

An Empirical Study on the Relationships between TQM Practices and Overall Service Performance: The Case of a Public Service Sector in Malaysia

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ABSTRACT

In recent years, the TQM movement has swept the service sector in Malaysia because the shift towards quality practices is crucial to the survival of service firms. Some studies have proven that TQM practices have significantly positive impact on organizational performances. This study sought to enhance understandings of relationships between TQM practices and the overall service performance of a public service sector in Malaysia. Methods include correlation and multiple regression analyses. The result of the overall multiple linear regression indicates that the model has a good fit. In addition, this paper further investigates correlations of the variables and the overall regression model for the present of multicollinearity and found that its existence is low. The overall result from the multiple linear regression suggests that some of the regression coefficients of the predictor variables (TQM practices) are significant toward explaining the dependent variable (service performance).

Keywords: *TQM, service performance, Malaysia.*

Introduction

Previous research has suggested that there are positive associations between total quality management (TQM) and production results such as productivity, product quality, and overall performance for manufacturing companies that have adopted the quality initiative (Schroeder et al., 1992; Oliver and Wilkinson, 1989; Agus, 2001). However, over the past years, TQM has become accepted practice in services. Many organizations in service sector in Malaysia have implemented TQM, and the quality program has been set up to improve profitability and customer satisfaction. The recent and wide-ranging focus on service quality speaks to the importance of the issue in Malaysia. TQM is also implemented as a function of organizations' long-run success, in which quality practices will be needed to survive in global environment. Mann (1992) stated that TQM is not only considered as a vehicle for continuous improvement but also as a management process for producing quality products and services, increasing productivity, sales turnover and improving customer satisfaction.

Although more firms are realizing the importance of service quality and customer satisfaction, there are no specific ways of achieving them. Since consumer expectations are rising, public services will need to focus their efforts on quality improvement and emphasize their ability on satisfying customers. In addition, they need to pay close attention to the unique characteristics of service quality (Davison and Grievies, 1996). According to Bitner (1990), evaluation of a service firm usually depends on evaluation of the service encounter or customer interaction with the firm. Therefore, knowledge of the factors that influence customer evaluations in service encounters is important. Previous empirical studies and theories are helpful in developing variables and attributes of service sector in this study. The instrument to measure critical factors of quality management in this study was adapted from the measures developed by Saraph, Benson and Schroeder (1989) as well as studies done by Powell (1995) and others (eg. Juran, 1974, 1992; Crosby, 1979, 1984; Deming, 1995; Feigenbaum, 1991 and Malcolm Baldrige, 1992). Saraph et al. (1989) proposed eight measures that could either be used independently or in combination to produce a profile of TQM practices in an organization. On the other hand, Powell (1995), examined TQM as a potential source of sustainable competitive advantage and reported findings from a new empirical study of TQM's performance consequences. Incorporating ideas, theories and studies from extensive literature review, we proposed

five TQM practices in this study. The TQM variables had content validity because an extensive review of the literature was conducted in selecting the measurement items which had been evaluated by professionals in the academic and business fields. In addition, measurements for customer satisfaction were adapted from an instrument developed by Zeithaml, Parasuraman and Berry (1990).

Methodology

Data were collected using an ex post facto design and a quantitative survey method. The research was carried out on a public service sector in Malaysia. Four hundred and thirty (430) top officers and 430 matching customers were selected randomly as respondents. The primary objective of the research was to measure top officers' perception of quality management practices in their organizations, gathered opinions from customers concerning their levels of satisfaction and also to investigate the impact of TQM practices on the overall service performance. For each randomly chosen branch/station of that sector, a top officer who was involved with TQM practices was selected as respondent. Simultaneously, a customer of that station was picked and included randomly in the survey. Two questionnaires were developed, one for the top officers (on TQM practices) and another for the customers (on customer satisfaction levels). To enable respondents to indicate their answers, 7–point ordinal scales were used for both questionnaires. The purpose of this paper is to enhance managerial understandings of service performance in relation to TQM implementations by addressing the following questions:

- What factors that correlates with TQM practices?
- Which TQM variables have significant impact on the overall service performance?

In accordance to these questions, the main objectives of this paper are:

1. To determine correlations among TQM practices in a public service sector in Malaysia.
2. To determine correlations between TQM practices, overall service performance and overall customer satisfaction.
3. To determine the level of multicollinearity in the regression modeling in the study.

4. To investigate the result of the multiple regression between TQM practices and the overall service performance.

Correlations

a. Correlations among TQM practices

Table 1 Spearman's Correlations among TQM Variables

TQM Practices	1	2	3	4	5
1 Top manag. Commitment	1.00				
2 Customer Focus	0.421**	1.00			
3 Benchmarking	0.395**	0.567**	1.00		
4 Training	0.305**	0.703**	0.553**	1.00	
5 Employee Focus	0.381**	0.693**	0.620**	0.748**	1.00

1. *P£0.05, **P£0.01 2. All t-tests are one-tailed

Table 1 exhibits the result of Spearman's correlations among TQM variables. Most of the TQM practices correlate significantly with each other ($p \leq 0.01$). First and foremost, top management commitment is highly correlated with customer focus ($r = 0.421$), benchmarking ($r = 0.395$), training ($r = 0.305$) and employee focus ($r = 0.381$). It also reflects the fact that top management found committed to TQM will consider customer satisfaction as their top priority, and will put quality-oriented trainings at the top of its quality agenda. Commitment to quality might be judged by the expenditure devoted toward quality programs and trainings (Davison and Grievies, 1996). Customer focus indicates strong correlations with top management commitment, benchmarking, training, employee focus and quality measurement. Good training exposure has positive correlations with customer focus and employee focus. Thus, on the basis of the preceding findings, we can conclude that most of TQM variables are significantly correlated with one another.

b. Correlations between TQM practices, overall service performance and overall customer satisfaction measurement.

Table 2 exhibits Spearman's correlations between TQM practices, overall service performance and customer satisfaction indicator. The overall

service performance indicator has high correlations with employee focus ($r = 0.614$) and customer-oriented quality programs and practices ($r = 0.529$). Next in line are top management commitment ($r = 0.517$), quality related training ($r = 0.503$), and benchmarking ($r = 0.438$). Customer satisfaction data were obtained from actual customers' responses in order to reduce systematic errors that would occur if these data were gathered from top officers perceived opinions. Customer satisfaction measurement has the highest correlation with customer-oriented TQM practices ($r = 0.292$), followed by employee focus ($r = 0.240$), training ($r = 0.206$), top management commitment ($r = 0.188$) and benchmarking ($r = 0.159$). These findings are consistent with several previous studies that proclaimed better organizational transformations as a result of TQM initiatives (Nakajo & Kono 1989; Snell & Dean 1992; Ebrahimpour & Withers, 1992; Bowen & Lawler, 1992).

Table 2 Spearman's Correlations between TQM Practices, Overall Service and Overall Customer Satisfaction Indicators

TQM Practices	Overall service performance	Overall Customer Satisfaction
1 Top manag. Commitment	0.517**	0.188**
2 Customer Focus	0.529**	0.292**
3 Benchmarking	0.438**	0.159**
4 Training	0.503**	0.206**
5 Employee Focus	0.614**	0.240**

1. * $P \leq 0.05$, ** $P \leq 0.01$ 2. All t-tests are one-tailed

Determining the Relationship of TQM Practices and the Overall Service Performance: A Multiple Linear Regression Analysis.

In this study, a multiple regression analysis was used to identify most important TQM variables and to investigate the relationships between predictor variables and a dependent variable. The model developed represents an attempt to account for the contributions of critical variables of TQM on the overall service performance of that service sector.

a. Testing the Overall Regression Model

A regression forecasting model is generated and hypothesized as follows:

The Regression Model:

$$Y = Y_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + e$$

where,

Y = Overall service performance

Y_0 = intercept, B_1, \dots, B_5 = slope, X_1 = top management commitment, X_2 = customer focus,

X_3 = benchmarking, X_4 = training, X_5 = employee focus, e = random error for observation i .

The overall significance of the multiple regression model is tested with the following hypotheses.

$$H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$$

H_a : At least one of the regression coefficients is $\neq 0$.

A rejection of the null hypothesis indicates that at least one of the predictor variables is adding significant predictability for Y. The multiple regression result (Table 3) indicates that a strong relationship existed as hypothesized. The model has moderately high values of multiple R (0.668) and R^2 (0.440). represents the proportion of variation of the dependent variable, Y, accounted for by the independent variables in the regression model. The value of adjusted = 0.440 with standard deviation = 0.598 and a significant F-value of 68.311. An adjusted takes into consideration both the additional information each new independent variable brings to the regression model and the change degrees of freedom of regression (Black, 2001). The model exhibited significant F value. The F test was used to determine if the research model was able to account for a significant amount of variation in the dependent variable. This model has a good fit and is able to explain about 66.8 % of the variance in the dependent variable (the overall service performance). This value is considered quite high, given that a multitude of factors affecting the overall service performance.

Table 3: The Regression Model Summary

R	R Square	Adj. R ²	SE	F	Sig
0.668	0.446	0.440	0.598	68.311	0.000

Table 4: The Relationships between TQM Practices and The Overall Service Performance

Variable	Unstd. Coeff. Beta	Std. S. Error	t Beta	Sig.	
Constant	0.8920	0.334		2.669	0.008
Manag. Commitment	0.2590	0.030	0.342	8.524	0.000
Customer focus	0.0647	0.081	0.046	0.803	0.422
Benchmarking	0.0043	0.041	0.005	0.103	0.918
Training	0.0974	0.072	0.083	1.348	0.178
Employee focus	0.4290	0.074	0.361	5.791	0.000

b. Significance Tests of the Regression Coefficients

The significance of beta coefficients provides support for the alternate hypotheses in the regression model. The relative sizes of the standardized beta coefficients provide some indication as to the comparative influence of the variables in the model (Hair, Anderson and Tatham, 1987). Individual significance tests for each regression coefficient are carried out by using a t test. The hypotheses for testing the regression coefficient of each independent variable take the following form:

$$\begin{array}{ll}
 H_0 : \beta_1 = 0 & H_0 : \beta_2 = 0 \\
 H_1 : \beta_1 \neq 0 & H_2 : \beta_2 \neq 0 \\
 H_0 : \beta_3 = 0 & H_0 : \beta_4 = 0 \\
 H_3 : \beta_3 \neq 0 & H_4 : \beta_4 \neq 0 \\
 H_0 : \beta_5 = 0 & \\
 H_5 : \beta_5 \neq 0 &
 \end{array}$$

Testing the regression coefficients not only gives researchers some insight into the fit of the regression model, but it also helps in the evaluation of how worthwhile individual independent variables are in predicting Y (Black, 2001). At $\alpha = 0.05$, the null hypotheses 1 and 5 are rejected because their t-values are less than 0.05. The result (Table 4) indicates that regression coefficients or slopes of X_1 (top management commitment) and X_2 (employee focus) have significant t-values. This indicates the importance of combined efforts from both management and employee levels. Managers are responsible for synthesizing all of the different processes and employees in the business into a cohesive system focused

on a common set of goals. The more aligned the focus on employees, the more they are able to demonstrate their value to effective TQM implementation. On the other hand, employees should give their greatest support to objectives they help set. In the long run, the organization will eventually benefit because employees are the people who are directly involved in the overall process of the organization. Given the chance, employees can give great contributions toward the success of the organization. In contrast, values of the significant t for hypotheses 2, 3 and 4, were unable to support propositions that customer focus (X_2), benchmarking (X_3) and training (X_4), are significant as the predictor variables. To reduce the concern for data multicollinearity due to highly correlated variables, the study further determines VIF (variance inflation factor) values. However, it is safe to conclude that the overall regression model has a good fit.

In this study, the regression model was tested in order to explore relationships among the five critical factors of TQM practices and a dependent variable namely the overall service performance. The results of the initial forecasting analysis was expected to provide insights into those TQM critical factors thought to be most important to achieving increased levels of the overall service performance. However, future researchers should be aware of two problems encountered during regression analysis and discriminant analysis: (1) the problem of multicollinearity and (2) the presence of outliers (In this study, the researcher detected no outliers from the scatter diagram)

Table 5 Collinearity Statistics

TQM Practices	Tolerance	VIF
Top Manag. Commitment	0.813	1.229
Customer focus	0.391	2.558
Benchmarking	0.643	1.556
Training	0.341	2.934
Employee focus	0.336	2.973

One problem that can arise in multiple regression analysis is multicollinearity. One of the basic assumptions in regression modeling is that the independent variables in the model are not linearly related. Multicollinearity is when two or more of the independent variables of a multiple regression model are highly correlated (Black, 2001; Wang, 1996).

Multicollinearity affects the stability of the parameter estimates calculated in multiple regression and discriminant analysis models. Technically, multicollinearity could lead to improper variable estimations and ultimately unstable regression models formation. This situation lead to misleading conclusion in regression models since independent variables that should be significant predictors of a dependent variable are insignificant. This is because when the independent variables are correlated, the estimated standard errors for the coefficients will be large, and as a result the t-statistics will be small (Agus, 2000). The t values test the strength of the predictor given the other variables in the model. If a predictor is highly correlated with other independent variables, it will appear not to add much to the explanation of Y and produce a low t value. However, had the predictor not been in the presence of these other variables, the predictor might have explained a high proportion of variation of Y (Black, 2001).

Several procedures have been proposed in the literature for detecting the presence of multicollinearity among variables (Wang, 1996). In this study, VIF_j (variance inflation factor) associated with each predictor variable X_j were determined. If one or more of these variance inflation factors are large, we can conclude that nearly linear relationships exist among independent variables. It has been suggested, as a rule of thumb, that values of VIF_j greater than 10.00 may be considered large enough for us to suspect serious multicollinearity (Graybill & Iyer 1994). Since none of the TQM variables exhibit values of VIF_j greater than 3.00, (Table 5) it is concluded that the presence of multicollinearity in this study is not severe. On the whole, the result concluded a significant overall F test for the model, and also significance t values for predictor variables such as top management commitment and employee focus.

Discussion and Conclusion

According to Harwood and Pieters (1990), there are benefits of TQM that need to be highlighted. The following are some of the likely benefits of a systematic approach to quality improvement:

- things happen faster (TQM Performance)
- the organization becomes easier to manage; (TQM Performance)
- communication improves (TQM Performance)
- people help solve problems, experiencing less frustration and more satisfaction (TQM performance and customer satisfaction)

The best reasons for adopting a total quality management strategy is to gain or retain market share, maintain premium pricing, capitalize on new opportunities and survive the competition. Specifically, the likely benefits of a systematic approach to quality improvement are increased market share; cost reduction; things happen faster; the organization becomes easier to manage; communications improve; people help in solving problems as well as experiencing less frustration and more satisfaction (Harwood & Pieters 1990). For a relatively small investment, the return on total quality can be both rapid and sizable. At the same time, there are significant benefits of TQM that are less quantifiable, but perhaps more valuable in the long run to the health and well-being of the organization: shared values of people at all levels; increased employee motivation, flexibility and skill; and improved responsiveness and focused growth based on intimate knowledge of market and customer needs. Furthermore, TQM advocates (Juran 1988; Schmidt & Finnigan 1992; Easton et al. 1998) agree that TQM does produce value, through a variety of benefits: improved understanding of customers' needs, improved customer satisfaction; improved internal communication; better problem-solving; greater employee commitment and motivation; stronger relationships with suppliers, fewer errors; and reduced waste.

The keystone of each of these success stories is that managers understand the systematic nature of quality and make a commitment to improve the quality of their company's products and services. The more we observe, the more firmly we are convinced that quality improvement is the most fruitful path to higher productivity and competitive success (Leonard & Sasser, 1982). On the basis of the preceding reasoning, the result draws attention to the importance of top management commitment, employee focus, benchmarking, training, and customer focus in enhancing overall service performance. The multiple regression analysis showed hypothesized significant results on the overall model. In addition, it seems reasonable to conclude that top commitment and employee focus have significant contributions toward the overall service performance.

The results of correlation and regression analyses support the hypothesized proposition of the importance of TQM practices toward the overall service performance. A clear implication of the preceding discussions is the need for coordination between departments within the service sector in working towards creating a quality culture. We believe this study contains findings useful to practicing managers in the services industry and to other quality researchers. This study suggests that managerial and policy makers should incorporate quality practices in

their organizations since it has suggested that TQM does produce beneficial outcomes. To other researchers, this study would help them identify important variables of quality practices for public and profit-motivated service organizations in Malaysia and ways to determine multicollinearity in regression analysis. This study would also enrich the literature, theories and ideas in the study of TQM in Malaysia.

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