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A Service Quality Assessment of Internet Banking of Commercial Banks in Namibia in the Absence of Face to Face Encounter

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Abstract

Numerous studies on assessing service quality have focused on service delivery on a face to face basis. However, this study offers an insight of customer perceptions of service quality of internet banking of the commercial banks in Namibia in the absence of face to face encounter. By adapting models from prior studies, a structured questionnaire consisting of service quality of internet banking was administered to a sample drawn from the population of customers using internet banking. Using factor analysis, a refined model for assessing service quality of Internet banking was developed. The refined model includes three service quality dimensions: service performance, communication and website design.

Keywords
Service Quality, Internet Banking, Namibia, Commercial Banks, E-S-QUAL

1. Introduction
In recent years, there has been an increasing amount of literature on measuring service quality of internet banking as banking institutions have allowed for a much wider range of banking products and services to become available and delivered to retail customers through an electronic distribution channel collectively referred to as internet banking (Settlements, 2003). As a result, competition among banking institutions has become rigorous (Settlements, 2003). In Namibia, even though the number of customers using internet banking is on the increase (Yang and Fang, 2003), studies concerning service quality per se are scarce. Therefore, this study is an attempt to develop a model comprising of different service quality dimensions and use the model to assess the service quality of internet banking in Namibia.

For the purpose of this study, the four commercial banks considered were: First National Bank Namibia Limited, Standard Bank Namibia Limited, Ned Bank Namibia Limited and Bank Windhoek Namibia Limited. Fides Bank Namibia Limited, a micro-finance bank whose operations remained relatively small in comparison to that of the other four commercial banks (Yang and Fang, 2004) and EBANK Limited that recently got the banking license from the Bank of Namibia (Iyambo, 2003)and whose website only offer information without the possibility of making any transactions were excluded in this study.

2. Methodology
Based on the literature review, a conceptual framework consisting of six dimensions of quality from the empirical work in Parasuraman and Zinkhan (2002) was developed.

2.1 Sample size
For this study, the sample size was put to be 500 internet banking customers as it was very difficult to identify potential customers or hard to locate customers' contact details from the commercial banks for the study

2.2 Sampling method
Since it was very difficult to identify potential subjects for the study, non-probability sampling methods called snowball sampling was used to generate an initial sample of online bank customers. According to Faugier and Sargeant (1997), snowball sampling allows one to gain access to the hard-to-reach and/or hidden population

2.3 Data validation
In order to determine the reliability and validity of the questionnaires before administration, the instrument was pre-tested in order to assess the flow of the questions, the time required to complete the questionnaire and to evaluate respondent interest and attention. In addition, a pilot study was conducted with ten respondents to check whether any changes needed to be made to the questionnaire before using it for the main study. The pre-testing, items that appeared to be awkward and vague was rephrased and refined.

2.4 Data analysis
In analyzing the data, Excel and XLSTAT were used. XLSTAT is a statistical software suite and is the most complete and widely used statistical add-on for Microsoft Excel for both Windows and MAC (Parasuraman and Zinkhan, 2002).

3. Results
3.1 Demographics
A total of five hundred (500) respondents were invited to participate in the survey. Only 221 responses were received. Seven (7) of the responses had missing answers and were excluded in this study. As a result there were 214 valid responses used in this study. Of the 214 responses, the survey comprised 49.53% males (n=106) and 50.47% females (n=108). Most of the respondents (66%; n=142) have been using the internet banking for more than 12 months, (22%; n=46) of the respondents have been using the internet banking between 3 -12 months. The remaining (12%; n=26) were for those using the internet banking for less than 3 months (Table 2).

Table 2. Demographics

Gender	Count	%
Male	106	50%
Female	108	50%
Length of IB use	**Count**	**%**
Less than 3 months	26	12%
3 - 12 months	46	22%
More than 12 months	142	66%

3.2 Exploratory Factor Analysis
Principal components analysis using Varimax rotation was applied to the data set. Bartlett's Test of Sphericity and the Kaiser-Meyer- Olkin (KMO) measure of sampling adequacy were used to establish the appropriateness of the data. Both these tests (KMO = 0.915; Bartlett's Test of Sphericity (sig=0.0001) were found to be acceptable to conduct factor analysis.

An extraction value of the communalities of all the variables revealed that 5 items were not great than 0.5. The 5 items were subsequently removed to reduce ambiguity in the interpretation of the factors (Faugier and Sargeant, 1997) and a second Principal Component Analysis (PCA) was performed on the remaining items. A re-run of the factor analysis had only 1 item to not fit well with the factor solution, and hence was also dropped from the analysis. The process was repeated until the desirable result was obtained.

With the help of eigenvalues, three (3) factors which accounted for 65.03% of the overall variance in the scale item scores were extracted.

Table 2. Exploratory factor analysis

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Eigenvalue	5.32	1.48	1.01	0.69	0.63	0.55	0.51	0.46	0.44	0.38	0.35	0.18
Variability (%)	44.32	12.31	8.39	5.76	5.27	4.56	4.22	3.85	3.68	3.19	2.94	1.52
Cumulative %	44.32	56.63	65.03	70.78	76.05	80.61	84.83	88.67	92.36	95.55	98.48	100.00

Table 2 shows that, only the first three factors (F1 – F3) have eigenvalues of over 1.00 and together they explain over 65% of the total variability in the data. This result suggests that the final solution should extract not more than 3 factors. Hence, the performed Principal Component analysis in this case leads to the extraction of only three factors and this means that all the 12 variables (questions) should be regrouped to form only three (3) service quality dimensions.

After the reduction of factors from six to three (varimax with Kaiser Normalization as the rotation method), the next task was to name the three factors. There exist no rules for naming factors. However, it has been argued that one should give names that best represent the variables within the factors (XLSTAT, 2015). This makes the naming of factors more of an art work.

Therefore, Factor F1 is made of six variables Q6*, Q8*, Q14, Q16*, Q17* and Q18*. By studying the content of these questions named Service Performance. Equally, factor F2 was labelled as Communication and it includes two variables Q11* and Q12*. Lastly, the last factor F3 includes four variables Q1* - Q4* and was suitably named as Web site design.

To get a deeper understanding of how customers perceive the service quality of internet banking, descriptive statistics was used on the modified model and presented separately for each service quality dimension.

To interpret the survey responses, one would preferably compare the responses to an industry benchmark or to a similar survey question from a prior study (Tabachnick and Fidell, 2001). But for this study, such record of data does not exist. Also, with Likert scale data, one cannot use the mean as a measure of central tendency as the data this scale produces is ordinal and hence has no meaning

For these reasons, experts over the years have argued that the mode or the median should be used as the measure of central tendency and that frequencies (percentages of responses in each category) should be used (Yong and Pearce, 2013). For analysis purpose, the mode (in this study means the most frequent or most popular option) will be used in this study to display the distribution of percentages of responses in each category.

3.3 Service Performance

This service quality dimension was made-up of six variables Q6*= my bank does not allow phishing schemes through spam e-mail or pop-up windows on my internet banking; Q8* = my internet banking web site begins with 'https' in the address bar to indicate that the page is secured; Q14* = My bank uses encryption to prevent unauthorized access to my private information; Q16* = My bank's internet banking web site work in many internet browsers; Q17* = All my internet banking transactions are recorded, ensuring that I keep track of all payments that I have made; Q18* = I can view and download my account balances and transactions as can be seen in Table 4 and where SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree.

Table 3. Service performance

Statistic	Q6*					Q8*				
Category	SD	D	N	A	SA	SD	D	N	A	SA
Frequency per category	10	21	48	62	72	8	8	21	55	119
Rel. frequency per category	5%	10%	23%	29%	34%	4%	4%	10%	26%	56%

Statistic	Q14*					Q16*				
Category	SD	D	N	A	SA	SD	D	N	A	SA
Frequency per category	13	9	51	61	77	10	16	41	76	70
Rel. frequency per category	6%	4%	24%	29%	36%	5%	8%	19%	36%	33%

Statistic	Q17*					Q18*				
Category	SD	D	N	A	SA	SD	D	N	A	SA
Frequency per category	12	2	20	53	127	11	8	26	51	117
Rel. frequency per category	6%	1%	9%	25%	59%	5%	4%	12%	24%	55%

As can be seen in table above, Variable Q6* shows that although 10% of the respondents disagree and 23% were neutral or undecided, more respondents (34%) strongly agreed that the bank does not allow phishing schemes through spam e-mail or pop-up windows on the internet banking website. Variable Q8* shows that while 10% of the respondents were neutral, most respondents 56% strongly agreed and 26% agreed that internet banking web site begins with 'https' in the address bar to indicate that the page is secured. Those who strongly disagree and disagree were 4% each. Variable Q14* shows that although 24% of the respondents opted for neutral or undecided, respondents strongly agree (36%) that the bank uses encryption to prevent unauthorized access to their private information. Variable Q16* shows that while 19% of the respondents could not make up their mind, the high frequency of respondents 36% agreed and 33% strongly agreed that their banks' internet banking website work in many internet browsers. Variable Q17* shows that majority of the respondents 59% strongly agreed that all their internet banking transactions are recorded in order to keep track of all the payments made. Variable Q18* shows over half of the respondents, 55% strongly agreed that they can view and download their account balances and transactions.

3.4 Communication

This second dimension was made-up of only two variables Q11* = My bank's customer call centre can be contacted 24 hours a day whenever I have problems with internet banking systems and Q12* = My bank informs me whenever the internet banking is not available as can be seen in the Table 5 and SD =Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree).

Table 5. Communication

Statistic	Q11*					Q12*				
Category	SD	D	N	A	SA	SD	D	N	A	SA
Frequency per category	28	30	50	51	54	47	35	39	50	40
Rel. frequency per category	13%	14%	23%	24%	25%	22%	17%	18%	24%	19%

In table above, Variable Q11* displays that although a quarter of the respondents (25%) strongly agreed that the bank's customer call center can be contacted 24 hours a day whenever customers had problems with internet banking systems, 23% of the respondents reacted neutral, while 13% strongly disagree and 14% completely disagree that the bank's customer call center can be contacted 24 hours a day whenever one encounters problems with internet banking services. Variable Q12* on the other hand displays that 18% of the respondent reacted neutral to this variable while about a quarter (24%) of respondents agreed and 19% strongly agreed that the bank informs them

whenever the internet banking is not available. Contrary to those who said that the bank informs them whenever the internet banking is not available, a significant number of the respondents (strongly disagree = 22% and disagree = 17%) reacted differently to the bank's ability to informs its customers whenever the internet banking is not available.

3.5 Website Design

This third and last service quality dimension was made up of four variables Q1* = the website design is visually appealing and has a user-friendly interface; Q2* = Registering for internet banking is easy on my bank's website; Q3* = The web site has all my banking needs on the menu option; Q4* = The organization and structure of online content is easy to follow and Table 6 depicts the descriptive statistics of these variables. SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree.

Table 6. Website design

Statistic	Q1*					Q2*				
Category	SD	D	N	A	SA	SD	D	N	A	SA
Frequency per category	11	18	52	81	51	19	29	41	85	40
Rel. frequency per category	5%	8%	24%	38%	24%	9%	14%	19%	40%	19%

Statistic	Q3*					Q4*				
Category	SD	D	N	A	SA	SD	D	N	A	SA
Frequency per category	16	24	49	78	46	10	11	53	74	65
Rel. frequency per category	8%	11%	23%	37%	22%	5%	5%	25%	35%	31%

Variable Q1* shows that there was no difference in percentages between respondents who were neutral = 24% and those who strongly agree = 24% and it was unfortunate that the study did not carry out a statistical test to determine whether there was any significance in the percentage of Neutral and strongly agree being the same. However, it can be seen that 38% of the respondents agreed that indeed the website design of their internet banking sites are visually appealing and has a user-friendly interface. Similarly, it would have been very interesting to assess whether there was any statistical significance in the percentage of Neutral (19%) and strongly agree (19%) on Variable Q2* being the same. Nonetheless, 40% of respondents agreed that it is very easy to register for internet banking on their internet banking website and 9% and 14% strongly disagree and disagree respectively.

Variable Q3* shows that, while 37% of the respondents agreed to this variable and the difference in percentage between those who were neutral = 23% and strongly agree = 22% is insignificant, 8% and 11% strongly disagree and disagree respectively that the banking website has all their banking needs on the menu option. Lastly, Variable Q4* shows that there was an equal number of percentage (strongly disagree = 5%; disagree = 5%) of respondents for this variable. Possible explanations for this might be that respondents could not differentiate the difference between strongly disagree and disagree. Although 25% were neutral and 31% strongly agreed, the higher percentage (35%) of those who responded to this variable agreed that the organization and structure of online content is easy to follow.

4. Discussion

One of the chief objectives of this current study was to develop a scale to measure service quality of internet banking in Namibia. With the help of Factor analysis and Principal Component analysis, changes were made to the initial theoretical model for the attainability of higher reliability and consistency. The refined scale was identified including three service quality dimensions, namely Service Performance, Communication and Website Design with internal consistency ranging 0.602 - 0.862. When compared with previous studies in other parts of the world which were carried in the domain of e-services in general and internet banking in particularly, it was found that the three service quality dimensions uncovered in this study appear most often on the scales developed to measure e-service quality. The researchers (Sauro, 2011) uncovered four service quality dimensions to measure quality of Internet banking services in Sweden. All the three service quality dimensions identified in this study were consistent with the

ones reported by Sauro (2011). Other previous studies which are in agreement with the current study are those of Jamieson (2004) as well as Kenova and Jonasson (2006)
The first service quality dimension labelled Service Performance is made-up of six variables and accounted for 44.32% of the variance. This service quality dimension deals with the safety and secured transactions, no misuse of customers' personal information that gets exchanged on the internet interaction, the internet banking is always available for business and the speed of completing a transaction. The items that loaded onto this service quality dimension mostly relate to reliability, security, privacy and efficiency issues involved when transacting on the internet banking. What emerged from the descriptive analysis, was that most respondents were satisfied (agreed) or very satisfied (strongly agreed) that their online banking expectations in terms of reliability, security, privacy and efficiency were being met by their internet banks. The finding of these aspects on internet banking services is in support with previous studies (Jamieson, 2004; Gupta and Bansal, 2012; Molap, 2008; Dhurup et al., 2014)

The second service quality dimension labelled communication, comprised two variables and accounted for 12.31% of the total variability in the data. This service quality dimension is related to prompt responses of the bank to customers' requests by email or other means, the easiness to reach the bank by telephone and the availability of banks' support staff at all times when needed. Contrary to expectations, the descriptive analysis showed that customers have the highest level of dissatisfaction or indifference with the internet banking services such as: the 24 hours contact to the banks' customer support center whenever customers encountered problems with internet banking activities and banks' ability to inform its customers whenever the internet banking site is not available. Although, these results differ from some published study (Nimakoet al., 2013), they are in agreement with those obtained by Kenova and Jonasson (2006).

The last service quality dimension named Website Design, contained four variables and accounted for 8.39% of the variance. It deals with the design and the user-friendliness of the bank's website, easy navigation panel, easy registration of internet banking, has all banking needs on the menu option. What appears to be the case from descriptive analysis is that this service quality dimension has high percentage of customers whose expectations have been met. The finding of this service quality dimension is consistent with previous literature regarding Website design in internet banking (Dhurup et al., 2014; Ariff et al., 2012).

5. Conclusions

For the purpose of the study, a survey of 221 internet banking customers was conducted, from which 214 responses have been used for the analysis. In order to analyze the data and its reliability, Cronbach's alpha Test of Reliability and Principal Component Analysis were carried out. The Cronbach's Alpha Test of Reliability showed the relative reliability of the dimensions used in the model and the Principal Component Analysis led to some alterations in the initial theoretical model. Due to the low communalities, six of the items pertaining to the initial theoretical model - Q5*, Q7*, Q9*, Q10*, Q13* and Q15* were dropped from the model. Thus, the final version model consisting of Service Performance, Communication and Website design for measuring the quality of internet banking was developed.

Also, this study was limited to commercial banks and questionnaires that were answered by the online banking customers. Since the respondents' lists that would permit the random sampling were not readily accessible, allowing the study to use snowball sampling, no thoughts will be made outside the defined research area and extrapolation of the results in this study is discouraged. As studies about internet banking in Namibia were scarce, this study relied on sources from other countries. However, the foreign literatures reviewed were considered relevant to the current Namibian online banking industry. Last, it would be exciting and puzzling to test the model of this study for measuring the service quality of internet banking on other types of online services.

References

Settlements B. F. I., Electronic Banking Group of the Basel Committee on Banking Supervision, pp. 1-35, 2003.
Yang E. and Fang X., Online service quality dimensions and their relationships with satisfaction, International Journal of Service Industry Management, Vol. 15 No. 3, pp. 304-326, 2004.
Iyambo A., Shatona A., Nelumbu D., Haiyambo E., Motinga E., Sackaria J. and Namakalu H., Electronic Commerce Implication for the financial system, 2003.
Limited EBank, Bank of Namibia issues banking license to ebank limited, Media Release, pp. 1-2, 2014.

Parasuraman A. and Zinkhan G., Marketing to and Serving Customer through the Internet: an Overview and Research Agenda, Journal of the Academy of Marketing Science, 30(4),, pp. 286-295, 2002.
Faugier J. and Sargeant M., Sampling hard to reach populations, Journal of Advanced Nursing, 26, pp. 790-797, 1997.
XLSTAT, XLSTAT, 29 09 2015. [Online]. Available: http://www.xlstat.com/en/.
Tabachnick B. and Fidell L., Using Multivariate Statistics (4th Ed)., New York: Harper Collins., 2001.
Yong A. G. and Pearce S., A Beginner's Guide to Factor Analysis: Focusing on Exploratory Factor Analysis. Tutorials in Quantitative Methods for Psychology, vol. Vol. 9(2), pp. 79-94, 2013.
Sauro, J., Measuring Usability with the System Usability Scale (SUS) Retrieved from Measuring U: http://www.measuringu.com/sus.php, 2011.
Jamieson, S., Likert scales: how to (ab)use them, Med Educ,. Vol. 38, No. 12, pp. 1217-1218, 2004.
Kenova V. and Jonasson P., Quality Online Banking Services, Bachelor's Thesis in Business Administration:Jonkoping University, 2006.
Gupta K. K. and Bansal I., Development of an instrument to measure internet banking service quality in India, Journal of Arts, Science & Commerce,Vol.– III, Issue 2(2), p. 2, 2012.
Molap M. N., An assement of internet banking service quality, Master's thesis in Business Management, 2008.
Dhurup, M., Surujlal, J. and Redda E., Customer Perceptions of Online Banking Service Quality, Mediterranean Journal of Social Sciences,Vol 5 No 2, pp. 587-593, 2014.
Ariff M. S., Yuna O. L., Zakuana N. and Jusoha A., Examining Dimensions of Electronic Service Quality for Internet Banking Services, International Congress on Interdisciplinary Business and Social Science 2012, pp. 854-859, 2012.
Ariff M. S. M., Zavareh F. B., Zakuan N. and Ishak N., Electronic Service Quality of Iranian Internet Banking, Rev. Integr. Bus. Econ. Res. Vol 2(2), 2013.
Nimako S. G., Gyamf N. K. and Wandaogou A. M. M., Customer Satisfaction With Internet Banking Service Quality in The Ghanaian Banking Industry, international journal of scientific & technology research volume 2, pp. 1-11, 2013.

Biography

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