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Modelling Customer Satisfaction at Ghana Commercial Bank: An Application of Ordinal Logit Regression

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Abstract

In the competitive banking business, customer satisfaction is taken as a matter of success. It rely on a multitude of factors and varies from one customer to another and product to product. The capability and ability of a bank depends on the degree of its customer satisfaction. Thus banks usually place more weight on customer satisfaction and loyalty. This paper analysed the effect of service quality on customer satisfaction at Ghana commercial bank. It was noted in the results that service quality dimensions on tangible, responsiveness, empathy and trust are relevant contributing factors to customer satisfaction at Ghana commercial bank. However, reliability and assurance, in terms of, service quality aspects are not really contributing significantly to customer satisfaction. The study suggest the following managerial policies. First, the managers should regularly conduct customer surveys and should incorporate feedback in the changes desired by the customers. The banks can provide training programs for their employees in order to make them more effective while dealing with the customers, especially in handling customer complaints. This can help to improve satisfaction by reducing defections of dissatisfied customers.

Keywords: Customer Satisfaction; Service Quality; Ghana Commercial Bank; Ordinal Logit Regression.

1. Introduction

The service sector has contributed largely to the worldwide gross national product in the twenty first century (Kara et al., 2005). In the huge service enclave, the banking industry is one of the most relevant entities; it has expanded relatively quickly in the world. The level to which customers' needs and expectations can be satisfied largely depends on the quality of service (Banerjee, 2012). The concept of satisfaction is rather subjective and hence difficult to determine, (European Institute of Public Administration, 2008). It rely on a multitude of factors and varies from one customer to another and product to product. However, when expectations and needs of customers are met, then quality is said to be achieved, (Parasuraman et al. 1991). Other researchers have asserted that satisfaction is the meeting of the needs or wants of customers (Olivia et al., 1992; Fecikova, 2004 and ISO, 2005). Titko and Lace (2010) have argued that customer satisfaction is the back bone of the power and survivorship of a bank. Thus, banks place more value and much focus on customer satisfaction, (Kattack and Rehman 2010). Yeung et al. (2002) however accentuated that verbal interaction can lure customers to bring new customers to the bank which can lessen the cost of marketing. But Sureshchander et al. (2003) have a contrary view, which is supported by Abdullah and Rozario (2009). They intimated that the extent of customer satisfaction could be motivated by various internal and external factors.

The numerical strength of commercial banks operating in Ghana has increased to 27 (Bank of Ghana, 2010) and are predominant in the urban centres. The quantum of services and packages sold by these banks has also gone up in Ghana (Bank of Ghana 2006). Therefore, these are indications that customers have easy access and also receive quality service from banks. Harti (2006) thinks that the attitude of customers is not predictable since their priorities' have become more intricate and distinct. Customers differ from one another and even perceive the same thing differently, (Smith 2009). Some previous researches are of the view that satisfaction is, among others, the by-product of marketing (Oliver, 1980; Surprenant and Churchill, 1982; Spreng et al, 1996; Mick and Fournier, 1999). Meanwhile, Hofstede (2001) posit that some of the Asian cultures such as India, Pakistan are collectivist and therefore verbal advertisements are important for

their banks. File and Prince (1992) asserted that satisfied customers who tell other customers about their experiences usually enhances word-of-mouth advertisement. This approach enable the banks to expand in customer numbers. According to Prabhakaran (2003) a more satisfied customer is relevant in sustaining a loyal customer base since the customer is the king. Thus establishing a link between service quality, satisfaction and loyalty is essential. Kumar *et al.* (2009) posited that quality of service influences satisfaction which consequently enhances customer loyalty. Saif (2009) noted that satisfaction is the effect of service quality. Caruana (2002) modelled the relationship between service quality and loyalty using satisfaction as a mediation variable operating with retail banks in Malta. Other researches have noted that service quality has effect on satisfaction and therefore leads to loyalty (Chang *et al*., 2009). Zeithaml *et al* (2008) argued that there is some degree of correlation between service quality, customer satisfaction and customer loyalty in one conceptual framework.

Service quality and satisfaction were modelled as different, yet closely linked concepts. There is a positive correlation among the two concepts (Beerli *et al*., 2004). This correlation is however debatable. Many studies have accentuated that service quality is a direct consequence of satisfaction, whilst a contrast view holds for other researches. Jamal and Naser (2003) noted that satisfaction was the outcome of service quality, yet, there was no relevant correlation between satisfaction and tangible component of service environment. This results was contrasted with past studies by Blodgett and Wakefield (1999), yet confirmed by Parasuraman *et al* (1993). Many of the studies argued that service quality leads to satisfaction (Bedi, 2010; Kassim and Abdullah, 2010; Kumar *et al*., 2010; Naeem and Saif 2009; Balaji, 2009; Lee and Hwan, 2005; Athanassopoulos and Iliakopoulos, 2003; Parasuraman *et al* 1988). It is a fact that that service quality has a positive effect on satisfaction (Yee *et al.,* 2010) but Bitner (1990) and Bolton and Drew (1991) argued that satisfaction leads to service quality. This assertion was confirmed by Beerli *et al.* (2004). There is widespread perception that Ghana Commercial Bank (GCB) does not provide its customers with quality service and as a result customer satisfaction is rather low. Many factors that influence customer satisfaction, particularly service quality, need to be analysed in order to accurately measure it. Against this backdrop, this article seeks to model customer satisfaction base on service quality at GCB in Ghana.

2. Materials and Method

2.1. Sampling Strategy and Sample Size

In selecting the sample of customers, stratified random sampling technique was employed. The study sample consisted of 750 customers drawn from across five cities of the various regions comprising southern Ghana. The study also infused some amount of quota sampling to allocate quotas to the various strata based on the numerical strength of customers within the stratum. The technique considered the population of GCB customers in these regions each as a stratum. Subsequently, a simple random sampling technique was used to select customers as shown in Table 1 below.

Table 1: Customers of GCB from Selected Cities in Ghana

City	Strata Sample Size
Accra	250
Koforidua	100
Ho	100
Cape Coast	100
Takoradi	200
Total	750

Source: Researchers field survey 2015

2.2. Structure of Questionnaire

The study employed self-administered questionnaires to collect data from the respondents. The respondents were first asked questions on their demographic characteristics and subsequently sought respondents' ratings of key services rendered by Ghana Commercial Bank in respect of various products. The questionnaire was divided into three main parts comprising of questions on respondents' demographic data, questions related to overall customer satisfaction and questions related to quality of service.

2.3. Data Management

The variables in the questionnaire were coded as follows; Gender (1= male, 2= female), Type of Account (1= savings, 2= current, 3= salary, 4= investment, 5= others), occupation (1= civil servant, 2= public servant, 3= private). All other

questions relating service quality and customer satisfaction were in Likert form and rated as: Strongly Disagree=1, Disagree=2, Not sure=3, Agree=4 and Strongly Agree=5.

2.4. Model Specification, Estimations and Tests

In considering methods for Likert scale responses having more possible options, a number of methods have been developed for handling the various possibilities. The most appropriate method developed for this case is the *ordinal logit* concept (Agresti, 2002 and Gelman and Hill 2007).

The basic idea underlying the ordinal logit model is re-expressing the categorical variable in terms of a number of binary variables based on internal cut-points in the ordinal scale.

The following notation would employed in the model.

- Let Y be a random variable that can take on one of the K discrete values (i.e., fall into one of K classes)
- Number the classes 1,..., K
- Thus, $\pi_{i2} = \Pr(Y_i = 2)$ denotes the probability that the ith individual's outcome belongs to the second class
- More generally, $\pi_{ik} = \Pr(Y_i = k)$ denotes the probability that the ith individual's outcome belongs to the kth class.

On the other hand when the categories are ordered to assume that the log odds of $Y \geq k$ is linearly linked with the predictor variables. This is known as the proportional odds model which demands the estimate of only one regression coefficient per predictor variable (Clogg and Shihadeh, 1994 and Brant, 1990)

The model is given by

$$\log\left(\frac{\pi_k + \ldots + \pi_K}{1 + \ldots + \pi_{k-1}}\right) = \beta_{0k} + X^T\beta \qquad (1)$$

Thus, we still have to estimate $K-1$ intercepts, but only p linear effects, where p is the number of explanatory variables (note that $K + p - 1 < (K-1)(p+1)$ if $K > 2$).

2.4.1. Testing Parallel Lines

According to Liao, (1994) the *Chi-Square* is usually employed to determine the difference between two –2log-likelihood figures. If the lines are parallel, the observed significance value for the change would be large, since the general model does not improve the fit very much and hence the parallel model is said to be adequate.

The following hypothesis are tested in this study.

H_0: The location parameters (slope coefficients) are the same across response categories

H_1: The location parameters (slope coefficients) are not the same across response categories

2.4.2 Goodness-of-Fit Test

From the observed and expected frequencies, the usual Pearson and Deviance goodness-of-fit measures can be computed (Ananth and Kleinbaum, 1997). The Pearson goodness-of-fit statistic is

$$\chi^2 = \sum\sum\left(\frac{O_{ij} - E_{ij}}{E_{ij}}\right)^2 \qquad (2)$$

The deviance measure is

$$D = 2\sum\sum O_{ij} In\left(\frac{O_{ij}}{E_{ij}}\right) \qquad (3)$$

The following hypothesis are tested here.

H_0: The fitted model is consistent with the observed data

H_1: The fitted model is not consistent with the observed data

When the model fits well, the observed and expected cell counts are similar, the value of each statistic is small, and the observed significance level is large (Ananth and Kleinbaum, 1997). You reject the null hypothesis that the model fits if the observed significance level for the goodness-of-fit statistic is small (O'Connell, 2006). Good models have large observed significance levels (Ananth and Kleinbaum, 1997 and O'Connell, 2006)

2.4.3. Overall Model Test

According to Liao (1994) and Allison (1999) a change in likelihood function has a chi-square distribution even when there are cells with small observed and predicted counts. When it is observed that the difference between the two log-likelihoods—the Chi square—has an observed significance level of less than 5%, it means that the null hypothesis that the model without predictors is as good as the model with the predictors can be rejected (Liao, 1994 and Allison, 1999).

The hypothesis test here is given by

H_0: The model without predictors is as good as the model with the predictors

H_1: The model without predictors is not as good as the model with the predictors

3. Results

From the observed significance levels ($p<0.05$) in Table 2 below, it can be seen that four factors out of the six service quality dimensions were statistically significant in influencing a customer satisfaction level. These dimensions include; tangibility, responsiveness, empathy and trust. Meanwhile, customers who agree to tangibility are more likely to assign higher ratings on satisfaction level than their counterparts who do not disagree. Also, commercial banks customers who agree on the *bank's responsiveness* are more likely to assign higher ratings for satisfaction level than customers who think otherwise. Interestingly, customers who disagree on the dimension of *empathy* are more likely to assign high ratings for satisfaction level than those who agree. Moreover, customers who agree on the dimension of *trust* in the bank are more likely to assign higher ratings for satisfaction level than their counterparts who just disagree.

However, service quality dimensions including reliability and assurance were each not statistically significant. This means that each of these service quality dimension does not significantly influence a customer satisfaction level.

Table 2: The Ordinal Logistic Model

		Estimate	Std. Error	Wald	P-value	95% Confidence Interval	
						Lower Bound	Upper Bound
Threshold	[SL = 1]	-0.694	0.939	0.546	0.460	-2.534	1.146
	[SL = 2]	2.444	0.977	6.258	0.012	0.529	4.359
	[SL = 3]	4.527	1.111	16.595	0.000	2.349	6.705
	[SL = 4]	9.972	1.878	28.190	0.000	6.291	13.653
Location	[TA=1]	3.650	1.837	3.947	0.996	0.049	7.252
	[TA=2]	-0.636	1.036	0.377	0.794	-2.668	1.395
	[TA=3]	-0.783	0.793	0.974	0.003	-2.337	0.772
	[TA=4]	-1.657	0.679	5.959	0.036	-2.987	-0.327
	[TA=5]	0[a]					
	[RL=1]	0.810	2.643	0.094	0.759	-4.369	5.990
	[RL=2]	2.371	1.396	2.885	0.089	-.365	5.106
	[RL=3]	0.257	0.883	0.085	0.771	-1.473	1.988
	[RL=4]	-0.302	0.758	0.159	0.690	-1.787	1.183
	[RL=5]	0[a]					

	[RS=1]	-0.219	1.594	0.019	0.467	-3.343	2.906
	[RS=2]	-0.080	1.083	0.005	0.317	-2.203	2.043
	[RS=3]	-0.262	0.937	0.078	0.044	-2.099	1.574
	[RS=4]	0.706	0.584	1.458	0.034	-0.440	1.851
	[RS=5]	0[a]					
	[AS=1]	-9.541	4.546	4.405	0.036	-18.452	-0.631
	[AS=2]	-0.033	1.188	0.001	0.978	-2.362	2.296
	[AS=3]	1.165	0.897	1.689	0.194	-0.592	2.922
	[AS=4]	-0.329	0.765	0.185	0.667	-1.828	1.170
	[AS=5]	0[a]					
	[EM=1]	5.044	2.577	3.831	0.049	-0.007	10.094
	[EM=2]	0.200	1.185	.028	0.866	-2.124	2.523
	[EM=3]	0.035	0.915	.001	0.970	-1.758	1.828
	[EM=4]	-0.327	0.698	.219	0.639	-1.696	1.042
	[EM=5]	0[a]					
	[TR=1]	6.672	3.451	3.738	0.053	-0.092	13.436
	[TR=2]	7.367	1.885	15.281	0.000	3.673	11.061
	[TR=3]	1.917	0.841	5.193	0.023	0.268	3.566
	[TR=4]	0.830	0.724	1.314	0.001	-0.589	2.248
	[TR=5]	0[a]					

a. This parameter is set to zero because it is redundant.

Table 3: Test of Parallel Lines

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	125.468			
General	100.352	25.117	48	0.997

The assumption that the regression coefficients are the same for all three categories is tested using the test of parallel lines. If you reject the assumption of parallelism, you should consider using multinomial regression, which estimates separate coefficients for each category. Since the observed significance level in Table 3 is large (i.e. $p>0.05$), it implies that there is no sufficient evidence to reject the parallelism hypothesis. Therefore we conclude that the regression coefficients are the same across the response categories.

Table 4: Model Fit

Model	-2LogLikelihood	Chi-Square	df	P-value
Intercept Only	243.057			
Final	125.468	117.589	24	0.000

From Table 4 above, it can be noted that the difference between the two log-likelihoods with Chi-square distribution has a p-value less than the significance level 0.05 (i.e. $p<0.05$). This indicates that there is sufficient basis to reject the null hypothesis and therefore conclude that the final model gives a significant improvement over the baseline intercept-only

model. Hence the final model gives better predictions than if you just guessed based on the marginal probabilities for the outcome categories.

Table 5: Goodness-of-Fit Test			
	Chi-Square	**df**	**P-value**
Pearson	222.751	231	0.640
Deviance	119.923	231	1.000

From Table 5 above it can be observed that the p-value (0.640) is greater than the significance level (0.05). This means that we fail to reject the null hypothesis that the fitted model is consistent with the observed data. Thus we conclude that the data and the model predictions are similar at 95% confidence level which implies a good model. The Pseudo R-square (Nagelkerke=76.8%) indicates that the predictor variables explains most of the proportions of variation between customer satisfaction (response). There is however about 23.2% of the variability which is unaccounted for, which may be due to research related errors.

4. Discussion

This study has established that there is a link between service quality and customer satisfaction in Ghana commercial bank. Meanwhile, previous researches (Jamal and Nasr, 2003 and Parasuraman *et al.*, 1993) found that there is no important relationship between customer satisfaction and tangible aspects of service quality, in contrast, this study noted that tangible significantly influence customer satisfaction and this is supported by Blodgett and Wakefield (1999).

Service quality aspect on assurance was not statistically significant in this study which is in contrast with Caruana et al. (2000) model. The study here asserted that satisfaction is strongly influenced by service quality dimension on responsiveness which contradicts a previous study Banergee (2012). There are overwhelming arguments that it is more expensive to win new customers than to keep existing ones (Hormozi and Giles, 2004). This is in line with this study as service quality dimension on trust influence's satisfaction and could therefore make it easier for the bank to retain its customers. This assertion was also confirmed by an earlier study Yeung et al., (2002). Customer satisfaction programmes should take into consideration that the provision of convenient, easy and fast banking services is closely associated with the customers' perceptions of how these bank services are delivered to them. These perceptual outcomes will, in turn, affect the level of bank customer satisfaction ratings. The current study suggests that in general customers in Ghana are, to some extent, satisfied with services provided by the Ghana commercial bank. This may be interpreted as service quality being an antecedent of customer satisfaction because service quality is the driver of the bank performance.

5. Conclusions

The results showed that service quality dimensions in terms tangible, responsiveness, empathy and trust are relevant contributing factors to customer satisfaction at Ghana Commercial Bank. However, reliability and assurance, in terms of, service quality aspects are not really contributing significantly to customer satisfaction. The study suggest the following managerial policies. First, the managers should regularly conduct customer surveys and should incorporate feedback in the changes desired by the customers. The bank can provide training programs for their employees in order to make them more effective while dealing with the customers, especially in handling customer complaints. This can help to improve satisfaction by reducing anxiety of dissatisfied customers.

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