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Review

TQM and knowledge management: Literature review and proposed framework

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This research study seeks to come up with a conceptual framework that investigates the different dimensions of total quality management (TQM) and its effects on knowledge management (KM). This is to help build a theoretical framework of TQM and its dimensions, which mainly consists of leadership, strategic planning, information and analysis, process management, human resource focus and customer focus. These constructs are rooted in the work of Malcolm Baldrige National Quality Award (MBNQA). To build the conceptual framework, the background of TQM and Knowledge Management theory served as a good starting point. The current research study is based on the complete assessment of present literatures, the six constructs of TQM and the three elements of knowledge acquisition, knowledge application and knowledge dissemination. This paper serves as a guide to senior management, who seeks to improve their company's organizational knowledge management activities through the execution of TQM practices, in which the TQM practices support their company's knowledge management efforts. Furthermore, the conceptual model serves as a benchmark for practitioners to execute their TQM programmes more effectively and efficiently in their own respective firms. This paper seeks to close the gap on the existing literature, by giving guidance to the senior management of TQM companies that aspires to discover the competency of knowledge management. By developing a deeper understanding of the relationship between TQM practices and knowledge management, senior management can thus focus their efforts on the practices that ensure the firms' ability to establish a competitive knowledge management capability.

Key words: Total quality management, knowledge management, Malcolm Baldrige National Quality Award
Paper type: Conceptual paper

INTRODUCTION

For the past two centuries, the introduction of Total Quality Management (TQM) on both practical and theoretical levels have played an important role on the growth of management practices (Bayo-Moriones and Merino-Diaz, 2001; Hoang et al., 2006; Prajogo and Sohal, 2003). The definition of TQM defined by Lin and Ogunyemi (1996) is an all inclusive business management beliefs, which consists of a set of guiding principles that exemplifies the foundation for continuous improvement and hence it is acknowledged as the most 'holistic' approach offered to date in sustaining the efforts for organizational improvement (Dar-El, 1997). TQM is characterized as one of the most important topics in operations management research (Filippini, 1997; Samson and Terziovski, 1999; Nair, 2006) and it is well known it plays a vital role in giving firms a sustainable competitive edge when it is implemented successfully (Prajogo and Sohal, 2004). Examples quoted by previous researchers in their studies have emphasized how through the implementation of TQM practice enabled many companies to attain a sustainable competitive edge (Adam, 1994; Dean and Bowen, 1994), to participate in the global arena competitively (Saraph et al., 1989; Ahire et al., 1995; Black and Porter, 1996; Hendricks and Singhal, 1997), leading to the upgrading of operating performance (Flynn et al., 1994; Samson and Terziovski, 1999), which is associated with market orientation (Mohr-Jackson, 1996). Knowledge Management (KM) has developed into different areas in the study of firms and is alleged to play an important part in attaining sustainable competitive ad-

vantage in the present day business and academic arena (Wong, 2006; Nonaka and Takeuchi, 1995; Gloet and Berrell, 2003). According to Scarbrough et al., (OCED, 2003), KM can be described as "covering any intended and methodological process or put into practice the knowledge of acquiring, capturing, sharing and using knowledge, wherever it resides in, to improve the learning capability and performance of firms" (as cited by Bozbura (2007, p. 210)). In spite of the large body of literature in TQM, there is still insufficient systematic experimental evidence with regard to the degree of TQM practices and its result on knowledge management (KM) behaviour, despite the importance of their relationship within the firms(Molina et al., 2007). It was proposed by Decaloris and Deeds (1999) that by managing TQM well and to achieve KM behaviour purposely and tactically, are vital in helping a firm achieve a competitive advantage. In addition to that, it was concluded by Ju et al. (2006) that these two facets play as one major role in maintaining the development of an organization. For an organization to survive and succeed, it is crucial to manage TQM well and to attain KM holistically, both in terms of theory and practicality (Molina et al., 2004; Ju et al., 2006; Hsu and Shen 2005). Molina et al. (2004) furthermore emphasized that a theoretical base is helpful to clarify the relationships in TQM in the literature, which is vital for achieving a competitive edge for firms. To close the gap in the existing literatures and to provide practical help to manage the effects of TQM on KM, this paper propose a set of TQM practices and furthermore, to come up with a conceptual model that could shed some guidance on the implementation of TQM.

Given the above reasons, this paper will investigate the past literature and then supplement this work by investigating each TQM practices and their relationship with knowledge management behaviour. The other sections of this research paper are structured as follows: In the next section, the theories laid down in the literature of key practices of TQM and knowledge management. The literature review leads to examine how certain TQM practices are related and present the propositions and then followed by the proposed conceptual framework. Finally, the conclusions with respect to the new knowledge from this study are discussed followed by limitations of the study, implications, and recommendations for future research.

LITERATURE REVIEW

Key practices of TQM

Several efforts have been done to prove the elements of TQM in the past decade (Saraph et al., 1989; Flynn et al., 1994; Ahire et al., 1996). According to prior TQM research, the constructs of TQM has been categorized in a few ways, even though they complement each other (Prajogo and Sohal, 2003). There is no clear agreement of TQM research concerning its key elements that show the capabilities of what TQM portrays when referred (Shenawy et al., 2007; Escrig-Tena and Bou-Llusar, 2005). Hence, there arises a difficulty of reaching an agreement on the elements of TQM due to the inconsistency in the previous research (Hoang et al., 2006). A complete assessment of TQM literature have shown that TQM practices could be secured in seven areas, being leadership, strategic planning, customer focus, information and analysis, human resource management (HRM), process management and supplier management (Sila, 2007). A huge amount of previous literatures that confirms the practices of TQM theoretically and practically is mainly based on the criteria of Malcolm Baldrige National Quality Award (Shenawy et al., 2007; Wilson and Collier, 2000). The constructs embedded in the TQM practices are leadership, strategy and planning, customer focus, information and analysis, people management and process management (Prajogo and Sohal, 2003). It was argued by Samson and Terziovski (1999) that their model includes the Malcolm Baldrige National Quality Award (MBNQA) criteria that have been acknowledged as representing TQM practices by several scholars such as Ahire et al., (1995), Dean and Bowen (1994) and Juran (1995). These practices are also consistent with the standard of the Malcolm Baldrige National Quality Award (MBNQA) as implied by Sila (2007) and Sila and Ebrahimpour (2003), who examined the TQM practices taken out by 76 empirical TQM analysis and categorized them under 2002 MBNQA model (Sila, 2007). Hendricks and Singhal (1997); Wrolstad and Krueger (2001) further mentioned that by putting into effective practice the MBNQA criteria, it will enhance economic performance.

Through the comprehensive examination of past research, which includes the criteria of the most esteemed quality award such as MBNQA (1999), six dimensions of TQM practices were formed to signify the main TQM practices in this research study as shown in Table 1, for three most important reasons (Hoang et al., 2006): (a) integrate the most well-recognized quality award criteria of leadership, customer and market focus, information and analysis, strategic planning, human resource and people management – extensively acknowledged by TQM researchers and practitioners; (b) comprise the constructs that signify the soft and hard facets of TQM conferred in the literature and (c) have been regarded as key practices of TQM implementation in both manufacturing and service industries by past researchers and scholars (Powell, 1995; Prajogo and Sohal, 2003; Samson and Terziovski, 1999; Hoang et al., 2006).

Knowledge management

Many definitions regarding knowledge management (KM) can be found in literature written by famous scholars such as Darroch, 2003; Lee and Yang, 2000; Lee et al., 2001; Nonaka, 1994). It is essential to understand the definition

Table 1. The six dimensions of TQM practices with their explanations.

Constructs	Related studies	Explanations
Leadership and top management commitment	Ahire et al. (1996); Powell (1995); Saraph et al. (1989); Prajogo and Sohal (2003); Prajogo and Sohal (2004); Dean and Bowen (1994)	The degree of visibility and support that management provides in implementing a total quality environment is significant to the success of TQM adoption.
Customer Focus	Black and Porter (1996); Evans and Lindsay (1995); Samson and Terziovski (1999); Prajogo and Sohal (2003); Flynn et al. (1994); Powell (1995); Hoang et al. (2006)	To have well satisfied customers is one critical objective. Develop and manage strong customer relationships for the longer term. Know the customers' current needs and future expectations.
Strategic Planning	Anderson (2000); Prajogo and Sohal (2003); Prajogo and Sohal (2004); Motwani (2001); Powell (1995); Saraph et al. (1989)	The degree to which the organization has a clear vision, mission, long-term plan and quality policy.
Information and Analysis	Prajogo and Sohal (2003); Prajogo and Sohal (2004); Samson and Terziovski, (1999); Sila and Ebrahimpour (2003); Hackman and Wageman (1995)	The degree to which data and information to be collected and analyzed for the aim of quality improvement.
Process management	Juran (1995); Motwani (2001); Powell (1995); Samson and Terziovski (1999); Teh et al. (2008); Flynn et al. (1994); Zairi (1997); Ahire et al. (1996)	Emphasizing adding value to processes, increasing quality levels, and having program to reduce wasted time and costs in all internal processes.
Human Resource Management	Flynn et al. (1994); Black and Porter (1996); Samson and Terziovski (1999); Wilson and Collier (2000)	The degree of a wide-ranging management process that is designed and incorporated in the firm's strategy.

Source: adapted from Hoang et al. (2006).

of knowledge before having a better understanding of KM. According to Nonaka (1994), knowledge is a comprehensive concept with profound meanings, bearing the belief that it increases an organization's ability for effectual action. Knowledge can be further divided into two, that is, tacit knowledge and explicit knowledge (Nonaka, 1994 and Gupta et al., 2000). Tacit knowledge is defined as one that is inherent inside an individual and according to Nonaka, (1994); Lin and Lee, (2004), it is acquired through imitation and practice. On the other hand, explicit knowledge is defined as a data which is either technical or in academic terms or information that is written in a formal language (Smith, 2001; Ooi et al., 2009). Furthermore, explicit knowledge can be further articulated in the form of rules, guidelines and principles (Nonaka, 1994). Four different forms of knowledge conversion were mentioned by Nonaka (1994), namely socialization, externalization, combination and internalization, in which the model explicitly describes the conversion of knowledge being a spiral and continuous process between the interactions between explicit and tacit knowledge.

KM is defined as a methodological method that enhances the capability of a company to assemble and organize the knowledge in order to improve the decision-making ability and business strategy formulation process (Hsu and Shen, 2005; Ooi et al., 2009). According to Darroch (2003), KM is termed as a process for knowledge creation and manages the distribution and sharing of knowledge within and between each organization. Darroch's definition of KM portrays that KM is made out of three main sections, which are knowledge acquisition, knowledge dissemination and knowledge responsiveness; whereas for Lee et al. (2001), KM incorporates only two parts, namely knowledge acquisition and knowledge dissemination. From the process point of view, KM consists of knowledge creation, knowledge retrieval, knowledge sharing and knowledge application (Nonaka and Takeuchi, 1995). Based on the statements given above, KM behaviours cover the acquisition of knowledge, the dissemination of it as well as the application. These three constructs of knowledge have soon become the major concepts of KM, whereby each construct of KM is presented as dependent on the other components. In other words, knowledge is acquired, distributed and then comes the application part.

THE CONCEPTUAL MODEL AND PROPOSITIONS DEVELOPMENT

The hypothesized conceptual model is developed to simultaneously examine the relationship between TQM practices and organizational KM behaviours (that is, knowledge acquisition, knowledge dissemination and knowledge application). The link between TQM principles

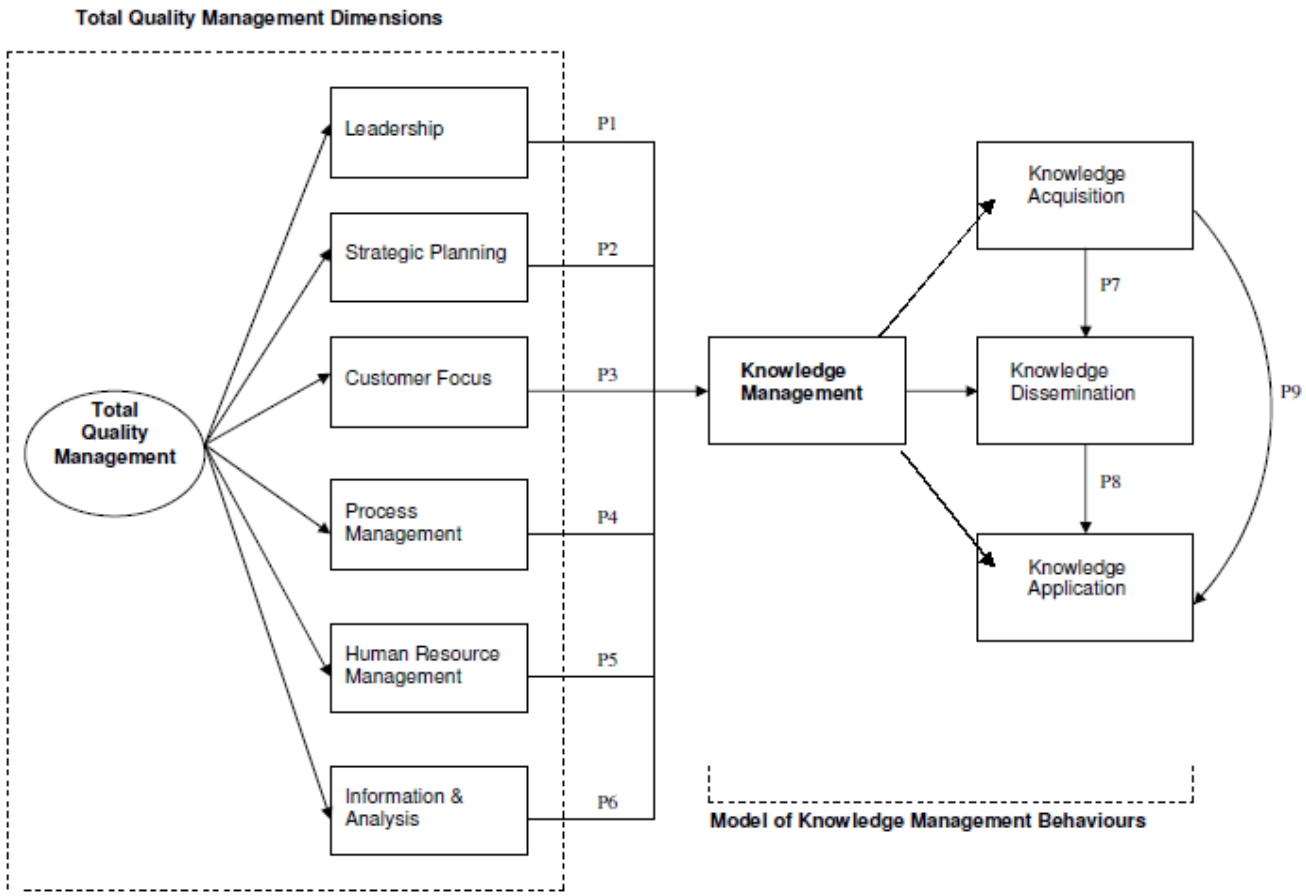

Figure 1. Model of knowledge management behaviours.

and organizational knowledge management behaviours are illustrated in Figure 1. In this theoretical framework, TQM practices and knowledge management behaviours are independent and dependent variables respectively. The present study thus attempts to bridge the gap by providing a basis for a thorough and insightful discernment of the influence of TQM practices on knowledge management behaviours. Although the causal relationships among the constructs shown in Figure (1) seem to be straightforward, to our knowledge, the present study is the only one that holistically examines the associations between TQM practices and KM behaviours. In order to make practical statements about TQM multidimensionality and its associations with KM behaviours, the model require further analysis.

Propositions between TQM practices and KM behaviours

Leadership: Leadership is described as a link through which one individual have control over the performance and conduct of other individuals (Ehigie and Akpan, 2004; Mullins, 1996) to attain a company's set objectives (Robbins, 2003). As cited by Zairi and Youssef (1995, p.38) of Mele and Colurcio (2006), the empirical studies concluded that "in the context of TQM, leadership is not so much about power, authority and control, but more of empowerment, recognition, giving guidance and developing others". Hence, one of the most effectual methods for leaders to fuel the energy of a group is to be creative in allowing the group to innovate (Ahmed, 1998).

Given the existing situation of firms, where its focal point are mainly knowledge based, TQM needs a change in the main organizational elements, in particularly the leadership styles (Powell, 1995). Macneil (2001) mentioned that management leadership could add tremendously to the core competencies improvement and skills in the course of their role being helpers of organizational learning in the workplace, in particularly by helping to cultivate a knowledge management behaviour environment in which employees are encouraged to apply their inferred and tacit knowledge to solve problems that arises. Many studies have confirmed that senior managers play an important role to control the rate of success for KM activities (Wong, 2006; Horak, 2001; Holsapple and Joshi, 2000) as well as enhancing the process of managing organizational process (Bryant, 2003).

Bryant (2003) furthermore mentioned that mission, motivation, systems and structures design for the various activities of a company that supply the means to trade knowledge should come from management leadership.

The senior manager's role as a helper in supporting the practice of knowledge management in teams, namely knowledge acquisition, knowledge dissemination and knowledge sharing is vital for the development and enhancement of collective learning ability in organizations (Ellinger and Bostrom, 1999). Wong (2006) recommended that management leadership should portray good examples by freely contributing their knowledge, made known the significance of KM to other workers and also to attempt to cultivate a culture that encourages the sharing and creation of knowledge. In other words, it is vital for management leadership to institute this situation for KM to be effective (Holsapple and Joshi, 2000; Wong, 2006). Apart from that, it has also been widely known and established by both researchers and practitioners that leaders do have a vital role to play in creating and maintaining a favourable knowledge management environment (Gupta et al., 2000; Macneil, 2001; Bryant, 2003; Ellinger and Bostrum, 1999). In a study done by Storey and Barnett (2000), they found that the support given by management leadership should be continuous and be conveyed in a practical manner and such support could then be converted into intensive efforts that would contribute to KM success. Hence, the following proposition is given:

P1: Leadership is positively related to knowledge management behaviours (i.e. knowledge acquisition, knowledge dissemination and knowledge application).

Strategic planning: Strategic planning has been categorized as activities which are conducted both socially and cognitively to obtain success and stay competitive in any sector (Calantone et al., 2003). In the latest research conducted by Anderson (2000), strategic planning, under certain conditions and circumstances, does contribute to the higher performance of an organization. The focal point of this criterion lies in the strategic planning and exploitation of plans of an organization, coupled with the organization's focus on key customers and operational performance requirements (Samson and Terziovski, 1999; Evans and Lindsay, 1995).

In their studies, Carayannis et al. (2000) and Grant (1996) commented that the extent of a firm being competitive mainly comes from the special knowledge of its employees, the ability of a firm to create new knowledge and be innovative, and the strategic actions taken by the firm. Strategy points to where and the way in which an organization will be heading to in the coming years (Beijerse, 2000). Liebowitz (1999) mentioned that one of the main factors of KM success is to have a well thought out strategy, as this strategy provides a founda-tion for how a firm can organize its capabilities and resources to attain its KM objectives. All efforts to associate KM programmes to strategic planning have become a vital source of competitiveness for all firms (Chong et al., 2006).

Related closely to the idea of strategy, is the formation of a convincing and shared vision for pursuing KM behaviours. It is essential that employees support and share this vision and trust that it will work (Wong, 2006). It was further commented by Wong (2006) that value hypothesis had to be clearly defined and stated so that passion to attain it can be created among management and employees. In short, before a significant investment can be made to instigate a KM effort, all the above fundamentals need to be carefully developed. The American Productivity and Quality Centre (1999) made a study and concluded that firms running after different KM strategies have more success when the strategy employed is associated with their business strategic plan. Hence, based on this, for firms that wish to implement KM behaviours, it is essential to ensure their knowledge program are consistent with the company's missions. Hence, the following is proposed:

P2: Strategic planning is positively related to knowledge management behaviours (that is knowledge acquisition, knowledge dissemination and knowledge application).

Customer focus: Sila (2007) and Brah et al. (2000) both mentioned that a firm's success in the long run is dependent upon how its customers' needs are satisfied effectively and efficiently on a continuous basis. To create a value for the customer is the main principle (Mele and Colurcio, 2006; Woodruff, 1997), whereby it portrays how well the company confirms current and up-and-coming customer requirements, expectations, satisfaction, as well as providing effectual customer relationship management (Samson and Terziovski, 1999;
Evans and Lindsay, 1995). Hence, the issues of customer focus and satisfaction received the largest coverage in the literature world due to it main efforts in increasing customer satisfaction in nearly every kind of business (Hoang et al., 2006). As the environment is changing constantly, total quality-oriented firms that employ innovative activities should be attentive to the information and act in response to meet the needs of the customers (Santos-Vijande and Alvarez-Gonzalez, 2007).

To characterize customer focus, the practices incorporate the gathering of information about the expectations of customers and then to distribute such information within the firm itself (Dean and Bowen, 1994). To push forward these activities, knowledge sharing is highly encouraged among employees, in particularly for those tasks that are dependent on prior task by other colleagues. For example, line managers are dependent on the statistical information that the sales and marketing division supply (e.g. the number of sales purchases of new product, customers' feedback on product and services), in which it is a helpful evaluation on the orders that customer placed and whether their needs are being

satisfied. In simple terms, as customers' input is helpful towards quality improvements, customers' information and feedback should be shared among employees within a firm. One of the examples being Philips (Royal Philips Electric), whereby this company from Netherland has a strong principle in putting customers satisfaction as the company's main concern. In order to be successful, every decision made by the organization should be customer centred and that incorporates matters such as the suggestions made by customers in knowledge creation activities, storing of knowledge that is valuable to custommers, assessing through customer complaints and using that knowledge to satisfy customer needs and improve customer satisfaction (Ju et al., 2006). Furthermore, business processes that emphasized on customer knowledge are part and parcel of intellectual assets that a firm can have (Bassi and Van Buren, 1999).

In a different example, a study was conducted by O'Dell et al. (1999) on Dow Chemical Company (Dow), and it was found that one of the key factors in measuring its value for Dow is through customer success. The company attempts to recognize these intellectual capitals that are link with customer success and then identifying the individual elements that affect them. In addition to the same research (O'Dell et al., 1999), it was also reported that USAA, one of USA's top insurance companies, owns a system that is able to quantify customers feedback, and hence this has contributed to the improvement of their overall customer base knowledge. O'Dell et al. (1999) further emphasised that customer focus strategy is about capturing knowledge about customers, understanding their needs and using the knowledge within the firm to solve customer problems. In another study done by Stankosky and Baldanza (2001), it is of utmost importance to understand the needs and problems of customers as these are the main factors for continuous improvements and innovations to any company. Hence, the following propositions were made:

P3: Customer focus is positively related to knowledge management behaviours (that is, knowledge acquisition, knowledge dissemination and knowledge application).

Process management: Process management is defined as the behavioural and systematic principles that are important to managing the process rather than the outcomes (Anderson et al., 1994; Teh et al., 2008). It also points to the way how businesses strive to be successful by encouraging the need for knowledge innovation and creativity in process improvement and optimisation (Zairi, 1997).

Process management stresses the value adding to a process, increasing the productivity of every employee and enhancing the quality of the company (Motwani, 2001). Ju et al. (2006) commented that the basic requirements of process management are to lower down costs, boost efficiency and reducing cycle-time, which all can be applied to KM behaviours. There are several processes and performances that exemplify the KM discipline (Wong, 2006) and that the literature stressed a few of the processes that are connected with KM (Al-Mabrouk, 2006). For example, adequate measures needed to be ready to ascertain that KM processes are addressed in an organized and structured manner. Hence, the organization of how the KM process is to be implemented is vital (Holsapple and Joshi, 2000; Al-Mabrouk, 2006).

Clarke (2006) claimed that process management endeavours to execute process capabilities, ensuring consistent outcomes and that customers' needs and expectations are met. Both quality and KM structure are assumed to be things that can be handled and controlled by the organization. Due to this perception, one can assumed that firms adopting the process management approach will at the same time implement the structural approach to KM. In a case study done by Ju *ET AL.,* (2006) in Taiwan, on the link between TQM critical factors and KM value chain activities, they found that knowledge storage can reduce the engineers' time for ASE Inc. In terms of knowledge distribution, searching time have been reduced and problem solving skills was further improved as the company rearranges all the documents orderly. As for knowledge applications, in order to apply process management into it, reports on company's projects are made available to every employee in need. A proposition made by Lee et al. (2001) was that an effective process management will have an effect on quality performance. This could be attained by reducing process variation where quality performance is acquired, disseminated and shared. As process variance is being reduced, the chances of having defective parts will also shrink accordingly. Molina et al., (2007) concluded that the most significant matter in the link between TQM processes control and the internal knowledge transfer is the systematic use of control processes in a firm, which has an important part to play on the search for and transfer of knowledge to which they are applied. For firms that have put TQM into practice, it is widely known that TQM helps in the continuous improvement of processes, and this will direct such firms to seek and use the knowledge they need. Hence, the following proposition can be suggested.

P4: Process management is positively related to knowledge management behaviours (that is knowledge acquisition, knowledge dissemination and knowledge application).

Human resource management: In the present knowledge-based economy, people are regarded as the most important asset (Fang et al., 2005), in which it is widely acknowledged in the literature the significance of human aspects, such as providing training and compensation plans, from the perspective of TQM (Tari et al., 2007). Oltra (2005, p. 71) make mention that "both knowledge and human resources are being gradually looked upon as the main force of a multifaceted business environment". Furthermore, Alvesson (1993) made a

claim that the people are the ultimate knowledge inventor and owners. This is supported by a statement made by Devenport and Volpel's (2001, p. 212), whereby they stated that "to manage knowledge is to manage people; to manage people is to manage knowledge". Numerous studies were done to survey the relationships between human resources and KM, one of them being Zupan and Kase (2007). Through the study of line managers and HR specialists and their structural positions in knowledge creation and knowledge sharing, both of them have explored the inferences for devising and executing HR practices in knowledge intensive firms. The results obtained has shown that the line managers are the main source to the knowledge networks and are considered to be the knowledge actors; whereas the HR specialists are not. As a result of this finding, it was concluded that in a knowledge intensive firm, the decentralised method is a more preferred way to HRM. This leads to the suggestion that HR practices are more focus on line managers and this can have a better effect on the knowledge creation and knowledge sharing process.

In an interesting study done by Lin (2007), it was found that individuals often enjoy helping others and at the same time, to enhance self knowledge efficacy. With the support from senior management and appropriate organizational rewards, it could further enhance the knowledge sharing process, which could then lead to superior innovation. In short, Lin (2007) concluded that employees, in general, are willing to collect and share their knowledge and this would enable the company to encourage and cultivate a knowledge sharing culture, which would eventually lead to an increase in innovation performance in the firm. Undeniably, many researchers have stressed the significance of HRM as one way to enhance knowledge transfer, in particularly in the form of technology know-how (e.g. Sparkes and Miyake, 2000; Zander and Kogut, 1995), due to the fact that HRM and KM have become more sophisticated and comprehensive (Gloet, 2006; Yahya and Goh, 2002). In accordance to Dougherty (2001), teamwork creates an image of sharing out the work, which in turn help in the knowledge transfer within a firm. Taking into consideration of such matters, the following propositions have been formulated:

P5: Human Resource management is positively related to knowledge management behaviours (that is knowledge acquisition, knowledge dissemination and knowledge application).

Information and analysis: In the present digital era, information plays an important part in the business operations (Sen, 2001). This component is used to emphasize the significance of data-base information, which is used to help in making more informed decisions (Dean and Bowen, 1994; Hackman and Wageman, 1995). Both Samson and Terziovski (1999) and Malcolm Baldrige National Award Criteria (1999) have make mention that information and analysis lies within the "scope, management and the utilization of data and information, to maintain a good focus on customers, to strive towards a greater quality control and to improve performance of a firm".

In particularly for firms that operate in the technology-based arena and for those that find it difficult to stay afloat in the competitive marketplace, information is seen to be an important element for firms to improve and enhance their innovation process (Lemos and Porto, 1998). According to Hsu et al., (2007), for a firm to stay competitive in the present global arena, it is essential that a firm know how to manage their information and knowledge.

Information and analysis are sensible elements of KM and can be applied to KM behaviours effectively (Hussain et al., 2004). According to several scholars, it plays an essential role in the trend towards KM behaviours and as well to provide support to a firm's KM processes (Wong, 2006; Hussain et al., 2004). It has been suggested by Stenmark (2002) a multi-perspective view of intranet, which would help in the creation of an effective KM culture that can be segmented into different categories: information perspective, awareness perspective and communication perspective. Information analysis facilitates a speedy search of information, recovers information very quickly and enables communication among employees and hence allowing the creation and transferring of KM processes within the firm (Al-Mabrouk, 2006).

Hussain et al. (2004) claimed that information plays an essential part as a mechanism for reflection; an information standpoint on the intranet is highly relevant and applicable for works that have a need for knowledge. From the point of view of awareness, it was propose that explicit information should be exploited to link firm's employees with information and other individuals that might be otherwise missed. A study was done by Hung et al. (2005) on the crucial success factors that involved the implementation of a knowledge management system (KMS) for the pharmaceutical sector in Taiwan. The findings show the importance of an information systems infrastructure in the adoption of a KMS. This implies that large organizations are more prone to notice that a system can be successful depends largely on the quality of information system structure and the capability of its maintenance personnel. From the point of view of communication, Hussain et al. (2004) stated that information analysis helps employees in a firm to collectively interpret the available information by lending support to the different forms of channels for negotiations and conversations, and hence converting such knowledge to benefit the organization as a whole. Hence, the following proposition was made:

P6: Information and analysis is positively related to knowledge management behaviours (that is knowledge

acquisition, knowledge dissemination and knowledge application).

Propositions among KM behaviours

Research done on the associations among KM behaviours such as knowledge acquisition, knowledge application and knowledge dissemination has been few. As for knowledge application, it is well-known as the starting point of the KM process, which relates to the location, formation or the breakthrough of knowledge, which incorporates the tracking down and analyzing the available information and explicit knowledge (Lee and Yang, 2000; Darroch, 2003). Knowledge can be originated from a variety of different sources but associated with a variety of issues an organization is faced. For example, Darroch (2003) posits that knowledge can be acquired from the employees of an organization and thus will reveal an individual's experiences and capabilities. The distribution of knowledge within a firm has been the most discussed about issue in the literature of KM (e.g. Steward and Waddell, 2008). With their knowledge-creation spiral, Nonaka and Takeuchi (1995) have come up with a reasonably structured method to disseminating knowledge. Four forms of knowledge dissemination have been identified: socialization, externalization, combination and internalization (Darroch, 2003). According to Lee and Yang (2000), they have argued that "the best practice to distribute knowledge is through systematic transfer", where an environment is created in which knowledge can be shared (p. 790). As for knowledge application, it simply means the sharing of different types of knowledge in which a company has access to. For example, if the firm has acquired certain knowledge about a client, then it will apply the knowledge within itself. Associated strongly with knowledge application is the quality and timeliness of the firm's response, in which it is portrayed as a representation of organization's quickness and efficiency (Dove, 1999; Darroch, 2003). Darroch further posits that every element of KM behaviour is dependent upon other factors, whereby acquisition of knowledge will come first, followed by knowledge distribution and then response (Darroch, 2003). Based on the existing and previous literature, in which guidance is limited, a positive relationship has been proposed between the three knowledge management behaviours. In other words, an organization with a larger pool of knowledge will be better in its knowledge dissemination and knowledge application (Darroch, 2005). In the same manner, an organization that is well-developed in its knowledge dissemination will be better in its knowledge application (Darroch, 2005). The propositions related to the discussion in this section are:

P7: Knowledge acquisition is positively related to knowledge dissemination.

P8: Knowledge dissemination is positively related to knowledge application

P9: Knowledge acquisition is positively related to knowledge application

THEORETICAL IMPLICATION

This study presents an up-to-date research in the area of TQM and has connotations on both theoretical and managerial perceptions. From the theoretical implications' perception, this is one of the few studies that intends to measure multidimensionality of QM elements and its association with knowledge management. Although many studies has been done on the topic of TQM, those studies rarely stressed on the impact of TQM on know-ledge management. The theoretical model presented in this paper should be able to lay the conceptual base for the insight into the examination of the multidimensionality of knowledge management and TQM practices, which would then lead to more in-depth research in the area of TQM. This paper also aims to draw out further exploration by other fellow researchers into a more detailed research on the correlation matrix between TQM practices and knowledge management. Hence, this study further encourages more advanced research to be done on TQM and KM and to provide a clearer understanding of the link between TQM and KM behaviours to the quality management practitioners and academicians. To add on further, this study with its relatively new theoretical model, could also gather the attention of other researchers. Further research is anticipated to be carried out in different countries or in different industries using the conceptual model, to study the effects of TQM practices on KM behaviours and then to further explore into the measurement of the TQM change.

MANAGERIAL IMPLICATION

This research has shed some light into some practical implications for firms that plan to implement KM into their organizations, whereby the firms will be able to gauge the effects of TQM practices and the KM processes. Firstly, if top management has the intention to execute TQM practices, they can find some useful insights in this article. Second, the effects from any six constructs of the TQM model can cause different implications on the KM of employees at different levels of the organization. Third, this study has proven that when an activity or task is carried out to achieve a certain objective, this task or activity might transform into some other company's objectives. For the role as a predictive model, this study can also assists us by informing us of the shortcomings when a particular strategic TQM programme is implemented, which might have a negative effect on the results for KM. Hence, the different types of influences from TQM practices can be examined upon more easily by the management when they plan or carry out the organizational process. Therefore, it can be summarised that this conceptual model can provide a foundation for the practi-

tioners to implement their TQM programmes more effectively and efficiently in their firm.

Much have been proven that knowledge acquisition, knowledge dissemination and knowledge sharing are the main factors in knowledge functioning for any organization, hence, it is very important for the management to explore the effects of TQM implementation on KM programme. This proposed model is recommended to be useful in assisting senior managers of TQM companies who intend to enhance their KM capabilities. With an improved comprehension on the relationship between TQM and KM, senior managers can better understand and identify the competitive KM capabilities.

CONCLUSION

Undeniably, TQM and KM contribute significantly to the improvisation of performance for any organization. The proposed model in this study seeks to close the gap in the literature for the assessment of the multidimensionality of TQM and its association with organizational KM. Furthermore, this model seeks to advance the literature regarding the relationship between TQM and KM research and at the same time, to provide a means for both the practitioners and the academicians to better comprehend the link between TQM practices and KM behaviours. Apart from that, this paper propose this model to be used for the implementation of TQM practices and also to measure the organizational processes such as the effectiveness of strategic planning, leadership, process management, customer service, human resource management and the employment of information analysis. The initial study on the model, which is to examine the link between TQM practices and the KM, has led to further studies on the six dimensions of TQM, which are known to be important attributes to the KM management. As for improvements, further surveys and research should be done using the multivariate analysis to test, validate and enhance the model. Currently, the questionnaire to collect data from manufacturing organisations in Malaysia is being designed, in order to confirm the proposed model shown in Figure 1 and its propositions listed above. The results obtained will be reported in a future article.

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