examine service quality on specific automated service delivery systems, especially internet banking, and mobile phone banking [116-118]. Scanty studies have highlighted on other electronic banking service delivery systems including branch networking, ATM banking and other forms of electronic banking.

Al-hawari et al. [119] proposes a 5-dimensional scale for measuring electronic banking service quality namely: ATM quality, telephone banking quality, internet banking quality, customer perception of core services and customer perception on price.

Subsequently, [120] came up with a general dimension named as EbankQual that is applicable to measure electronic banking service quality. EbankQual model reflects 5-dimensions of electronic banking service quality. Access, web interface, trust, attention and credibility were manly the constructs developed by the author.

Recent contributions to the area is the work of [121] which conceptualizes electronic banking service quality dimensions into personalization, information quality, website usability, responsiveness, reliability, and assurance.

Likewise, [122] identifies assurance, empathy, reliability, responsiveness, tangible product availability, product convenience and interaction as electronic banking service quality dimensions. [123] asserts technology security, information quality, technology convenience, technology usage easiness, reliability and customer service as an important electronic banking service quality dimensions.

On the contrary, [88] argues that, [120] and other reviewed dimensions for measuring the general electronic banking service quality are not sufficient enough as they do not elicit the general service quality dimensions in broader e-banking service to examine the overall service quality concept in the area of banks' automated services. The need for a broader dimension of eBankQual was therefore proposed after thorough review on service quality concepts developed in extant literature. In the modified eBankQual of [103] a 12-dimension scale including: system availability, E-fulfillment, accuracy, efficiency, security, responsiveness, ease of use, convenience, cost effectiveness, problem handling, compensation and contact were constructed to measure electronic banking service quality.

Based on the reviewed studies, theories, models and the overall literature regarding the general concept of service quality, e-service quality and electronic banking service quality dimensions, aspects and constructs, this study adopts several constructs, aspects and dimensions from the following models, constructs, dimensions and aspects in the Table 1, to modify and develop all-encompassing electronic banking service quality dimensions and constructs for achieving the objectives set therein.

Table 1. Summary of related literature

No.	SQ model/ constructs	SQ dimension	Authors	Methods
1	The Nordic model	Technical service quality, Functional service quality (professionalism and skill, attitude and behavior, accessibility and flexibility and trustworthiness, service recovery, services cape and reputation and credibility	Kumbhar (2012) Wolinbarger & Gilly 2003 Li and Suomi (2009)	Ordinal
2	SERVQUAL	Reliability, responsiveness, assurance, empathy and tangibles	Parasuraman, Zeithaml and Berry (1985, 1988, 1994).	Li Likert Scale kert scale
3	SERVFERF	Reliability, responsiveness, assurance, empathy and tangibles	Croning and Taylor (1994)	Likert Scale
4	Three-Component model	The service product (ie Technical quality), the service delivery (i.e.	Rust and Oliver (1994)	Likert Scale

No.	SQ model/ constructs	SQ dimension	Authors	Methods
		functional quality) and the service environment.		
5	The Multilevel model	(hierarchical form) Customers overall perceptions of service quality, primary dimensions and sub dimensions	Dabholkar, Thorpe, and Rentz (1996)	Likert Scale
6	The SERVPERF	Performance-only conceptualization of service quality.	Cronin and Taylor (1992),	Likert Scale
7	SERVPEX	Tangibles, reliability and customer care	Robledo (2001	Likert Scale
8	The E-S-QUAL	efficiency, reliability, flexibility, security/privacy, responsiveness, compensation, ease of navigation, assurance, price knowledge, site aesthetics, customization/ personalization	Zeithaml et al. (2000),	Likert Scale
9	WebQual	Informational fit to task, interaction, trust, response, time, design, intuitiveness, visual appeal, innovativeness, flow-emotional appeal, integrated communication, business process and substitutability.	Loiacono, Watson and Goodhue (2000),	Likert Scale
10	SITEQUAL,	Ease of use, aesthetics, processing speed and security.	Yoo and Donthu (2001)	Likert Scale
11	LibQual	Reliability, responsiveness, assurance, empathy, and tangibles	Cook et al. (2003),	Likert Scale
12	E-RecSQUAL	responsiveness, compensation and contact	Parasuraman (2005),	Likert Scale
13	DigiQual	Reliability, responsiveness, assurance, empathy, tangibles	The Association of Research Libraries (2005),	Likert Scale
14	GIQUAL	Responsiveness, assurance, empathy, tangibles and reliability	Tsoukatos and Rand (2007)	Likert Scale
15	BANKSERV,	Polite, help promptness, neatness, apology, advice, security etc.	Akiran (1994)	Likert Scale
16	BANKZOT	Desired, adequate, predicted and perceived service quality	Nadiri et al (2009)	Likert Scale
17	EbankQual	Access, web interface, trust, attention and credibility.	Kumbhar (2012) Wolinbarger & Gilly 2003 Li and Suomi (2009)	Likert Scale
18	WEB-QUAL (modified)	Usability, design, information, trust, empathy	Bames & Vidgen (2002),	Likert Scale
19	EbankQual (modified)	system availability, E-fulfilment accuracy, efficiency, security, responsiveness, ease of use, convenience, cost effectiveness, problem handling, compensation and contact	Kumbhar (2012)	Likert Scale
20	eTailQ	Design, personalization, fulfilment, reliability, privacy/security, customer service	Wolinbarger & Gilly 2003	Likert Scale

No.	SQ model/ constructs	SQ dimension	Authors	Methods
Several other service quality dimensions and construct developed from extant literature adopted includes the following				
21		convenience, accuracy, feedback/complaint management, efficiency, queue management, accessibility and customization	Joseph et al. (2003)	Likert Scale
22		responsiveness, assurance, security, convenience, efficiency and easy to operate	Sharma and Surendra (2011)	Likert Scale
23		ATM quality, telephone banking quality, internet banking quality, customer perception of core services and customer perception on price.	A-Hawari et al. (2005)	Likert Scale
24		Personalization, information quality, website usability, responsiveness, reliability, and assurance.	Samar, Swad and Rolf (2009	Likert Scale
25		assurance, empathy, reliability, responsiveness, tangible product availability, product convenience and interaction	Bedi Monica (2010)	Likert Scale
26		Website design, reliability, responsiveness, security, fulfilment, personalization, information and empathy	Li and Suomi (2009)	Likert Scale

2. RESEARCH MODEL

In the model designed to suit the current study on electronic banking service quality dimensions, 11-dimension scale has been outlined for further classifications and extraction to a more simpler and defined constructs. Otherwise referred as redefined electronic banking service quality.

Table 2. Adopted and modified constructs from extant studies

Dimensions	Description	Supporting authors
Accuracy	The extent to which e-banking systems offer banking services without mistakes	Kumbhar (2012) Joseph et al. (2003)
Perceived cost/price	Commissions, fee and charges on e-banking service transaction, telecommunication, internet charges	Zeithaml et al. (2000), A-Hawari et al. (2005)
Convenience/efficiency,	Delivering of quick and immediate banking services without delays	Kumbhar (2012), Joseph et al. (2003), Sharma and Surendra (2011), Bedi Monica (2010)
Customization	The extent at which e-banking systems are modified to suit individual customer's needs or could be used to perform desired transaction.	Zeithaml et al. (2000), Joseph et al. (2003) Li and Suomi (2009)
system navigation/ease of use	Clarity of e-banking system interface, layout of e-banking products and information relevance	Zeithaml et al. (2000), Yoo and Donthu (2001) Kumbhar (2012), Wolinbarger & Gilly (2003) Li and Suomi (2009)Kumbhar (2012), Sharma and Surendra (2011) ,Samar, Swad and Rolf (2009)

Dimensions	Description	Supporting authors
E-fulfillment,	Availability of divers banking services and scope of e-banking services offered	Kumbhar (2012), Wolinbarger & Gilly (2003) Li and Suomi (2009)
Reliability	The trustworthiness of e-banking systems for achieving its intended purposes or what it is needed for.	Parasuraman, Zeithaml and Berry (1985, 1988, 1994). Croning and Taylor (1994), Zeithaml et al. (2000), Cook et al. (2003), The Association of Research Libraries (2005), Tsoukatos and Rand (2007), Wolinbarger & Gilly 2003 Samar, Swad and Rolf (2009, Bedi Monica (2010), Li and Suomi (2009)
Accessibility,	The extent at which e-banking systems are perceived to be reachable at any point in time and at vantage places	Kumbhar (2012), Wolinbarger & Gilly 2003 Li and Suomi (2009)
Security/privacy	Freedom from danger of loses, fraud. Safe from worry and protecting customers' interest	Zeithaml et al. (2000), Akiran (1994), Wolinbarger & Gilly (2003), Sharma and Surendra (2011), Li and Suomi (2009)
System Availability	The presence of up-to-date e-banking equipment, ATM, Internet banking, E-bill pay, MS alerts, Debit Cards, Branch networking etc	Prasuraman Zeithaml and Malhotra (2005) Kumbhar (2012)
Contacts	Communicating through e-banking systems for customer support, request and directions regarding transactions.	Prasuraman Zeithaml and Malhotra (2005) Kumbhar (2012)

3. METHODS AND DATA ANALYSIS

This study adopts a descriptive survey with population of all customers of the Ghana Commercial Bank Ltd. As, the selection of an appropriate sample and sampling method depends on the aim of the study [124] the current research employs the use of purposive sampling technique which is defined as selecting units (e.g. individuals, groups, institutions), based on a specific purpose associated with answering a research question. This method allows the researcher to actively select the most productive sample to answer the research questions [124]. Therefore, the purposive sampling technique was used to consciously select six hundred (600) respondents who meet the criteria of having used electronic banking services for the past twelve months and above. Based on survey strategy views of [125,126] the researcher adopted structured questionnaires and interviews approach to gather data from the respondents. The purpose of the questionnaires it to have insight into customers' intention on electronic banking service quality regarding electronic service delivery systems offered by the bank

(GCBLtd) and finally to collect bio-data of the respondents. The Statistical Package for Social Sciences (SPSS Version 21.0) was used to analyze the data gathered. Gathered data in the study is presented and analyzed using statistical techniques such as descriptive statistic (such as frequencies and simple percentages), Principal Component Analysis with Factor Analysis as an extraction method followed by a CFA to confirm the measurement items.

A test of validity and reliability of the items on each constructs was conducted to measure the strength of the tested items. Validity refers to the extent at which statistical instrument measure it intended purpose [127]. The study explored to find out the extent of internal consistency among the items in service quality dimensions and whether they can be relied upon to measure service quality of electronic banking.

Convergent and discriminant validity were considered for indications of validity problems using the stats tools package (excel) for measurement validation. The estimates for convergent validity (with AVE) shows decent

AVE values above 0.50 while all the square root of the AVE on the (diagonal matrix in Table 5) were sufficiently higher than all inter-factor correlations. Indicating adequate convergent and discriminant validity of the measurement model as specified by [128]. In no doubt that, the research measures were valid and reliable as the MSV and ASV for all constructs were far less than the AVE and that, the composite reliability (CR) ratios computed for all factors were highly above the minimum threshold of 0.70 in all cases when items of constructs obtained significant path loadings at p<0.001.

4. DATA ANALYSIS AND PRESENTATION

From a purposive sample of 600 electronic banking customers of the Ghana Commercial Bank Ltd, 556 data was retrieved representing 92.6% of the 600 sample contacted. 302 were male and 254 were females. 481 with first degree and above whilst 71 had below diploma and certificate. 320 with ages above 30 years and 236 respondents had ages below 30 years. Also, the data had 281 married and 205 singles as respondents.

Successively, the data was keyed into excel for screening where missing data and unengaged responses were important issues for consideration. None of the cases had missing data Vis a vis unengaged responses as all the cases had approximately reliable standard deviation $s = \sqrt{\frac{\sum_{i=1}^{n}(X_i - \bar{X})^2}{(n-1)}}$ greater than 0.5

In SPSS version 21, the location and variability of the data as responded by the 556 retrieved cases was established. Skewness ($G1 = \frac{\sqrt{n(n-1)}}{n-2}g1$) (for age & gender) and Kurtosis (for the Likert-scales) were analyzed to test the Normality of the data set. Given a threshold of +/- 2.00 to check indications of problematic Kurtosis, There exist no issues of potentially problematic kurtosis as none of the cases had values extremely higher than the threshold. Respectively, all the test scores obtained for most of the bio characteristics of the respondents were approximately normally distributed for males and females with skewness of -.009 to .500 and a kurtosis of -.910 to 1.813 for the Likert scale items. Explicitly the data set in no terms differ significantly from normality and is approximately normally skewed nearly to zero and kurtotic with less or no problematic issues.
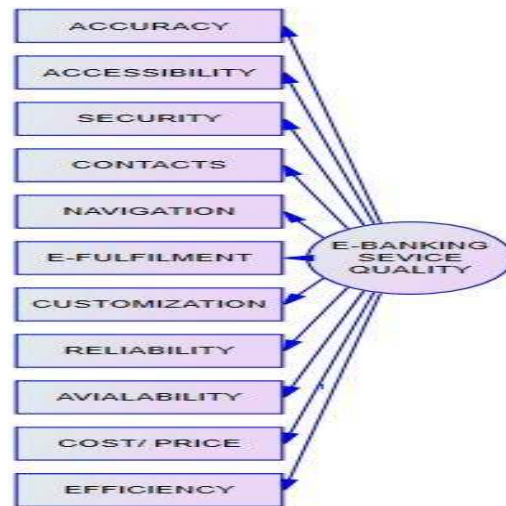

Fig. 1. Pictorial presentation of the research model

From the data obtained, an EFA using PCA with Varimax rotation was executed to show the presence of correlations in the e-banking service quality model. Several analyses were staged to substantiate the expected loadings of the observed variables and the existence of adequate correlation whilst reliability and validity criteria were all met. Upon stages of iterations, 4 items representing cost and prices of e-banking services as construct for measuring e-banking service quality were discarded to obtained clear and well defined factor solution as their communalities and MSA were very low (.245 to .221) hence they were discarded. Successively, the KMO and Bartlett's test for sampling adequacy (.977) was sufficiently significant (with approximate *Chi-Square* of 78936.886 at 1081 df, p<0.001) and the communalities for all the items (in Table 3) were satisfactorily high (all above 0.6 and most above 0.800), indicating a sufficient correlation among the items designed for e-banking service quality construct. This further affirm that, the data retrieved for the items of e-banking service quality constructs is not from identity population as the correlation coefficients are sufficiently different from zero. Then again, the MSA values obtained for each items all above .5 (see Table 3) goes to reinforce that, sampling adequacy for the research data is superb according to [129]. Subsequently, a clean factor pattern with no cross loadings was generated using the Varimax rotation (see table). Additionally, the reproduced correlation matrix had only 3, representing 0% non-redundant residuals greater than 0.05, further confirming the adequacy of the items and the 3-factors

extracted for the model. *The Cronbach's alpha reliabilityestiamte* $\alpha = \frac{K}{K-1}\left(1 - \frac{\Sigma_{i=1}^{K}\sigma^2 Yi}{\sigma^2 X}\right)$ for each construct was internally consistent.

4.1 Confirmatory Factor Analysis

In as much to test the measurement items and the defined constructs for e-banking service quality, a confirmatory factor analysis was conducted to obtain a decent measurement model for the study, utilizing the pattern matrix model builder of the SPSS Amos version. A CFA was computed to further justify and confirm the factor structure specified in the EFA analysis in view to clarify the relationship between observed measures (indicator) and latent variables. The modification indices generated were examined to determine further extent of opportunity to improve the model and thus gives a confirmation to the measurement items. Accordingly, the error terms for several measurement items were co-

varied (see Fig. 2) to obtain decent good fit for the research model. The goodness of fit indices derived for the measurement model; Cmin, RMR, RMSEA, NFI and PCFI expose sufficient predictive ability present in the model as indicated in Table 5. Then again, all the path estimates were sufficiently higher than .5 in all cases (as shown in Table 6 and Fig. 3) which further affirms that, the values obtained for the fit indices are sufficient. Further examination of the measurement model evinces the covariance estimates of construct to construct relationship in the e-banking service quality. In most cases, the covariance estimates are less than .5 and .6 in few cases. Also, the standardized residuals co-variances were consulted to find if there exist discrepancies in the proposed and the estimated model of the e-banking service quality model. In all cases, all the standardized residuals were far less than .4 and .2. Table 5 indicates the goodness of fit indices of the measurement model for redefined e-banking service quality.
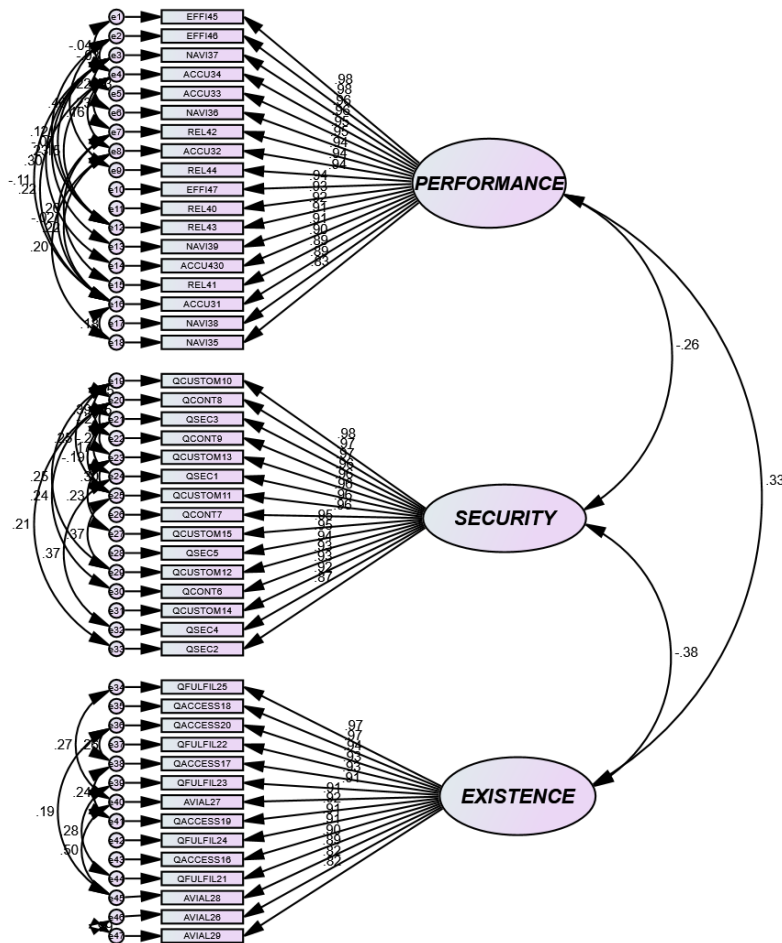

Fig. 2. Measurement model

Table 3. Initial factor extraction

KMO and bartlett's test					
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.				.977	
Bartlett's Test of Sphericity	Approx. Chi-Square			78936.886	
	Df			1081	
	Sig.			0.000	
Initial factor extraction					
Constructs & Items	**MSA**	**Factor loadings**	**Eigenvalues**	**% of variance**	**Communality**
System performance			15.659	33.318	
EFFI45	.979[a]	0.966			0.964
EFFI46	.976[a]	0.959			0.954
NAVI37	.974[a]	0.946			0.929
ACCU34	.970[a]	0.943			0.921
ACCU33	.985[a]	0.941			0.919
NAVI36	.987[a]	0.936			0.903
REL42	.971[a]	0.930			0.898
ACCU32	.989[a]	0.925			*0.888*
REL44	.984[a]	0.921			0.887
EFFI47	.988[a]	0.920			0.880
REL40	.987[a]	0.913			0.869
REL43	.986[a]	0.905			0.847
NAVI39	.984[a]	0.901			0.843
ACCU430	.979[a]	0.899			0.842
REL41	.987[a]	0.887			0.818
ACCU31	.988[a]	0.879			0.809
NAVI38	.991[a]	0.876			0.803
NAVI35	.990[a]	0.825			0.718
System security			13.567	28.866	0.000
CUSTOM10	.972[a]	0.961			0.962
CONT8	.966[a]	0.949			0.947
SEC3	.979[a]	0.945			0.939
CONT9	.976[a]	0.944			0.926
CUSTOM13	.978[a]	0.938			0.918
SEC1	.980[a]	0.937			0.923
CUSTOM11	.980[a]	0.935			0.920
CONT7	.982[a]	0.933			0.916
CUSTOM15	.985[a]	0.931			0.912
SEC5	.989[a]	0.930			0.909
CUSTOM12	.989[a]	0.919			0.892
CONT6	.987[a]	0.919			0.884
CUSTOM14	.985[a]	0.911			0.880
SEC4	.981[a]	0.901			0.857
SEC2	.983[a]	0.857			0.787
System presence			11.873	25.262	0.000
FULFIL25	.970[a]	0.944			0.939
ACCESS18	.964[a]	0.930			0.923
ACCESS20	.969[a]	0.920			0.898
FULFIL22	.983[a]	0.905			0.867
ACCESS17	.979[a]	0.902			0.871
FULFIL23	.981[a]	0.895			0.849
AVIAL27	.956[a]	0.894			0.857
ACCESS19	.984[a]	0.888			0.854
FULFIL24	.982[a]	0.882			0.828
ACCESS16	.984[a]	0.879			0.831
FULFIL21	.970[a]	0.875			0.831
AVIAL28	.959[a]	0.870			0.821
AVIAL26	.904[a]	0.816			0.736
AVIAL29	.905[a]	0.815			0.734

Source: field data

Table 4. Initial factor extraction

Rotated component matrix[a] , reliability mean and standard deviations of thee measurement indicator				Mean	SD
Cranach's alpha	**Component**				
	1	**2**	**3**		
	0.981	**0.974**	**0.887**		
EFFI45	.966			3.42	1.030
EFFI46	.959			3.43	1.025
NAVI37	.946			3.43	1.026
ACCU34	.943			3.43	1.023
ACCU33	.941			3.42	1.025
NAVI36	.936			3.41	1.032
REL42	.930			3.43	1.027
ACCU32	.925			3.41	1.029
REL44	.921			3.42	1.037
EFFI47	.920			3.42	1.038
REL40	.913			3.43	1.029
REL43	.905			3.42	1.039
NAVI39	.901			3.44	1.026
ACCU430	.899			3.43	1.021
REL41	.887			3.42	1.032
ACCU31	.879			3.43	1.034
NAVI38	.876			3.44	1.037
NAVI35	.825			3.42	1.032
CUSTOM10		.961		3.64	1.178
CONT8		.949		3.64	1.172
SEC3		.945		3.64	1.179
CONT9		.944		3.64	1.182
CUSTOM13		.938		3.63	1.185
SEC1		.937		3.64	1.167
CUSTOM11		.935		3.64	1.177
CONT7		.933		3.63	1.180
CUSTOM15		.931		3.64	1.179
SEC5		.930		3.65	1.181
CUSTOM12		.919		3.66	1.182
CONT6		.919		3.65	1.170
CUSTOM14		.911		3.65	1.199
SEC4		.901		3.63	1.159
SEC2		.857		3.61	1.176
FULFIL25			.944	2.79	1.232
ACCESS18			.930	2.80	1.228
ACCESS20			.920	2.79	1.223
FULFIL22			.905	2.77	1.218
ACCESS17			.902	2.80	1.211
FULFIL23			.895	2.78	1.215
AVIAL27			.894	2.79	1.218
ACCESS19			.888	2.80	1.222
FULFIL24			.882	2.79	1.221
ACCESS16			.879	2.78	1.228
FULFIL21			.875	2.77	1.226
AVIAL28			.870	2.78	1.219
AVIAL26			.816	2.79	1.150
AVIAL29			.815	2.79	1.150

Extraction method: Principal component analysis.
Rotation method: Varimax with Kaiser normalization.[a]
a. Rotation converged in 5 iterations

Table 5. Goodness of fit test of the measurement model

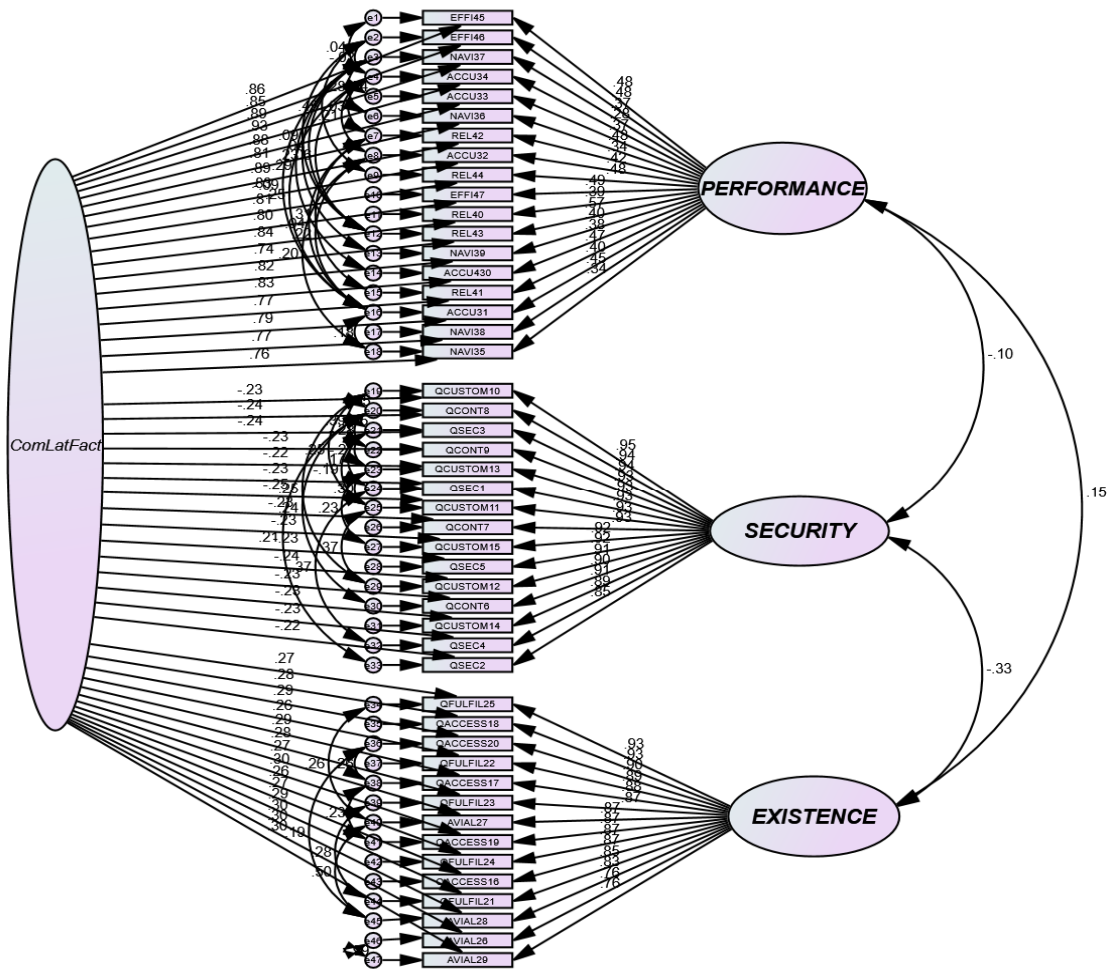| CHI square and goodness of fit indeces		
CHI-square		*2364.978*
D/F		*981*
Probability		*0.000*
Goodness of FIT		
Metric	**Observe values**	**Recommended thresholds**
cmin/dif	*2.235*	Between 1 and 3
CFI	*.985*	> .950
RMSEA	*.038*	< .060
PCLOSE	*.965*	> .050
RMR	*.026*	< .05
PNFI	*.885*	> .50
GFI	*.903*	> .80
NFI	*.973*	> .90

Source: field data

Fig. 3. Bias testing with common latent factor

Table 6. Measurement model validation

	CR	AVE	MSV	ASV	Performance	Existence	Security
Performance	0.991	0.862	0.110	0.088	0.929		
Existence	0.985	0.827	0.148	0.129	0.332	0.910	
Security	0.992	0.894	0.148	0.107	-0.258	-0.385	0.945

Table 7. Standardized estimates of measurement items

Items		Latent constructs	Estimate before CLF	S.E.	C.R.	P	Estimates after CLF
EFFI45	<---	PERFORMANCE	0.984	0.001	102.435	***	0.482
EFFI46	<---	PERFORMANCE	0.977	0.01	101.792	***	0.478
NAVI37	<---	PERFORMANCE	0.96	0.012	83.723	***	0.371
ACCU34	<---	PERFORMANCE	0.957	0.012	81.184	***	0.276
ACCU33	<---	PERFORMANCE	0.965	0.012	79.226	***	0.368
NAVI36	<---	PERFORMANCE	0.946	0.013	74.388	***	0.484
REL42	<---	PERFORMANCE	0.944	0.013	72.957	***	0.342
ACCU32	<---	PERFORMANCE	0.936	0.014	69.103	***	0.425
REL44	<---	PERFORMANCE	0.938	0.014	70.142	***	0.484
EFFI47	<---	PERFORMANCE	0.938	0.014	70.016	***	0.487
REL40	<---	PERFORMANCE	0.928	0.014	65.376	***	0.389
REL43	<---	PERFORMANCE	0.918	0.015	61.551	***	0.575
NAVI39	<---	PERFORMANCE	0.912	0.016	59.517	***	0.396
ACCU430	<---	PERFORMANCE	0.913	0.015	59.938	***	0.377
REL41	<---	PERFORMANCE	0.898	0.017	55.168	***	0.473
ACCU31	<---	PERFORMANCE	0.887	0.017	52.303	***	0.401
NAVI38	<---	PERFORMANCE	0.888	0.017	52.586	***	0.449
NAVI35	<---	PERFORMANCE	0.831	0.02	41.622	***	0.337
QCUSTOM10	<---	SECURITY	0.981	0.001	92.590	***	0.953
QCONT8	<---	SECURITY	0.974	0.011	87.575	***	0.944
QSEC3	<---	SECURITY	0.97	0.011	90.127	***	0.939
QCONT9	<---	SECURITY	0.959	0.01	100.968	***	0.932
QCUSTOM13	<---	SECURITY	0.955	0.013	78.217	***	0.929
QSEC1	<---	SECURITY	0.955	0.012	78.276	***	0.927
QCUSTOM11	<---	SECURITY	0.958	0.011	91.352	***	0.925
QCONT7	<---	SECURITY	0.956	0.012	79.156	***	0.928
QCUSTOM15	<---	SECURITY	0.952	0.013	76.343	***	0.925
QSEC5	<---	SECURITY	0.951	0.013	75.404	***	0.922
QCUSTOM12	<---	SECURITY	0.938	0.013	76.871	***	0.907
QCONT6	<---	SECURITY	0.933	0.014	66.276	***	0.904
QCUSTOM14	<---	SECURITY	0.934	0.015	66.751	***	0.906
QSEC4	<---	SECURITY	0.916	0.015	59.96	***	0.888
QSEC2	<---	SECURITY	0.873	0.018	48.613	***	0.846
QFULFIL25	<---	EXISTENCE	0.969	0.016	78.804	***	0.931
QACCESS18	<---	EXISTENCE	0.967	0.013	77.903	***	0.927
QACCESS20	<---	EXISTENCE	0.944	0.015	66.118	***	0.899
QFULFIL22	<---	EXISTENCE	0.932	0.015	61.542	***	0.894
QACCESS17	<---	EXISTENCE	0.928	0.016	60.109	***	0.882
QFULFIL23	<---	EXISTENCE	0.912	0.017	55.452	***	0.866
AVIAL27	<---	EXISTENCE	0.911	0.015	62.802	***	0.869
QACCESS19	<---	EXISTENCE	0.92	0.016	57.68	***	0.87
QFULFIL24	<---	EXISTENCE	0.91	0.017	54.832	***	0.872
QACCESS16	<---	EXISTENCE	0.909	0.017	54.758	***	0.87
QFULFIL21	<---	EXISTENCE	0.901	0.018	52.691	***	0.853
AVIAL28	<---	EXISTENCE	0.886	0.018	49.379	***	0.835
AVIAL26	<---	EXISTENCE	0.818	0.02	38.473	***	0.764
AVIAL29	<---	EXISTENCE	0.817	0.021	38.352	***	0.762

Path estimates are significant at the 0.001 level (two-tailed)

4.2 Measurement Model Validation

A validation was then again important as the model was duly fit. In validating the measurement model, convergent validity with AVE was calculated whilst the square root of the AVE (on the diagonal in the matrix below) were compared to all inter-factor correlations. The results shows that, all factors obtained decent AVE values above 0.50 and all the diagonal values are greater than the correlations among the factors indicating adequate convergent and discriminant validity of the measurement model as specified by [128]. Also, both MSV and ASV were far less than the AVE which further testifies valid distinct factors in the model. In addition, the composite reliability (CR) was computed for all factors and in all cases, the CR was highly above the minimum threshold of 0.70 whilst all items of constructs also had significant path loadings at $p<0.001$ further confirming that the measurement items and constructs are sufficiently valid in this study.

4.3 Bias Testing with Common Latent Factor (CLF)

Considering the single research instrument (survey) adopted to obtain data for redefined e-banking service qualities in this study, and given that, the data obtained could be either affected with common rater effect, consistency motif, mood state and common scale anchors, a common method bias test with unmeasured latent factor as recommended by [130] for explicitly unmeasured common factor studies is considered to determine if a method bias is affecting the results of the measurement model. Comparing the standardized regression weights before and after introducing the Common Latent Factor (CLF) shows that, most of the regression weights of the system quality indicators are sufficiently affected by the CLF in that, most of the deltas are higher than 0.400. However, the CR and AVE for each construct still meets the minimum thresholds. Notwithstanding, the CLF is recommended to be retained as composites are imputed to adjust CMB in other related studies to err on the conservative side.

5. RESEARCH FINDINGS

This study extracted e-banking service quality dimensions and redefines them to a simpler constructs using exploratory and confirmatory factor analysis. To gain insight and obtain more relevant outcome for this study, the Principal Component Analysis with Varimax was performed to identify the most effective service quality dimensions of electronic banking and to factor all the related dimensions for simpler analysis and interpretation. The analysis revealed 10 salient dimensions in service quality construct even though, 11 dimensions were initially proposed for the study. These 10 dimensions were extracted on 3 factors after series of correlations were present in the R-matrices.

Factor I was named as systems' performance quality, composed of navigation, efficiency, reliability and accuracy of electronic banking medium. The factor is defined as the extent at which the electronic medium used in financial transactions are easy to use and that electronic banking systems are operable to perform quick but faultless transactions and also reliable in its delivery of customer services. Factor II was named as systems' security quality which comprised of security, contacts and customization of e-banking service quality dimensions. It is defined as the extent to which electronic systems are modified to suit individual purposes or tasks in that, e-banking devices are programmed to protects customers' financial transactions and to communicate with the bank in-terms of transaction difficulty or problems. This refined dimension is associated with issues regarding security and privacy of electronic banking services.

The III Factor was named as systems' presence quality, involving E-Fulfillment, Accessibility and Availability dimensions of electronic banking service quality. It is referred as the presence or the existence of e-service platforms and electronic systems or the extent to which electronic service and systems are obtainable and receptive for use.

6. CONCLUSION AND RECOMMENDA-TIONS

The upshot of this study brings to fore existence of various antecedents in e-banking service quality. It is cardinally adduced that, e-banking services qualities could be factored on three antecedents involving the qualities that best describes the existence of e-banking systems and services, the qualities that defines the security concerns of e-banking systems and services and the qualities that examines the performances or functioning of e-banking services. It is evidenced that, the extant service

quality dimensions conceptualized for e-banking service quality could be simply classified on the various antecedents redefined in by this study. Since studies of this nature on e-banking service quality is limited however few scholars have devoted their efforts and resource to clarify service quality of e-banking, this study suggests that much attention should be concentrated on simplifying or constructing antecedents for the various dimensions of e-banking. As this study similarly suffers several limitations in that;

- The study was mainly conducted in a localized setting of retail banking.
- The study was restricted to a specific geographic region belonging to a single commercial city in the eastern region of Ghana.
- The study also does not rely on broader sample size to represent the entire population and hence the results could be viewed as just the perception of few clients interviewed but not the general populace of the bank.
- There exist a common method bias (CMB) in the data used for this study.

The above constraints go to suggests that, further researches need to be done in this area of e-banking service quality where a reasonable sample size will be used to represent the population, and the use effective statistical techniques such as a covariance based method would be awarded to carry the analysis. However, the need to test for CMB and compute composites if any, examine the distinctiveness thus discriminant validity and convergent validity of these redefined e-banking service quality antecedents are equally imperative in different research population whenever this redefined e-banking service quality is examined or applied to test its effects on other constructs such a customer satisfaction and retention.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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The peer review history for this paper can be accessed here:
http://sciencedomain.org/review-history/12452