3

A METHODOLOGY OF TQM, ISO/TS16949 AND ORGANIZATIONAL PERFORMANCE IN MALAYSIAN AND THAILAND AUTOMOTIVE INDUSTRIES: CHALLENGES IN INTERNATIONAL SURVEY RESEARCH

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3.1 INTRODUCTION

In contrast to what the wealth of textbooks on conducting empirical research seems to indicate, the actual research process is quite messy in nature. From this perspective, embarking on a cross-country research project introduces many additional dilemmas. In this paper, the authors attempt to explore these issues in more detail and offer possible solutions to address them. We begin by identifying the need of cross-country research and significant of this study.

The concept of Total Quality Management (TQM) has been developed as a result of intense global competition. Organizations with international trade and global competition have paid considerable attention to TQM philosophies, procedures, tools and techniques. According to Juran,

international competition requires higher levels of quality achievement by organizations (Blackiston, 1996).

However, the implementation of TQM has not occurred at the same pace in different regions of the world. Early implementation started in Japan, US, Europe, and later followed by the developing countries. To compete in the global market, developing countries need to implement TQM, tools, and techniques within all sections of their industries. Despite the number of publications and quantity of research on TQM, little empirical work has been carried out in developing countries, particularly in the ASEAN region.

The automotive industry is one of the most important and strategic industries in Malaysian manufacturing sector. Since the implementation of ASEAN Free Trade Area (AFTA), competition has become intense between ASEAN countries especially Thailand, which has been said to be the "Detroit of Asia". To survive in a competitive market place, TQM implementation is one of the key strategies that can help align Malaysian automotive industries to remain competitive. A comparative study can provide an overall perspective and understanding of the main differences and similarities in TQM implementation.

Meanwhile, the ISO/TS16949 certification has been receiving increasing interests especially for automotive related organizations. The standard relates to certain minimum quality systems that organizations should meet to assure a consistent quality of products, services and processes. ISO/TS16949 is a new specification and new to the automotive industry. Due to its short history, there is still much confusion the effects of ISO/TS16949 registration and efforts on TQM and organizational performance relationships.

TQM and ISO/TS16949 systems have become two important streams of quality management. These two methods and their impacts on organizational performance have attracted the interests of researchers all over the world. In the case of Malaysia, the automotive industries have been growing rapidly

since early 1980's. Given the importance of automotive industries to the Malaysian economy, the authors have attempted to evaluate the relationship between TQM, ISO/TS16949 and impacts on organizational performance and make comparison between Malaysian and Thailand automotive industry.

This paper is structured as follows. The first section provides an introduction. In the second section, methodological challenges in cross-country research will be discussed. In the third section, the survey methodology and empirical data will be explored. In the fourth section, reliability and validity of the data will be analyzed. Finally, the last section contains the conclusions of the research.

3.2 METHODOLOGICAL CHALLENGES IN CROSS-COUNTRY RESEARCH

Compared with domestic research international cross-country research faces additional methodological challenges that, if not properly addressed, may considerably increase the risk of inferential errors (Singh, 1995). Indeed, the literature emphasizes that constructs and concepts may entail specific attributes and meanings which need to be explicitly taken into account to ensure sound interpretation of cross-country data (Peng et al., 1991). In a concurrently, there is evidence that the language of the questionnaire affects the use of single-language surveying (Harzing et al., 2002). These arguments require cross-country researchers to systematically establish equivalence in terms of their adopted constructs, measures and samples (Mullen, 1995; Sekaran, 1983; Singh, 1995). To determine which methodological issues are most relevant, it is crucial to characterize a given research project in terms of its approach to cross-country research. In this regard, Adler (1983) distinguishes between three orientations to investigating cross-country management issues which are parochial, polycentric and comparative research. The

approaches and their main characteristics are compiled in Table 1.

Table 1 Characteristics in cross-country management issues (Adler, 1983)

Title	Type of study	Approach to similarity and difference	Primary question	Main methodological issues
Parochial Research	Domestic management studies	Assumed similarity	Study is only applicable to management in one country	Traditional methodologies: All of the traditional methodological issues concerning design, sampling, instrumentation, analysis and interpretation without reference to country
Polycentric Research	Individual studies of organizations in specific foreign country	Search for difference	What is the pattern of organizational relationships in country X?	Description: How can country X's organizations be studied without either using home country theories?
Comparative Research	Studies comparing organizations in many countries	Search for both similarity and difference	How are the management and employee similar and different across country?	Equivalence: Is the methodology equivalent at each stage in the research process? Are the meanings of key concepts defined equivalently?

The three approaches to cross-country research vary in terms of their methodological issues and thus require different measures to cope with underlying research process. Where parochial research reflects what we consider a domestic research setting, polycentric research focus on particularities of certain countries or those of organizations operating in these specific

52

countries. In many cases, especially in less researched settings such as developing countries (Bulmer & Warwick, 1983), such measures are not readily available, thus requiring the researcher to develop new scales.

Comparative research aims at contrasting two or more countries and it had been chosen for this study. For example, a researcher who is interested in examining the extent of TQM implementation level across different countries. In order to draw meaningful inferences from the study, the researcher need to ensure equivalence throughout the entire research process. Most importantly, the constructs proposed require equivalent treatment in all countries.

The overall structure of the research methodology employed in this study can be best demonstrated using a flow chart. The study can be divided into three phases as illustrated in Figure 1. Each phase describes the research activities which will be conducted and the flowchart act as a roadmap throughout the research activities.

The first phase of the research activities performed are critical literature review on quality in international context, TQM in automotive industries both in Malaysia and Thailand, TQM, and performance measurement system. In addition to that the author has also conducted critical review on TQM constructs, organizational performance measures, ISO/TS16949 efforts and critical review on various structural equations modeling by previous researcher. All these research activities were conducted to establish the need for comparative study between ASEAN countries specifically, Malaysia and Thailand automotive industries using the proposed TQM constructs, proposed ISO/TS16949 efforts, and organizational performance measures. This then will pave the way towards formulating a research model using SEM, developing the research hypotheses, and the development of survey instrument in investigating TQM implementation in Malaysian and Thailand automotive industries. Finally, the selection of the companies for pilot study and full

survey will be determined in this phase.

In the second phase, the research activities will focus on data collection. This will comprise of sending the survey instrument to experts for validation, conducting a pilot study and translating to Thai language. Accordingly, professional translation and bilingual researchers will be required to conduct the data collection in Thailand automotive industries. In relation to previous activities, the authors will also need to improve the questionnaire, if necessary and, finally implementing the full survey in Malaysia and Thailand automotive industries.

In the final phase, the research activities will be on data screening and data analysis. The data will input in SPSS format and then analyzed using SPSS and Structural Equation Modeling (SEM). Next, discussions and implications of the survey results will be presented, and finally the author will provide recommendations for future research.

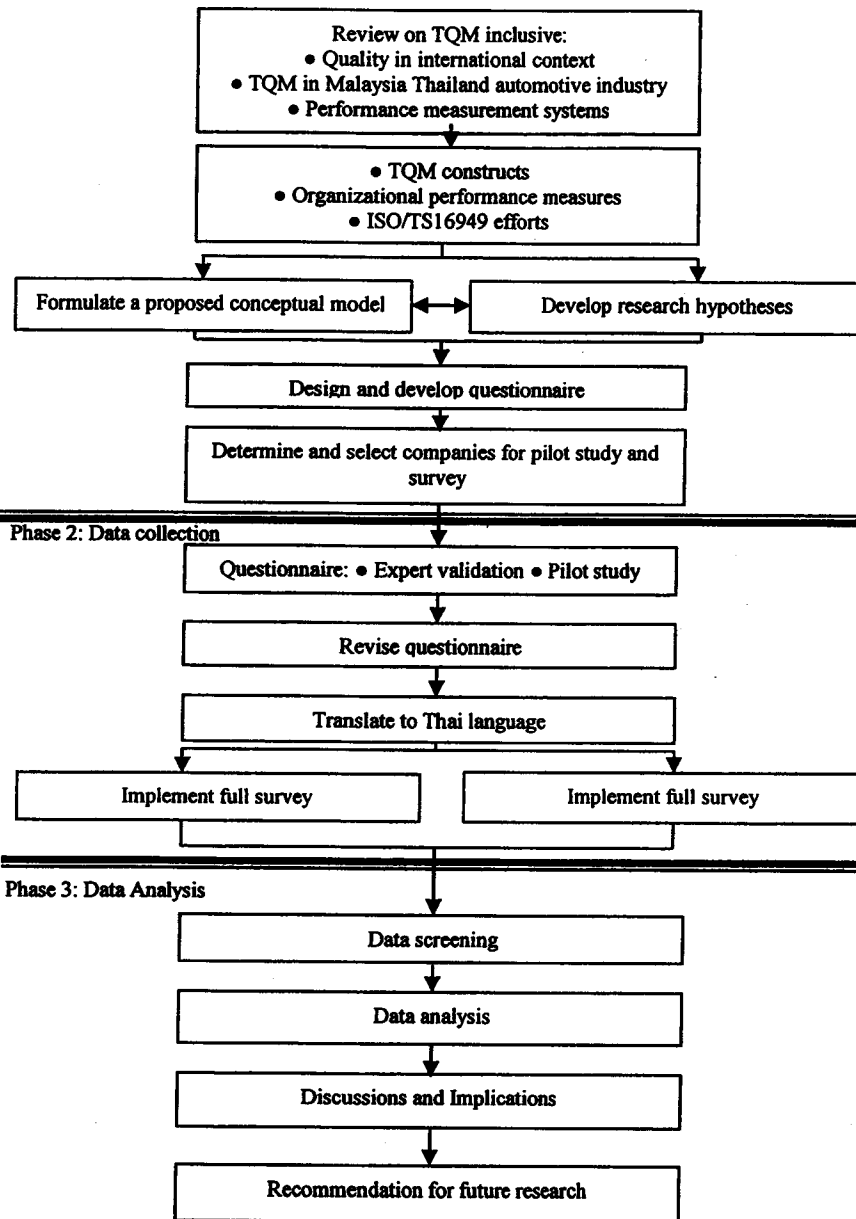Phase 1: Literature review and development of research method

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┌─────────────────────────────────────────────┐
│            Review on TQM inclusive:          │
│         ● Quality in international context    │
│    ● TQM in Malaysia Thailand automotive industry │
│         ● Performance measurement systems    │
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                      ↓
┌─────────────────────────────────────────────┐
│                ● TQM constructs              │
│       ● Organizational performance measures  │
│               ● ISO/TS16949 efforts          │
└─────────────────────────────────────────────┘
        ↓                            ↓
┌──────────────────────────┐  ┌──────────────────────────┐
│ Formulate a proposed     │←→│ Develop research hypotheses │
│ conceptual model         │  │                          │
└──────────────────────────┘  └──────────────────────────┘
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┌─────────────────────────────────────────────┐
│          Design and develop questionnaire    │
└─────────────────────────────────────────────┘
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┌─────────────────────────────────────────────┐
│  Determine and select companies for pilot study and │
│                      survey                  │
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Phase 2: Data collection

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┌─────────────────────────────────────────────┐
│  Questionnaire: ● Expert validation ● Pilot study │
└─────────────────────────────────────────────┘
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┌─────────────────────────────────────────────┐
│               Revise questionnaire           │
└─────────────────────────────────────────────┘
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┌─────────────────────────────────────────────┐
│            Translate to Thai language        │
└─────────────────────────────────────────────┘
        ↓                            ↓
┌──────────────────────────┐  ┌──────────────────────────┐
│   Implement full survey  │  │   Implement full survey  │
└──────────────────────────┘  └──────────────────────────┘
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Phase 3: Data Analysis

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┌─────────────────────────────────────────────┐
│                Data screening                │
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┌─────────────────────────────────────────────┐
│                 Data analysis                │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│          Discussions and Implications        │
└─────────────────────────────────────────────┘
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┌─────────────────────────────────────────────┐
│         Recommendation for future research   │
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Figure 1 Overview of overall structure research methodology

3.3 SURVEY METHODOLOGY

When developing a survey, three methodological issues require special attention in an international research context which is choice of survey type, the use of measurement scales that capture equivalent concepts across countries and survey language.

Chang (2002) describes survey as questioning the respondents and the recording of their responses to be used as data for analysis. A survey is considered the most economical among methods available for data collection due to its ability in performing efficient data collection (Moser and Kalton, 1971), which had been used by the authors. In addition, it has many other advantages such as geographical flexibility, able to reach a widely dispersed sample especially in international study, free from interview bias and it gave respondent more time to check and verify their answers (Mangione, 1995). In general, a survey typed questionnaire approach is relatively cost effective, time saving, and energy saving.

3.3.1 Survey Instrument

The survey instrument used in this study was largely derived from the work of Rao et. al (1999) with the purpose of identifying constructs of TQM. As Madu (1998) and Bavagnoli and Perona (2000) assert, the questionnaire is a popular data collection method in studies quality management. The questionnaire in this study had four sections which are:

i.   Section 1: General information
ii.   Section 2: Perceptions on success factors
iii.   Section 3: Perceptions on quality management systems
           implementation
iv.   Section 4: Perceptions on performance measures, major
           problems and the most critical success factors

The Likert scale with points: [5] Very High, [4] High, [3] Medium, [2] Low and [1] Very Low was used to allow the respondents to nominate their performance against the criterion under consideration. An additional scale [x] was provided to allow for those respondents who did not know or unsure of the answer.

3.3.2 Expert Validation

There has been a growing concern for methodology rigor in instrument validation and model testing in quality management research (Flynn *et al.,* 1994). To further develop and empirically test the emerging quality management theories, the researchers need to develop better quality management measurement instruments with high validity, stability and reliability (Ahire *et al.,* 1996). Even though it is acknowledged that poor measurement properties of instruments lead to erroneous conclusions, many empirical quality management studies employed instruments that failed to meet minimal standards of reliability and validity.

To conduct the expert validation, the final draft of the questionnaire was sent to TQM experts including international and national universities academicians and consultants, and also TQM automotive practitioners. Before that, to suit the Thailand automotive industries environment, the entire survey instrument was validated by Thailand experts and followed by other TQM experts. In Thailand, all communications with respect to the survey was carried out in English and in Thailand language. For the survey instrument which will be used in Thailand automotive industries, the final questionnaire was translated to Thai language using the following processes; First, the Thailand researcher, who has sufficient knowledge of the subject and command of both English and Thai languages, translate the English version of questionnaire into Thailand language. Another native of Thailand, who has sufficient knowledge of both English and Thailand

languages, also translates the English version to Thai language. The two Thai language versions of the questionnaire was compared to each other. Finally, a third person, whose area of research is in quality management and has good command of both English and Thailand, will evaluate the translation and provide his comments on the translations. The final version of this stage used for the survey in this study.

The comments and feedback given were very useful in rectifying and improving the instrument. Most of the comments and suggestions received were carefully analyzed and based on the analysis three modifications were made on the questionnaire. First, Section 2 (General TQM opinions) has been deleted from the questionnaire. Second, 'respondent position in the company' has been added in Section 1 and finally, Section 4 'Perceptions on Quality Standards Implementations' changed to 'Perceptions on Quality Management Systems Implementation'. Majority of the quality experts and practitioners gave a positive remark where they commented that the study is an interesting project worth researching especially on quality management system (ISO/TS16949).

3.3.3 Population and Sampling of the Study

The target population of this study will be from the automotive industries since the quality practices in different industries, may vary substantially (Flynn *et al.*, 1995). The identification of sample starts with determining the sampling population. The selected population should possess the knowledge and information that is required to fulfill the requirements of the study and it is from the list that a sample of respondents is to be drawn.

For empirical studies, it is important to plan the sample sizes so that needed protection against both Type I and II errors can be obtained and so that the estimates of interest have sufficient precision to be useful (Hair *et al.*, 1998). This planning is necessary to ensure that the sample sizes are large enough to

detect important differences with high probability. Planning of sample sizes is therefore an integral part of the research design.

Sample size can impact the statistical test by either making it insensitive (at small sample sizes) or overly sensitive (at very large sample sizes) (Marsh *et al.*, 1988; Bearden *et al.*, 1982). In other words, an increase in the size of the sample chosen would result in an increase in power while, a decrease in the size of the sample selected would result in a decrease in power.

Structural Equation Modeling (SEM) requires large sample sizes due to the large number of estimations that take place (Hair *et al.*, 1998). The critical question in SEM is how large a sample is needed. As the sample size become large (exceeding 500), the method becomes too sensitive and any difference between the proposed model and the actual pattern of relationships is almost always detected, making all goodness-of-fit measures indicating a poor fit (Tanaka, 1987; Marsh *et al.*, 1988). While there is no correct sample size, a reasonable recommendation is to test a model with a sample size of about 150 to 300 (Bentler, 1995; Hoelter, 1983).

In this study, in Malaysia, the sampling plan started with the compilation of the mailing list obtained from four automotive industry related associations which are Malaysian Automotive Component Parts Association (MACPMA), Proton Vendors Association (PVA), Kelab Vendor Perodua (KVP), and Toyota Supplier Club (TSC). In Thailand, the companies selected will be from the automotive vendor's list such as Isuzu and Thai Motor Industry Co., Ltd which is a joint venture with Ford (UK), Fiat and Nissan. This list includes the addresses of the company, the Managing Director / Chief Executive Officer, and the classification of the companies.

Respondents title (e.g. Managing Director, CEO, Plant Manager) were selected so that the questionnaire could be mailed to the person most likely to be knowledgeable about quality practices and performance of the companies. Further, inclusion of some titles (e.g. quality engineer) ensured that some typically

small companies were included in the target sample. Finally, in Malaysia, the questionnaire was distributed to 650 companies and in Thailand, the questionnaire was distributed to 700 companies.

3.3.4 Data Collection

Mail survey was conducted to collect data in this study. Mail survey is used because they are relatively simple way to collect quantitative data. The survey packet consisted of a large (9" x 12") mailing envelope that included the instrument and cover letter stapled together, as well as a post-paid self addressed envelope. The survey packet was mailed in various batches to the target sample.

The second mailing was done to non-respondents about one month after the first mailing. In order to minimize survey costs, a decision was made to send a complete survey packet with reminder letter to every alternate non-respondent on the mailing list. The other non-respondents were sent a post card that was post-paid. It requested the recipient to complete the questionnaire and return it, if the original survey was lost, and the recipient would be willing to complete a survey, a new survey package will be sent.

Even after second mailing was done, the response rates is still low around 15% in Malaysia and 10% in Thailand. To increase the response rate a telephone calls and follow-up fax transmission were made persuading them to fill up the questionnaires. In Thailand, due to most of the companies representative are preferred to speak in Thai language, the follow-up process was carried out with the help of researchers from Thammasat University. A well-designed training program was provided to the researchers before they conducted the survey. This was helpful to increase the response rate and get the respondents answer the questionnaire.

The data was collected between July 2008 and December 2008. The questionnaire was distributed to a total of 650

60

companies in Malaysia and there were 161 completed questionnaires received giving a response rate 25%. Meanwhile, for Thailand, the questionnaire was distributed to a total of 700 companies and there were 150 returned giving a response rate of 21%.

3.3.5 Treatment of Missing Data

Using the structural equation modeling (SEM) in general, treatment of missing value became important. SEM requires that "complete data are required for the probability density and adjustment must be made to data sets that are incomplete" (Brown, 1994). Thus, a method for handling missing data was required. A question in a given survey dataset may be missing a value for different reasons. Reasons include:

    i.   Omission during entering data from original questionnaire
   ii.   Accidental lack of response by the respondent

In this study, it would appear that both reasons come to play. A different procedure was used to adjust to the missing data for each situation. The first step was to eliminate input errors on the part of the data entry. The hardcopy of each questionnaire that presented missing value was examined and the data entry error was input. There were five cases in Malaysia dataset and only one case in Thailand dataset.

The second step was to deal with the issue of respondent non-response. In this study, if less than 5% of the data is missing, the missing data will be filled in with the mean value (Tabachnick and Fidell, 1996). Otherwise, if more than 5% of the data is missing, the information will be dropped from the study. For Malaysian, there were 10 cases the missing data filled in with the mean and four cases was dropped from the dataset due to more than 5% of the data missing. Meanwhile, none of the cases was found in Thailand dataset. Table 2 shows the summary of the final

dataset.

Table 2 Summary of final dataset

	Malaysia (cases)	Thailand (cases)	Remark
Received	161	150	
Data entry error	5	1	Edit and accept
Less than 5% missing	10	0	Fill in with mean and accept
More than 5% missing	4	0	Drop
Total	157	150	

3.3.6 Test of Response Bias

To assess the potential of response bias, this study tested the difference of the available data of the early and late respondents (Kaynak, 2003). In this study, the final data was split into two, depending on the dates they were received. Respondents from the first and second mailing represented early respondents, while those after the second mailing represented late respondents.

The t-test were performed on the responses of these two groups and yielded no statistically significant difference (at 95% significance level) on demographic variables including type of ownership, number of employees, types of products, and certified quality system of the respondents received. The t-test also indicated no significant difference between means of the two groups in terms of the implementation of TQM practices, ISO/TS16949 efforts and organizational performance measures. As a result, there appears to be no potential bias due to sampling sources.

3.4 Reliability and Validity

Conducting empirical research without considering its reliability and validity is useless since the results cannot be generalized (Flynn et al., 1990). The data collected by surveys is of little use unless its reliability and validity can be demonstrated.

62

In this study, several sets of analyses will be conducted to test the reliability and validity of the data collected from both countries. First, exploratory factor analyses with varimax rotation will be conducted for each of the latent constructs. Measured variables that load poorly will be dropped. Then, reliability analysis will be performed for each of latent constructs to test an internal consistency.

3.4.1 Exploratory Factor Analysis

Factor analysis is appropriate when investigating the factor structure underlying the data (Hatcher, 1994). Each observed variable is a linear combination of the underlying factors. According to Petty (1995), factor analysis is a technique to achieve parsimony through the identification of the smallest number of descriptive terms to explain the maximum amount of common variance in a component matrix. An exploratory factor analysis using a principal component analysis was the chosen for extraction method. Varimax with Kaiser Normalisation was applied prior to factor rotation, thus keeping factors with an eigen value of one or greater. This procedure was chosen to eliminate error variance (Tinsley and Tinsley, 1987). Within the context of this study, the EFA was conducted in three separate factors:

(1)   Performing an EFA to determine the underlying items of TQM constructs.

In this study, these eight factors for TQM constructs are compared with the original constructs from the questionnaire. The first factor consists of seven items from quality leadership construct which is question 1, 3, 4, 5, 6, 7, and 2. No items were recommended to be omitted.

The second factor can be classified as customer focus and satisfaction, and consists of five items (question 2, 1, 3, 7, and 6). Two items from the original questionnaire and are recommended

63

to be excluded from the analysis which is question 4 and 5. The third factor can be classified as quality information and analysis (QIA). This factor consists only four items (question 2, 6, 7 and 1) and the other three items are recommended to be excluded which is question 3, 4 and 5. The fourth factor can be classified as human resource and development (HRD) and consists of four items (question 7, 4, 1 and 3). Three items are recommended to be excluded which is question 2, 6 and 5.

The fifth factor consists of five items from strategic planning management (SPM) and no items were recommended to be omitted. The sixth factor consists of five items from supplier quality management (SQM) which is question 1, 4, 5, 6 and 7 and two items from the original questionnaire and is recommended to be excluded from the analysis which is question 2 and 3. The seventh factor consists of five items from quality results (QR) which is question 5, 3, 4, 1 and 2. One items from the original questionnaire and is recommended to be excluded from the analysis which is question 6. Finally, the eighth factor can be classified as quality assurance and comprises of five items (question 7, 4, 3, 1, and 2). Two items are recommended to be omitted are question 5 and 6. Thus, based on exploratory factor analysis results, this indicates that eight TQM constructs has been identified with 40 items as compared to original questionnaire which are 53 items.

(2)   Performing an EFA to determine the underlying items of organizational performance measures.

In the case of OP measures, the 14 items loaded on the two factors as suggested. A varimax rotation was also performed. All items loaded onto the expected constructs as they were originally design. Factor loading were higher than 0.4 on its own factors. No items were recommended to be omitted. The first factor represents level of satisfaction (LS) and second factor represent business result (BR).

64

(3)   Performing an EFA to determine the underlying items of ISO/TS16949 efforts.

In this study, these four factors for ISO/TS16949 efforts are compared with the original constructs from the questionnaire. Factor loading were higher than 0.4 on its own factors (see appendix B3). The first factor consists of three items from control plan (CP) efforts, second factor comprises of 19 items from implementation of management tools and techniques (MTT), third factor consists of eight items from improvement activity (ImpAct) efforts and finally, fourth factor consists of four items from internal audit (IntAud) efforts. No items were recommended to be deleted for all 34 items represent ISO/TS16949 efforts as originally questionnaire design.

3.4.2 Reliability Analysis

There are several schools of thoughts on how to conduct a reliability analysis (Rasli, 2006). One says that reliability analysis can be conducted on all the items one shot, while the other says that it would be better to conduct the analysis after the items have been factored. In this study, second method is preferred and an internal consistency was performed for the 40 items of eight TQM constructs, 14 items of OP measures, and 34 items of ISO/TS16949 efforts by using the SPSS reliability analysis procedure.

Tables 3 to 5 shows the results summary of the reliability analysis for the TQM constructs, OP measures and ISO/TS16949 efforts. Since all the constructs have reliability coefficients (alpha value) of more than 0.7, thus it implies that all the items from the constructs are statistically reliable and should not be dropped for further analysis, namely, the inferential analyses.

Table 3 Results of internal consistency analysis for TQM constructs

N o.	TQM Constructs	No. of items	Alpha (α) value	Items for deletion	Alpha (α) if item is deleted
1.	Quality leadership (QL)	7	0.851	None	0.851
2.	Customer focus satisfaction (CFS)	5	0.795	CFS3	0.796
3.	Quality information and analysis (QIA)	4	0.802	None	0.802
4.	Human resource development (HRD)	4	0.824	None	0.824
5.	Strategic planning management (SPM)	5	0.799	None	0.799
6	Supplier quality management (SQM)	5	0.836	None	0.836
7.	Quality results (QR)	5	0.746	None	0.746
8.	Quality assurance (QA)	5	0.730	None	0.730

Table 4 Results of internal consistency analysis for OP measures

N o.	Organizational Performance Constructs	No. of items	Alpha (α) value	Items for deletion	Alpha (α) if item is deleted
1.	Level of satisfaction (LS)	6	0.816	None	0.816
2	Business result (BR)	8	0.842	None	0.842

Table 5 Results of internal consistency analysis for ISO/TS16949 efforts

N o.	Organizational Performance Constructs	No. of items	Alpha (α) value	Items for deletion	Alpha (α) if item is deleted
1.	Control Plan (CP)	3	0.769	CP3	0.785
2.	Management tools and techniques (MTT)	19	0.946	None	0.946
3.	Improvement activity (ImpAct)	8	0.912	None	0.912
4.	Internal audit (IntAud)	4	0.858	None	0.858

3.5 CONCLUSIONS

Conducting meaningful international survey research is prone to additional difficulties and complexities and can easily discourage researchers from initiating cross-country inquiry in the first place. Given these problems, many areas in the field of international management are still largely under researched and provide ample opportunities to advance our knowledge in this domain. The authors hope that by identifying some of the key issues and challenges in international survey research and offering solutions

throughout this study are able to promote more research in the future especially among developing countries. Addressing the challenges and solutions raised in this paper will contribute to a more rigid and sound conduct of research across countries. In the case of this study, the data collected from both countries, Malaysia and Thailand have been proved to be valid and reliable through exploratory factor analysis and reliability analysis.

REFERENCES

Adler, N.J. (1983). A typology of management studies. *Journal of International Business Studies*, **Vol. 14** No. 2, pp. 29-47.

Ahire, S.L., Golhar, D.Y., Waller, M.A., (1996). Development and validation of TQM implementation constructs. *Decision Science*. **Vol. 27** (1) pp 23-56.

Bavagnoli, G. and Perona, M. (2000). Surveying quality management: a new measure-oriented approach, *International Journal of Quality & Reliability Management*, **Vol. 17** No. 8, pp. 839-57.

Bearden, W.O., Sharma, S. and Teel, J.R. (1982). Sample size effects on chi-square and other statistics used in evaluating causal models. *Journal of Marketing Research*, **Vol. 19**, pp. 425-530.

Bentler, P.M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, **Vol. 107** No. 2, pp. 238-246.

Blackiston, G.H. (1996). A barometer of trends in quality management, *National Productivity Review*, **Vol. 16**, pp. 15-23.

Brown, R.L. (1994). Efficacy of the indirect approach for estimating structural equation models with missing data: A comparison of five methods. *Structural Equation Modelling*, **Vol. 1** No. 4, pp. 287-316.

Bulmer, M. and Warwick, D.P. (1983). *Social Research in*

Developing Countries: Surveys and Censuses in the Third World. Chichester: Wiley.

Chang, T.L. (2002). *Six Sigma: A framework for small and medium sized enterprises to achieve total quality.* Cleveland State University: PhD Dissertation.

Flynn, B.B., Sakakibara S., Schroeder, R.G., bates, K.A. and Flynn, E.J. (1990). Empirical research methods in operations management. *Journal of operations management,* **Vol. 9** No.2, pp. 250-284.

Flynn, B.B., Schroeder, R.G. and Sakakibara, S. (1994). A framework for quality management research and an associated measurement instrument. *Journal of Operations Management,* **Vol. 11,** pp. 339-366.

Flynn, B.B., Schroeder, R.G. and Sakakibara, S. (1995). The impact of quality management practices on performance and competitive advantage . *Decision Sciences,* **Vol. 26** (5), pp. 659-692.

Hair, Jr., Anderson, J., R. Tatham and Black, W. (1998). *Multivariate data analysis with readings.* 4th ed. Prentice Hall, Englewood Cliffs: New Jersey.

Harzing, A.W., Maznevski, M., and country collaborators. (2002). The interaction between language and culture: A test of the cultural accomodation hypothesis in seven countries. *Language and Intercultural Communication,* **Vol.2** No.2, pp. 120-139.

Hatcher, L. (1994). *A Step-by-step Approach to Using the SAS system for Factor Analysis and Structural Equation Modeling.* Cary, NC: SAS institute, Inc.

Hoelter, J.W. (1983). The analysis of covariance structures: Goodness-of-fit indices, *Sociological Methods and Research,* **Vol. 11,** pp. 325-344.

Kaynak, K. (2003). The relationship between total quality management practices and their effects of firm performance. *Journal of Operations Management,* **Vol. 21,** pp. 405-435.

Madu, C.N., (1998),"An empirical assessment of quality: research consideration", *International Journal of Quality Science*, Vol. 3 No. 4, pp. 348-55.

Mangione, T.W. (1995). *Mail Surveys – Improving the quality*. Sage Publications: London.

Marsh, H.W., Bella, J.R., and McDonald, R.P. (1988). Goodness-of-fit Indexes in Confirmatory Factor Analysis: The effects of sample size. *Psychological Bulletin*, Vol. 103, pp. 391-410.

Moser, C.A. and Kalton, G. (1971). *Survey methods in social investigation*. 2nd Edition, Heinemann Educational: London.

Mullen, M.R. (1995). Diagnosing measurement equivalence in cross-national research. *Journal of International Business Studies*, Vol. 26 No. 3, pp. 573-596.

Peng, T.K., Peterson, M.F., and Shyi, Y.P. (1991). Quantitative methods in cross-national management research: Trends and equivalence issues. *Journal of Organizational Behaviour*, Vol. 12 No. 2, pp. 87-107.

Petty, G.C., (1995). Vocational-technical Education and the Occupational Work Ethic, *Journal of Industrial Teacher Education*. Vol. 32 No.3, pp. 45-58.

Rao, S.S., L.E. Solis, and Raghu-Nathan. (1999). A framework for international quality management research: Development and validation of a measurement. *Total Quality Management*, Vol. 10 No. 7, pp. 1047-1075.

Rasli, A. (2006). *Data analysis and interpretation: A handbook for postgraduate social sciences*. Penerbit Universiti Teknologi Malaysia, Johor, Malaysia.

Sekaran, U. (1983). Methodological and theoretical issues and advancement in cross-national research. *Journal of International Business Studies*, Vol. 26 No. 3, pp. 597-619.

Singh, J. (1995). Measurement issues in cross country research. *Journal of International Business Studies*, Vol. 26 No. 3,

pp. 597-619.

Tabachnick, B. and Fidell, L. (1988). *Using multivariate Statistics*. New York, HarpereCollins.

Tanaka, J. (1987). How big is enough? Sample size and Goodness-of-Fit in Structural Equation Models with latent variables. *Science Development*, **Vol. 58,** pp. 134-146.

Tinsley, H.E.A., and Tinsley, D.J., (1987). Use of Factor Analysis in Counseling Psychology Research. *Journal of Counseling Psychology.* **Vol. 34** No. 4, pp. 414-424.