

Measuring quality of service and its outcomes: an econometric model

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Abstract

The Hierarchical Service Quality Model (HSQM), developed by Brady and Cronin (2001) to capture the quality of services sector, was used as base to extend it to evaluate Pakistan's banking sector services' quality and its outcomes in the form of banking sector customers' satisfaction, trust and loyalty. Sample included 240 bank-customers of six different randomly selected banks located in Islamabad-Rawalpindi area. A 5-item Likert scale questionnaire was used which yielded data on customers' responses with good reliability tests measuring Cronbach's alphas ranged from acceptable (0.70s) to good (0.80s) and very good (0.90s) levels. Econometrically modeled HSQM's replication coupled with its extensions aiming at to measure various outcomes like customers' satisfaction, trust and loyalty behaved well and yielded statistically significant results. Based on the results, the HSQM extended econometric model is recommended to measure services quality in other sectors.

JEL Classification: F13, F14, F18, F31

Keywords: Services quality, HSQM's extension, customers' satisfaction, trust, loyalty, econometric modeling, Pakistan.

I. INTRODUCTION

The work on capturing quality of services sectors – the largest sector of an economy – got momentum during the last two decades of previous century, and a number of different approaches were forwarded by academicians and researchers in this regard (Garvin, 1984 & 1987; Parasuraman, Berry & Zeithaml, 1985, 1988 & 1991; Babakus & Boller, 1992; Rust & Oliver, 1994; Buttle, 1996; Dabholkar et al., 1996; Stevenson, 1999; Sower, 1999; Evans & Lindsay, 1999; Brady & Cronin, 2001). Most of the approaches, especially in their early stages, were qualitative in nature. With the passage of time and efforts made, quantitative techniques for measuring services quality got momentum. The two very sophisticated tools of measuring services quality, which got global recognition, have been popularized under the names of SERVQUAL (Parasuraman et al., 1988) and Hierarchical Service Quality Model (Brady and Cronin, 2001).

Brady and Cronin's (2001) Hierarchical Service Quality Model (abbreviated as HSQM) measures services quality through three of its main dimensions, namely Interaction quality,

Physical environment quality and Outcome quality; each of which, respectively, further consists of three sub-dimensions, namely Attitude, Behavior & Expertise; Ambient conditions, Design & Social factors; and Waiting time, Tangibles & Valence. The HSQM tool provides base for measuring services quality quantitatively, using econometrics techniques. This researcher has attempted to extend Brady and Cronin's (2001) HSQM measure to link it with and measure services quality outcomes, namely customers' satisfaction, customers' trust and customers' loyalty, using a quantitative econometrically specified model.

II. METHODOLOGICAL FRAMEWORK

A. Measuring services quality

Brady and Cronin (2001) presented a relatively improved contemporary model for measuring services quality (as opposed to product quality) and named it "Hierarchical Service Quality Model" (HSQM). This model "is perhaps the most fruitful approach to service quality assessment to date" (Pollack, 2009). The model incorporates ones "understanding of what defines service quality perceptions, how service quality perceptions are formed and how important it is where the service experience takes place (Caro and Roemer, 2006).

Brady and Cronin's (2001) HSQM measures services quality through three of its main dimensions (Interaction quality, Physical environment quality and Outcome quality), each of which further consists of three sub-dimensions, namely:

Major dimension of Interaction quality and its sub-dimensions of:

- a. Attitude
- b. Behavior
- c. Expertise

Major dimension of Physical environment quality and its sub-dimensions of:

- a. Ambient conditions
- b. Design
- c. Social factors

Major dimension of Outcome quality and its sub-dimension of:

- a. Waiting time
- b. Tangibles
- c. Valence

The first part of Figure I represents how nine sub-dimensions of services quality are developed in to three main dimensions, namely Interaction quality, Physical environment quality and Outcome quality, which further add up to yield total perceived services quality. Section I of the questionnaire, given in Appendix IV, represents the related items (questions) and constructs (sub-dimensions and main dimensions) developed to capture perceived services quality, using HSQM. To test the applicability of HSQM, the following hypotheses were tested through the estimation of related econometric models developed and placed along with each hypothesis below.

H₁: Pakistani banking sector Interaction quality (IQ) is a function of employees Attitude (AT), Behavior (BE) and Expertise (EX); where IQ would econometrically estimate as:

$$IQ = f(AT, BE, EX) \tag{1}$$

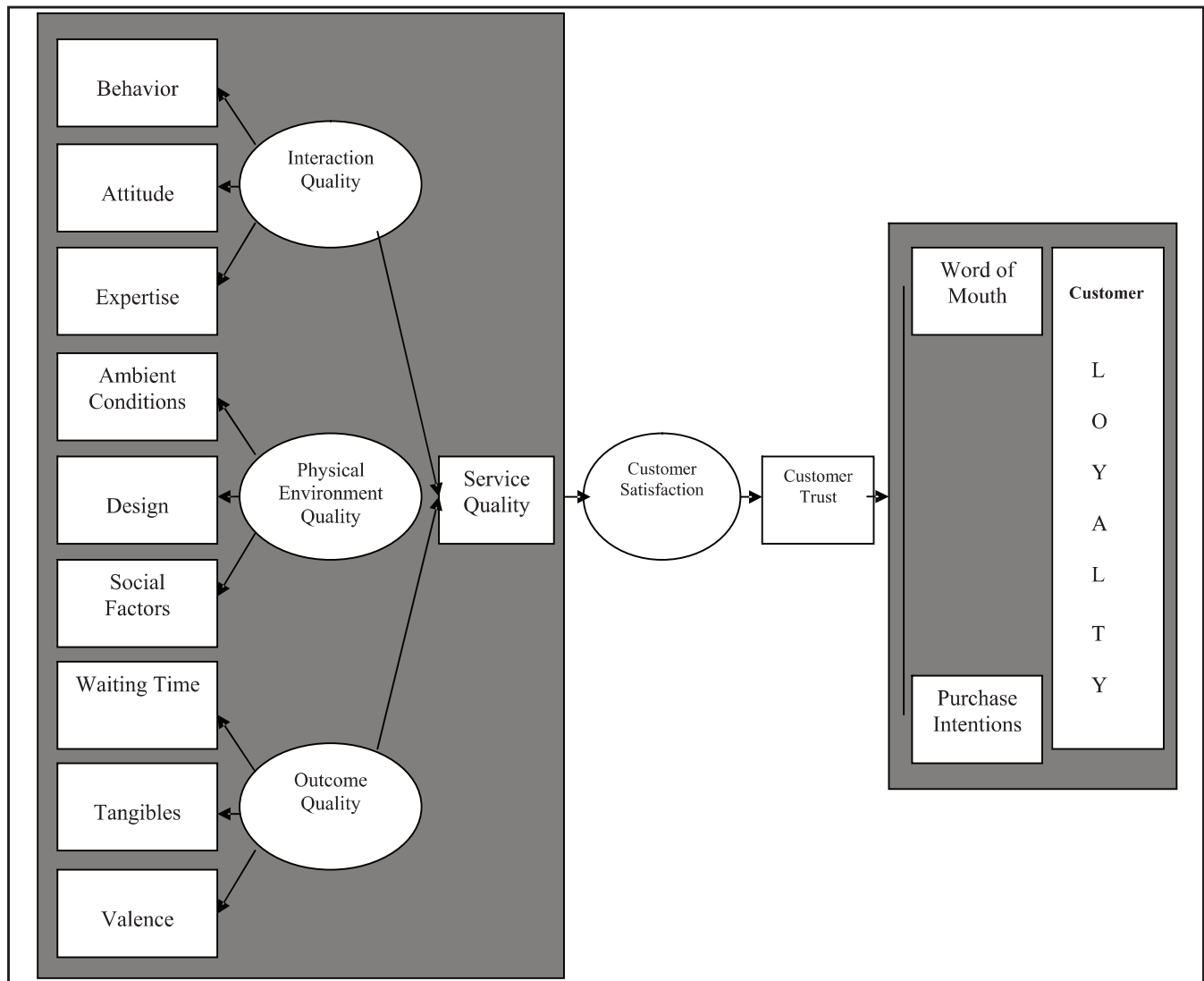
H₂: Pakistani banking sector Physical environment quality (PE) is a function of Ambient conditions (AC), Design (DE) and Social factors (SF); where PE would econometrically estimate as:

$$PE = f(AC, DE, SF) \tag{2}$$

H₃: Pakistani banking sector Output quality (OQ) is a function of Waiting time (WT), Tangibles (TA) and Valence (VA); where OQ would econometrically estimate as:

$$OQ = f(WT, TA, VA) \tag{3}$$

Figure I : Research model
Measuring Quality of Services and Its Outcomes: An Econometric Model



- H₄: Pakistani banking sector Service quality (SQ) is a function of the predicted values of Interaction quality (IQP), Physical environment quality (PEP) and Output quality (OQP); where SQ would econometrically estimate as:
- $$SQ = f(IQP, PEP, OQP) \quad (4)$$

B. Extending HSQM to measure services quality outcomes

The latter half of Figure I portrays how the perceived services quality measured through HSQM would extend to measure services quality outcomes, namely customers' satisfaction, customers' trust and customers' loyalty's two facets, Customers' Word-of-Mouth and Customers' Purchase intent. Section II of the questionnaire (Appendix IV) represents the related items (questions) and constructs to capture customers' satisfaction, customers' trust, customers' word-of-mouth and Customers' purchase intent.

The following hypotheses would be tested through the estimation of the related econometric models developed and placed below.

- H₅: Pakistani banking sector Customers' Satisfaction (CSP) is a function of the predicted value of Service quality (SQP); where CSP would econometrically estimate as:
- $$CSP = f(SQP) \quad (5)$$

- H₆: Pakistani banking sector Customers' Trust (CTP) is a function of the predicted value of customers' satisfaction (CSP); where CTP would econometrically estimate as:
- $$CTP = f(CSP) \quad (6)$$

- H₇: Pakistani banking sector Customers' Word-of-Mouth (WMP) is a function of the predicted value of customers' trust (CTP); where WMP would econometrically estimate as:
- $$WMP = f(CTP) \quad (7)$$

- H₈: Pakistani banking sector Customers' Purchase Intent (PIP) is a function of the predicted value of customers' trust (CTP); where PIP would econometrically estimate as:
- $$PIP = f(CTP) \quad (8)$$

C. Sampling

Pakistan banking sector customers, belonging to (i) five public sector banks, (ii) four specialized banks, (iii) seventeen private banks, (iv) eight micro-finance banks, (v) five Islamic banks, and (vi) six foreign banks, constitute the population

for the study under hand. The above referred six major types of banks constitute the sampling frame. This helped to use the Stratified random sampling technique, wherein the above stated six types of banks provided the first strata in the first stage of sampling, which was followed by the second stage, wherein one bank from each of the six major bank-types was randomly selected. Please refer to Appendix I to have a look at the list of banks where the study was conducted.

In the third stage, 50 questionnaires were provided to main branches of each of the six banks located in Islamabad/Rawalpindi area, for filling from their respective customers. In total, 300 questionnaires were distributed, but 264 were returned and 240 were found valid and complete for use in the study.

III. RESULTS AND DISCUSSION

A. Reliability test

The data on customers' responses, collected through questionnaire, were tested for reliability; the results were turned out to be satisfactory. Please refer to appendix III for results.

B. Measuring services quality: econometric analysis

The empirical results of econometric models, meant for measuring services quality (equation 1 through 4) and its outcomes (equations 5 through 8), are provided in Appendix

table III. A discussion on the evaluation and interpretation of results is presented in the following paragraphs.

Econometric model 1 measures Interaction quality (IQ). Its estimation has been found statistically significant on the basis of F statistics ($F = 246.144$; $p = 0.000$). The three explanatory variables included (AT, BE and EX) appear to be collectively responsible for 75.80 percent variance ($R^2 = 0.758$) in the dependent variable. However, as far as individual explanatory variables are concerned, BE and EX have been turned out to be highly statistically significant ($p < 0.01$) while AT has not, suggesting that BE and EX are contributing towards Interaction quality (IQ) and AT does not. H₁ is therefore partially accepted.

Econometric model 2, which measures Physical environment quality (PE), suggests that the estimated model as a whole is statistically significant ($F = 138.000$; $p = 0.000$), and the three explanatory variables included (AM, DE and SF) are collectively responsible for 63.70 percent variance in the dependent variable (PE). As far as individual explanatory variables are concerned, all three explanatory variables, AM, DE and SF have turned out to be statistically significant ($p < 0.05$), suggesting that AM, DE and SF are contributing towards determining of Physical environment quality (PE). H₂ is therefore

accepted.

Econometric model 3 measures Outcome quality. The results suggest that model as a whole is statistically significant ($F = 119.506$; $p = 0.000$), and the three explanatory variables included (WT, TA and VA) are collectively responsible for 60.30 percent variance in the dependent variable (OQ). However, as far as individual explanatory variables are concerned, TA and VA have turned out to be highly statistically significant ($p < 0.01$) and WT has not, suggesting that TA and VA are contributing towards Output quality (OQ) significantly while WT is contributing but relatively insignificantly. H_3 is therefore partially accepted.

Econometric model 4 incorporates the effects of all the above three estimated services quality sub-dimensions to measure Service quality (SQ) as per HSQM measure, suggested by Brady and Cronin (2001). The results suggest that model as a whole is statistically significant ($F = 138.203$; $p = 0.000$), and the predicted values of the three explanatory variables included (IQP, PEP and OQP) are collectively responsible for 63.70 percent variance in the dependent variable (SQ). As far as individual explanatory variables are concerned, all three explanatory variables, IQP, PEP and OQP, have turned out to be statistically significant ($p < 0.05$), suggesting that all the three sub-dimensions of Service quality positively contribute towards determining of Service quality (SQ). H_4 is therefore fully accepted.

Econometric model 5 measures Customers' satisfaction (CSP) as the first outcome of predicted value (already estimated) of Services quality (SQP). The empirical results suggest that model as a whole is statistically significant ($F = 1456.586$; $p = 0.000$), and the 86 percent variance of the dependent variable (CSP) has been explained ($R^2 = 0.860$). The explanatory variable SQP has turned out to be highly statistically significant ($p < 0.01$), suggesting that the predicted value of Service quality positively contribute towards determining of customers' satisfaction. Hypothesis H_5 is therefore accepted.

Econometric model 6 measures whether the predicted value of Customers' satisfaction (CSP) further determines Customers' trust (CTP). The results suggest that model as a whole is statistically significant ($F = 1158.853$; $p = 0.000$), and the 83 percent variation in the dependent variable (CTP) has been explained ($R^2 = 0.830$). The explanatory variable CSP has turned out to be highly statistically significant ($p < 0.01$), suggesting that the predicted value of customers' satisfaction positively contributes towards determining of customers' trust.

Econometric models 7 and 8 measure whether the predicted value of Customers' trust (CTP) further determines customers' loyalty in terms of its two dimensions, namely Customers' word-of-mouth (WMP) and purchase intent (PIP). The

estimated empirical results of model 7 suggest that model as a whole is statistically significant ($F = 741.930$; $p = 0.000$), and the 75.70 percent variation in the dependent variable (WMP) has been explained ($R^2 = 0.757$). The explanatory variable CTP has turned out to be highly statistically significant ($p < 0.01$), suggesting that the predicted value of customers' trust positively contributes towards determining of customers' loyalty in the form of customers' word-of-mouth. The estimated results of model 8 suggest that model as a whole is statistically significant ($F = 552.791$; $p = 0.000$), and the 69.90 percent variation in the dependent variable (PIP) has been explained ($R^2 = 0.699$). The explanatory variable CTP has turned out to be highly statistically significant ($p < 0.01$), suggesting that the predicted value of customers' trust positively contributes towards determining of customers' loyalty in the form of customers' purchase intent. The hypothesis H_8 is therefore accepted.

IV. CONCLUSION

First, all the four econometric models used for testing of the first four hypotheses related to the application of Brady and Cronin's (2001) HSQM have been turned out statistically significant on the basis of F statistics; this helps to conclude that HSQM measure can be replicated in Pakistani situation, particularly for measuring services quality in the banking sector. The hypothesis H_4 , which hypothesizes that Service quality (SQ) is a function of the predicted values of its three sub-dimensions previously discussed, has been fully accepted, suggesting that all the three sub-dimensions of Service quality positively contribute towards determining of quality in Pakistani banking services.

Second, the four econometric models, used to test the possible extension of HSQM to measure the outcomes of services quality in the form of customers' satisfaction, trust, and customers' loyalty's two facets, namely word-of-mouth and purchase intent, have also been turned out to be statistically significant. The related hypotheses H_5 to H_8 have been accepted, suggesting that the perceived service quality as measured through HSQM determines directly customers' satisfaction, which in turn determines customers' trust, which further determines customers' loyalty's two facets, word-of-mouth and purchase intent.

APPENDIX I

Names of banks selected for study

S.No.	Types of banks	Names of banks selected
1	Public sector banks	National Bank of Pakistan
2	Commercial banks	Askari Bank Limited
3	Specialized banks	Zarai Taraqati Bank Limited

4	Islamic banks	Meezan Bank Limited
5	Micro-finance banks	Khushhali Bank Limited
6	Foreign banks	Barclays Bank PLC

APPENDIX II
Results of reliability test

Construct	Cronbach's Alpha
Interaction Quality (IQ)	0.835
Attitude (AT)	0.776
Behavior (BE)	0.803
Expertise (EX)	0.857
Physical Environment Quality (PE)	0.788
Ambient Conditions (AC)	0.823
Design (DE)	0.874
Social Factors (SF)	0.814
Outcome Quality (OQ)	0.865
Waiting Time (WT)	0.807
Tangibles (TA)	0.880
Valence (VA)	0.888
Service Quality (SQ)	0.839
Customer Satisfaction (CS)	0.924
Customer Trust (CT)	0.907
Customers' loyalty	
Word of Mouth (WM)	0.877
Purchase Intention (PI)	0.849

APPENDIX III
Empirical Results of Econometric Models (1 – 9)

	Empirical Results
1	<p>Interaction quality (IQ) model $IQ = f(AT, BE, EX)$ $IQ = -0.115 + 0.037AT + 0.427BE + 0.551EX$ (-0.714) (0.504) (6.510) (11.20) (0.476) (0.615) (0.000) (0.000)</p> <p>$F = 246.144 (0.000) \quad R^2 = 0.758 \quad R^2_{adjusted} = 0.755$</p> <p>(Figures in the first and second parenthesis, respectively, are t-ratio and p-value)</p>

2	<p>Physical environment quality (PE) model $PE = f(AC, DE, SF)$ $PE = 1.148 + 0.403AM + 0.172DE + 0.163SF$ (6.793) (5.615) (2.459) (2.084) (0.000) (0.000) (0.015) (0.038)</p> <p>$F = 138.000 (0.000) \quad R^2 = 0.637 \quad R^2_{adjusted} = 0.632$</p>
3	<p>Outcome quality model $OQ = f(WT, TA, VA)$ $OQ = 1.203 + 0.120WT + 0.367TA + 0.256VA$ (6.719) (1.479) (5.080) (3.086) (0.000) (0.141) (0.000) (0.002)</p> <p>$F = 119.506 (0.000) \quad R^2 = 0.603 \quad R^2_{adjusted} = 0.598$</p>
4	<p>Service quality model $SQ = f(IQP, PEP, OQP)$ $SQ = -0.101 + 0.248IQP + 0.217PEP + 0.534OQP$ (-0.466) (2.914) (2.293) (4.321) (0.6410) (0.004) (0.023) (0.000)</p> <p>$F = 138.203 (0.000) \quad R^2 = 0.637 \quad R^2_{adjusted} = 0.633$</p>
5	<p>Customers' satisfaction model $CS = f(SQP)$ $CS = -0.809 + 1.212SQP$ (-6.217) (38.165) (0.000) (0.000)</p> <p>$F = 1456.586 (p = 0.000) \quad R^2 = 0.860 \quad R^2_{adjusted} = 0.859$</p>
6	<p>Customers' trust model $CT = f(SQP)$ $CT = -0.836 + 1.233SQP$ (-5.630) (34.042) (0.000) (0.000)</p> <p>$F = 1158.853 (p = 0.000) \quad R^2 = 0.830 \quad R^2_{adjusted} = 0.829$</p>
7	<p>Word-of-Mouth model $WMP = 0.020 + 0.984CTP$ (0.130) (27.238) (0.897) (0.0000)</p> <p>$F = 741.930 (p = 0.000) \quad R^2 = 0.757 \quad R^2_{adjusted} = 0.756$</p>
8	<p>Purchase intent model $PIP = 0.444 + 0.900CTP$ (2.738) (23.511) (0.007) (0.0000)</p> <p>$F = 552.791 (p = 0.000) \quad R^2 = 0.699 \quad R^2_{adjusted} = 0.698$</p>

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BIOGRAPHIES



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