

Mathematical Modeling Of Service Quality Towards Organizational Performance: Case Study On Malaysian Local Authorities

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This study examines the relationship between service quality and the organizational performance in Malaysian Local Authorities. 214 respondents participated in this study, whereby the data are gathered through self-administered structured questionnaire. . The results of this study highlighted the close association between the service quality and the organization performance which confirmed that investments in quality should indeed resulted in better performance. The service quality variables that were found to be the strongest predictors of organization performance were customer productivity followed by management commitment, internal customer satisfaction, system, policy and procedure, human resource and infrastructure.

Field of Research: Management Science, Public Institutions Management, Mathematical Modeling, Malaysia

1. Introduction

The Local Governments, being a service provider to the public, should not be immune from pressure that drives an organization to be successful with quality services that satisfy the customers and stakeholders (Ali *et al.* 2007). In Malaysia, there are ninety-seven local authorities in West Malaysia and forty-seven in East Malaysia (Ministry of Housing and Local Government, 2007). Since local authorities are very much involved in the development of the district, they have become one of the most important agencies in terms of development of local districts. Hence, their efficiency and effectiveness of resource utilization that is being funded through budget allocation will greatly affect the economic growth of the country at the macro level. Currently, most of the efficiency and effectiveness of resource utilization is determined through revenue and cost management. Having noted this, the study tried to investigate the relationship between service quality and organizational performance among the local authorities in Malaysia.

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2. Literature Review

When mentioning service quality most researchers always referred to two schools of thought that dominate the extent thinking. One is Nordic school of thought based on Grönroos's (1984) two-dimensional model. And the other is the North American school of thought based on Parasuraman *et al.* (1988) five dimensional SERQUAL model. Besides this, there are other relevant significant conceptual and empirical works, which focused on service quality, and can be summarized as:

- (1) customers' experiences with tangibles, reliability, responsiveness, assurance, and empathy aspects of service delivered by a firm (Parasuraman *et al.* 1988);
- (2) technical and functional quality (Grönroos, 1984);
- (3) service product, service environment, and service delivery (Rust & Oliver, 1994); and
- (4) interaction quality, physical environment quality, and outcome quality (Brady & Cronin, 2001).

Dealing with those conceptual and empirical works invite other researchers to give comments and feedbacks, which can be assumed as limitation that need to be solved. Most comments can be concluded into two major needs; the need to develop industry specific measures of service quality (Babakus & Boller, 1992) and the need to develop an instrument specifically for the local service (Karatepe *et al.* 2005). Malhotra *et al.* (1994) posit that the cultural differences (e.g., individualism / collectivism, power distance) between countries are likely to have varying effects on the definition of service quality. Kettinger *et al.* (1995) stated that the weight of evidence suggests that the culture plays a significant role on the definition of the service quality construct. Indeed, Imrie *et al.* (2002), stated that managers should avoid employing the SERQUAL scale globally and instead they should develop "a new, culturally bounded measure of service quality" (p.17) where this is another challenge and limitation occurs when using SERQUAL model. This study develops a service quality measure for the Malaysian Public Sector in general and specifically for Local Authorities in West Malaysia.

3. Methodology and Research Design

This study employed survey method. Data were obtained from the senior officer of each department from each local authority through self-administered personal interviewed aided by structured questionnaires. 800 sets of questionnaires were distributed and 214 were returned. Of these 214, 7 were incomplete and follow-up was carry-out to fill in missing information. These 214 although a 26.8 percent response rate, were deemed sufficient for further analysis because the recommended sample size by Hair *et al.* (1998) was between 100-150. A series of statistical procedures and measures are recommended in the literatures (Hair

et al. 1998) to find the relationship between the related construct measured in this study.

3.1. Measures

Eight constructs, productivity improvement (PRODTY), internal customer satisfaction (ICS), management commitment (MGT), human resource management (HRM), system, policy and procedure (SOP), infrastructure and environmental factor (INFRA), overall service quality (SERQUA) and performance (PERFORM), were operationalized in order to test the research model.

- **Productivity Improvement (PRODTY)**

Productivity is referring to the efficiency and effectiveness of employees. The main focus on these construct is the association and impact given to the service quality (Kontoghiorghes & Gudgel, 2004) and organization performance (Tangen, 2005). Nine items were chosen and represent productivity and were measured using 7-point scales anchored by “Very Strongly Disagree”(1) and “Very Strongly Agree”(7).

- **Internal Customer Satisfaction (ICS)**

The instrument to measure internal customer satisfaction was adopted from the work of few researchers such as Gilbert (2000). All nine items were measured using 7-point scales anchored by “Very Strongly Disagree”(1) and “Very Strongly Agree”(7).

- **Management Commitment (MGT)**

Management commitment is one of the most important elements in Total Quality Management (TQM) (Kanji & Asher, 1993; Curry & Kadasah, 2002). Others, Hradesky (1995) proposed management commitment and performance need to be integrated during performing the main activities in the organization whereas Oakland (1996) mentioning the need of consistency involvement in management commitment. Four items were measured using 7-point scales anchored by “Very Strongly Disagree”(1) and “Very Strongly Agree”(7).

- **Human Resource Management (HRM)**

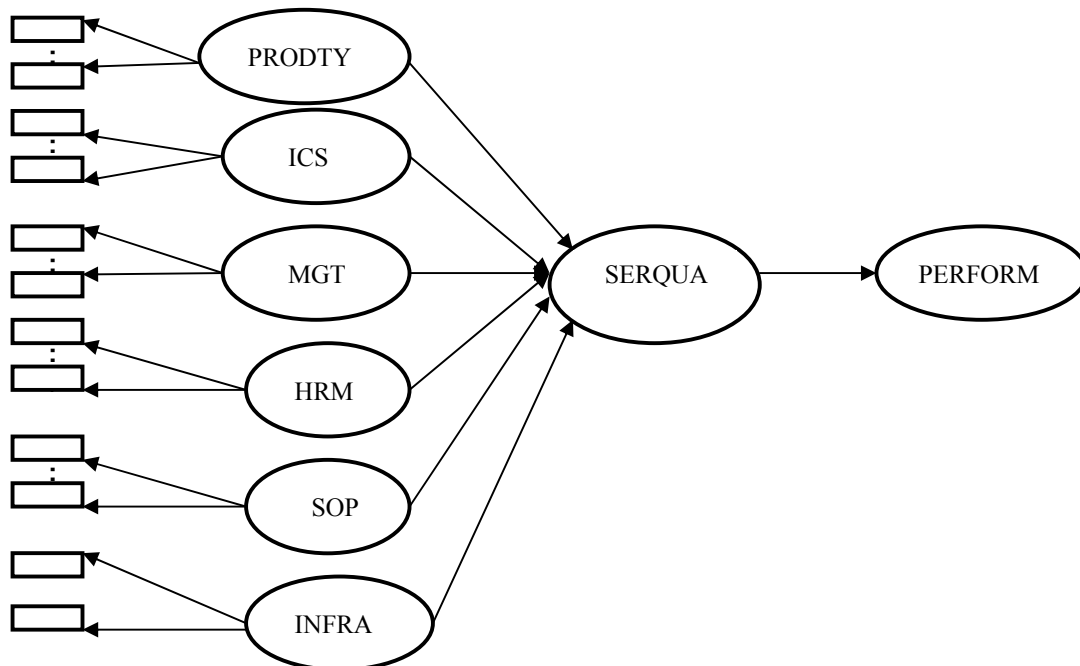
Human resource management is related with the training, recognition, promotion and carrier development. According to Lawler *et al.* (1995), employees must have power, information, knowledge and benefit to smoothen the business process. Six items were measured using 7-point scales anchored by “Very Strongly Disagree”(1) and “Very Strongly Agree”(7).

- **System, Policy and Procedure (SOP)**

System, policy and procedure always been used as an instrument or criteria in the quality award winner assessment (Ghobadian & Ashworth, 1994; Tan, 2002). It is believe that system, policy and procedures has direct impact on improving

the internal factor rather than the external factor such as the employees and processes. Four items were measured using 7-point scales anchored by “Very Strongly Disagree”(1) and “Very Strongly Agree”(7).

Figure 1 Research model



• **Infrastructure and Environment (INFRA)**

Infrastructure and environment consist of technologies, equipments and facilities. Those instrument will help to enhance the service quality and performance of the organization (Athanasopoulos *et al.* 2001). Five items were measured using 7-point scales anchored by “Very Strongly Disagree”(1) and “Very Strongly Agree”(7).

• **Service Quality (SERQUA)**

Specifically when refer to service quality with local authorities; the first thing that always appears is the customer complaint. Therefore most of items developed to measure service quality in this study relate to customer complaint which at the end it will linked with service performance (Zeithaml *et al.* 1990; Johnston & Jones, 2004). Seven items were chosen and represent productivity and were measured using 7-point scales anchored by “Very Strongly Disagree”(1) and “Very Strongly Agree”(7).

• **Overall Performance (PERFORM)**

The overall performance measured by the internal customer based on the perceived service quality delivered and achievement that the organization

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received. The items developed as referred to the previous studies (Anderson & Sohal, 1999; Sun, 2000). Seven items were chosen and represent productivity and were measured using 7-point scales anchored by “Very Strongly Disagree”(1) and “Very Strongly Agree”(7).

3.2. Hypotheses

This study has seven specific research hypotheses. In other words it try to examine the relationship between seven exogenous constructs with one endogenous construct. Those seven exogenous constructs will consist the expectation of the local authorities' employees on the service quality that delivered to the customer and indirectly will affect the organizational performance. The research objectives can be put into the following hypotheses :

- H_{A1} : Internal customer satisfaction through service quality has positive effects on organizational performance.
- H_{A2} : Productivity improvement through service quality has positive effects on organizational performance.
- H_{A3} : System, policy and procedure through service quality has positive effects on organizational performance.
- H_{A4} : Management commitment through service quality has positive effects on organizational performance.
- H_{A5} : Infrastructure and environmental factor through service quality has positive effects on organizational performance.
- H_{A6} : Human resource management through service quality has positive effects on organizational performance.
- H_{A7} : All the exogenous constructs has positive effects on the endogenous constructs (organizational performance).

3.3. Reliability Analysis

Reliability is the extent to which a measures is free from variable errors (Nunnally,1978). For the purposes of this study, the internal consistency method assesses the Cronbach alpha statistic, which indicates strong reliability if the alpha co-efficient exceeds 0.7 and moderate reliability if the alpha co-efficient exceeds 0.6(Nunnally, 1978). Table I shows the initial alpha co-efficient for each of the combined scales and their associated subscales. From the table, it can be seen that both of the combined scales and all of the subscales exceeded Nunnally`s requirement for strong internal consistency.

Table I Reliability Statistics for Scale

Scale	Cronbach alpha
Internal customer satisfaction	0.9336
Service quality	0.9172
Productivity improvement	0.9265
Management commitment	0.9127
Human resource management	0.9292
System, policy and procedure	0.8761
Infrastructure & Environmental	0.8688
Organizational performance	0.9543

3.4. Confirmatory Factor Analysis

Confirmatory factor analysis is normally referred to as the measurement model if it is the only model analysis in SEM (Thompson, 2000; Hair et al. 1998). Confirmatory factor analysis help to specify and confirm the relationships of the variable and factors prior to the analysis. It also allow total control of which variables describe the factor. Therefore the researcher can assign each variable that describe the factors. Since researchers have complete control over the allocation of indicators for each construct, variable that have low loadings on respective factors are constrained to zero (Hair et al. 1998). Variable with highest loadings in a particular factor will be selected to describe that factor. Consequently the variables become indicators to the specified factors also known as latent constructs. Latent construct is “an abstract, hypothetical concept that cannot be directly observed, but that is represented by concrete operational definitions” (Bryant, 2000). The scales used in this confirmatory factor analysis were subjected to factor analysis in the form of Principal Axis Factoring (PFA) (Hair et al. 1998). Carmines and Zeller (1979) suggested items with factor loadings exceeding 0.7 be accepted; which indicates more shared variance between the construct and its measures than error variance. Eight constructs were identified : six exogenous constructs (ICS, PRODTY, MGT, HRM, SOP and INFRA) and two endogenous constructs (SERQUA and PERFORM).

3.5. Modeling And Hypothesis Testing Using AMOS

Table II shows the hypotheses of each constructs association of the model. Discussion of these impacts as follows:

- However at $\alpha = 0.05$, Construct ICS has a positive and significant association with Construct SERQUA (PE = 0.158; t = 2.215; p = 0.027). Base on the

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dataset, H_{A1} was asserted showing that that Internal customer satisfaction has positive effects on performance of local authorities.

- However at $\alpha = 0.05$, Construct PRODTY has a positive and significant association with Construct SERQUA (PE = 0.461; $t = 2.958$; $p = 0.003$). Failure to reject H_{A2} based on the dataset show that productivity improvement has positive effects on performance of local authorities.

Table II The hypotheses of each construct associations of the model

Construct associations	Parameter Estimate (PE)	t-value of structural effect	p-value
ICS with SERQUA	0.158	2.215	0.027*
PRODTY with SERQUA	0.461	2.958	0.003*
MGT with SERQUA	0.215	1.808	0.071**
INFRA with SERQUA	0.073	1.887	0.059**
SOP with SERQUA	0.147	2.266	0.023*
HRM with SERQUA	- 0.147	- 2.547	0.011*
SERQUA with PERFORM	1.159	11.572	0.000*

Notes: * Significant at 5%, **Significant at 10%

- Result showed that at $\alpha = 0.10$, Construct MGT has a positive and significant association with Construct SERQUA (PE = 0.215; $t = 1.808$; $p = 0.071$). Failure to reject H_{A4} based on dataset show that management commitment has positive effects on performance of local authorities.
- At $\alpha = 0.10$, Construct INFRA has a positive and significant association with Construct SERQUA (PE = 0.073; $t = 1.187$; $p = 0.059$). Failure to reject H_{A5} based on the dataset asserts this alternative hypothesis. It shows that infrastructure and environmental factors has positive effects on performance of local authorities.
- At $\alpha = 0.05$, Construct SOP has a positive and significant association with Construct SERQUA (PE = 0.147; $t = 2.266$; $p = 0.023$). Failure to reject H_{A3} based on the dataset show that system, policy and procedure has positive effects on performance of local authorities.
- At $\alpha = 0.05$, Construct HRM has a negative but significant association with Construct SERQUA (PE = -0.147; $t = -2.547$; $p = 0.011$). Failure to reject H_{A6} based on the dataset show that human resource management has negative effects on performance of local authorities.
- However at $\alpha = 0.05$, Construct SERQUA has a positive and significant association with Construct PERFORM (PE = 1.159; $t = 11.572$, $p = 0.000$). Base on the dataset, H_{A7} was asserted showing that service quality has positive effects on performance of local authorities.

- The results also order to indicated that there were strong and significant correlations among the six exogenous Constructs ICS, PRODTY, HRM, MGT, INFRA and SOP (see Table III).

Table III Correlation of the exogenous constructs

Exogenous constructs	Construct ICS	Construct PRODTY	Exogenous constructs Construct HRM	Construct MGT	Construct INFRA	Construct SOP
Construct ICS	1.00					
Construct PRODTY	0.846	1.00				
Construct HRM	0.708	0.807	1.00			
Construct MGT	0.745	0.873	0.849	1.00		
Construct INFRA	0.620	0.700	0.672	0.586	1.00	
Construct SOP	0.749	0.833	0.848	0.824	0.684	1.00

3.6. Evaluating The Model Fit

In evaluate the model fit, another set of hypothesis was used:

Ho : The overall model has a good fit

Ha : The overall model does not have a good fit.

Failure to reject the null hypothesis is desired because it indicates that the overall model can predict the observed variance-covariance matrix in the data set (Hair *et al.* 1998). In short, the overall model has a good fit. AMOS revealed that chi-squared (χ^2) was 458.413 and the degrees of freedom (df) were 393. Furthermore, the root mean square error of Approximation (RMSEA) Index was 0.028 which was below the 0.05 threshold (< 0.05 is a good fit) while normed fit index (NFI) was 0.937 which was above the 0.9 threshold (Hair *et al.* 1998). Both RMSEA index and NFI indicated that the model has a good fit. Based on the data set, there are strong evidence not to reject the null hypothesis.

4. Discussion

Overview Of The Model

The model indicated that all constructs have strong associations either with service quality or performance. The overall model is presented in Figure 2.

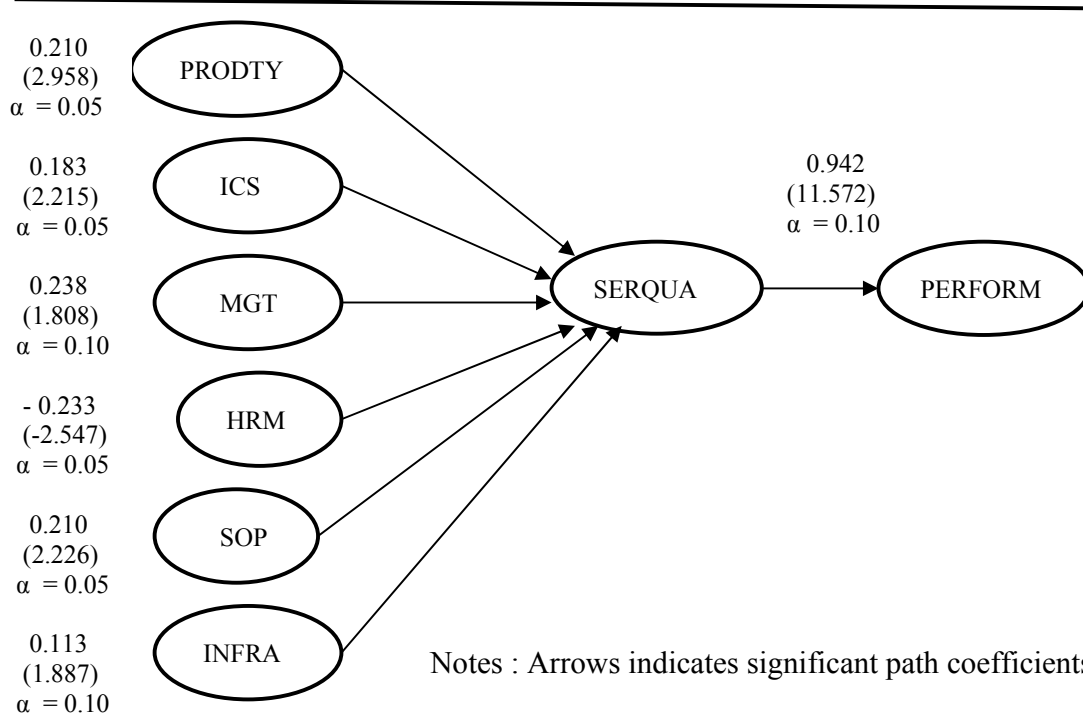
Customer Productivity (PRODTY)

Customer Productivity has positive effects on the service quality and indirectly to the overall performance of local authorities (p-value = 0.003 at 0.05). The need for customer productivity in term of efficiency and effectiveness to improve service quality at the same time improving the overall performance is strongly supported by the results in the data set. Furthermore, this construct has the strongest effects compare to other constructs (Figure 2).

Internal Customer Satisfaction (ICS)

The construct of internal customer satisfaction is manifested by eight variables (see Table II). These variables represent the characteristics of the construct. Based on the data set, the model shows that internal customer satisfaction has positive effects on the service quality and indirectly to the overall performance of local authorities (see Figure 2 and Table II).

Figure 2 Path diagram and values of parameter estimate of the model significant at 0.05 and 0.10 Significance level respectively (t-values in brackets)



Management Commitment (MGT)

The results show that there is a significant path relationship of management commitment towards service quality (p-value = 0.071, $\alpha = 0.10$). Management commitment is also highly correlated with the other exogenous constructs (Table III).

Human Resource Management (HRM)

Human resources are the most important dimension in quality and productivity improvement (Ross, 1994). Previous study handle by few researchers such as Paauwe and Richardson (1997) give an overview on the relationship between HRM/TQM and performance which focused on satisfaction, motivation, absenteeism, retention, trust and involvement. Others, Sun *et al.* (2000) found that employee involvement is significant and positively correlated with improvement in business performance. However, the result shows that it was significant but having a negative relationship to the service quality and performance (Table II and Figure 2). The same result was produced by Khong and Richardson (2003) which totally divert from the main assumption. It is believe that this was caused due to insufficient supporting data which relate to the misunderstanding and clarification of questionnaire during the data gathering.

System, Policy and Procedure (SOP)

System, policy and procedure always relate with the ISO 9000 implementation and respond to the change of management system and culture. Most of the local authority in Malaysia in the process of improving the management system and culture, involve with kind of quality activities such as 5S program, Quality Control Circle (QCC), Benchmarking Practices, TQM and most of them have been ISO certified. Due to this, the results show that system, policy and procedure can positively affect service quality and also indirectly the overall performance of local authority(p-value = 0.023, α = 0.10).

Infrastructure and Environment (INFRA)

Infrastructure and environment play an important role act as to compliment customer satisfaction and services. Relevant studies that explained the involvement of infrastructure and environment such as Athanassopoulos *et al.* (2001). The results show that there is a significant path relationship of infrastructure and environment towards service quality and overall performance (p- value = 0.059, α = 0.10).

Service Quality (SERQUA)

The emphasized are more towards the internal customer perceived during the delivery process to satisfy the external customer. Previously, when dealing with service quality, we always referred to the most popular concept and approach that introduced by Parasuraman *et al.* (1988). However, the items or elements used in this study still have indirect connection with the five items used by Parasuraman *et al.* (1988) which consist of reliability, responsiveness, empathy, assurance and safety. Results show that service quality really has positive impact to overall performance and this has been proven by a lot of studies before.

Limitations

This study is subject to several limitations. First, the results should be interpreted within the usual limitations of survey research. Second, the results of study were based on cross-sectional data no statement of causation could be made. Third, participation in the survey was voluntary. It is possible that the respondents who declined to participated and/or treated as drop-outs were different from those who participated. Furthermore, the parameters set in this model are snapshots of the conditions of the local authority at that particular time and place. Therefore, there is a probability that the data offered reliability but not necessarily consistency. However, with all kinds of limitation mentioned above, the results of the study generally indicate that further understanding of the organizational performance such as the customer productivity and management commitment of local authorities should be addressed and further investigated that might help the local authorities to strategize it roles and functions to suit with the need of quality management practices.

5. Conclusion and Discussion

Detail conclusions are:

- Internal customer satisfaction, customer productivity, management commitment, human resource management, system, policy and procedure and infrastructure and environment are highly correlated (see Table III).
- Internal customer satisfaction has positive effects on service quality and indirectly effects on the overall performance of local authority in West Malaysia.
- Customer productivity has positive effects on service quality and indirectly effects on the overall performance of local authority in West Malaysia.
- Management commitment has positive effects on service quality and indirectly effects on the overall performance of local authority in West Malaysia.
- Human resource management has negative effects on service quality and indirectly effects on the overall performance of local authority in West Malaysia.
- Infrastructure and environment has positive effects on service quality and indirectly effects on the overall performance of local authority in West Malaysia.
- Service quality has positive and direct effects on overall performance of local authority in West Malaysia.

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These study develop a 51-items survey instrument to measure local authorities perceptions of service quality in West Malaysia. The results showed that service quality could be conceptualized and measured as a six-dimensional construct consisting of internal customer satisfaction, management commitment, customer productivity, human resource management, system, policy and procedure and finally infrastructure and environment. The scale exhibited high internal consistency reliability and met rigorous conceptual and empirical criteria for construct validity such as Confirmatory Factor Analysis and Maximum Likelihood. Our results showed that customer productivity is the most important dimension of service quality, follow by management commitment, human resource management, system, policy and procedure, internal customer satisfaction and infrastructure and environment.

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