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Control Systems for Quality Management

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1. Introduction

Total Quality Management (TQM) has become a strategic effective weapon for the successful of various type of organizations. Given its strategic importance, TQM has been implemented in various organizations such as manufacturing (Arawati, 2005; Sohal & Terziovski, 2000; Zakaria, 1999); small medium enterprises (Mohd Nizam & Tannock, 2005); higher education (Cruickshank, 2003) as well as public departments (Abdul Karim, 1999; Hunt, 1995; Nor Hazilah, 2004). The quality management as a discipline has developed through several phases, starting from 'quality by inspection', 'Statistical Quality Control (SQC)', 'Quality Assurance (QA)', and 'Total Quality Management (TQM)' (Prybutok & Ramasesh, 2005). According to Kanji (2002), the ultimate goal of TQM is customer satisfaction. To achieve this, the implementation of TQM requires all members of an organization work as a team through the culture of continuous improvement. In other words, the three pillars of TQM are employee empowerment, continuous improvement and customer focus.

In their studies, these authors (Arawati, 2005; Li, Yasin, Alavi, Kunt, & Zimmerer, 2004) have revealed that there is a significant relationship between TQM and performance. However, not all TQM implementers have executed their TQM successfully. These contradicts findings were reported by other researchers (Samson & Terziovski, 1999; Sanchez-Rodriguez & Martinez-Lorente, 2004; Sohal & Terziovski, 2000; Witcher, 1994). In a review paper, Sila and Ebrahimpour (2002) concluded that previous studies on the relationship between TQM and performance had revealed inconsistencies and sometimes produced conflicting results. Ehigie and McAndrew (2005) concluded that the implication of these unresolved issues is that, future researchers need to investigate factors that could influence the results of TQM. Thus, more empirical evidence is needed to shed light on this unresolved issue.

The unsuccessful of strategy implementation by organizations worldwide are common stories. According to Kaplan and Norton (2000) 70 to 90 percent of organizations worldwide failed to execute their strategy successfully. Contingency theory literature suggests the unsuccessful implementation of a strategy is due to the 'mismatch' or 'misfit' between the strategy and control systems. A strategy is only a means toward an end. To ensure a strategy is successfully executed, strategy related control systems must be institutionalized (Zakaria, 1999). As widely discussed in the literature, good performance effect of TQM can be

harvested by complimenting it with effective and supportive control systems (Andersen, Lawrie & Savic, 2004; Daniel & Reitsperger, 1991; Selto, Renner & Young, 1995)

In line with the contingency theory, management accounting literature proposes that the periodicity of traditional accounting control systems such as budgetary control systems has been blamed for ignoring organizational long-term initiatives (Hayes & Abernethy, 1980; Kaplan, 1983; Otley; 1999; Rangone, 1997), such as in meeting the urgency of TQM in an organization. Dent (1990) in his review paper, stressed that shortermism of traditional accounting control systems had been criticized as discouraging the long-term focus of TQM to be in place. Consequently, several contemporary complementary approaches such as strategic management accounting, strategic cost management, and non-financial performance measurement have been proposed and introduced as means to overcome the limitations of traditional management accounting control systems in dealing with strategic issues (Otley, 1999; Rangone, 1997). In addition to these approaches, the role of strategic control systems (SCS) has been recognized as important systems for the purpose of strategy implementation (Chenhall, 2005; Hoque, 2004; Muralidharan, 2004) including TQM. Hoque (2004) for instance, revealed that there is a significant association between organizational strategy and performance through the presence of SCS.

The increase in TQM awareness has been recognized as one of the important factors that is heightening interest among researchers in control systems issues (Butler, Letza & Neale, 1997). However, the existing literature on the relationship between organizational strategy and control systems is still at the beginning, incomplete and at its infancy (Chenhall, 2003; Daniel & Reitsperger; 1991; Otley, Broadbent & Berry, 1995). They shared a similar view that the issues of the relationship between organizational strategy and organizational control systems were not well addressed in the previous scholarly literature. Therefore, this research area deserves more empirical evidence in examining the relationship between TQM and control systems.

This study contributes to the academia and practitioners. Without doubt, this study is vital due to the inconsistencies, unresolved and even contradictory findings in identifying the relationship between organizational strategy, structure and performance (Prajogo & Sohal, 2006). Given this phenomenon, this study aims to provide evidence to support the proposition that the structural relationship between TQM, SCS and organizational performance is significant.

2. Problem statement

The Malaysian government has initiated various quality management strategies initiatives such as TQM, Zero Defect and Customer Charter to improve the performance of public service. The starting point of current quality awareness in the Malaysian local government was the launch of the 'Excellent Work Culture' campaign in 1989. All these quality management initiatives would be associate with various benefits including better product quality (Ahire & Golhar, 1996), shortening service delivery times, increasing customer satisfaction, as well as achieving higher productivity (Sila & Ebrahimpour, 2002).

However, after more than 20 years of the 'Excellence Work Culture' programme has been launched, the performance of local governments in Malaysia still receives much criticism

and complaints, suggesting the inability of these institutions in delivering high quality services to meet the expectation of public at large (Ibrahim & Abd Karim, 2004). As such, the Minister of Housing and Local Government has made a statement that the Malaysian local government was unable to deliver a good service to the public (The Star, p.14, 6 June 2004).

Given the phenomenon, the relationship between TQM, strategic control systems and performance of Malaysian local government provides an opportunity for a scientific investigation to be undertaken. The low performance of TQM organizations could be related to the issue of misfit between TQM and control systems (e.g. Ittner & Larcker, 1997). Although the number of studies on the relationship between TQM and performance that are reported in the literature are encouraging, the issue of the inter relationship between TQM, control systems and performance has not been fully explored. Given the shortcomings in the literature concerning the issue of control systems in explaining the relationship between TQM and performance as well as emerging issue of performance of Malaysian public service, this study undertakes to investigate:

To what extent TQM is related to strategic control systems in order to achieve good organizational performance.

3. Research question and objective

In line with the research problem discussed in the preceding section, the following research question was investigated: Is the structural model of TQM and organizational performance mediated by strategic control systems? The objective of this study is to test the structural relationship between TQM, strategic control systems and organizational performance strategic control systems.

4. Literature review

4.1 Malaysian local government's experience

The number of government servants in Malaysia is increasing year by year, with the current number of more than 1.3 million servants as depicted in Table 1. Apart from the high number of employees, the public sector has also contributed a significant rate of Gross Domestic Product (GDP). As such in 1997, public sector contributed 6.6 % out of the total Malaysian GDP, while in 2002 the percentage of contribution into GDP by the public sector increased to 7.2 %. Given the high number of total employment and percentage of contribution to GDP, it is evident that the public sector forms an enormous part of the allocation of Malaysian nation wealth. Moreover, this sector is also accountable for its action to every citizen of the nation. Thus, the importance of having effective public organizations to be in place is clearly apparent.

In Malaysia, we have a three-tier system of government which comprises of the federal government, state government and local government. Local government falls under the exclusive jurisdiction of the respective state government. Evolving from a major restructuring carried out in 1973, local governments today come within two principal categories, which are the Municipal Council and the District Council (Abdul Karim, 1999). But nowadays, several local governments have achieved the status of City Council. Based on

the information provided by the Ministry of Housing and Local Government, there are 145 local governments in Malaysia as in December 2005 (http://www.kpkt.gov.my).

Date	Number of Government Servant
31 December 2000	979,464
30 June 2001	985,967
31 December 2001	994,548
30 June 2002	1,004,508
31 December 2002	1,026,143
30 June 2003	1,060,649
31 December 2003	1,080,886
30 June 2004	1,041,778
31 December 2004	1,098,638
30 June 2005	1,337,413

Source: Official website of Public Service Department, http: www.jpa.gov.my/statistik (accessed on 26 July 2006).

Table 1. Numbers of Government Servant by Year

As a forefront organization, performance of the Malaysian local government becomes very crucial (Ibrahim & Abdul Karim, 2004). As with other public organizations, local government in Malaysia also response to any new improvement agenda promoted by the federal government. One of the significant improvement agenda was the birth of the quality initiatives. The impetus of current quality awareness in our public sector is the launch of the 'Excellent Work Culture" campaign in 1989. Since then, the Malaysian public sector has embarked on various administrative reforms like TQM, zero defect and ISO 9000. In general, the commitment of public organizations to the implementation of quality initiatives has been very encouraging (Muhamad *et al*., 2003).

The launching of the 'Excellent Work Culture Movement' by the Rt. Hon. Prime Minister on 27th of November 1989 showed the Malaysian government's commitment towards quality and productivity improvement in the public services. Subsequently, under Excellent Work Culture Movement, the government has instituted various activities for improving quality in the public sector. Among the quality initiatives was the launching of the Manual on Quality Management and Improvement in the Public Service on 25 June 1990 (DAC No 4 of 1991). Further, in order to assist Heads of Department in implementing strategies for quality improvement in their respective agencies, the DAC No 4 of 1991, entitled 'Guidelines on Strategies for Quality Improvement in the Public Service' was published. As elaborated in this guideline, government agencies are given the responsibility for planning and implementing seven programmes for quality improvement, namely Q suggestion system, Q process system, Q inspection system, Q slogan, Q day, Q feedback system, and Q information system (DAC No. 4 of 1991).

As with other Malaysian governmental organizations, many local governments in Malaysia over the past years have committed to institutionalize TQM. As commonly reported in TQM literature, a number of benefits can be derived from the implementation of TQM into the local government. For instance, the institutionalization of TQM shows to the community at large that the local government is committed to improve the performance. As prescribed by

TQM scholars, TQM is among others, able to ensure that local government is responsive to the expectations and needs of its constituents; empower its servants in performing their responsibilities; create a conducive working environment; and achieve the objective of cost effective (Hunt, 1995).

However, the implementation of TQM in the public organizations is not free from several obstacles due to the nature of public service. Generally, customers of public organizations are various, key performance indicators are problematic to be measured precisely, annual budget circles and the need for the politicians to show short-term results often devastate the long-term perspectives of TQM, and implementing TQM is time-consuming. Additionally, TQM implementation can be very expensive to the public expenses (Hunt, 1995). However, the primary obstacles for any TQM implementation are short-term vision of leaders and their lack of understanding of TQM (Sohal & Terziovski, 2000). These difficulties are reflected by the low performance of TQM initiatives in certain Malaysian local governments. As such, only two local governments, which are the City Hall Kuala Lumpur and the Kuantan Municipal Council, were nominated for PMQA (Prime Minister Quality Award) in 1990 (Government of Malaysia, 1991).

In mobilizing quality initiatives in public sector, eleven various projects have been implemented (Government of Malaysia, 1991) such as:

a. The publication of the 'Manual on Quality Management and Improvement in The Public Sector';
b. The distribution of the circular letter from the Chief Secretary to the Government (P.M 17479/11 Vol. 2 dated 30th July, 1990);
c. Training on Quality Management by Institut Tadbiran Awam Negara;
d. Production of the Training Manual on Quality Management and Improvement;
e. Talks on Quality Management by Malaysian Administrative Modernisation and Management Planning Unit (MAMPU);
f. The production of videos tapes on quality and productivity management;
g. The publication of journal of 'KHIDMAT' and 'CEKAP';
h. The Prime Minister's Quality Award for the Public Sector; and
i. Quality Control Circles (QCC).

The 'Manual on Quality Management and Improvement in The Public Sector' highlights various important concepts of quality management for government agencies. These concepts are reference points for implementing quality management and improvement efforts, the structures that need to be set-up and the way to operationalise them in the actual working environment. These concepts are (Government of Malaysia, 1991):

a. Quality is defined as meeting customers' and stakeholders' requirements which can in turn be translated into standards of excellence;
b. Quality is achieved through prevention. It can be attained by setting standards and ensuring that these standards are adhered to;
c. The performance standard is zero defect. In other words, the standard set must be achieved the first time and every time;
d. The cost of quality is the extra cost incurred due to non-conformity to standards. For instance, repetitive jobs, scraps, compensation payments and managing complaints; and

e. All work is process. These processes can be broken down into main activities which can be illustrated through work flow charts.

Furthermore, DAC No. 1 of 1992 suggests that Malaysian Government departments must emphasize on seven management principles of TQM, namely: support of top management, implementation of long-term strategic plan on quality, customer focus, providing training and recognition, fostering teamwork, establishing performance measurement and emphasizing quality assurance. These seven management principles are in line with the critical factors of TQM as discussed in TQM literature that were scientifically developed.

4.2 The calls for strategic control systems

According to Juran (1988), the implementation of quality programme in an organization can be phased into three main phases, namely quality planning, quality control, and quality improvement. During the quality planning stage, an organization prepares to meet the intended quality objectives. Then, quality control is designed to ensure that the quality objectives set in the planning stage are being achieved at the end of the production process. The third phase of trilogy, known both as quality improvements and Juran's *breakthrough sequence*, is the means for managers to find and remedy the basic cause leading to a quality failure. In other words, the breakthrough process is used as a troubleshooting tool to keep the quality planning-control sequence running as intended.

However, Juran (1988) estimates that approximately 80% of the problems identified with breakthrough analysis are correctable only by improving management control systems. The remaining 20% can be attributed to workforce error. In other words, the existence of suitable management control systems is vital for organizations to be able to successfully implement TQM strategy. Perhaps, this situation could be more critical in public organizations, since 95% of errors are caused by systems error and only 15% are attributable to the actions of the workers (Koehler & Pankowski, 1996).

The role of third part of Juran's (1988) trilogy is to find and cure the basic cause leading to a quality failure. Conversely, the function of management control systems is to prevent those bad causes from happening (Merchant, 1982). Since the focus of TQM is prevention, therefore, if public organizations improve its control systems, they can prevent mistakes in the systems (Koehler & Pankowski, 1996). Thus, the existence of suitable control systems can be a significant system in supporting the implementation of TQM. Indeed, prevention is better than cure. However, the empirical study that examines the relationship between TQM and control systems relatively remains less explored.

Apart from many success of TQM, many researchers reported that not all TQM adopters had gained positive impact from TQM (Madu *et al*., 1995; Powell, 1995; Yasin *et al*., 2004). Perhaps, these failure stories were due to the critical factors of TQM considered were incompatible with the traditional mechanistic way of organizing (Hoogervorst, Koopman & Van der Flier, 2005). As commonly stressed in TQM literature, among the critical factors of TQM is teamwork and strong focus on employee involvement. As such, Juran (1995) noted that quality award winners practiced employee involvement culture to an unprecedented degree. Seeing employee as an important factor of TQM implies an approach fundamentally different from the traditional mechanistic approach. Therefore, TQM is considered to be a misfit with the traditional mechanistic organization, since it ignores employees as a crucial

source for achieving strategic objectives. As elaborated by Dent (1990), mechanistic approach like traditional accounting control systems would hinder the achievement of a long-term strategy.

Conversely, Spencer (1994) advocated that many critical factors of TQM like customer focus; teamwork; management commitment; and employee empowerment were compatible with the organic organizations. Thus, the role of strategic control systems has been recognized as a vital system in supporting the organizational strategy like TQM (Goold & Quinn, 1993; Muralidharan, 2004). As documented by Goold and Quinn (1993), without strategic control systems, even good strategies can easily be blown. However, the study on the relationship between TQM and strategic control systems is relatively a new area to be explored. Thus, strategic control systems (SCS) in TQM organizations is the main focus of this study.

The organic type of organizations refers to the organizations that are implementing organic forms of control systems. Organic control systems are more flexible, responsive, involve fewer rules and standardized procedures and tend to be richer in data than mechanistic control systems (Chenhall, 2003). All of these characteristics are important in achieving customer satisfaction as the nature of customer satisfaction is dynamic. As commonly discussed in the TQM literature, customer satisfaction is the ultimate goal of TQM. Examples of organic type of control systems found in control systems literature are strategic interactive controls (Simons, 1995); control systems that provide broad scope information, flexible aggregations and integrative information and information provided in a timely way (Chenhall, 1986); and strategic control systems (Ittner & Larcker, 1997). Due to its strategic characteristics, it is clear that the implementation of SCS 'fits' with the ultimate goal of TQM which is customer satisfaction.

A case study undertaken by Andersen *et al*. (2004) confirmed that TQM could be implemented more successfully with the presence of SCS. From their findings, it can be concluded that although the reasons for failure of TQM are complex, the result that suggesting this failure relates to poor linkage between TQM and SCS was convincing. However, their study was narrowly focused on only one element of SCS which was performance measurement. Therefore, the researchers suggested that more future study is needed to consider wider SCS framework. Concurrently, as a case study, it naturally imposes a limitation of the generalizability of their findings. Therefore, a further study involving larger sample is needed to help validate and extend the generalizability of the findings.

5. Model of the study

The premise of contingency theory is that the strategy and control systems must somehow 'fit' together if the strategy is to be successfully executed. This premise has been widely investigated in the strategy literature as well as management accounting literature with the various operationalization of the concept of fit. Moving from the premise of contingency theory, this study postulates that the unsuccessful of TQM could be related to the misfit between TQM and control systems.

There are various ways of investigating the concept of 'fit' under contingency theory. However, this study has developed the research framework based on the concept of 'fit as

mediation' as put forward by Venkatraman (1989). The idea behind the concept of 'fit as mediation' is the link between strategy and outcome mediated by the control systems. Figure 1 indicates the relationship between TQM and performance is mediated by strategic control systems.

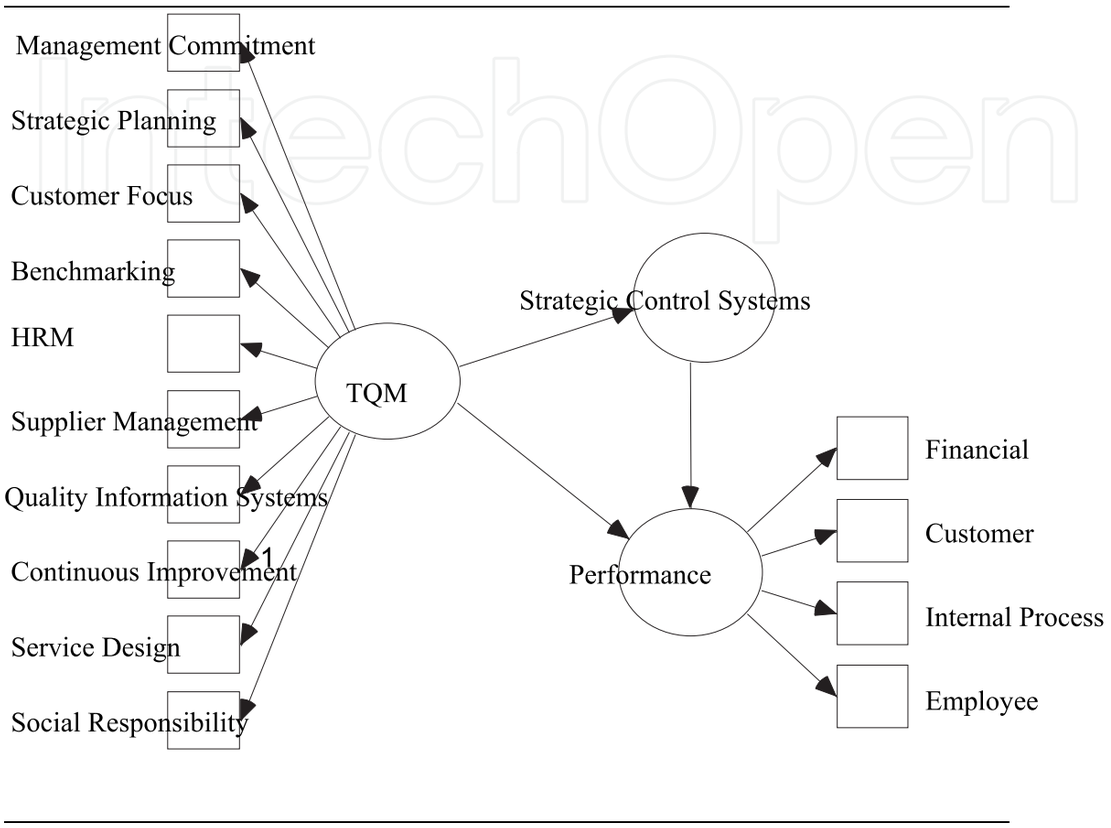

Fig. 1. A Structural Model Incorporating the Relationship between TQM, Strategic Control Systems and Performance.

6. Hypothesis development

After completing an extensive review of TQM literature, Sila and Ebrahimpour (2002) concluded that previous empirical evidence on the relationship between TQM and organizational performance had revealed inconsistencies in findings. In response to these conclusive results, Ehigie and McAndrew (2005) suggested that future researchers need to investigate variables that could influence the success of TQM. Among key variables that have been widely discussed in the literature and able to shed a light in explaining the relationship between organizational strategy and strategy related performance is control systems. In management accounting literature, the discussion about the control systems that is required for TQM to be successful has received much attention (Andersen *et al*., 2004; Daniel & Reitsperger, 1991; Ittner & Larcker, 1997; Selto *et al*., 1995).

The relationship between TQM and organizational performance is not restricted to the direct relationship; perhaps it could be indirect through the presence of SCS. As reported by

Horovitz and Thietart (1982), the use of the suitable control systems is among the prerequisite for a strategy to be successful. The implementation of TQM, for example, cannot be separated from organizational structure like control systems (Othman, 2000) since the organizational control systems have an important role in supporting TQM implementation (Moura E Sa & Kanji, 2003). As such, the function of organizational control systems is to monitor the development of TQM towards the predetermined goals.

Additionally, Chenhall (2003) claimed that the appropriate organizational control systems must exist to support TQM. In line with Chenhall (2003), Daniel and Reitsperger (1991) also found that the organizational control systems must be consistent with TQM to gain good organizational performance. Drawing from the findings of Daniel & Reitsperger (1991) as well as the premise of contingency theory, this study postulates that TQM can be implemented more successfully through the presence of TQM focused control systems. This structural relationship is also in line with the concept of 'fit as mediation' proposed by Venkatraman (1989). In line with the above discussion, this research hypothesizes:

H: The structural model of TQM and organizational performance is mediated by strategic control systems.

7. Research methodology

7.1 Unit of analysis

Unit of analysis of the study is the department of City Council (CC) and Municipal Council (MC) in Malaysia West.

7.2 Respondents

The respondents of the study were Heads of Department (HOD). They are most familiar with their departments' practices and performance results.

7.3 Population and sampling frame

Table 2 tabulates the number of existing departments by each city council and municipal council in Peninsular of Malaysia. The total number of existing departments is 341. However, 36 departments **(figure in bold)** were involved at the pilot study stage. Therefore, the balances of 305 departments were considered as the sampling frame for the main field work. The sampling frame of this study was developed by using two reliable resources, namely official websites of related local governments, and direct contact with officers from related local governments by using email or telephone. The latter approach was used due to the technical problem with official websites of related local governments during the data collection process. For example, Sungai Petani MC did not have an official website, thus a call was made to their Public Relation Officer. Kulim MC did not have such information eventhough they have their official website, thus a call was made to their Head of Administrative Department. Langkawi MC did not develop an official website, thus a call was made to their HOD of Management. Information about Teluk Intan MC was e-mailed by their officer.

Local Government	Existing Department
City Council	
Kuala Lumpur	22
Johore Bharu	7
Alor Star	8
Malacca	13
Ipoh	9
Shah Alam	12
Petaling Jaya	14
Municipal Council	
Batu Pahat	6
Johore Bharu Tengah	9
Kluang	6
Muar	7
Sungai Petani	10
Kulim	10
Langkawi	8
Kota Bharu	**8**
Alor Gajah	11
Seremban	**11**
Nilai	6
Port Dickson	9
Kuantan	11
Temerloh	13
Manjung	10
Taiping	8
Kuala Kangsar	7
Teluk Intan	8
Kangar	8
Pulau Pinang	10
Seberang Prai	10
Ampang Jaya	10
Kajang	**10**
Klang	10
Selayang	11
Subang Jaya	9
Sepang	7
K. Terengganu	**7**
Kemaman	6
Total population	341

Source: Developed by researcher based on information of every local government

Table 2. Existing Department by Local Government in Peninsular of Malaysia

7.4 Sampling procedure

This study used stratified cluster sampling. For groups with intragroup heterogeneity and intergroup homogeneity, cluster sampling is most appropriate (Sekaran, 2003). Generally, the characteristics of local governments in Malaysia are as follows:

- Governed under the same act, Local Government Act 1976
- Monitored by the same ministry, Ministry of Housing and Local Government
- Have similar functions, roles, objectives and types of activities as prescribed in Town and Urban Planning Act 1976 and Road, Drainage and Building Act 1974.
- Minimal difference in the organizational structure of each local government
- Many departments with different kinds of objectives, functions and activities within each local government. For instance, the Town Service Department and the Engineering Department.

Given the above characteristics, cluster sampling was applied for selecting samples. According to Davis (2000), cluster sampling is one of the methods more widely used in large scale studies. However, cluster sampling is exposed to larger errors than other probability sampling. This larger error occurs because the selection of each sampling unit within the cluster is dependent on the selection of the cluster, although the cluster is randomly selected. In order to reduce the loss of precision from cluster sampling, selection of cluster was stratified according to the status of the local government. This stratified cluster sampling (Davis, 2000) selects cluster at random from pre-specified strata.

8. Findings

8.1 Descriptive analysis of the constructs

According to the mean score, the implementation of each TQM factor and SCS are expressed as a high or low degree of TQM or SCS. In addition, the level of organizational performance is expressed as high or low performance.

Constructs	Mean	Standard Deviation	Min	Max
Management commitment	4.19	0.67	2.00	5.00
Strategic planning	3.85	0.62	2.00	5.00
Customer focus	4.00	0.60	1.00	5.00
Benchmarking	3.72	0.67	1.00	5.00
Human resource management	3.59	0.74	1.00	5.00
Supplier relationship	3.44	0.51	1.00	5.00
Continuous improvement	3.87	0.70	1.00	5.00
Quality information system	3.22	0.69	1.00	5.00
Service design	3.55	0.63	1.00	5.00
Social responsibility	4.03	0.68	1.00	5.00
Strategic Control Systems	3.66	0.61	2.00	5.00
Financial performance	3.67	0.74	1.00	5.00
Customer performance	3.62	0.61	1.00	5.00
Employee performance	3.67	0.66	1.00	5.00
Internal Process performance	3.63	0.69	1.00	5.00

Table 3. Descriptive Statistics of the Constructs (n=205)

As tabulated in Table 3, the mean value of management commitment is the highest among the TQM factors. This indicated that the commitment of management of local government understudied towards TQM was in a good situation. The minimum and maximum values of management commitment are 2.00 and 5.00 respectively, with the standard deviation of 0.67. However, the mean value of quality information systems is the lowest among the TQM factors with the value of 3.22. This mean value provided evidence that, more work needs to be done to improve the level of usage of quality information systems of Malaysia local governments. The possible explanation for this situation is that only a small number of local governments were advanced in their quality information systems.

8.2 Structural Equation Modeling test

SEM using AMOS was employed for examining the structural model of the study as depicted in Figure 2. SEM is an appropriate statistical technique for testing a model that is hypothesized to have relationships among latent variables that are measured by multiple-scale items, where at least one construct is both a dependent and independent variable (Hair *et al*., 1998). As depicted in Figure 2, the TQM and OP are represented by oval which denote latent variable. TQM is represented as single latent variable composed of ten observed variables. OP is represented as a single latent variable composed of four observed variables. SCS is only measured by a single variable. In Figure 2, SEM attempts to account for random measurement error as represented by the small circles with the letter 'e'. The covariance matrix among the variables constituted the input for the SEM analysis. Although in practice both covariance and correlation matrices can be used as the input for SEM analysis, but the usage of covariance matrix is more recommended (Kelloway, 1998). By using AMOS package, the default matrix of this statistical package is covariance matrix.

The analysis of SEM using maximum likelihood estimation as performed in this study requires normal distribution of data. To satisfy this assumption, the test of normality, namely skewness and kurtosis were performed. As reported in Table 4, the value of skewness was between -0.427 and -1.293; and the value of kurtosis was between 0.205 and 2.768 respectively. Based on the results of skewness and kurtosis test, it indicated that the data of the study is within the acceptable level of normality assumption. According to Kline (1998), if the skewness is lower than 3.00 and kurtosis is lower than 10.00, the data has not violated the normality assumption.

The full model (input) is illustrated in Figure 2. The path coefficient between TQM and each of the ten indicators and the respective error variances were estimated, except that between TQM and management commitment that was fixed to 1. The path coefficient between OP and each of the four indicators and the respective error variances were also estimated, except that between OP and financial performance that was fixed to 1. On the other hand, none of the paths of the SCS variable was estimated since the SCS was explained by a single observed variable. Based on the suggestion by Kelloway (1998) in dealing with the condition of one indicator for a latent variable, the path coefficient between SCS and its error variance was set at a fixed value using the value of one.

Prior to testing the hypotheses, the model overall fit must be established (Bollen, 1989). The result of the full structural model with standardized parameter is presented in Figure 3. In

order to evaluate the full structural model fit, a series of indices provided by AMOS were examined. Model fit determines the degree to which structural equation model fits the sample data. Model fit indices that are commonly used are chi-square (χ^2), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), and root mean square residual (RMS). These indices are based on differences between the covariance matrix of observed model and the implied model (Hair *et al*., 1998). Among these indices, the chi square is the most popular index (Bollen, 1989). In evaluating chi-square value, researchers are interested in obtaining insignificant chi-square value. Generally, smaller chi-square value indicates a better model fit to the data. However, the index of chi-square has been criticized due to this index being very sensitive to the sample size (Bollen, 1989).To derive a conclusion, SEM literature is always suggesting researchers evaluate the model fit based on a range or series of fit indices. Table 5 depicts the list of goodness of fit measures and the levels of acceptable fit adapted from Hair *et al.* (1998).

Variables	Skewness	Kurtosis
Management commitment	-0.637	0.870
Strategic planning	-0.872	0.778
Customer focus	-1.037	2.274
Benchmarking	-0.777	0.740
Human resource management	-0.836	0.767
Supplier relationship	-0.683	2.062
Continuous improvement	-0.809	1.330
Quality information systems	-0.427	0.205
Service design	-0.604	1.262
Social responsibility	-1.293	2.768
Strategic control systems	-0.586	0.309
Financial performance	-0.694	0.628
Customer performance	-0.733	0.713
Employee performance	-0.880	1.274
Internal Process performance	-0.809	1.298

Table 4. Skewness and Kurtosis of Constructs

Goodness of Fit Measures	Levels of acceptable fit
Chi-square	$P \geq 0.05$
Chi-square/degrees of freedom	≤ 3.00
Goodness-of-fit Index (GFI)	≥ 0.90
Adjusted Goodness-of-fit Index (AGFI)	≥ 0.90
Normed Fit Index (NFI)	≥ 0.90
Non Normed Fit Index (NNFI) or Tucker Lewis Index (TLI)	≥ 0.90
Comparative Fit Index (CFI)	≥ 0.90
Root Mean Square Residual (RMSR)	≤ 0.08

Adapted from Hair *et al*. (1998)

Table 5. Levels of Acceptable Fit of Goodness of Fit Measures.

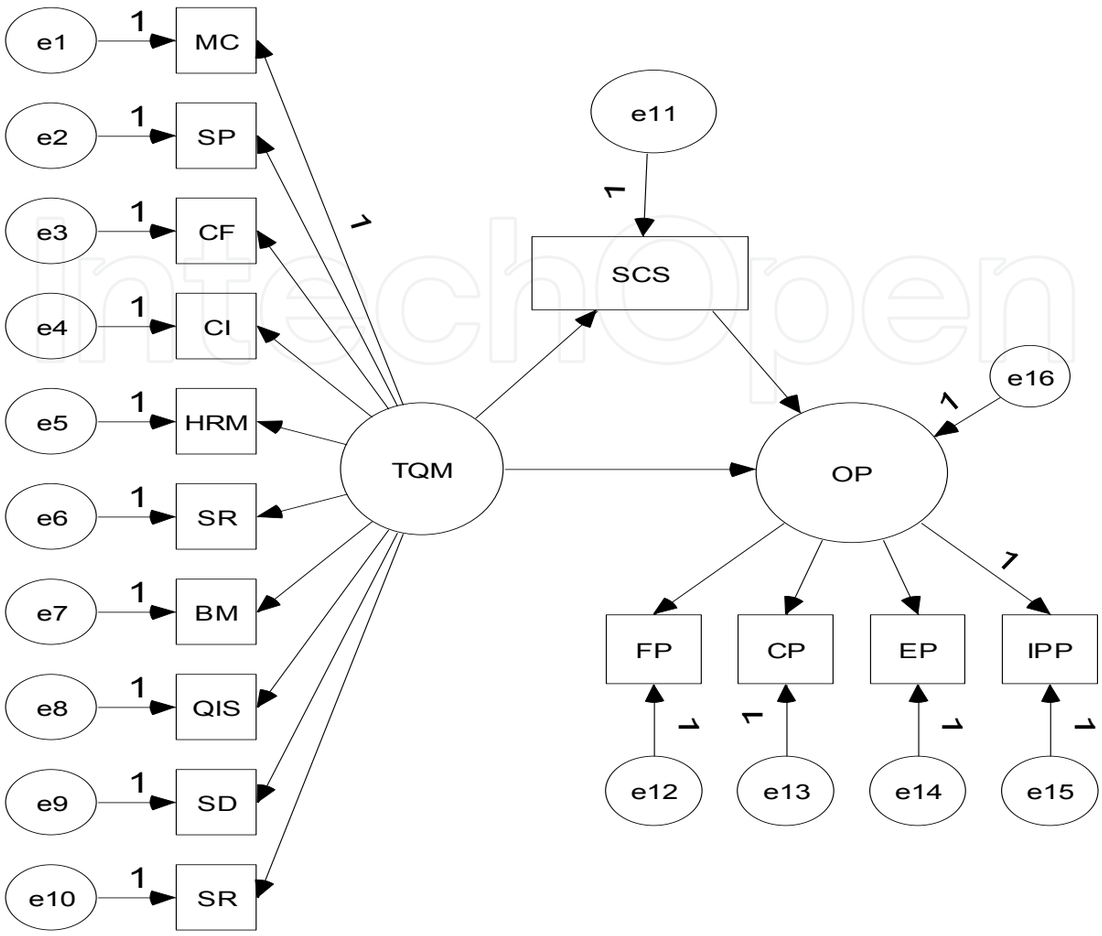

Fig. 2. Full Model (input)

However, the indices of the full model investigated in this study as given in Figure 3, did not achieve the suggested level. Thus, modifications on the model were done based on modification index. Modification index provides information for model modification. This step was redo several times until the model investigated fit the data.

Table 6 reports the indices of the modified model. The indices of the modified model surpassed or are marginally lower than the benchmark value suggesting the model did fit to the data. Given that hypothesis testing was evaluated. In order to test the hypothesis of this study, the significant of the structural paths were investigated by referring to the value of critical ratio (CR). A critical ratio is defined as the ratio between the standard estimation and its standard error (Arbuckle & Worthe, 1999). Normally, a structural path with CR value larger than 1.96 in magnitude is considered as significant.

The hypothesis of this study is the structural relationship between TQM, SCS and organizational performance fit to the data. Table 6 tabulates the index of modified model of this study had achieved the suggested level. Additionally, Table 7 presents the results of direct effect and indirect effect between the constructs under study. As can be seen, the total effect of TQM on OP is higher than the direct effect of TQM on OP. The total effect of

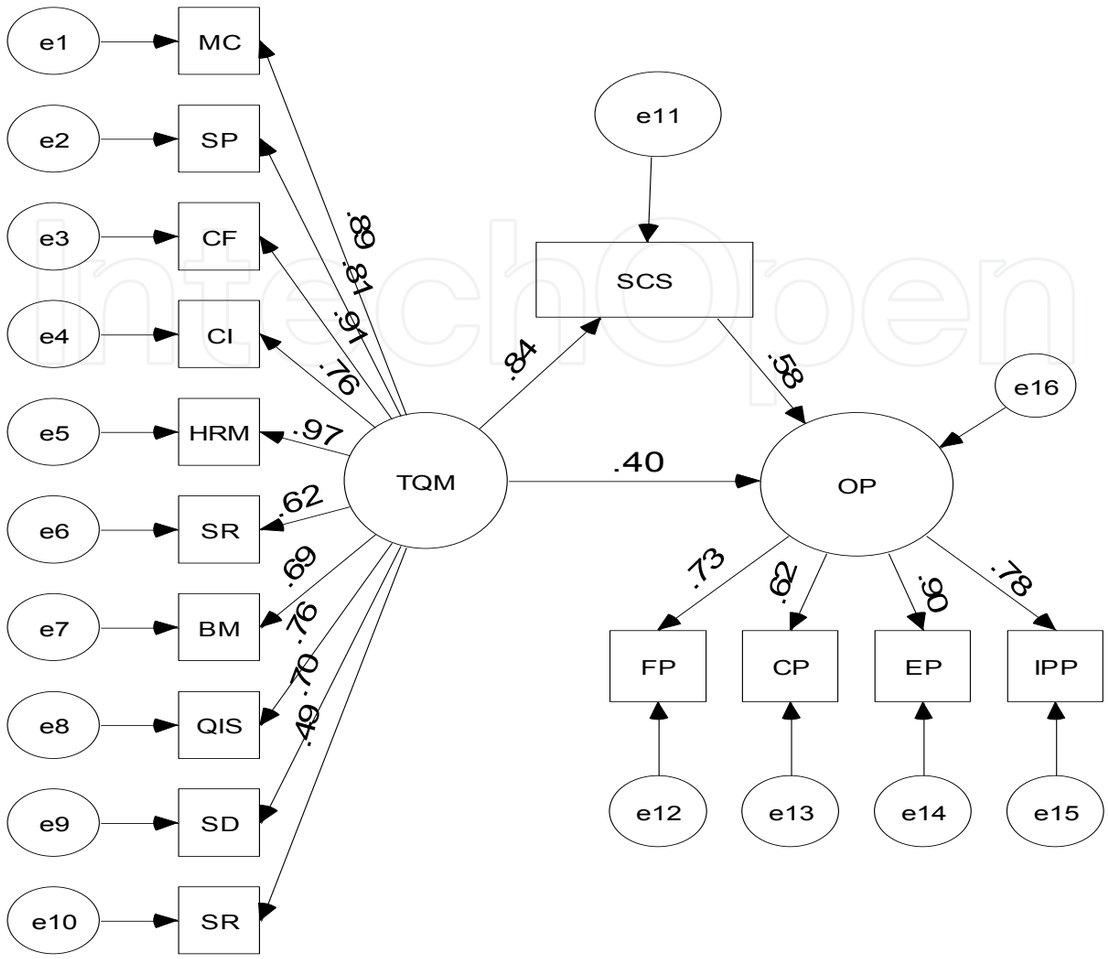

Fig. 3. Full Model with Standardized Parameter

Indices	Value	Threshold	Acceptability
Goodness of fit index (GFI)	0.848	≥ 0.90	Marginal
Relative fit index (RFI)	0.854	≥ 0.90	Marginal
Normed fit index (NFI)	0.902	≥ 0.90	Acceptable
Incremental fit index (IFI)	0.922	≥ 0.90	Acceptable
Tucker Lewis index (TLI)	0.833	≥ 0.90	Marginal
Comparative fit index (CFI)	0.921	≥ 0.90	Acceptable

Table 6. Indexes of Full Modified Model

Path	Direct effect	Indirect effect	Total
TQM→SCS	0.861		
TQM→OP	0.400	0.481	0.881
SCS→OP	0.559		

Table 7. Standardized Direct and Indirect Effect

TQM on OP can be calculated by adding the direct effect of TQM on OP and indirect effect of TQM on OP through the presence of SCS as follows. The indirect effect of TQM on organizational performance through the presence of SCS is calculated by multiplying the direct effect of TQM on SCS and the direct effect of SCS on OP (0.861 X 0.559 = 0.481). Therefore, the total effect of TQM on organizational performance is 0.881. This result provides evidence that the impact of TQM on the level of organizational performance may improve through the presence of SCS. Therefore, H_1 is supported.

9. Conclusion

This study investigated the structural relationship between TQM, Strategic Control Systems (SCS) and Organizational Performance (OP). The investigation was motivated by the inconsistent findings concerning this relationship that appears in the literature, thus becoming another unresolved issue that needs to be scientifically revisited. Given the importance of control systems in executing organizational strategy, this study attempted to identify the mediating role of SCS on the relationship between TQM and OP. This study found that TQM on strategy through the presence of SCS had a stronger relationship with OP, as compared to direct relationship between TQM and OP. In other words, the finding indicated that the explanatory power of TQM toward OP was higher when mediated by SCS than that of TQM directly toward OP. Therefore, it could be concluded that the presence of SCS is essential to the success of TQM strategy. Perhaps, TQM strategy and SCS have a synergistic impact on OP. Therefore, these findings provide support for the earlier conclusion derived by Andersen *et al*. (2004). As concluded by these authors, an organizational strategy could be implemented more successfully with the presence of strategy related control systems.

The implementation of TQM needs high inter-functional activities (Groocock, 1986; Feigenbaum, 1986), whereby entire functional activities like research and development, purchasing, production, human resource, accounting and marketing are involved in the attainment of TQM strategy. In order to coordinate these high inter-functional activities, an effective control systems must be in placed (Zakaria, 1999). Based on the finding of this study, it suggests that local governments seeking to achieve better performance by institutionalizing TQM are subject to the effectiveness of TQM focused control systems. By having TQM focused control systems, TQM philosophy would be easier to be internalized by all employees as an internal culture of their organization.

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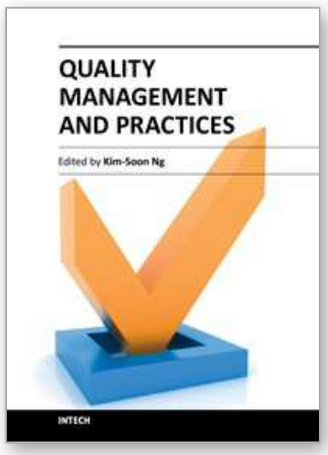

Quality Management and Practices

Edited by Dr. Kim-Soon Ng

ISBN 978-953-51-0550-3
Hard cover, 254 pages
Publisher InTech
Published online 27, April, 2012
Published in print edition April, 2012

This book is comprised of a collection of reviews and research works from international professionals from various parts of the world. A practical approach to quality management provides the reader with the understanding of basic to total quality practices in organizations, reflecting a systematic coverage of topics. Its main focus is on quality management practices in organization and dealing with specific total quality practices to quality management systems. It is intended for use as a reference at the universities, colleges, corporate organizations, and for individuals who want to know more about total quality practices. The works in this book will be a helpful and useful guide to practitioners seeking to understand and use the appropriate approaches to implement total quality.

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