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Role Conflict in Information Systems Personnel: A TQM Perspective

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Abstract: This study examines the extent to which Total Quality Management (TQM) practices (i.e., leadership, strategic planning, customer focus, human resource focus, process management and information analysis) are associated with the role conflict of Information Systems (IS) personnel in Malaysia. The empirical data were collected from 237 IS personnel from both manufacturing and service firms in Malaysia. To our knowledge, this is the first empirical study of IS personnel which presents the formation of a theoretically based model which integrates the elements of TQM with role conflict. Using multiple regression analysis, process management and information analysis were found to have negative relationships with role conflict. Human resource focus was reported to have a positive relationship with role conflict. The findings indicate that the firms might gain by focusing on the enhancement of the process management and efficient use of information analysis in order to reduce the unpleasant role conflict of IS personnel. However, firms are encouraged to look for ways to reduce the pressure of human resource focus on role conflict. The proposed model is useful for practical usage by organizational administrators and managers to attain a better understanding of different dimensions of TQM in relation to role conflict of employees.

Key words: Information systems personnel, Malaysia, role conflict, total quality management

INTRODUCTION

Many organizations are facing intense competition and a rapid growth and complexity of technological change. Computers, information systems and Information System (IS) personnel are recognized as critical elements that determine a firm's ability to cope with increasing competition and changes (Li and Shani, 1991). Qualified IS personnel are known as a costly and scarce resource (Baroudi, 1985). Therefore, the success of the IS department and the computer-dependent firms are highly dependent on the effective management of IS personnel (Baroudi, 1985).

In addition to this, many large organizations also realize the strategic importance of Total Quality Management (TQM) in improving their competitiveness (Price and Chen, 1993). Several firms such as IBM, GE and AlliedSignal proposed that TQM concept is applicable and helpful to every functional division (Chow and Lui, 2003). With the widespread of TQM adoption, the IS departments also started looking towards TQM as a strategy to gain competitive advantage. Nevertheless, managers understand that introducing new operations approaches into the culture of a firm usually result in dissatisfied or confused employees who may not accept the new program (McNabb and Sepic, 1995). For example, when an organizational change is proposed (e.g., a change in the technology used, operating procedures or processes), a heightened level of anxiety often arises among employees (McNabb and Sepic, 1995).

Because the implementation of TQM often introduces new techniques and practices, it is likely that IS personnel, occupying various roles may face role conflict when individual receives conflicting job performance information. Numerous types of role conflict such as inter-sender conflict and person-role conflict (Kahn *et al*., 1964) have been studied and operational scales for measuring role conflict have been formed (House and Rizzo, 1972; Rizzo *et al*., 1970). However, limited studies have been conducted to relate TQM practices to role conflict of IS personnel. More studies need to be conducted to explore the occurrence of the role conflict on the basis of different TQM practices imposed upon the employees. Generally, the diagnosis of role conflict is likely to be of value in understanding employees and in developing mechanisms (e.g., job design, supervisory training etc.) to manage the dysfunctional consequences for individuals and organizations. Furthermore, the prospective effect of role conflict is costly to the IS personnel with respect to emotional consequences such as lower job satisfaction and higher tension (LeRouge *et al*., 2006; Igbaria *et al*., 1994) as well as to the organisation in view

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of lower performance quality and higher turnover (Lee, 2000; Igbaria and Siegel, 1992).

This study examines the relationship between multi-dimensionality of TQM practices and role conflict of IS personnel in Malaysia. This study begins by reviewing the literature on the relationship between TQM practices and role conflict. This leads to the development of research hypotheses. A research framework is then outlined before reporting and discussing the findings of surveys of IS personnel in Malaysia. This study concludes by considering the limitation for future research, both theoretical and managerial implications of the study.

FORMULATION HYPOTHESES

TQM practices: TQM is a management philosophy that can be described by its practices, techniques and three principles, namely customer focus, continuous improvement and teamwork (Dean and Bowen, 1994). Many firms increasingly employ TQM framework based upon assessment criteria from quality award (Black and Porter, 1996). For example, Malcolm Baldrige National Quality Award (MBNQA), European Quality Award (EQA), the Deming Application Prize (DP), the Swedish Quality Award (SwQA), Singapore Quality Award (SQA), Hong Kong Management Association Quality Award (HKMAQA), Mauritius National Quality Award (MNQA) and South Africa Business Excellence Award (SLNQA) are some national criteria used for company self-assessment (Tan and Lim, 2000).

According to Flynn and Saladin (2006), the MBNQA has served as a well-accepted framework for organizing the components of quality management. In fact, MBNQA provides the foundation for more than 56 national and international quality awards, with different degrees of local modification, in several countries worldwide (DeBaylo, 1999). Prajogo and Sohal (2003) asserted that MBNQA consists of one criterion of organizational performance and six criteria of TQM practices (i.e., leadership, strategy and planning, customer focus, people management, process management as well as information and analysis). The majority of manufacturing companies in Europe, the USA, Japan and Australia have adapted these six dimensions of TQM as above mentioned (Samson and Terziovski, 1999).

Based on earlier research on TQM (Chung *et al.*, 2008; Prybutok *et al.*, 2008; Prajogo and Sohal, 2003; Samson and Terziovski, 1999), six TQM practices have been identified for this present study, namely, leadership, strategic planning, customer focus, human resource focus, process management and information analysis.

Role conflict: McNabb and Sepic (1995) believed that most if not all of TQM adoption failures may be attributed to the fundamental culture of the firm and the operating climate that the culture nurtures in their staff. Four measures of organizational climate (i.e., employees' role conflicts, supervisory support, overall environment and internal communication) were employed in their study of factors influencing acceptance of change (McNabb and Sepic, 1995). In retrospect, role conflict has been found to be related with many adverse personnel outcomes which are considered as dysfunctional for the firms (Miles and Perreault, 1976). A study by Weiss (1983) asserted that job stresses (e.g., role conflict and overload) among 297 IS managers are positively related to psychological and physiological strains. Igbaria and Siegel (1992) reported that role conflict and boundary spanning activities are positively correlated with turnover intentions. King and Sethi (1998) surveyed 160 IS personnel from five cities in USA and concluded that institutionalized socialization tactics result in lower role conflict. LeRouge *et al.* (2006) further completed a study of 124 IT developers in 12 Fortune 500 companies and discovered that role stress fit was positively related to job satisfaction and organizational commitment. Role stress fit is determined by IT developers' preferred and perceived levels of role ambiguity and role conflicts (LeRouge *et al.*, 2006).

Past studies stressed that role conflict are ubiquitous among computer-related jobs (LeRouge *et al.*, 2006; Lee, 2000; Igbaria and Siegel, 1992; Weiss, 1983). This is partly because IS personnel often receive vague information on what is expected of them from their superiors (Baroudi, 1985) and the rapid changes of advanced technological development induce uncertainty among IS managers (Lee, 2000). Essentially, role conflict occurs when two or more demands arise concurrently and having to comply with one makes it difficult to comply with the other (Igbaria and Siegel, 1992). For example, employees face role conflict when they are challenged by tasks and responsibilities due to resource constraints and competing demands placed by the superiors, peers or subordinates (LeRouge *et al.*, 2006; Kahn *et al.*, 1964). Kahn *et al.* (1964) identified four components of role conflict, namely, person-role conflict, intrasender conflict, intersender conflict and role overload.

- Person-role conflict occurs when role requirements violate personal values or when a person's needs and aspirations lead to behaviours that are unacceptable to members of the role set (Rabinowitz and Stumpf, 1987).
- Intrasender conflict occurs when a supervisor requests an individual to obtain material which is

unavailable through normal channels and at the same time prohibits violations of normal channels (McPherson, 1965).

- Intersender conflict occurs when role requirement or expectations from role sender oppose those from one or more other parties (Rabinowitz and Stumpf, 1987).
- Role overload occurs when the role expectation communicated to the focal person exceeds the amount of time available or ability for his or her accomplishment (Rabinowitz and Stumpf, 1987).

In present study, role conflict is treated as a unidimensional concept because some researchers Beauchamp and Bray (2001), Abdel-Halim (1978) and Rizzo *et al.* (1970) reported difficulties in differentiating empirically between various types of role conflict.

THE LINK BETWEEN TQM PRACTICES AND ROLE CONFLICT

Leadership: Leadership is included in the MBNQA criteria as the category that encompasses every part of MBNQA criteria (Prybutok *et al.*, 2001). Leadership facilitates organizational and employee learning, evaluates business performance and establishes better relationships with stakeholders (Prybutok *et al.*, 2001). Notably, managerial and supervisory staff have an influence in resolving subordinates' role stressors in countries such as Taiwan, India, Iran and Brazil in a study by Peterson *et al.* (1995). For example, when the senior executives impose conflicting pressures on the subordinates, it is likely that confusion will set in and the employee will experience role conflict.

Along these lines, Kahn *et al.* (1964) reported a negative correlation between closeness of supervision and role conflict. Supportive leader behaviours for a cluster of managerial and professional technical employees were found to be negatively correlated with role conflict (House and Rizzo, 1972). Teas (1983) posited an inverse relationship between leader consideration and role conflict. In contrast, Ruyter *et al.* (2001) in a study of 154 call center employees in the Netherlands found that leadership initiating structure did not influence role conflict. In view of the preponderance of the evidence from prior research relating to leadership and role conflict, the following hypothesis is proposed:

- **Hypothesis 1:** Leadership has a significant negative association with role conflict.

Strategic planning: Strategic planning is a structured process of setting the short and long term goals and devising plans to improve relationships with customers, suppliers and business partners (Prybutok *et al.*, 2008). Following Paul *et al.* (1978), although the execution of strategic planning differs from organisation to organisation, strategic planning requires each organisation to firstly decide what it wants to be and this decision is based on various quantitative measures (e.g., sales, increase in profits and return on investment) and qualitative measures (e.g., environmental issues and innovation).

Top management devises the strategy based on external (e.g., technological change, competitive moves and government regulations) and internal (e.g., availability of capital and skills) conditions and consequently, the middle management has to carry out appropriate quality improvement programs, while the subordinates of the middle management are responsible for implementation (Gunasekaran *et al.*, 1994). According to Lorange and Vancil (1976), the design of this process-deciding who does what, when-are complicated because managers at each level of a hierarchy must agree on an integrated action plan. Therefore, the process of strategic planning often involves various conflicting expectations from different divisions. As a result, employees such as IS personnel always experience role conflict when role expectations from one division (e.g., finance division) are in conflict with those from the other divisions (e.g., information technology division, marketing division and etc.). Therefore, the following hypothesis is proposed:

- **Hypothesis 2:** Strategic planning has a significant positive association with role conflict.

Customer focus: Customer focus can be assessed by the frequency of customer satisfaction surveys and dissemination of the survey analysis to functional areas such as design and planning (Ahire and O'Shaughnessy, 1998). According to Lai (2003), customers are well-informed, knowledgeable and more demanding nowadays. Customers anticipate having their requirements fulfilled in the way of conformance to requirement and expect provision of continuous improvements in the product and service (Lai, 2003).

Role conflict occurs when employee is not able to satisfy incompatible expectations between manager and customers simultaneously (Karatepe *et al.*, 2006). For example, firms usually require the service role occupant to treat every client equally and the interaction between service employee and client to be restricted to those items which are officially defined and approved, while the client anticipates the service-provider to consider his or her special request (Shamir, 1980; Bar-Yosef and Schild, 1966). In other instances, a superior requires service employees

to serve as many customers as possible but those customers expect personal attention (Wetzels *et al*., 1999). Therefore, it is valuable to examine the relationship between customer focus and role conflict among the IS personnel. As such, the following hypothesis is proposed:

- **Hypothesis 3:** Customer focus has a significant positive association with role conflict.

Human resource focus: Ahire and O'Shaughnessy (1998), quality-oriented human resource management promotes the quality management environment through empowering employees and through ensuring that infrastructure is in place to facilitate employee participation and training employees in the technical and managerial sides of their role in TQM. Many service organizations have succeeded in their quality management program by implementing empowerment approaches in their organizations (Zemke and Schaaf, 1989; as cited by Sureshchandar *et al*., 2001).

Empowerment refers to participative management techniques, power sharing or delegating through goal setting by staff (Conger and Kanungo, 1988). In service firms, empowerment is a popular involvement approach in which employees should be competent in performing their job and be granted authority to make decisions (Wetzels *et al*., 1999). Surprisingly, Hartline and Ferrell (1996) reported a direct positive relationship between empowerment and role conflict. This indicates that empowerment may increase uncertainty because less official standards or procedures are accessible as guidelines for employees (Wetzels *et al*., 1999). Because human resource is an integral part of TQM, examining the relationship between human resource focus and role conflict of IS personnel is important. Thus, the following hypothesis is proposed:

- **Hypothesis 4:** Human resource focus has a significant positive association with role conflict.

Process management: Process management is defined as a set of practices that integrate methodological approaches with human resource management and these practices are executed to manage and enhance processes involving product and services development (Anderson *et al*., 1994). TQM can be effective only when the organizations have the necessary structures, processes and incentives to support the employees. Rizzo *et al*. (1970) noted that formal organizational structure is known as a source of role expectations and pressures that can increase role conflict. The types of conflict in service roles include conflict between the requirements directed at the employees from the management of the firm in the form of policies, rules and regulations (Shamir, 1980). This is consistent with the notion made by House and Rizzo (1972) in which the lack of policy and philosophy, unclear performance standards as well as ambiguous and often changing directives, are vulnerable to role conflict.

Role conflict was reported to be significantly related to formalization (Morris *et al*., 1979). Formalization implies the extent to which rules, procedures, instructions and communications are written (Pugh *et al*., 1968). In a highly formalized firm, the conflict between individuals expectations and the firm's expectations decrease considerably because the expectations of both the individual and firm are known (Johnson *et al*., 1998). Interestingly, Nicholson and Goh (1983) posited a negative association between formalization and role conflict among the production workers but reported a positive relationship between formalization and role conflict for personnel involving data processing research and development. On the basis of the literature, the following hypothesis is proposed:

- **Hypothesis 5:** Process management has a significant negative association with role conflict.

Information analysis: The implementation of TQM involves a primary focus on the quality of data that are valuable to the firms (Fox *et al*., 1999). In service industries, TQM program is concerned with the need to gather a large set of data and to run statistical analysis using the data (Au and Choi, 1999). High quality information may give different inference for different personnel (Xu *et al*., 2003). For example, Statistical Process Control (SPC) is used to evaluate the performance of a process, offer suggestions on how the process can be enhanced and to provide feedback to support management decision making (Dale and Cooper, 1992).

In a computerized information system, the lead-time in the information flow could be shortened and the conflicts among the functional departments could be reduced as information becomes more reliable (Gunasekaran *et al*., 1994). The use of quality information and analysis would result in reduced role conflict because employees are able to obtain timely information and have a better understanding of their expected roles and required tasks. Due to the impact which the use of information analysis has on role conflict, it is important to examine the relationship between information analysis and role conflict. Therefore, the following hypothesis is put forward:

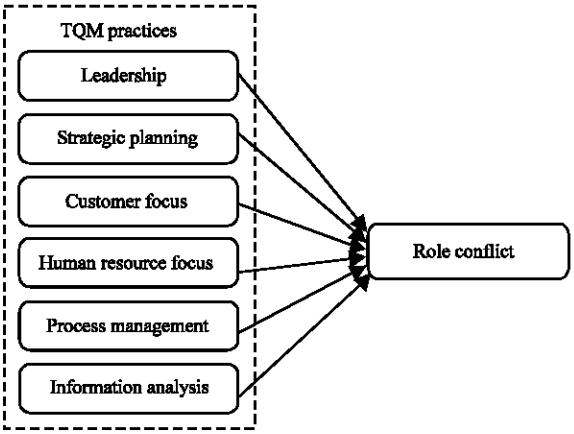

Fig. 1: Research framework

- **Hypothesis 6:** Enhanced use of Information analysis has a significant negative association with role conflict

Research framework: Based on the above literature review, a research framework has been developed to examine the relationship between TQM practices and role conflict (Fig. 1). The model indicates that TQM practices are independent variables and role conflict is a dependent variable. The variables selected are an integral part of TQM programs but they should not be viewed as the only ones that could be included.

MATERIALS AND METHODS

Here, the operational measures of variables, sample and data collection procedures used in the study as well as the statistical tests used to evaluate the relationship between the multi-dimensionality of TQM and role conflict.

Measures: Every construct was measured at the individual level of analysis. The instrument of TQM practices is an adaptation of the scale developed by Prajogo *et al.* (2007), Prajogo and Sohal (2006), Sohail and Teo (2003), Zhang *et al.* (2000), Samson and Terziovski (1999). The selection of the scales was based on two reasons. First, the scales are empirically established and their reliability and validity are comparable to other studies (Samson and Terziovski, 1999; Sohail and Teo, 2003). Second, the scales reflect the categories of MBNQA criteria that have b een determined as the basis of this study. The six TQM dimensions (i.e., leadership, strategic planning, customer focus, human resource focus, process management and information analysis) were organized using 42 items (Table 2). Sample items in this study include, top management actively participates in quality management and improvement process (leadership) the organisation has a mission statement which has been communicated throughout the company and is supported by our employees (strategic planning), our organization collects extensive complaint information from customers (customer focus), Our organisation has a company-wide training and development process for all our employees (human resource focus), our organisation's employees work as team but guided by clear goals (process management) and Our organisation regularly reviews on organisation's quality performance (information analysis). Responses to these items were on a 5 point Likert scale ranged from 1: strongly disagree to 5: strongly agree.

Role conflict was assessed using 5 items from scales developed by Rizzo *et al.* (1970). Although, the scale was developed more than three decades ago, it has been extensively validated for contemporary use and received favourable conclusions concerning the construct validity and psychometric properties of the scales (Gilboa *et al.*, 2008; Lee, 2000; Smith *et al.*, 1993; Jackson and Schuler, 1985). The reduced-item version of this scale has been adopted in numerous studies (MacKenzie *et al.*, 1998) and the selection of this scale was strongly supported by earlier evidence of its extensive use in other studies within industrial and organizational settings (King and Sethi, 1998; Igbaria and Chidambaram, 1997; Igbaria *et al.*, 1994; Gupta *et al.*, 1992; Igbaria and Siegel, 1992). The variables were measured using a 5 point Likert-scale representing the respondent's extent of disagreement or agreement with the associated statement. Sample items in this study include, I receive assignments that are within my training and capability (intrasender conflict) and I have enough time to complete my work (role overload). The 5 items of role conflict were averaged to create an overall role conflict score.

Sample and procedures: The target population of this study was IS personnel from ISO 9001:2000 certified organizations in Malaysia. A stratified random sampling was drawn from the certified organizations registered with the Federation of Malaysian Manufacturers (FMM) Directory (FMM Directory, 2007), or the organizations have been implementing TQM program (i.e., based on MBNQA criteria) for more than 3 years. FMM was founded in 1968 and is the largest economic institution in Malaysia representing over 2,000 manufacturing and industrial service firms of varying sizes (http://www.fmm.org.my FMM Directory, 2007). Because strict rules are applied to govern the eligibity of

companies for full membership of FMM, only 47% of the 2135 FMM members organizations have been granted ISO certification (http://www.fmm.org.my). Thus, the sample selected is viewed as a valid representation of the population because FMM is a recognized and acknowledged representative of the manufacturing and service industry for over 38 years. The sample in this study comprised a selection of the ISO-certified organizations situated in different regions (i.e., Selangor, Kuala Lumpur, Penang, Perak and Melaka) in Malaysia. This selection was made because these regions or states are the most industrialized states and are the fastest growing in Malaysia (http://www.dbkl.gov.my/pskl2020/english/ecnomic_and_population/index.htm). Furthermore, several of the world's leading electronics organizations with manufacturing operations and engineering services are situated in these states http://www.mida.gov.my.

The unit of analysis for this study was the full-time salaried IS personnel who possessed the knowledge of organizational practices pertaining to quality management practices. IS personnel with different work status (i.e., permanent and temporary employees) may experience variation in the nature of their tasks and hence induce different work attitudes (Galup *et al*., 2008). To ensure homogeneity of the sample, part-time and independent contract employees were excluded. Criteria for selection include: (1) direct involvement in information systems tasks such as designing, developing, implementing and supporting computer-based information systems; (2) representatives of three job position levels upper level (e.g., directors and managers), middle level (e.g., middle-level managers, executive-level employees, entry-leve professionals, IT team leaders, programmers, software designers, software engineers, system analysts, systems controllers, systems administrators) and lower level (technical support non-executives) and (3) willingness to express opinions about the organisation along various dimensions of TQM practices and feelings about role conflict experienced. These criteria are especially important since many researchers (Morris *et al*., 1979; Schuler, 1977; Szilagyi *et al*., 1976) asserted that job variation among respondents may present differences in role conflict.

Table 1: Breakdown of participating industries

Type of industry	No. of IS personnel
Manufacturing	127
Software	17
Service	56
Consultancy	37
Total	237

The survey was conducted from May 2008 till August 2008. Six hundred and fifty questionnaires were distributed with cover letters stating that participation in the study was voluntary and that individual confidentiality would be strictly maintained. Of the 650 questionnaires sent out, 453 questionnaires were returned. Of the 453, 216 questionnaires had to be excluded to ensure homogeneity of the selected sample (i.e., full-time salaried IS personnel). Thus, 237 returns were used for analysis, yielding a 36.46% response rate.

The respondents came from 45 different companies representing a wide variety of industries including manufacturing, software, service and consultancy. The breakdown of industries represented in the sample is presented in Table 1.

RESULTS

Factor analysis, reliabilities and correlations: Separate factor analysis were performed for all variables comprising multiple items (i.e., six dimensions of TQM practices and role conflict) (Table 2). The values of Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy for each factor obtained were all above 0.70 while each of the Bartlett's test of sphericity were all significant ($p<0.01$). All eigenvalues of the factors are greater than 1, thus all seven factors were significant for this study. Because, all the items of each scale had high factor loadings greater than 0.50 on a single factor, the results are satisfactory

Table 2: Results of Exploratory Factor Analysis (EFA) for the scales of hard TQM, soft TQM and role conflict

					Factor loadings						
Variables	No. of items	No. of factor	KMO	Eigen-values	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7
Independent											
Leadership	7	1	0.892	4.177	0.825	0.814	0.808	0.718	0.738	0.746	0.751
Strategic planning	7	1	0.881	3.992	0.770	0.828	0.682	0.791	0.764	0.774	0.663
Customer focus	7	1	0.836	3.726	0.742	0.774	0.738	0.675	0.616	0.777	0.770
Human resource focus	7	1	0.902	4.364	0.787	0.767	0.818	0.778	0.818	0.791	0.766
Process management	7	1	0.886	3.772	0.709	0.759	0.738	0.718	0.676	0.785	0.750
Information analysis	7	1	0.902	4.466	0.788	0.812	0.829	0.821	0.828	0.813	0.691
Dependent											
Role conflict	5	1	0.720	2.073	Nil	Nil	0.576	0.723	0.659	0.626	0.625

Table 3: Pearson's correlation analysis and scale reliabilities of the independent and dependent variables

Variables	Leadership	Strategic planning	Customer focus	Human resource focus	Process management	Information analysis	Role conflict
Leadership	-0.885						
Strategic planning	0.770**	-0.873					
Customer focus	0.556**	0.713**	-0.851				
Human resource focus	0.663**	0.668**	0.546**	-0.899			
Process management	0.696**	0.766**	0.631**	0.709**	-0.857		
Information analysis	0.643**	0.729**	0.666**	0.659**	0.755**	-0.904	
Role conflict	-0.348**	-0.360**	-0.294**	-0.261**	-0.447**	-0.450**	-0.645

**Correlation is significant at the 0.01 level (2-tailed). Scale reliabilities are shown on the main diagonal

since, Hair *et al.* (2006) suggested that the standardized loading estimates should be 0.5 or higher.

The reliability of the questionnaire was tested according to Cronbach's Alpha measurements. Reliability tests were conducted on the dependent variable (i.e., role conflict) and six independent variables (i.e., leadership, strategic planning, customer focus, human resource focus, process management and information analysis). The reliability coefficients ranged from 0.645 to 0.904, indicating that some scales were more reliable than others (Table 3). All coefficient alpha values exceeded the minimum acceptable level of 0.6 because according to Hair *et al.* (2006), reliability with values of 0.60 to 0.70 deemed the lower limit of acceptability. Thus, the instrument measuring TQM practices as well as role conflict was statistically assessed to be reliable.

A pearson's correlation analysis was conducted to examine the bivariate relationships between the independent variables and dependent variable respectively. A correlation coefficient is viewed as significant if p-value is less than 0.01. The results reported significant negative correlation between the independent variables and dependent variable (Table 3). Table 3 presents a significant negative relationship between information analysis and role conflict with the r-value of -0.450 and p-value is less than 0.01. There was also a significant negative correlation between process management with role conflict ($r = -0.447$, $p<0.01$). The negative moderate correlations were strategic planning with role conflict ($r = -0.360$, $p<0.01$) and leadership with role conflict ($r =-0.348$, $p<0.01$). Elements with weak correlation were customer focus with role conflict ($r = -0.294$, $p < 0.01$) and human resource focus and role conflict ($r = -0.261$, $p<0.01$).

Multiple regression analysis: Multiple regression analysis was employed to test the relationship between the TQM practices and role conflict. It is a practical technique to analyze the relationship between a single dependent variable and several independent variables (Hair *et al.*, 2006).

Since, parametric statistical techniques mainly assume that tests for normality showed no violations of this assumption, screening the data for normality is the primary step in the data analysis. Shapiro-Wilks test and a modification of the Kolmogorov-Smirnov test are two of the most common tests for normality (Hair *et al.*, 2006). As the data sets were larger than 100, the Kolmogorov-Smirnov test was applied to test for data normality (Coakes *et al.*, 2006). Thus, the Kolmogorov-Smirnov statistic with Lilliefors significant level for testing normality is applied to test the normality of standardized residuals. The Kolmogorov-Smirnov test shows a p-value of 0.2, which is greater than 0.05. Hence, the normality of the standardized residuals was assumed.

Sample size is a vital consideration in affecting the generalizability of the results by the ratio of observations to independent variables (Hair *et al.*, 2006). Hair *et al.* (2006) suggested a sample size to estimate parameter ratio of 15:1 or preferable with 20:1 as adequate to achieve meaningful estimates. In this study, the sample size to estimated parameter ratio was 39.5: 1 for the IS personnel. We conclude that the sample is adequate and representative.

While multicollinearity exists in studies concerning perception responses of similar constructs, it is unfavourable for statistical conclusions if it generates variables with tolerance values below 0.10 and Variance Inflation Factors (VIF) of 10 or higher (Hair *et al.*, 2006). Based on Table 4, each of the variables had a tolerance value of more than 0.10 and the VIF values ranged from 2.258 to 4.108, providing solid evidence against the presence of multicollinearity. Based on Cohen (1977), conventional definitions of effect size have been suggested as follows: r-value = 0.10 is considered small, r-value = 0.30 is medium and r-value = 0.50 is large. In other words, small effect explains 1% of the total variance; medium effect accounts for 9% of the total variance; large effect accounts for 25% of the variance (Field, 2005). From Table 4, it can be observed that the coefficient of determination (R^2) was 0.252, representing that 25.2% of role conflict can be explained by the six independent variables (i.e., leadership, strategic planning, customer focus, human resource focus, process management and information analysis). On the whole, the effect size for this study is deemed as large. The proposed model was

Table 4: Results of multiple regression analysis

	Unstandardized coefficients		Standardized coefficients			Collinearity statistics	
Variables	B	SE	Beta	t-value	Sig.	Tolerance	VIF
Model 1							
Constant	3.396	0.161		21.099	0.00		
Leadership	-0.057	0.056	-0.096	-1.005	0.316	0.356	2.808
Strategic planning	0.028	0.076	0.043	0.371	0.711	0.243	4.108
Customer focus	0.034	0.054	0.053	0.617	0.538	0.443	2.258
Human resource focus	0.115	0.048	0.208	2.366	0.019**	0.421	2.377
Process management	-0.225	0.069	-0.342	-3.244	0.001**	0.293	3.417
Information analysis	0.213	0.062	-0.334	-3.407	0.001**	0.339	2.951

**$p<0.01$, R^2: 0.252, Adj. R^2: 0.232, Sig. F: 0.00, F-value: 12.882, Dependent variable: RC

adequate as the F-statistics = 12.882 was significant at the 5% level. This indicated that the overall model has statistically significant relationship between TQM practices and role conflict. The individual model variables indicated that process management (β= -0.225, $p<0.01$) and information analysis (β = -0.213, $p<0.01$) were found to have a significant and negative relationship with role conflict. As expected, human resource focus (β = 0.115, $p<0.01$) was found to have a significant and positive relationship with role conflict. Therefore, the Hypotheses 4, 5 and 6 were manifestly supported. On the other hand, leadership (β = -0.057, $p > 0.05$), strategic planning (β = 0.028, $p>0.05$), customer focus (β = 0.034, $p>0.05$) had no significant relationship with role conflict. Thus, Hypotheses 1,2 and Hypotheses 3 were not statistically supported.

DISCUSSION

It is noteworthy that three TQM practices (i.e., human resource focus, process management, information analysis) were reliably significant to role conflict among the IS personnel in Malaysia. The present finding also supports the fact that process management was negatively correlated with role conflict. This is corroborated by findings in the past literature from Rizzo *et al.* (1970), Morris *et al.* (1979), Senatra (1980), Nicholson and Goh (1983), in which role conflict was found to be significantly related to process management (e.g., formalization and perceived organizational support). As service employees, IS personnel's role is to provide service to other divisions. They must often respond to conflicting demands from other divisions, many of which are seen as higher in the organizational power hierarchy (e.g., finance and human resource division). Drawing from this finding, we stress that the influence of process management in terms of reducing role conflict may be rendered ineffective if it is not accompanied by task-specific input which clarifies roles, goals and expectations, allowing IS personnel to know what is expected.

Intriguingly, the resulting regression coefficient of information analysis is negative (the predicted direction) and statistically significant. This reveals that information analysis is found to be significant to reduce the levels of role conflict. The result also reported a negative association between information analysis and role conflict. It implies that the information analysis that firms implement must emphasize the value of data integrity, timeliness of information, exclusion of inconsistencies and standardization of data and information formats, which in turn will reduce the role conflict of IS personnel. The finding indicates that there is value of TQM (i.e., information analysis) and it is imperative that firms continue the efficient use of information analysis.

In contrast, human resource focus was found to have a positive relationship with role conflict. This result is consistent with the findings by Morris *et al.* (1979), Hartline and Ferrell (1996) and Wetzels *et al.* (1999) in which role conflict was reported to have a significant positive relationship with human resource focus (e.g., participation in decision making and autonomy). This is explained by the fact that stress occurs when workload demand exceeds the capabilities of IS personnel (Ivancevich *et al.*, 1985). For example, empowered employees are often given extra job responsibilities to meet the demands of managers and customers (Conger and Kanungo, 1988). A state of conflict and frustration often develops among the empowered employees whenever they attempt to balance and fulfill multiple role demands (Hartline and Ferrell, 1996).

Since we expect role conflict to be reduced under the influence of leadership, the differentiation in this finding is surprising. It was discovered that leadership is insignificant to role conflict. Although other studies have shown that the contrary is the case, this result is consistent with that of a study by Ruyter *et al.* (2001) which concluded that leadership did not influence role conflict in their study in The Netherlands. It was reported that the call center in Ruyter's study may have a structured work environment and does not need the influence of leaders (Ruyter *et al.*, 2001). Findings in this

study can be explained by the fact that IS personnel work in centralised organizational units which may also be regarded as structured work environment similar to that of Ruyter *et al.* (2001). This means that IS personnel are unlikely to experience role conflict in relation to leadership because they are not highly dependent on the task-specific inputs from leaders which clarify roles, goals and expectations.

The present finding confirmed that strategic planning was found to be insignificant in increasing the role conflict among IS personnel. This is consistent with an empirical finding by Daniels and Bailey (1999) that reported strategy development processes were not related significantly to role conflict. The finding of present study indicates that because strategic planning is characterised by incremental approach (Daniels and Bailey, 1999) and people-interactive process (Lorange and Vancil, 1976) among the IS personnel, it is unlikely that strategic planning could increase the chances of receiving conflicting demands over work roles among the IS personnel.

Customer focus was observed to have insignificant relationship to role conflict. This indicates that there is no relationship between customer focus and role conflict. This can be explained by the fact that in the Malaysian context, Malaysian work teams in general show high levels of collectivism and have great respect for authority in supervisor-subordinate relationships (Schermerhorn and Bond, 1997). Collectivism is characterised by a tight social framework in which people distinguish between in-groups and out-groups; they expect their in-group (relatives, clan, organizations) to look after them and in exchange for that they feel they owe absolute loyalty to it (Hofstede, 1980) and collectivist culture emphasises hierarchy (Triandis *et al.*, 1990). Therefore, IS personnel are unlikely to experience role conflict in relation to customer focus because they are apt to accept their superior's instructions and are reluctant to act against authority to meet the conflicting demands from customers.

Research limitations and future research: This study is offered as a pioneering investigation of IS personnel in Malaysia. Although this study casts some new light on research examining the relationship between six TQM practices and role conflict, the findings have interesting implications. Extensions in future research would prove valuable on several fronts. First, this study is a pioneering study and we examined a single source of role stressor, that is, role conflict. Although, role conflict has been well recognized as a main role stressor in organizations, it would be worthwhile in future studies to include additional sets of role stressors such as role ambiguity, role overload, resource inadequacy, etc., to examine if integration with TQM practices reveals similar results. Second, although a questionnaire survey is cost-effective and this research method might be adequate as a preliminary test of the conceptual model, the questionnaire survey may suffer from response bias and lack of respondent awareness. Hence, this study needs to be followed up by field observations and interviews of IS personnel from the sample. Third, this primary research was predominantly cross-sectional and thus, causality between the TQM practices and role conflict should be considered as tentative. Longitudinal research studies using these variables would be useful to assess cause-effect linkages.

Implication

Theoretical implication: This study provided evidence of theoretical and managerial implications that deserve consideration in future research. A major contribution of this study is the formation of a theoretically based model which integrated the elements of TQM practices as well as role conflict. This contribution fills a gap in the field of TQM practices, given that TQM practices have been a significant source of practice-oriented management prescriptions and a plethora of published research. Thus, this model may stimulate further research and literature in this vein. Although other researchers integrate components of role conflict and personnel attitudes (Chen *et al.*, 2007; Ngo *et al.*, 2005; Senatra, 1980; Teas, 1983), very little research has been done on the relationship between TQM practices and role conflict.

Furthermore, this research contributed to theory by offering and testing a conceptual model that explains how and why diverse TQM practices have different relationships with role conflict. Present model examines the independent influences of six TQM practices on role conflict and treats role conflict as a dependent variable. The treatment of role conflict as a dependent variable stands in contrast to other researchers' treatment of role conflict as an independent variable (Shen, 2005; Lee, 2000; Igbaria and Greenhaus, 1992; Igbaria and Siegel, 1992). Thus, this conceptual model clarifies the associations between the different dimensions of TQM practices and role conflict as well as support future research towards the development of a comprehensive TQM research area.

Managerial implication: Considering that TQM practices can mitigate the deleterious effects of role conflict, this study holds significance for industrial practitioners and individuals. First, the managers can use the model proposed to evaluate the perceptions of role conflict of IS

personnel in TQM-oriented firms. Generally, each firm is different in terms of its human resource, culture, structure, processes, technology, products and services. What works successfully in one firm may not necessarily work well in another. Thus, the management should be wary of the effects of different TQM dimensions on IS personnel's role conflict. Knowing which TQM practices are more prevalent and destructive to IS personnel's role conflict would enable firms to devise plans to alleviate the unfavourable effects of TQM practices on role conflict.

Secondly, the process management and information analysis have been identified as sources of reducing role conflict. In contrast, managers must concern themselves with the pressures of human resource focus which causes increased role conflict. Firms could introduce appropriate implementation procedures to enhance the process management, improve the efficient use of information analysis and make changes in human resource focus in order to reduce role conflict.

CONCLUSION

In conclusion, this study addressed a significant gap in TQM literature by examining the effects of TQM practices on role conflict among IS personnel. Role conflict has been a disruptive issue for organizations over the years. Individuals in the state of role conflict may resolve the conflict by withdrawing from the roles entirely, by eliminating one role and adhering to the other or by compromising between the conflicting roles. When individuals fail to meet the role expectations, he or she is considered to be ineffective. This is certainly unhealthy and unproductive for any organisation.

The first move to manage role conflict is awareness. It is important to know which TQM dimensions are significantly associated with role conflict of IS personnel. Therefore, this study successfully provides initial guidance for responding to this challenge. Process management and information analysis are found to be significant TQM practices, which could reduce role conflict. Unduly high levels of human resource focus can induce high levels of role conflict among the IS employees. This study also provides a reason for organizations to exercise discretion and caution in adopting TQM practices as a tool for helping employees to manage role conflict.

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