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Service Quality and Customer Satisfaction in Fast Food Restaurants: A Customer Comparison Using Discriminant Analysis

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Abstract: This paper deals with service quality and customer satisfaction in fast food restaurants in the Philippines. A survey was conducted among 200 individual customers of quick service restaurants. Factor analysis revealed three principal service quality dimensions: Tangibles, Reliability/Responsiveness, and Assurance/Empathy. Discriminant analysis identified Assurance/Empathy and Tangibles as dimensions that differentiate male and female fast food customers. Lastly, regression models were derived to predict customer satisfaction for each gender. The results of this study will guide fast food restaurants in improving service quality dimensions that are deemed important by male and female customers, respectively.

Keywords: Service Management; Service Quality; Customer Satisfaction; Fast Food Restaurants; Discriminant Analysis

1. INTRODUCTION

Service quality is considered as an important factor driving customer satisfaction in the service environment. (Andaleeb & Conway, 2006) Since the fast food industry belongs to the service sector, it is worthwhile to investigate how service quality influences customer satisfaction in quick service restaurants.

Gilbert, Veloutsou, Goode, and Moutinho (2004) compared customer satisfaction in six globally-franchised fast food establishments across four countries. Factor analysis revealed two pertinent cross-cultural customer satisfaction dimensions: Satisfaction with Personal Service and Satisfaction with Service Setting.

Qin and Prybutok (2009) explored the relationship among service quality, customer satisfaction, and behavioral intentions in fast food restaurants in the USA. Five service quality dimensions were found to be significant: Tangibles, Reliability/Responsiveness, Empathy, Assurance, and Recovery. Service quality and food quality both lead to customer satisfaction. On the other hand, customer satisfaction directly affects behavioral intentions of fast food customers.

Canny (2014) conducted a survey among 213 customers of casual dining restaurants in Jakarta to determine the relationships among dining experience, customer satisfaction, and behavioral intentions of customers. Regression analysis results revealed that all three dining experience attributes – with service quality emerging as the most important – were significantly related to customer satisfaction. Furthermore, customer satisfaction was found to be significantly related to behavioral intentions of customers.

The three articles, however, treated the respondents collectively; that is, the authors did not attempt to analyse the responses in terms of age,

gender, income level, etc. In a study of the retail service evaluation process where gender and age were treated as moderators, Sharma, Chen, and Luk (2012) observed that "there are individual differences in the way customers perceive, evaluate, and react to their service experiences."

Afthinos, Theodorakis, and Nassis (2005) ascertained whether customer expectations of service in fitness centers vary according to gender, age, type of sport center, and motivation patterns. Statistical tests revealed that customer expectations differ significantly between male and female customers as well as between public and private fitness center customers.

Choi, Lee, Kim, and Lee (2005) probed into the relationship between service quality dimensions and patient satisfaction in hospitals in South Korea. Results showed that "the pattern of relationships between service quality and patient satisfaction was similar across the gender, age, and service type subgroups." (Choi et al, 2005) The level of satisfaction, however, was significantly different for patients categorized into the age and service type subgroups.

Snipes, Thomson, and Oswald (2006) conducted a survey among 8,667 students to ascertain if gender bias exists in service quality perceptions in higher education. Survey results from six colleges indicated that gender bias exists in service quality ratings given by the students. On the other hand, no gender differences were observed in the assessment of service fairness.

Mokhlis (2012) examined the relationship between service quality perceptions and customer satisfaction in municipal services. Survey results indicated that three service quality factors (Empathy, Tangibles, and Reliability) discriminate between male and female respondents. Furthermore, it was found that Tangibles, Reliability, and Responsiveness were significantly related to customer satisfaction for both genders.

Sharma et al (2012) investigated the relationships among sacrifice, service quality, value, satisfaction, and behavioral intentions of retail customers in Hong Kong. Statistical analyses revealed negative relationship between sacrifice and perceived value as well as positive association of perceived value and satisfaction with behavioral intentions for male and older customers. On the other hand, positive association of service quality with satisfaction and value was established for female and younger shoppers.

Based on the literature reviewed, it was found that male and female customers differ in evaluating service quality in fitness centers, higher education, municipal services, and retail stores. One article, however, concluded that service quality and customer satisfaction in hospitals are the same regardless of the patients' gender.

2. OBJECTIVES OF THE STUDY

The aim of this paper is to determine the relationship between service quality and customer satisfaction in fast food restaurants in the Philippines. Following are the specific objectives of the study:

(a) To determine the principal service quality dimensions in fast food restaurants,
(b) To determine service quality dimensions that differentiate male and female customers, and
(c) To predict overall customer satisfaction for each gender using service quality dimensions.

3. METHODOLOGY

A two-part questionnaire was designed to measure service quality and customer satisfaction in fast food restaurants in the Philippines.

Service quality was gauged using the DINESERV instrument developed by Stevens, Knutson, and Patton (1995) which cover five service quality dimensions: Tangibles, Reliability, Responsiveness, Assurance, and Empathy. The questionnaire is composed of 29 items answerable using a seven-point Likert scale ranging from strongly disagree (1) to strongly agree (7).

Customer satisfaction, on the other hand, was assessed using Westbrook and Oliver's (1991) four emotion-laden questions which include items such as "Overall, I am satisfied with my dining experience" and "My dining experience in this restaurant has been enjoyable," etc. The questions are likewise answerable using a seven-point Likert scale.

The survey was administered to individual customers of two major fast food establishments in the Philippines. The effort yielded a total of 200

usable responses – 125 (62.5%) of the respondents are male while 75 (37.5%) are female. These numbers approximate a Gallup poll results showing that "men are more likely than women to eat fast food at least weekly – 53% vs. 42%." (Dugan, 2013, August 6)

The sample size of 200 is deemed adequate since according to Hair, Black, Bobin, and Anderson (2010), "although the minimum ratio is 5:1, the desired level is between 15 to 20 observations for each independent variable."

Factor analysis, discriminant analysis, and multiple regression analysis were all employed to analyze the tabulated results.

4. RESULTS OF THE STUDY

Table 1 presents the results of the survey in terms of service quality perceptions and overall customer satisfaction in fast food restaurants.

Table 1 Means and standard deviations for service quality and overall customer satisfaction

Dimension	Male (n=125)		Female (n=75)	
	Mean	Std. Dev.	Mean	Std. Dev.
Tangibles	5.3416	0.7594	5.3347	0.6765
Reliability	5.4512	0.8485	5.5040	0.8989
Responsiveness	5.3093	0.9637	5.4444	0.9654
Assurance	5.2573	0.9448	5.4444	0.9473
Empathy	4.8624	1.1235	5.1707	0.8967
Overall Customer Satisfaction	5.0060	1.2981	4.8667	1.1786

Factor analysis was utilized to determine the dominant service quality dimensions. According to Hair et al (2010), the primary purpose of factor analysis "is to define the underlying structure among the variables in the analysis." As a multivariate technique, it "provides the tools for analyzing the structure of the interrelationships among a large number of variables by defining sets of variables that are highly interrelated, known as factors." (Hair et al, 2010)

The 29 items in the DINESERV instrument loaded into three factors: Tangibles, Reliability/Responsiveness, and Assurance/Empathy (see Table 2). Factor loadings of 0.50 or higher were included since they are considered to be practically significant when the sample size is 120 or larger. (Hair et al, 2010)

Tangibles refer to "the appearance of physical facilities, equipment, personnel, and communication materials." (Mokhlis, 2012) Items 1, 2, 7, 8, 9, and 10 all loaded into this factor. On the other hand, Reliability/Responsiveness pertains to the personnel's ability to perform the service dependably and accurately as well as their willingness to assist customers and provide prompt service. Items that loaded into this factor include numbers 11, 12, 13, 15, 16, 17, 18, and 19. Lastly, Assurance/Empathy refers to the knowledge and courtesy of personnel and their ability to convey trust and confidence as well as their caring, individualized attention. Items 20, 21, 23, 24, 25, 26, 27, 28, and 29 all loaded into this factor. It should be noted that item 19 is initially classified under Assurance; however, the question about the extra effort in handling special requests may have been attributed by the respondents to the personnel's ability to perform service dependably rather than to the personnel's caring and individualized attention.

Next, discriminant analysis was employed to ascertain whether male and female customers significantly differ in their evaluation of service quality (see Table 3). Two primary objectives of discriminant analysis are "to identify the group to which an object belongs" and "to predict and explain the bases for each object's group membership through a set of independent variables." (Hair et al, 2010)

The service quality dimensions were treated as independent variables while the genders served as the dependent variables and given categorical values. Discriminant analysis is "the appropriate statistical technique [to employ] when the dependent variable is a categorical variable and the independent variables are metric variables." (Hair et al, 2010)

As shown in Table 3, two service quality dimensions: Assurance/Empathy and Tangibles significantly differentiate male and female customers.

Table 2 Results of the factor analysis

Factor Loadings	Factor 1 Assurance/ Empathy	Factor 2 Tangibles	Factor 3 Reliability/ Responsive-ness
Tan1		0.6085	
Tan2		0.6723	
Tan7		0.7065	
Tan8		0.6812	
Tan9		0.6924	
Tan10		0.7155	
Rel11			0.6943
Rel12			0.6603
Rel13			0.6737
Rel15			0.5787
Res16			0.7005
Res17			0.7615
Res18			0.5424
Ass19			0.5499
Ass20	0.5496		
Ass21	0.5660		
Ass23	0.5517		
Ass24	0.5736		
Emp25	0.7212		
Emp26	0.6369		
Emp27	0.8208		
Emp28	0.7675		
Emp29	0.7854		
Eigen-value	5.6147	4.2172	5.3806
% Total Variance	19.36	14.54	18.55

Table 3 Results of the discriminant analysis

Independent Variable	Unstandard-ized CDFC	Discrimi-nant Loading (Rank)	Uni-variate F-ratio (p-level)
Assurance/ Empathy	1.3508	0.6068 (1)	8.5411 (0.0039)
Tangibles	-0.9782	-0.3135 (2)	6.3637 (0.0124)
Reliability/ Responsive-ness	-0.2277	0.2111 (3)	0.1941 (0.6600)

The discriminant function derived has a chi-square value of 12.8633 (2 degrees of freedom) which is significant at p-level=0.0049. This exhibits strong discriminate group membership with respect to the independent variables used. The said function can be written mathematically as

$$d_{ik} = -0.7876 + 1.2548\ (\text{Assurance/Empathy}) - 0.8949\ (\text{Tangibles}) \quad \text{(Eq. 1)}$$

Table 4 shows the accuracy of the discriminant function in terms of its predictability of group classification. As can be seen in Table 4, the function has a 66.00% accuracy in classifying male and female customers. This value is 3.50% better compared to maximum chance criterion and 12.87% better compared to proportional chance criterion. Therefore, the discriminant function derived from the data is considered to be acceptable.

Lastly, multiple regression models were derived to predict overall customer satisfaction using service quality dimensions. According to Hair et al (2010), multiple regression analysis "is a general statistical technique used to analyze the relationship between a single dependent variable and several independent variables."

Model 1 treated the principal service quality dimensions as independent variables and the overall customer satisfaction as dependent variable for the male customers. Analysis of variance results (see Table 5) show that the model derived is significant at p=0.0000. All three service quality dimensions are included in the final model which means that they are all essential in predicting overall customer satisfaction. Tangibles and Assurance/Empathy have significant influence on customer satisfaction.

Model 1 can be written as

$$\hat{y} = -0.0233 + 0.1480(\text{Tangibles}) + 0.0350(\text{Reliability/Responsiveness}) + 0.5510(\text{Assurance/Empathy}) \quad \text{(Eq. 2)}$$

Table 4 Classification matrix

Observed Classification	Predicted Classification: Male p=0.625	Predicted Classification: Female p=0.375	Total
Male	115	10	125
Female	58	17	75
Total	173	27	200
Overall Percentage of Cases Correctly Classified			66.00%
Percentage Accuracy Based on Maximum Chance Criterion			62.50%
Percentage Accuracy Based on Proportional Chance Criterion			53.13%

Table 5 Analysis of variance results for model 1

Source of Variation	Sum of Squares	df	Mean Squares	F
Regression	95.4612	3	31.8204	33.9315
Residual	113.4178	121	0.9378	
Total	208.9330			
R = 0.6759		Adjusted R^2 = 0.4434		
R^2 = 0.4569		Std. error of estimate = 0.9684		

Model 2 treated the principal service quality dimensions as independent variables and overall customer satisfaction as dependent variable for the female customers. Analysis of variance results (see Table 6) revealed that the model derived is significant at p=0.0003. Similarly, all three service quality dimensions are included in the final model which indicates their importance in predicting overall customer satisfaction. However, it is Reliability/Responsiveness which has significant effect on customer satisfaction.

Model 2 can be expressed as

$$\hat{y} = 1.1389 + 0.0850(\text{Tangibles}) + 0.3900(\text{Reliability/Responsiveness}) + 0.0450(\text{Assurance/Empathy}) \quad \text{(Eq. 3)}$$

Table 6 Analysis of variance results for model 2

Source of Variation	Sum of Squares	df	Mean Squares	F
Regression	23.4316	3	7.8105	6.9878
Residual	79.3601	71	1.1177	
Total	102.7917			
R = 0.4774		Adjusted R^2 = 0.1953		
R^2 = 0.2280		Std. error of estimate = 1.0572		

In order to validate the derived regression models, the split-sample analysis which is considered as one the most direct validation approaches was utilized. (Hair et al, 2010)

For this study, the split-sample validation as suggested by Garbin (n.d.) was performed. This procedure involves dividing the sample size into two, conducting a regression analysis, and then comparing the correlation coefficients and structures of the resulting models. The comparison of correlation coefficients was done using the Fisher's Z-test recommended by Preacher (2002).

Table 7 presents the results of the split-sample validation done for both male and female customers. It can be seen that both regression models are acceptable as the correlation coefficients are equal for the two subsamples and the structures of the resulting models (in terms of the independent variables included in the models) are also the same compared to the original regression models.

Table 7 Results of the split-sample validation

	Male	
Value	Subsample 1 (n_1=63)	Subsample 2 (n_2=62)
R	0.7814	0.8488
Fisher's Z	Z = -1.107	
	Female	
Value	Subsample 1 (n_1=38)	Subsample 2 (n_2=37)
R	0.4068	0.5451
Fisher's Z	Z = -0.746	

5. CONCLUSION AND RECOMMENDATION

This paper was able to come up with the following conclusions:

(a) There are three principal service quality dimensions that customers use in evaluating fast food restaurants in the Philippines: Tangibles, Reliability/Responsiveness, and Assurance/Empathy.
(b) Two service quality dimensions, Assurance/Empathy and Tangibles, differentiate male and female customers.
(c) Overall customer satisfaction can be predicted using service quality dimensions.

Compared to earlier studies, this paper reveals new findings as well as those that are consistent with previous research results. Qin and Prybutok (2009), for instance, found five significant service quality dimensions: Tangibles, Reliability/Responsiveness, Recovery, Assurance, and Empathy. The authors, however, made use of the SERVPERF scale instead of the DINESERV survey instrument.

Mokhlis (2012) concluded that three service quality dimensions (Empathy, Tangibles, and Reliability) discriminate between male and female customers. His study, however, focused on municipal services rather than on fast food restaurants.

Lastly, Canny (2014) found that service quality was the most significant factor in determining customer satisfaction in casual dining restaurants. Service quality, however, was not broken down into different dimensions in his paper.

The results of this study will help fast food restaurants in understanding their customers better and encourage them to improve on service quality dimensions that greatly influence customer satisfaction.

Future researches can include other service quality dimensions as suggested in the literature such as food quality, restaurant image, and perceived value. (Ryu, Lee, and Kim, 2011) The relationships can also be extended to include behavioral intentions of customers as this is found to be significantly related to customer satisfaction. (Qin & Prybutok, 2009) Other moderating variables could also be explored like age, income level, educational background, etc. to make the analysis more specific.

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