

## Total Quality Management and Knowledge Sharing: Comparing Malaysia's Manufacturing and Service Organizations

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**Abstracts:** The aim of this study was to examine the difference between Malaysian manufacturing and service organizations with regard to the multidimensionality of TQM practices and the relationship of these practices to knowledge sharing behavior from middle management employees' perspective. The empirical data for this study were collected from 208 middle management employees from Malaysian manufacturing and service organizations with a response rate of 62.01% (129 respondents) from the manufacturing firms and 37.98% (79 respondents) from the service firms. The finding indicated there was no significance difference between Malaysian manufacturing and service organizations in the level of TQM practices and knowledge sharing. The multiple regression analysis also indicated a stronger relationship for manufacturing firms than for service firms between TQM practices and knowledge sharing, particularly in relation to teamwork. Results should be an interest to the TQM managers and practitioners in Malaysia. This finding increased our understanding on the applicability of TQM practices and the association of these practices to knowledge sharing in both Malaysian manufacturing and service organizations. This study has contributed towards advancing the TQM literature with a better understanding of the perception of middle management employees of TQM practices and its association with knowledge sharing in both Malaysian manufacturing and service organizations.

**Key words:** TQM, knowledge sharing, manufacturing organizations, service organizations

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### INTRODUCTION

Over the years, the focus in strategic management thinking has moved towards individual firm capabilities (Lawless *et al.*, 1989), culture (Fiol, 1991), know-how of employees, suppliers and distributors (Hall, 1992) as well as learning organization (Anderson *et al.*, 1994). Quality management has been an important component of the overall organizational movement for the past 20 years (Lee *et al.*, 2003). Quality systems have gained attention of top managers and quality professionals worldwide, which in turn, has encouraged individuals to implement the quality improvement practice (Kanji, 1998). Along with these lines, the discussions of Total Quality Management (TQM) have often been reverential due to the benefits offered by its implementation such as improved operational performance (Merino-Diaz de Cerio, 2003; Flynn *et al.*, 1995) and customer satisfactions (Ahmed and Sushil, 2008). TQM is known as a set of techniques and procedures implemented to minimize or remove variation from a production process or service-delivery system so that the level of efficiency, reliability and quality could be

enhanced (Steingard and Fitzgibbons, 1993). Although TQM concepts originated from statistical and engineering areas, the present TQM is highly related to of the area of human relations whereby qualitative elements such as customer orientation, employee involvement and teamwork are emphasized (Yong and Wilkinson, 2001). TQM methodologies also embody extensive advances over conventionally individualistic, competitive and hierarchical organizational structure (Steingard and Fitzgibbons, 1993). People also realized that they are trained, recognized, rewarded, grouped and managed differently (Schonberger, 1994). Furthermore, many employees are more likely to turn to other colleagues for information than to an impersonal source (database and documents). Thus, promoting knowledge sharing within organizations is increasingly important in both manufacturing and service firms.

While there is considerable body of TQM literatures that have provided general comparison of TQM practices between the manufacturing and service industries around the world (Powell, 1995; Prajogo, 2005), there is however very little existing literature on the comparative analysis

of TQM practices and knowledge sharing between manufacturing and service firms. Since TQM practices are exercised differently in manufacturing and service industries, it is interesting to juxtapose and compare the TQM practices implemented and the relationship of these practices to knowledge sharing behavior in both manufacturing and service firms. Correctly managing TQM towards achieving knowledge sharing is strategically and tactically vital for gaining a competitive advantage in the manufacturing and service industries. In order to bridge the gap and provide organizations with practical assistance in dealing with TQM and its association with knowledge sharing behavior, this study seeks to examine the difference between the manufacturing and service organizations in Malaysia with respect to the implementation of TQM practices and the relationship of these practices to knowledge sharing behavior as perceived by middle management employees.

Given the above reasons, this study presents an empirical study where the main objective is to explore the relationship between TQM practices with knowledge sharing behaviour as perceived by middle management employees and compare this relationship between manufacturing and service firms in Malaysia.

Knowledge is about know-how and know-why. Knowledge sharing involves three major aspects which includes type of knowledge, knowledge channel and target group. The organizational knowledge constitutes explicit knowledge and implicit or tacit knowledge (An *et al.*, 2004; Fernie *et al.*, 2003; Jacobs and Roodt, 2007). Explicit knowledge is described as knowledge that can be codified and expressed by language while implicit or tacit knowledge is defined as knowledge that cannot be expressed. Both explicit and tacit knowledge exist in transition and symbiosis forms. Knowledge can be transferred through many channels such as face to face, training, conference, networking, experience and practice. Knowledge can be transferred among individuals, teams and organization.

Therefore, knowledge sharing is viewed as an activity through which knowledge is transferred and disseminated among individuals, teams and organization (Lee, 2001; An *et al.*, 2004). Jacobs and Roodt (2007) and Hong *et al.* (2004) defined knowledge sharing as a process of learning towards the concept of knowing, understanding, refining a thought, an idea or a suggestion in creating more value-added to an organization, society and psychological need of people. A firm can expedite the information flow in the supply chain, enhance the efficiency and effectiveness of the supply chain as well as react to customer varying needs faster by managing the

existing data and sharing it with other parties within the supply chain (Li and Lin, 2006). In addition, knowledge sharing occurs as the sharers successfully use their insights or ideas to assist sharers in their analysis, problem solving, learning process and practices (McDermott, 1999).

A comprehensive literature review of the previous empirical analysis on TQM proposes that academicians and practitioners have defined TQM practices in various ways although they are complementary to each other (Prajogo and Sohal, 2003). There are various definitions of TQM in the literature and several methods have been used by scholars to assess its implementation. Inconsistencies in these previous studies make it difficult to reach a conclusion on the practices and dimensions of TQM (Hoang *et al.*, 2006). Most of the scholars agree that the top management commitment is the drive of TQM (Saraph *et al.*, 1989; Motwani, 2001). Quality practitioners or gurus such as Deming, Crosby, Juran and Gryna, Feigenbaum, Ishikawa and others have developed certain propositions in the areas of quality management. In an empirical study, Reed *et al.* (2000) systematically reviewed the ideas proposed by the quality gurus and found five elements of TQM, namely, customer focus, leadership and top management commitment, training and development, teamwork and culture on which all of them had agreed. Shenawy *et al.* (2007) analyzed the effects of TQM on competitive advantage by using a meta-analysis approach. They identified five major components of TQM, namely, top management and leadership, culture, teams, training and development and process efficiency, which are grounded in the work of Deming and deduced from other models offered by Reed *et al.* (2000).

Jun *et al.* (2006) analyzed survey-based research on TQM practices conducted in Maquilador. They found that the six HR-focused TQM practices most frequently investigated were top management commitment, employee empowerment, employee training, teamwork, appraisal system and employee compensation. It is not surprising that the issue related to top management commitment and satisfaction received the biggest coverage in this survey literature. Sila and Ebrahimpour (2002) conducted an investigation of the TQM survey-based research published between 1989 and 2000 and they found that most frequently investigated factors were customer focus, leadership and top management commitment, teamwork and employee involvement. Moreover, the importance of organizational culture has also been discussed and focused in the TQM literature such as Reed *et al.* (2000). Through the comprehensive review of the TQM literature, six constructs of TQM practices, namely customer focus, leadership, training and development, teamwork, reward

systems and organizational culture were selected to represent the core of TQM practices in this study for the main reason that these practices have been accepted by five quality gurus (Deming, Crosby, Juran, Feigenbaum and Ishikawa) as well as the well-known scholars such as Saraph *et al.* (1989), Reed *et al.* (2000) and Shenawy *et al.* (2007).

Early empirical studies present comparisons of quality management practices between the manufacturing and service industries (Powell, 1995; Prajogo, 2005). A comparison study done by Van der Wiele *et al.* (1993) covered 358 organizations, primarily from the UK and the Netherlands. The findings asserted that the service firms were found equally knowledgeable about TQM as compared with manufacturing firms. Powell (1995) mailed surveys to CEOs of firms in the northeastern of US. The survey by Powell (1995) included both manufacturing and service firms and reported that manufacturing firms were significantly more satisfied with their TQM implementation than service firms because manufacturing firms effectively mastered the TQM tools and procedures. The study by Beaumont *et al.* (1997) covered 261 Australian manufacturing firms and 85 Australian service firms. Using the same set of questionnaires by Eisen *et al.* (1992), the study found that there was no significant difference between the manufacturing and service firms with regard to the patterns of training in quality management practices (Beaumont *et al.*, 1997). Huq and Stolen (1998) chose 18 manufacturing companies and 18 service companies in the mid-western region of USA to assess whether TQM concepts apply equally to manufacturing and service companies. The aggregate study concluded that manufacturing companies signified higher dissemination of TQM knowledge when compared with service companies (Huq and Stolen, 1998). Based on a survey collected from 111 service organizations and 129 manufacturing organizations which participated in the Singapore Quality Award programme, Woon (2000) stated that the service organizations showed a significantly lower level of TQM implementation than the manufacturing-oriented service and the manufacturing organizations. In contrast with these findings, Prajogo (2005) discovered that the level of TQM practices were not significantly different between 103 manufacturing and 91 service firms in Australia.

These studies are a part of the growing literature on comparison study on quality management practices between the manufacturing and service industries. This paper is distinguished from the past studies in some aspects. This paper aims to examine the difference between Malaysian manufacturing and service organizations with regard to the human side of TQM

practices and the relationship of these practices to knowledge sharing behavior from middle management employees' perspective.

Based on the above literature, the primary research questions of this study can be articulated as follows:

**RQ1:** Is there any significant difference between manufacturing and service organizations with respect to the level of TQM practices and knowledge sharing behavior as perceived by middle management employees?

**RQ2:** Is there any significant differences in the strength of the relationship between TQM practices and knowledge sharing behavior between manufacturing firms and service firms from middle management employees' perspective?

## MATERIALS AND METHODS

**Research instruments:** The instrument developed in this study of two major sections. The first section consists of six constructs measuring TQM practices and the second section consists of dimensions relating to knowledge sharing behaviour. The instrument utilised a five-point Likert scale that represents a range of attitudes from 1 = strongly disagree to 5 = strongly agree.

**Independent variables: TQM practices:** Thirty items used in this study to measure the six dimensions of TQM were adapted from Zhang *et al.* (2000), Prajogo and Sohal (2003) and Lau and Idris (2001). The six dimensions included organizational culture, customer focus, leadership, training and development, reward system and teamwork. Sample items included in the survey included Clearly identifiable teams are utilized as the primary means to organize the work, as opposed to individual job functions or independent work stations (teamwork), Our company has a salary promotion scheme for encouraging employee participation in quality improvement (reward system), Our organization collects extensive complaint information from customers (customer focus), This organization has provided me with training opportunities enabling me to extend my range of skills and abilities (training and development) and Top management strongly encourages employee involvement in quality management and improvement activities (leadership).

**Dependent variable: knowledge sharing measures:** Similar to TQM, knowledge sharing has been reflected and measured in various ways in previous empirical studies (Jacobs and Roodt, 2007). Among this variation, the construct for measuring knowledge sharing developed

by Lin and Lee (2004) was the one that most closely matched to our objective. This construct showed good validity and reliability and it reflected overall sharing with the knowledge.

**Sample:** The target sample of this study was middle management employees from both manufacturing and service organizations in Malaysia which are either ISO 9001:2000 certified or have been implementing TQM programme. These organizations were selected from the list of Federation of Malaysian Manufacturer (FMM) Directory (2007). FMM is the largest economic organization in Malaysia representing over 2,000 manufacturing and industrial service companies of varying sizes and it was established in 1968 (FMM Directory, 2007; FMM, 2008). Given the strict rules that govern full membership of FMM, 47% of the 2135 FMM members organizations have been granted ISO certification (FMM, 2008). 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 survey was conducted between the months of January till April 2008.

The unit of analysis for this study was the full time middle management employees (for example, executives, engineers, supervisors, accountants, departmental managers and etc.) who possessed knowledge of their organizational practices pertaining to quality management and while had vast awareness about the level of knowledge management in their respective organizations. In order to reduce research biasness, part time and contract employees were excluded from this study as this sampling strategy would give a more conservative test of hypotheses than a strategy whereby other types of employees were also included (Tsui *et al.*, 1997). According to Ishikawa (1985), middle management act as the traffic policeman of an organization in which they must channel information to those who are in related divisions. The process of sampling these middle management are consistent with prior studies (Manz and Sims, 1993; Olian and Rynes, 1991; Ishikawa, 1985) and middle management employees are the main roadblock to successful TQM (Quality Progress, 1993, pp. 16-18 as cited by Thiagarajan and Zairi, 1997).

A pilot test was conducted with two Operations Research professors to test the validity of the survey content. The revised survey was sent to 20 participants from two service and manufacturing organizations for evaluation. The respondents were asked to evaluate the survey based on the wordings, relevance and clarity. The final surveys were randomly sent to 450 middle

management employees from twenty-five organizations from the manufacturing sector (i.e., includes electrical and electronics, food and beverages, semiconductor firms, furniture and wood products and etc.) as well as twenty organizations from the service sector (i.e., includes international insurance companies, consulting service firms, local banks, hotels, higher learning institutions and other related organizations were purposively targeted). Besides being ISO 9001:2000 certified or having being implementing TQM programme, these organizations were also chosen because TQM practices were likely to be sophisticated and established in these organizations. Of the 450 questionnaire that were distributed, 230 surveys were returned. However, only 208 of these surveys were usable and of the 208 respondents, 129 respondents (62.02%) were from manufacturing sector while 79 respondents (37.98%) were from service sector.

## RESULTS AND DISCUSSION

**Profiles of respondents:** This survey respondent includes 82 (39.42%) female and 126 (60.58%) male. The age group of the respondents was as follow: 1.44% was aged were less than 25 years old, 1.92% were between 26-30 years old, 11.06% were between 31-35 years and the remaining 85.58% were aged over 36 years old. 84.61% of the sample respondents were married. In terms of the educational background of the respondents, 195 (over 93%) of them had achieved at least a Diploma level qualification (Table 1).

**Factor analysis and scale reliabilities:** A varimax rotated principal component factor analysis was performed on the six dimensions of TQM practices (i.e., leadership and top management commitment, training and development, customer focus, teamwork, reward systems and organization culture) comprising 30 items to define the underlying structure among the variables in the analysis.

Based on the suggestion from Hair *et al.* (1998), only a loading of 0.5 or greater on the factor and 0.35 or lower on the other factors was considered. The results for the factor analysis extracted six factors solution with eigenvalues greater than one and the total variance explained was 50.99%. The KMO measure of sampling adequacy was 0.897 (i.e., >0.60) while the Bartlett's test of sphericity was significant ( $p = 0.000 < 0.01$ ). The results of factor analysis are summarized in Table 2.

Factor analysis was also applied to view the dimensionality of the dependent variable (knowledge sharing). A single factor solution emerged with eigenvalue of 1.957 explaining 48.934% of variance in the

**Table 1: Profiles of the survey respondents**

Profile	No. of respondents	Category	Count	Percentage
Gender	208	Male	126	60.58
		Female	82	39.42
Marital status	208	Married	176	84.61
		Single	32	15.39
Age	208	Below 25 years old	3	1.44
		26-30 years old	4	1.92
		31-35 years old	23	11.06
		36-40 years old	75	36.05
		41 or above	103	49.53
Qualification	208	No qualification	13	6.25
		Diploma	39	18.75
		Bachelor degree/Professional qualification	140	67.31
		Master degree	14	6.73
		Ph.D degree	2	0.96
Length of services	208	Less than 1 year	6	2.88
		1-2 years	8	3.85
		3-5 years	15	7.21
		6-10 years	61	29.33
		11-20 years	80	38.46
		Above 20 years	38	18.27
Organizational category	208	Manufacturing	129	62.01
		Service	79	37.98

**Table 2: Factor analysis and scale reliability-TQM practices**

Variables	Item	Factor loading	A set of items	Reliability
Training and Development (TD)	TD4	0.728	5	0.8584
	TD1	0.715		
	TD2	0.641		
	TD3	0.616		
	TD5	0.533		
Leadership (LD)	LD2	0.659	7	0.8413
	LD3	0.635		
	LD1	0.613		
	LD6	0.611		
	LD7	0.605		
	LD4	0.558		
	LD5	0.518		
Reward Systems (RS)	RS4	0.711	6	0.8556
	RS5	0.674		
	RS1	0.545		
	RS3	0.541		
	RS2	0.519		
	RS6	0.512		
Teamwork (TW)	TW2	0.629	5	0.7845
	TW3	0.608		
	TW4	0.545		
	TW5	0.539		
	TW6	0.501		
	CF1	0.763		
CF2	0.642			
CF3	0.581			
CF5	0.503			
Organizational Culture (OC)	OC5	0.537	3	0.7165
	OC6	0.521		
	OC7	0.513		

**Table 3: Factor analysis and scale reliability-Knowledge sharing**

Variables	Item	Factor loading	A set of items	Reliability
Knowledge Sharing (KF)	KF2	0.815	4	0.7767
	KF1	0.812		
	KF4	0.588		
	KF3	0.536		

F1: Knowledge sharing

data. The KMO measure of sampling adequacy was 0.733 (i.e., >0.60) indicating a sufficient intercorrelation, while the Bartlett's test of Sphericity was significant ( $p = 0.000 < 0.01$ ). The result of factor analysis for knowledge sharing is summarized in Table 3.

Cronbach's Alpha was applied to test the reliability of the questionnaire measurements. Reliability tests were conducted on dependent variable (i.e., knowledge sharing) and the independent variables-TQM practices (i.e., leadership, training and development, customer focus, reward systems, teamwork and organization culture). The reliability coefficient of the variables exceeded the minimum acceptable level of 0.7, which concurs with the suggestion made by Nunnally (1978). The Cronbach alpha values are shown in Table 2 and 3, respectively.

The differences between manufacturing and service firms: Multivariate analysis of variance (MANOVA) with Hotelling's Trace test was applied in order to examine whether there is a statistical differences between the TQM practices and knowledge sharing between the manufacturing and service firms. The results are shown in Table 4.

The Hotelling Trace ( $F = 1.281, p > 0.01$ ) indicated that there was insignificant difference between the two types of firms. The independent-sample t-test was performed to take notes the result of the Multiple Analysis of Variance (MANOVA) test to identify which variables were significantly different between the manufacturing and the service firms. Results from the Levene's test also indicated that there was no unequal variance between the two groups with respect to the six variables examined.

**Table 4: t-test between manufacturing and service firms with respect to TQM practices and knowledge sharing**

Parameters	Manufacturing (n = 129)		Service (n = 79)		Mean difference	p-value
	Mean	SD	Mean	SD		
Leadership	3.6491	0.5775	3.7904	0.5920	-0.1413	0.091
Customer focus	3.6924	0.5677	3.6206	0.6326	0.0718	0.398
Training and development	3.4543	0.6809	3.5797	0.8561	-0.1255	0.244
Reward systems	3.3514	0.6810	3.3628	0.8090	-0.0114	0.913
Teamwork	3.5799	0.5438	3.6286	0.5859	-0.0487	0.544
Organizational culture	3.4895	0.5121	3.5675	0.5934	-0.0780	0.317
Knowledge sharing	3.5233	0.5990	3.6614	0.6591	-0.1381	0.122

Based on Table 4, all variables showed insignificant difference between the manufacturing and service firms in terms of TQM practices and knowledge sharing. This result shows that although TQM originated in the manufacturing industries, its principles have also permeated the service industries. Thus in response to RQ1, the findings suggest that there is no significant difference between manufacturing and service firms in terms of the adoption of TQM practices and knowledge sharing. The result from this finding is consistent with the findings from previous researchers such as Beaumont *et al.* (1997) and Prajogo (2005) who found no significant difference in the TQM implementation between manufacturing and service firms.

**The relationship between TQM practices and knowledge sharing:**

The relationship between the TQM practices and knowledge sharing is presented in Table 5. Multiple regression analysis was used for analysis of the association between TQM practices and knowledge sharing. With an adjusted R<sup>2</sup> of 33.4% and an F-value of 11.693 (p<0.001), the model (I) has a reasonable fit if compared with model (II) (Table 5). Thus, in response to RQ2, the result of the multiple regression analysis indicates that manufacturing firms show a relatively stronger positive relationship between TQM practices and knowledge sharing. For manufacturing firms, the individual model variables revealed that teamwork ( $\beta = 0.247, p<0.01$ ), training and development ( $\beta = 0.414, p<0.01$ ) and customer focus ( $\beta = 0.034, p<0.05$ ) were found to have significant and positive relationship with knowledge sharing. On the other hand, only one variable in model II (i.e., teamwork and knowledge sharing ( $\beta = 0.409, p<0.05$ )) is statistically significant in service firms. This result is interesting given teamwork is found to be significant to enhance the level of knowledge sharing in both manufacturing and service sectors. In other words, the result of this research study proves that teamwork is perceived as an essential TQM practice and there is a positive association with knowledge sharing. The finding stresses on the need to work in a team and include better TQM practices in order to ensure successful of knowledge sharing in both sectors.

**Table 5: Regression analysis of TQM practices and knowledge sharing between manufacturing and service firms**

Variables	Manufacturing model (I) (N = 129)	Service model (II) (N = 79)
Independent variables	$\beta$	$\beta$
Leadership	-0.136	-0.071
Customer focus	0.205*	0.256
Training and development	0.414**	0.076
Reward systems	-0.086	-0.132
Teamwork	0.247**	0.409*
Organizational culture	0.005	0.113
R <sup>2</sup>	0.365	0.370
Adjusted R <sup>2</sup>	0.334	0.318
F-value	11.693**	7.057**

\*p<0.05, \*\*p<0.01

This study casts new light on research that has examined the relationship between TQM practices and knowledge sharing. It is interesting that teamwork was reliably significant to knowledge sharing in both manufacturing and service firms. Team members may have shared more knowledge because of teamwork opportunities created. For example, teamwork might entail presenting task information to team members or receiving feedback on a project from team members. The finding is corroborated with the finding presented by Wright *et al.* (1994) in which he reported that teamwork will lead to knowledge transfer from one another and combine an individual's old knowledge to create new skills.

Finding indicated that training and development is positively associated with knowledge sharing in manufacturing firms. Consistent with the findings of Goh (2002), he asserted that effective training is vital to promote knowledge sharing due to the fact that it provides an arena where workers are grouped together to gain and share new knowledge. Therefore, the human resource division of manufacturing firms must provide satisfactory and continuous training and development programs to help the implementation of TQM in contributing to the enrichment of knowledge sharing via the use of technological tools. This is consistent with the findings of Stoddart (2001). Furthermore, training and development programs help in sharing the knowledge of different stages in manufacturing's value chain. For example, the sharing of technical knowledge from the development laboratories to the manufacturing factories

and the marketing units and the sharing of market knowledge from the field back to the manufacturing factories and the laboratories.

Likewise, customer focus is found to be significant and contribute to enhance the knowledge sharing in manufacturing firms. This may be because manufacturing firms actively engage in exchange of information, know-how and feedback with customers in order to survive in this competitive market. Consequently, the present result is in line with the theory and assumptions of Buckman (2004) where he agreed that customer focus is an important element in companies that are successful in developing knowledge sharing.

Surprisingly, the finding revealed that leadership is not equally significant to predict knowledge sharing behaviours and outcomes among middle management employees in both manufacturing and service sectors. This implies that leadership is profoundly weak in influencing groups of employees in knowledge sharing. Thus, middle managers or leaders should strengthen their leadership by regularly building trust among the staff in order to break the communication barrier which in return will facilitate knowledge sharing (Arnord *et al.*, 2000). Following Amord *et al.* (2000) leaders should encourage and empower their staff to articulate their ideas to nurture knowledge sharing.

The study affirmed that organizational culture is insignificant to knowledge sharing in both manufacturing and service firms. In practice, this means both manufacturing and service firms failed to cultivate the knowledge shared culture among the employees. This could be due to leaders' poor initiating directives to foster the social interaction among the staff, to build good relationship and trust among the employees. Hence, middle managers and leaders should reevaluate their organizational processes to leverage knowledge sharing capabilities and develop trust among the middle management employees (Mosadegh Rad, 2006; Politis, 2003) articulate clear vision and mission statement and promote more social interaction (O'Dell and Grayson, 1998).

It is observed that there is a weak relationship between reward systems and knowledge sharing in both manufacturing and service firms. This implies that reward systems may not be attractive and effective to facilitate knowledge sharing among the employees. This finding is found to be in contrast with the findings of McDermott and O'Dell (2001) and Sharratt and Usoro (2003) where their studies reported that the reward systems are significant towards knowledge sharing.

## **IMPLICATIONS**

Despite the considerable attention researchers have paid to TQM research area, little research examines the relationship between TQM and knowledge sharing. Our findings suggest this scarcity has impeded further insights into broader view in TQM perspectives, that is, which diversity of TQM influence the value of knowledge sharing among the employees. This paper is one of the very few studies to conceive of TQM as an influential factor to knowledge sharing. A theoretical contribution of this study was the integration of ideas about TQM practices and knowledge sharing in both manufacturing and service firms. In particular, six attributes (i.e., leadership, customer focus, training and development, reward systems, teamwork and organizational culture) were linked together for the first time as critical components of TQM in measuring the relationship with knowledge sharing.

From a managerial perspective, this study holds significance for practitioners. The middle management employees can use the model proposed here to evaluate the perceptions of knowledge sharing in their firms. This model could help decision makers identify specific TQM components where improvement should be made. A vital practical message from this study is that industrial practitioners should explicit about the importance of teamwork in cultivating knowledge sharing behaviour and outcomes in both manufacturing and service firms. Employees who involved in teamwork may, over time, instigate to share knowledge because they increasingly need different knowledge and ideas in completing their project. Hence, the management could look into several ways to improve the connectivity among their employees such as creation of cross-functional team and knowledge fairs that provide a platform for sharing knowledge. When knowledge sharing does not naturally happen, management could consign liaison roles to connect with many employees of the firm.

## **RESEARCH LIMITATIONS AND FUTURE RESEARCH**

This study opens up many avenues for new research. First, this finding was based on cross-sectional data and claims about causality could not be substantiated. Hence, it is highly recommended that other researchers could use longitudinal data to examine the relationship between TQM practices and knowledge sharing in the subsequent research. Second, the sample taken in favour of middle

management employees limits the generalizability of the results. Replicating this finding in other settings and managerial level such as top managerial level and low managerial level is suggested to fully understand the role of TQM practices in fostering knowledge sharing in both manufacturing and service firms. Another concern involves the use of self-reported survey data that might include a biased response from the respondents and this may pose concerns to verify the pervasiveness or apparentness of the respondents towards TQM practices. Thus, following research should include exploratory interviews of full-time middle management employees from the sample. Additional research is also needed to be able to specify individual differences in knowledge sharing behaviors under the domains of TQM. Resolution of these issues would help explain the role of TQM in fostering knowledge sharing.

### CONCLUSION

In conclusion, this finding successfully shows that TQM components could be usefully conceptualized as one of the factors which govern the occurrence and effectiveness of knowledge sharing among the middle management employees. Fostering knowledge sharing within the organizations is an increasingly main challenge for both manufacturing and service firms. If firms view establishing and maintaining relations among members within a team, as a good practice and support it, such management practice may positively affect the extent of knowledge sharing across the firms. Both manufacturing and service firms might find this study fruitful to re-evaluate on ways to improve their TQM practices as a relatively inexpensive and pragmatic way to enhance the flow of valuable knowledge in the organizations. By studying multidimensionality of TQM practices, researchers could attain a fine-grained understanding of how different TQM dimensions in both manufacturing and service firms contribute to knowledge sharing behaviors and outcomes.

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