1. Introduction

1.1. Purpose and significance of study

Quality management had been around for decades, alongside with the robust growth of manufacturing and globalization trend. With the need for cross borders transactions growing, quality needs to be constantly monitored to ensure the standardization of product and service quality. Under such prerequisite, quality compliance becomes a need. Quality is also becoming the only way to survive the increasingly competitive red ocean market. Managing with quality becomes an essential art that is crucial for the survival of the organization, and also as the only way for the organization to grow and mature. Hence the growing need for embrace of quality management practices, and to constantly understand where does the organization stand in levels of implementation for quality management practices from time to time.

Embracing quality management means many new ways of doing old things; it means changes, lots of them. How ready the organization is for change is determined by the culture of the organization. In fact, the culture of the organization predetermine whether would the organization initiate its attempt to monitor and pursue the quest for quality. The concept somehow resembles the egg and the chicken theory; there is no way of telling which had really come forth first. Hence, organizational culture would continue to make a difference affecting how well could the organization mature further in their quality management practices, and how effectively do they convert all these effort into significant progress on their output performance. There is an additional interesting perception to this trend of constant pursue for maturing the quality management

practices of an organization, the fact being there is no real ending of this quest. It goes on. The organization had to be constantly reshaping itself to poise its best for the market. There is always a better way, much more effective, further done in a more efficient manner and method, for a better result.

This is where innovation comes into the big picture of continuous improvement for quality management. Mere compliance of quality is no longer sufficient for survival, to be able to survive, real growth is imperative. However, the question is how well does the quality management practices nurture innovation and further encourage its bloom? In other words, how effective do quality management practices contribute to the capability of the organization to be innovative? Does great performance and high maturity in quality management naturally leads to great innovation performance in the output, be it operationally or financially?

1.2. Research questions & research objectives

1. What is the level of implementation for quality management practices among Malaysian manufacturing companies that are ISO 9000 certified?
2. How much would quality management practices influence the organizational performance, in terms of innovation and quality performance?
3. How would organizational culture influence the relationship between quality management practices and organizational performance of the organization?

The objectives of this study are to:

1. To investigate the level of implementation for quality management practices among ISO 9000 certified manufacturing companies in Malaysia.
2. To investigate how much would quality management practices influence organizational performance in terms of innovation and quality performance

3. To investigate how organizational culture would influences the relationship between quality management practices and organizational performances.

1.3. Scope of the study

This study would investigate the level of implementation for quality management practices amongst manufacturers in Malaysia that are ISO 9000 certified. The relationship between quality management practices with organizational performance would also be scrutinized. Simultaneously, organizational culture would be investigated to unearth its influence as a mediator (if any) between the practices of quality management and its output on organizational performance. Organizational performance would then be split into innovation performance and quality performance, and their relationship with quality management practices and organizational culture would be observed.

1.4. Organization of study

This write up would commence with the introduction to the topic, presenting its scope and purpose, and phrasing the research questions effectively for the benefit of clear topic view.

Next, literature review would begin with the introduction of quality, shaping further into the trends and current waters of quality management practices, delving deep into the development of measures for quality management practices, and blooming into the observation on performance measurement operationally. Meanwhile, trends of organizational culture linked with organizational performance would be placed under minuscule observation, in attempts to reveal the development of studies that had been done on organizations that had made an effort in quality management practices within their organization. Finally, the

justification for quality management practices in terms of business results (operational performance) would be presented lengthily. This would be further enhanced by the facts of innovation performance by organizations that had embraced quality management practices.

The research methodology would further see the development of hypothesis for this study, justified by supporting literatures in previous chapter. Measures selected would be based on extensive reading and shortlisted to the most effective ones. Sampling design, data collection and data analysis would follow the trend pictured in the literatures on studies done previously.

Once research methodology had been dished out, the results would be summarized statistically, measures further analyzed, hypothesis tested, and results discussed efficiently with the relevant support of literatures.

This write up would end with conclusions of the study, further indicating its limitations and suggestions for future research, not forgetting to state the implications offered by this study towards the general development of this study in its broad context.

2. Literature Review

2.1. Quality, its introduction

Quality itself is a big word that would cover many different dimensions. Hence there is no definite one-stop definition for Quality, except for the simplified version finalized in the 1980s in United States generally: “Quality is meeting or exceeding customers’ expectation”.

On the other hand, the official definition of quality, back in 1978, by American National Standards Institute (ANSI) and American Society for Quality (ASQ), was “Quality is the totability of features and characteristics of a product that bears on its ability to satisfy given needs.” One could easily conclude that the former one mentioned here, simplified in 1980s is a much easier and all encompassing definition given the stark simplicity of it.

David A. Garvin (1984) had gone on to further elaborate the various dimensions of quality. He stated 8 principles of quality dimensions, namely performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality.

Further on, there are three levels of quality, namely organizational quality, process level quality, and performer quality. These three levels differ in scopes of level of management, individuals and tasks (Brache and Rummler, 1988). The interesting part lies in the fact that quality management of an organization is at its most effective when quality is directly tied to the strategic level of an organization, namely, organizational quality level (Bayo-Moriones & Cerio, 2003).

2.2. Quality management

In quality management, there are components that form the whole picture, critical factors, tools, techniques, and practices. To guide the implementation of this whole set of components, frameworks containing these components had been developed into improvement programs. There had been many continuous improvement programs around, and the numbers keep increasing in decades, increasing and evolving from the existing ones. The most well-known frameworks are under Total Quality Management, Six Sigma, ISO 9000, Malcolm Baldridge National Quality Award (more often referred to as Baldridge, or MBNQA), Deming price, European Quality Award (EQA), Canadian Awards for Business Excellence, and Australian Business Excellence Award (Evans & Lindsay, 2005). Although there are so many frameworks available, guided by the awards named earlier, the basic fundamental idea is still the same, managing quality as quality management, throughout the organization, inward and outward, whatever the guiding framework may be. The word framework might not be as applicable in other studies, as they tend to utilize other terms. Still, the basic idea prevails. Tummala and Tang (1996) observed and compared quality management, Malcolm Baldrige, European Quality Awards, and ISO certification. They have a few intriguing conclusions that is relevant to our discussion here, that is, MBNQA, EQA and ISO are all results' based awards. The main purpose of their existence is to promote the awareness towards quality, and to heighten competitiveness of those that are awarded, though their focus points and strengths would differ from point to point, nevertheless, it is quality management all the same.

Interestingly, Magd and Curry (2003) had actually taken the trouble to prove the compatibility between TQM and ISO9000, they found TQM a way of getting started and ISO9000 could be built upon what TQM had initiated in the organization, and vice versa. Tari (2005) elaborated how the different guidelines for different awards work. To get firms started; they could aim at ISO9000 first, and get their hard part of quality management tools developed. If they are satisfied with just the hard part component of quality management, they would have remained there. However, if they wish to grow more, improve and implement quality management further, they could refer to the EFQM model as it would guide them more in improving their competitiveness and to grow further. Ultimately, the total quality management concept is when the whole firm is immersed in the culture of continuous improvement, then only are they ready for the next stage evolution of innovation.

Kannan and Tan (2005) had come from the angle of improving operations performance, acknowledging quality management as one of the three musketeers, the other two being supply chain management and just-in-time management. The interesting reminder here would be supply chain and JIT are actually management systems that focus more on the big picture flow, where managing external sources are also part and parcel of the management system, which is not as extensively covered in quality management itself. However, the differences in form of focus had not seemed to affect the correlation between these three practices, as organizations had agreed upon the importance and close relationships of all these three practices as an indispensable part of their operational strategy. Talib, Rahman and Qureshi (2011) reviewed that the six major TQM practices are top-management commitment, customer focus, training

and education, continuous improvement and innovation, supplier management and employee involvement. Their six major supply chain management practices identified are customer relationship, material management, strategic supplier partnership, information and communication technologies, corporate culture and close supplier partnership. The TQM and SCM practices do not clash, but seemed to allow for complementally synergy relationship. Hence, joined forces between a high dedication to quality and thorough understanding of supply chain seemed to be able to maximize the effect on business performance, as proven in Kannan and Tan's research in 2005.

Quality had been defined extensively upon its importance of existence. On the other hand, at the condition when a management is lacking of quality, there would be a severe compromise in its consistency of standards. Such was the case mentioned in Low and Omar's study in 1997 for construction industry in Singapore. At that time, quality management practices are still at dawning stage for this industry, hence, the paper mentioned the setbacks that had caused difficult implementation and slow pick up for quality management effort. They had specifically mentioned the crucial need for top management support to embrace quality management practices in order to initiate and integrate the culture and innovative efforts needed. Technical side of quality management could not reap maximum result for the firm if the essential factors of TQM in terms of communication and coordination, teamwork, employee participation, training, motivation, and feedback are not integrated into the mainstream operation system of the firm. However, it is interesting to note that the importance of leadership and culture had only been mentioned in Low and Omar (1997)'s

conclusion and not embedded as part of the essential dimensions of TQM suggested earlier.

Calantone and Knight (2000) confirmed in their studies that product quality does play an essential role in deciding firm's performance, alongside with other factors such as international market orientation, technical reputation, and generic strategies. However, product and service quality is just the outcome from the organization, in which it would be measured as a performance output; the process journey that had resulted in the quality of the product is the gist that needs to be worked upon, thus the term quality management. Kull and Wacker (2010) further echoed this by proving that quality management practices would significantly affect quality performance, giving products with improved quality.

Even though quality management had been extensively studied since its initial offer to the world, but like how Dale & Wan (2002) had put it, continuous improvement itself is something that is continuous and should not come to an end. Hence the continuous proposal of researching the impact of quality management repeated from different angle, and from improved perspectives to gain better understanding of the current scenario that is happening in the present.

Petroni *et al*, 2003, had mentioned the benefits in embracing TQM for the R&D departments in two Italy laboratories, stating a significant increase in R&D productivity throughout the years. He mentioned that this is the most desired result for the companies as the critical factor for success was indeed in the development of products and innovation in their processes led by R&D.

2.3. The development on measures of quality management

Measurements would allow for quantifying the performance dimensions of products and services involved. The measures and indicators resulted from measurement are all numerical information derived from the processes involved in producing the targeted product or service. Information derived properly, with faithful and strategic collection, would allow for a proper reflection of what is and as is condition of the processes and product. The type of information would differ according to the tools used, depending on the angle that the tool would reflect, the stage of processes and sources of information collected (Evans & Lindsay, 2005). Then, the tool developed would be subjected for validation on the criteria of unidimensionality, convergent, discriminant and predictive. (Rao, Solis, & Raghunathan, 1999)

Previously mentioned in the introduction, there are three levels of quality, individual, processes, and organization. At each level, the strategic value of information would vary. By focusing on control, diagnosis and planning at each level, it is bound to reveal angles and information that is unique to that level (Brache and Rummler, 1988). The scopes of quality and operational performance information includes customer, financial, and market performance, human resource measures, supplier performance measures, and company specific measures (Evans and Lindsay, 2005). There are measures of quality management in terms of its practices, namely statistical control and feedback, product design process, process flow management and top management support (Arumugam and Ooi & Fong, 2008; Flynn *et. al.*, 1994).

Yet, all these specific measurements of different level and different scopes department had only caused fragmentized views of quality for the organization. It does not answer how the organization fares as a whole single unit in terms of

quality management. These shortages of information and overall measures had led to pursue in studies of overall quality management measurement. Back then in 1989, Saraph *et. al.* developed an instrument to overcome the obstacle of never being able to effectively measure the development and gradual achievement of quality management on its own context. They had aimed this specific development at the capability to measure quality measurement to the stage of organization as a whole, instead of micro-analyzing the groundwork issues. Hence the proposal of 8 critical factors (containing a total of 78 items), namely:

- The role of management leadership and quality policy
- Role of the quality department
- Training
- Product/ service design
- Supplier quality management
- Process management/ operating procedures
- Quality data and reporting
- Employee relations

After Saraph *et al* (1989), Badri *et al* continued the challenge in 1995, further replicating the study's framework to further validate the effectiveness of the instrument developed. Badri *et al*'s study had been conducted on 854 firms in United Arab Emirates, in contrast with the original location set-up of Saraph *et al*'s study, which was developed and conducted on grounds of United States. In Badri *et al*'s study, the total number of items for the 8 factors had been further refined to 66 items, as opposed to the original number of 78 items. Although

Badri had mentioned the reason for this move is to further refine measures for each factor, there is a possibility of geographical culture difference at play here, since United States and Arab Emirates are not exactly within the same neighborhood. Quazi, Jemangin, Low and Chin (1998) tested out Saraph *et al* (1989) in Singapore on 33 manufacturing and service firms. They had confirmed this measurement instrument to be a consistent and reliable tool.

1999, Rao *et al* had mentioned the need for the development of a valid instrument to quantify quality management practices that could be used across country borders as well as being simultaneously practical and academically sound. They had went on to base their construct upon Malcolm Baldrige categories, and further develop items to measure each factors from there through extensive review of quality literatures and further confirmation by quality professionals in industries to ensure the unambiguous nature of the survey items developed. They went on to demonstrate their instrument's "content validity, unidimensionality and reliability, discriminant and predictive validity", and to extensively proof their external validity by testing this survey on India, China, Mexico, Taiwan and US.

In 2008, Kanapathy had reviewed critical and extensive literatures on quality management measurement, thus short-listing the eight critical factors of quality management practices, mainly extracted from Saraph *et al* (1989) and Rao *et al* (1999). The eight factors are top management support, quality information availability, quality information usage, employee training, employee involvement, process/product design, supplier quality, and customer orientation.

Yang *et al* (2003b) had further tested these eight factors in Taiwan's semiconductor manufacturing industries and mentioned that the most significant quality management practice that is related to performance significantly is on time delivery performance. In 2008, Lin and Jang investigated the degree of quality management integration in Taiwan again by accessing the success of ISO implementation. This round they discovered that top management support is significantly linked to quality planning and employee involvement. Then quality planning has a strong significant indicative strength while employee involvement has a weak one for continuous improvement. Continuous improvement significantly affects operational performance, and operational performance significantly affects business performance. There had indeed been a significant progress in quality management practices trend for Taiwan.

Next to Taiwan and Hong Kong, Li, Anderson and Harrison (2003) explored the degree of integration for quality management practices in China, focusing on firms up north, with groups divided into different types of ownership, namely privately owned enterprises, state owned enterprises, and joint ventures. The highest scores went to privately owned companies and joint ventures, while the state owns scored badly. Their key indicative elements had been shortlisted after referring to a few researches before hand, including Saraph *et al* (1989), included are leadership, quality vision and planning, process control and improvement, production design, quality audit and evaluation, supplier quality management, education and training, and customer focus. The firms were asked to rate the extent as to how much each dimension is present at their firms.

Samson and Terziovski (1998) had a shorter list to critically measure total quality management. On their list was leadership, people management, customer focus,

strategic planning, information analysis and process management. They mentioned that they had followed the guide listed in the Malcolm Baldrige National Quality Award (MBNQA) established in 1987, however according to them previous studies had failed to yield a workable significant relationship between the MBNQA itself with practical organization performance. Arumugam *et al* (2009) had also used the list by MBNQA, adding in the factor of supplier relationship into the construct. Their study had revealed that all seven factors could significantly impact business results, and with high correlation relationship too. Their eight business performance measures were chosen from MBNQA too – customer satisfaction, work process improvement, supplier quality improvement, financial and marketplace performance, employee satisfaction, achievement of strategic goals and aspects and regulatory requirements compliance.

In 2002, Chin, Tummala and Chan had conducted a study in Hong Kong, examining the local manufacturing industries on their quality management practices based on the seven core elements in total quality management. The study had been mainly to test the climate of quality management at that time in that location. The outcome of the study had clearly showed the already well developed core quality management practices and the cores that needed more work and effort in further development. Their seven core elements are customer focus, leadership management, strategic quality planning, design quality, people participation and partnership, fact-based management, and last but not least, continuous improvement. Their study revealed the contradictory between the highly perceived to be important factors and the highly practiced factors of quality management practices, further stating that those factors are not the same for the former and latter cases. There is a gap that Hong Kong Manufacturers would like

to fill, as they believe that there is still plenty of room for improvement in their quality management practices.

In Hong Kong, 2003, Lai and Cheng used Black and Porter's (1996) 10 TQM factors comprising 32 items to measure their quality management implications across different industries. The noteworthy part is they had refined Black and Porter (1996) framework by splitting some items into two items as they see fit, resulting in a 10 factor 39 items measurement tool. Their 10 dimensions differed from the core elements used in Chin, Tummala and Chan (2002), theirs are people and customer management, supplier partnerships, communication of improvement information, customer satisfaction orientation, external interface management, strategic quality management, teamwork structures for improvement, operational quality planning, quality improvement measurement systems, and corporate quality culture.

Conca *et al.* (2004) had identified 8 measures of critical factors for Total Quality Management, namely Leadership, Quality planning, Communication, Training, Specialist training, Suppliers management, Customer focus, Process management, Continuous improvement and Learning. After stating these 8 measures, Conca *et al* (2004) had gone on to state the weaknesses of these quality management measurements, stating that these are but perceptions without taking financial factors and measures into its study. Moreover, they further clarify that this relationship between quality reflected through the quality management measures and the actual cause for the performance might not be absolute. Having further stated, the introduction of TQM might not be the cause for the performance; the relationships might have just existed plainly since some

fundamentals of TQM are indeed fundamental activities for any well-organized organizations.

Conca *et al* (2004) further attempted to develop measures for assessing quality management in certified firms. Their study had been conducted on firms that are being certified in ISO 9000, concentrating on those located in Alicante area of Spain. They had referred to those researches done by Saraph *et al* (1989) and Badri *et al*(1995), yet had proceeded to further outline their own sets of critical factors which affects quality management, guided by guidelines in the European Foundation for Quality Management. The eight factors that had been identified are leadership, quality planning, employee management, suppliers' management, customer focus, process management, continuous improvement, and learning. This research had highlighted an interesting point about firms' sizes for data sourcing in the previous studies mentioned that had attempted in similar exercise of outlining the critical factors for quality management evaluation.

In year 2004a, Prajogo and Sohal had empirically examined whether would TQM, multi-dimensionally, be able to determine significantly quality and innovation performance. The study had aimed at studying TQM in a multidimensional manner, breaking the factors into dimensions of either mechanistic or organic. Mechanistic TQM dimensions include strategy and planning, customer focus, information and analysis, and process management. Organic TQM dimensions are leadership and people management. Prajogo and Sohal did remind that though grouped under dimensions, each factor within the same dimensions are still unique and does not resemble the other factors grouped together with them. In 2006, they validated the multidimensionality of TQM traits again across borders with Singapore, further confirming that TQM could be divided into

mechanistic and organic categories, and capable to produce significant relationships with quality and innovation performance (Jiang Feng, Prajogo, Tan, & Sohal, 2006).

The critical factors of total quality management practices in Turkish textile industry had been shortlisted by Demirbag *et al* (2006). On the list, there are only seven factors, containing the shortlisted items of 20 from the original 30. The original 30 items had been based on Saraph *et* al (1989). Those seven factors are quality data and reporting, role of top management, employee relations, supplier quality management, training, quality policy, and process management.

Karuppusami and Gandhinathan (2006) did a Pareto analysis to reveal the list of critical factors that decides the successful integration of TQM in organizations. Their study covered 37 articles of TQM in scale development studies and studies that had observed correlation between quality, business performance and operational performance, in which the variables' validity and reliability of Critical Success Factors (CSF) had been tested. They had pooled all factors for quality management mentioned, and had come up with 56 CSF of TQM arranged according to the order of criticality. The top ten factors on the list are the role of management leadership and quality policy, supplier management, process management, customer focus, training, employee relations, product, quality data, role of quality department and human resource management and development.

Fotopoulos and Psomas (2010) went back to the basics to investigate which part of TQM factors would impact which part of organizational performances. Their TQM construct contained quality practices of top management, employee

involvement, customer focus, process and data quality management, and quality tools and techniques.

Breja, Banwet, and Iyer (2011) highlighted three highly applicable award frameworks in quality management practices assessment, namely Deming Application Price (DAP), Malcolm Badridge National Quality Award (MBNQA) and European Foundation for Quality Management (EFQM) excellence model. Their research focus on how effective is DAP in influencing business performance in India context, whereby the method of research is of qualitative results with data gathered through interviews and literature reviews.

Das, Kumar and Kumar (2011) had Thai manufacturing industry under scrutiny for investigation on how leadership competencies would affect TQM implementation within organizations and finally on their outcome in terms of product quality. They found out that different levels of leadership competencies would affect differing factors of TQM that could significantly predict product quality, in which there are indeed differences in factors involved. When leadership competencies are on the high, customer focus, continuous improvement, employee involvement and supplier quality management would lead to a significant relationship with product quality. When there are low competencies in leadership, then product quality could be significantly predicted by top management commitment, customer focus, and product innovation.

Fisher, Elrod and Mehta (2011) went on to differ from the norm of using TQM factors or the quality management factors like others did. They validated and improved a measurement instrument using Deming's 14 points. The origin of their measurement scale was from Tahimi *et al*'s study in 1995, consisting of 56 items.

They found that there had not been any significant difference between the mean values of Tahimi *et al* studies with their current one, hence it had been concluded that both studies echo each other without conflict. There had been two points that were unreliable in the former study, and continue being unreliable in the latter's study, and those two points had been suggested to be further improved.

2.4. Quality management and business results (performance measurement)

When it comes to business results, profitability performance could be used as an indicating factor to determine how well had the management performed in managing its quality. However, profitability is an end result that also involves the product life cycle, market sentiment and consumer behaviors, and therefore could not be the absolute yardstick of judgment for the success of quality management. Profitability could, however, be a reference point when connected with other factors collectively, to reflect on the financial well-being of the organization. For example, Maiga & Jacobs (2006) had used profitability improvement percentage as one of the indicators to reflect how much had the organization gained profitability wise. Their other indicators included quality improvement and relative cost improvement. Their aim had been to link up quality improvement with its financial consequences.

Angell and Chandra (2001) had traced performance results through sales revenues, manufacturing and inventory costs, and, quality failure costs in the quest to better guide quality investment program. However, looked closely, Angell and Chandra's study had taken rework and scrap costs, be it internally or externally, as part of the indicator to reflect the performance of a quality management system. This conflicts with Yang *et. al.* (2003b)'s research that

discovered quality management practices having no significant correlation with rework rate whatsoever. Interestingly, Samson and Terziovski (1998) had also taken in rework cost as part of its research data, but under the factor of delivery performance within the item cost of quality. This had allowed the role of rework cost as an individual causal factor to be tremendously downplayed in their research. Samson and Terziovski's (1998) had taken customer satisfaction, employee morale, productivity, quality of output and delivery performance as their performance measurement for TQM practices of organizations, in which to say, financial measurements had only taken up a very small fraction in the means of measuring quality management practices in their study.

Demirbag *et al* (2006) investigated the relationship between TQM factors, non-financial performance and financial performances. The pattern discovered was that direct relationship between TQM factors with financial performance had been significant yet weak, only when the non-financial performance serve as a mediating factor that there is a significant strong relationship linkage between TQM factors and financial relationship. Needless to say there had been a significant strong relationship between TQM factors and non-financial performance.

Macinati's (2008) research had echoed Demirbag's (2006) result that the quality management efforts had not been significantly linked to financial performance. He had surveyed the healthcare industry in Italy, and realized that quality management variables were significantly linked to the outcome subjective performance variable. This variable contains items of in-patient satisfaction, market orientation and reputation among stakeholders, and sounded more like an operational performance for service industry.

The measurement of quality management discovered by Saraph *et al* (1989), further sharpened and fitted by Badri *et al* (1995) had been limited to perceptual measures of grouped individuals and on the extent of quality management practices been applied (Baird *et al*, 2011). To date, this method of measurement had been adapted in many countries under many forms of studies further elaborated below, and it had proven its reliability as an effective measurement of quality management practices that is based on non-financial yardstick.

Lai and Cheng (2002) had measured quality outcomes with a multi-model performance framework (MMPF) by Weerakoon (1996), consisting of four dimensions, that is employee motivation, market performance, productivity, and impact on society. These were perceptual measures with a five-point interval scale, and the data was collected for over three years prolonged period to reveal the trend of the firms' strategy.

Kaynak went through a hyper detailed research in 2003, where she had went through the trouble of seeking the relationships between the factors of TQM with firm performance. The effort was not easy as the dimensions are all allowed to express their own relationship with the related firm performance respectively. The direct and indirect relationships had all been properly observed and listed out in her research. She restated the interdependence among of all TQM factors within her study, allowing further research on this field to trust upon the again proven assumption of TQM's interdependence.

Fotopoulos and Psomas (2010) had organizational performance measured by quality improvement, market benefits, customer satisfaction and protection of natural and social environment. Results showed that quality improvement is

significantly influenced by process and data quality management and employee involvement in the overall big picture of quality management. Then, process and data quality management and employee involvement has a primary causal relationship with adopted quality practices by the top management and also quality tools' application.

Prajogo and Sohal (2004b) measured quality performance of an organization through product quality, product innovation, and process innovation. Such measured aimed to reflect the company's competitive strategy in satisfying customers' needs with their product through continuous innovation. In 2011, Prajogo continued his research with McDermott on relationship between multidimensional organizational cultures with performance. The performance measurement in this study was similar to the 2004b studies, namely product quality, process quality, product innovation and process innovation. The only addition was process quality. The difference between the 2004b and 2010 studies were that the former looked at organizational performances from the angle of operational strategy, while the latter from the angle of organizational culture.

Arumugam, Ooi, and Fong (2008) set up their research framework to investigate the relationship of total quality management practices with quality performance. The TQM practices have mainly 8 factors, namely leadership, process management, information analysis, customer focus, supplier relationship, quality system improvement, continual improvement, and people involvement. The quality performance itemized perceptions of their performance of quality when compared to competitors and industry norms. The study revealed a positive significant relationship between the TQM practices with quality performance.

However, individually, only two factors have a significant relationship with quality performance, namely customer focus and continual improvement.

Further on within the same year of 2009, Arumugam and Ooi, together with Chang and Teh set up another research to investigate a case study on a local USA based manufacturing company on their total quality management practices. Their self assessment of TQM practices had seven factors, namely leadership, strategic planning, customer focus, information analysis, people management, process management, and supplier relationship. Their business performance is measured with eight factors, namely customer satisfaction, work processes improvement, supplier quality improvement, employee satisfaction, financial and marketplace performance, achievement of strategic goals and objectives, and regulatory requirements compliance. These eight factors are adopted from Baldridge National Quality Program (2002) since it had already had an established framework to measure business performance.

Since BNQP had been mentioned, it is best to take note that Malcolm Baldrige TQM model is from USA, Deming Model is from Japan, and EFQM model is in Europe. The models themselves are guidelines for these awards certification respectively. Interestingly, the quality awards themselves do not guarantee the profitability of the firms that were awarded. Corredor and Goni (2010) investigated the relationship between quality awards and firm performance, financially. Trends discovered were, pioneers of awards are usually those that had already had a high level of effective quality management, in which they operate well within the framework and guidelines accordingly to the awards. This leader category itself records highly significant relationship between obtaining an award with the profitability level of their company. Those that do not have such

sound management system, the followers' category, did not have a significantly different level of profitability after being awarded.

There had been an interesting input of categorization forwarded by Fotopoulos and Psomas (2009) based on Vouzas and Psyhogious (2007). They had TQM under two main categories, namely soft and hard. The ten TQM dimensions that had been repeatedly coined throughout this section is referred to as the soft TQM, where as the hard ones points to quality tools and techniques. Thinking it through, the necessity of including quality tools and techniques as part of the quality management assessment factor does sound logical, the hardware of computers need the essential software within it to be able to function, and software without hardware is not any good to anyone. Ahmad *et al* (2005) had echoed this by concluding that quantifying quality effectively is the fundamental step in effective quality management. Tari & Sabater (2004) insisted upon its simultaneous development with soft TQM to reap the maximum benefit from quality management practices, and had it proven in Spain. Vouzas and Psyhogious (2007) had gone on to prove that the strength of the firm's market position and rate of quality improvement is primarily influenced by first the "soft" TQM, then, the "hard" TQM.

2.5. Quality management, organizational culture and innovativeness

Organizational culture is a set of collective norms that fundamentally rules the running of an organization by governing directly its people (Irani, Beskese, & Love, 2004). It is based on the historical background of an organization and also its phases of development. The culture would help ascertain the present climate of an organization, deciding the ambience of the organization in its day to day

operation. When changes occur, such as the organization embracing quality management, it would have to embrace a new set of cultures and practices that might not cohere well with the current present within the organization, thus the challenge of such change (Sopow, 2007). There is a deep inherent need for the influences of organizational culture on the implementation of quality management practices to be studied. Further on, the outcomes resulted from the relationship between culture and QM practices would need to be observed, financially and operationally (Zu, Robbins, and Fredendall, 2010).

Yet, once successful, the implementation of a quality program would help significantly turn around the organizational climate, having worked through its fundamental culture with quality management. Such was the case as how Kunnanatt (2007) had discovered in his study with organizations that are having such struggle with their non-productive organizational climate. In Petroni *et al* (2003) case, adoption of TQM practices had been overcome by strong top management leadership and also intense training courses for those involved in the working process. In other words, the culture is infiltrated forcefully top down and also through the alteration in attitude and daily working routine.

Organizational culture dimensions that favor the implementation of quality management are empowerment, centralization, hierarchy, flexibility, formalization, innovation, teamwork and finally communication. (Pun & Jaggernath-Furlonge, 2009)

Srivastav (2010) listed organizational culture and organizational climate as two different dimensions. The culture dimension contained 8 values: openness, confrontation, trust, authenticity, proactivity, autonomy, collaboration, and

experimentation. Organizational climates contained achievement, expert influence, extension, control, dependency, and affiliation. According to Srivastas study in 2010, the implementation of ISO 9000 had made a significant difference in both organizational culture and climate. Therefore this had indirectly acknowledged the fact that there is a significant difference in organizational culture that would lead to making a significant difference in organizational performance.

Zu, Robbins, and Fredendall (2010) inspected the relationships between four dimensions of culture with the implementation of ten TQM or Six Sigma factors. The four dimensions of organizational culture used are group culture, developmental culture, rational culture, and hierarchical culture, namely the CVF model by Quinn and McGrath (1985) as mentioned by Zu, Robbins, and Fredendall in their 2010 study. According to their discovery, the four dimensions correspond with different factors of the quality management practices respectively. The relationships are interesting for some detail prowling, most noteworthy one would be rational culture that is related to nine out of ten TQM/ Six sigma factors, second in place is group culture, seven out of ten. Hierarchical culture is the only one that doesn't seem to have any relationship with any of the quality management practices, in which it is itself a terrible culture which hampers productivity and creates a de-motivating ambience at work.

In their conclusion, Zu, Robbins, and Fredendall (2010) did take note of one crucial point for organizational culture, that it is rare for the organization to consist only one culture within itself, and that the norm lies in the fact that an organization would usually contain a cocktail of cultures, all interlinked within. Skerlavaj, Song, and Lee (2010) took this concept one step further, stating that there would always

be a more dominating culture among the mixture of cultures within an organization.

Skerlavaj, Song, and Lee (2010) had conjured up a set of organizational learning culture (OLC) which is based on elements of organizational learning process, namely information acquisition, information interpretation, behavioral and cognitive changes. The OLC contained within itself aspects of four different types of cultures – group, developmental, hierarchical, and rational. This OLC would be tested against innovativeness which would include innovative culture (moderating independent variable) and innovations, administrative and technical types (dependant variable). The output revealed OLC having a strong significant positive relationship with both innovations. Once mediated by innovativeness (culture of innovation), the relationship between OLC and innovations is moderately positive.

The culture profile of an organization had been found to have a causal effect on the integration level of total quality management practices, further reflected through the measurement of operational performance (Baird *et al*, 2011). In Baird *et al*'s (2011) study, operational performance had been on inventory management performance and quality performance. Organizational culture measurement had been measured in terms of business unit culture, covering 5 factors namely outcome orientation, attention to detail, stability, teamwork/respect for people, innovation and aggressiveness, containing a total of 25 items. The culture factor of teamwork/respect for people was significantly related to the three out of four quality management dimensions, namely quality data and reporting, supplier quality and management, and product/service design. It is to be noted that innovation (of cultural dimension) was actually significantly related to supplier

quality management, suggesting that innovation is not only an internal issue, but is more of a supply chain issue which would directly involve the higher stream of business.

Organizational performance had been linked up with organizational culture, where Prajago and McDermott (2011) had investigated and proved to be true. Their organizational performance had been measured in different terms of product quality, process quality, product innovation and process innovation. Organizational culture measured 4 scales (group, developmental, hierarchical and rational) with a total of 15 items, of which each scale is itself a unique type of organizational culture. The main purpose of the study is to aid identification of suitable culture dimensions that correlate with company strategy (and the results it would want in the long run), to further develop and enhance it.

Organizational culture determines the willingness of an organization to go through organizational learning stage together as a whole unit. With such attitude would innovation be possible, and that the organization could have the extra edge in embracing innovation and to move aligned to it to be competitive. In other words, for the organization to survive in this increasingly competitive environment, innovation is a necessity, and organizational culture is the only way to manage it. (Skerlavaj, Song, & Lee, 2010).

2.6. Quality management and innovation performance

Yoshio Kondo in year 2000 wrote an article debating the issue of innovation versus standardization. As we all know, quality management is majorly about standardization, with that trend in full swing development that had left a huge vacant space for us to ponder would that hamper and kill off any seedlings for the

chance of innovation. Kondo begged to differ in his paper, stating that standardization and innovation complements each other, and that the standardization should be based on the concept of “mandatory aim, optional methods”. He went on to demonstrate the best method to encourage standardization and at the same time maximizing the possibility and chance for innovation by giving freedom to workers to discover their best efficient and effective way of working method after giving them basic training, shared with them experience knowledge and clearly communicated expectations in work goals.

Prajogo and Sohal (2001) initiated a formal discussion of whether would total quality management have relationship with innovation. Their discussion had aimed at three reasons, to investigate would TQM be relevant to innovation in terms of management, to decide whether TQM would be resourceful for innovation purpose, and to further acknowledge and clear out the contradictions for the relationship between innovation and total quality management.

They further summarized the contradictory arguments about the relationship between TQM and innovation. The summary focused on three main elements of TQM, namely customer focus, continuous improvement, and finally, teamwork, empowerment and involvement, spelling out both the positive and negative states of views.

In customer focus, the positive argues that TQM would readily allow firms to be innovative for they need to constantly search better way to fulfill customers’ needs and to further exceed their expectations. Along the lines of the same element of customer focus, the negative argues that TQM caused firms to be

reactive to customers, further stopping them from wandering into the blue ocean markets, blocking them out from introducing radical first movers, and couldn't tackle the issue of market turbulence and discontinuity.

On continuous improvement element, the positive argues that it encourages change, innovation, and instills creative thinking into the inherent ways of doing things within the organization. the negative begs to differ by taking TQM as a handcuff of its own nature, limiting innovation caused by its efficiency at all times, thus avoiding the possibility of slacken resources which could spark innovation to create new ways of doing things. They further argue that TQM causes ambition in incremental improvement hence spawning culture of not being ambitious and mediocrity in problem solving, with standardization killing the sense of adventure in completing tasks with different methods causing possibility of a better outcome, further freezing organization's flexibility by maximizing routines and regulatory standards, and blocks out double loop learning favoring the single loop.

In context of teamwork, empowerment and involvement, TQM would positively in nature allows people to communicate much more effectively, being less held down by fixed rules and technicalities, allowing them high degree of innovation. Negatively argued, TQM was accused to have pre-imposed structures and boundaries for the employees, being limiting in empowering them, allowing only petty scale of improvements and merely being involved in execution and not fully empowered to take charge of the unknown challenges. Group structure holding TQM as sacred would hamper any hints of individuality in entrepreneurship and creativity that is fundamental for innovation and inventions.

After the negative and positive arguments, Prajogo and Sohal (2001) went on to propose a framework to thoroughly investigate the relationship of TQM with innovation and quality performance. They proposed TQM as the mediating factor between business environment, organizational strategy and organizational culture with quality and innovation performance. Till date, there is still no literature proving that Prajogo and Sohal or anyone that had tested this framework they had proposed in year 2001 literature review paper.

In 2002, Prajogo and Sohal teamed up to investigate the empirical relationship between TQM practices, with quality and innovation performance respectively. This research directly challenge the negative arguments listed in their 2001 work. As participated in their positive arguments summarized in 2001 work, the results for 2002 study had proved TQM to have significantly positive relationship with innovation performance and quality performance. It is to be noted that the statistical result showed that TQM could better predict quality performance compared to innovation performance in which the they went on to remind that TQM was originally meant for quality performance after all.

After these plausible results in 2002, Singh and Smith (2004), also on Australia grounds, conducted a survey on 418 manufacturing organizations. It is to be noted that Prajogo and Sohal (2002) did theirs in Australia on 194 managers in Australia manufacturing and non-manufacturing organizations. Contradictorily, Singh and Smith's study had revealed that there is insufficient statistical evidence to claim that TQM and innovation are related. The items for innovation factor under Singh and Smith are whether had innovation being commercialized, whether R&D had led to world class techniques and technologies, how frequent is the rate for new operational processes and introduction of new products and

services. In comparison, the innovation factors under Prajogo and Sohal's study was product innovation and process innovation, each containing items with similar definition to Singh and Smith's study. Singh and Smith suggested that there may be a more complex relationship that links TQM to innovation.

During 2002, Bossink reported his case study of the Dutch construction industry on innovative quality management practices. The quality management practices he scrutinized are design, planning, systems, goal, positioning, and interaction practices. According to Bossink's research after extensive documents scanning, detailed interviews and observations, he concluded that the three quality management practices that supports innovation are planning, positioning, and interaction practices, with a mention of systems and goal practices being supportive of innovation attempts as well. The interesting fact that he also mentioned in the write up is the fact that the innovation attempt could be too late to do any good, stressing the importance of timely actions and decisions. In other words, efficiency is as important as effectiveness here. Echoing his view about timeliness innovation was Fred Hewitt in 1995. Fred Hewitt had mentioned the case study of Xerox, on how it had prevailed in the massive invasion of Japanese manufacturers in copiers' industry in the 1990s.

The deduction on whether or not quality management sits well with innovation had been further clarified by Kaynak and Hartley in 2005. They realized that high performing high technology firms are the ones that significantly and vigorously make an effort to integrate quality management practices into the organization, starting from the culture itself. It had been noted that only with top management's dedication, the whole organization could echo and follow suit the beat set up by their leaders and then develop the culture of quality. Lacking of the leadership

support, it had been reported that the effort is just going to be futile since the heartbeat in the culture had not been altered to sustain the effort for quality management. Kaynak and Hartley's results had restated the importance of quality management to high performing high technology firms when they concluded that quality management is the core that fuels the fast response of high technology firms in the sense of innovation.

In 2003, Petroni *et al* presented an interesting case study about the adoption of TQM by two large Italian research laboratories. At this note, it is to be reminded that the earlier trend presented in this write up about innovation had all questioned to a certain degree of the certainty of whether would quality management be able to foster innovation, instead of hampering it. Petroni *et al* study unexpectedly took all airs out of the sail in the questioning of TQM on innovation, by stating that back in the mid 1980s, it was total quality management that had saved the day in United States, and that the first department that had been reformed accordingly to TQM to heighten INNOVATION was the Research and Development department. Only when the result had been very satisfying with the R&D department had the trend spread into other main activities of the organization, namely engineering, production, and marketing, transforming their roles as internal suppliers. The first few companies involved and named in this attempt was 3M, Eastman Kodak, and Xerox.

In year 2004(a), Prajogo and Sohal had released another study on examining the empirical evidence for relationship between dimensions of TQM practices with quality and innovation performance. The size of study had also involved 194 managers in Australia, the outcome suggested that different elements of TQM dimensions would pair up differently with quality and innovation performance. The

mechanical dimensions of TQM would pair up with the quality performance, while the organic elements would pair up with the innovation performance.

Also in year 2004(b), Prajogo and Sohal did an empirical case study on an Australian organization, observing their transition from a TQM organization to a total innovation management organization, and being enlightened on how quality management could evolve with the strategy of an organization. They had specifically stressed this flexibility in evolving as an important piece of knowledge in their conclusion. Not only that, they had also noted that quality management developed from and deeply embedded within the culture of the organization, encompassing its daily operation, would help as a seeding ground to pose the company on advantageous ground in competitiveness. From how they concluded the study, TQM is a set of principles that should be readily broadened in perspectives and application by understanding the need for them in the first place. Only when the needs for these guiding practices are understood, that one could use it in synergy to and with any unknown challenges in the future.

Hoang, Igel, and Laosirihongthong braved the investigation for TQM's impact on innovation in year 2006. Their study was conducted in Vietnam. Their TQM factors consist of top management commitment, employee involvement, employee empowerment, education and training, teamwork, customer focus, process management, information and analysis system, strategic planning, open organization and service culture. Their innovation factor contains items of level of newness, number of new products, and share of turnover. Outcome reveals that TQM does not totally predict innovation performance. There are only a few dimensions within TQM that could act as a significant positive predictor for innovation performance. Those dimensions are leadership and people

management, process and strategic management, and last but not least, open organization.

In 2006a, Prajogo and Sohal made another attempt to investigate the relationship between TQM and innovation. They created an integrated model consisting TQM and technology/research and development management (total innovation management, TIM) together to form the two main independent variables, with the output being two dependant variables namely quality performance and innovation performance. Interestingly, in this study, they had failed in the attempt to resolve the relationship between TQM and innovation performance, echoing the results of Singh and Smith (2004), and Pinho (2008) on SMEs, they found no significant relationship between TQM and innovation. The former's study had shown that TQM integrated well with TIM, and that TIM has a significant positive relationship with innovation performance, indicating that TQM is essential as the breeding ground for innovation though it has no direct significant relationship.

During the same year of 2006, Prajogo & Sohal teamed up with Jiang Feng and Tan from Singapore to further test the impact of organic and mechanistic TQM on the quality and innovation performance. The findings had echoed the results of Prajogo and Sohol in 2004a, in which similarly, mechanistic TQM predicts quality performance better, while organic TQM predicts innovation performance better.

In Spain on 2007, Santos-Vijande and Alvarez-Gonzalez had factor in market turbulence condition to test the merits of TQM implementation towards the innovative culture of the firm and their total innovation effort in technical and administrative area, combined and also independently. They realized that the culture of innovativeness is needed as a mediating factor to link TQM to technical innovation, while TQM itself strongly influenced culture of innovativeness, and

that unexpectedly innovativeness could not influence administrative innovations at all. Administrative innovations had been bred on grounds set up through TQM, occurs in administrative of the operation and encompass the culture that platforms the communication throughout the organization. Technical innovation is all about the manufacturing process, products and their services. (Damanpour, 1991)

Fortuin and Omta in 2009 tested out the management of innovation by accessing innovation performance. Characters of Innovation in their study had been observed to reveal alikeness to quality management practices, or, basically, it conflicts not with quality management in terms of internal and external communication. In terms of accessing the competitiveness of the company it is indeed unique, but not total exclusive (in Kondo's language in year 2000) of each other. The only factor that is totally not in quality management vocabulary is the Research and Development department with all administration and management that it stands for. Hence it is imperative for us to discover whether or not within the means of quality management there already lies the stepping stone to innovation, and one just need to look to notice it lying there all the time when we were looking for it elsewhere. Lorente, Dewhurst and Dale (1999) had also stated how TQM hinders not business innovation, with some of its existing dimension being predictive to innovation performance, and is the stepping stone to get employees ready for the embrace of innovative ways. They noted that the presence of TQM dimensions such as continuous improvement, training, teamwork, and process management are all absolutely vital for innovation management.

Comparison of innovation performance by Fortuin and Omta (2009) had been done to innovation performance outlined by Prajogo and Sohal (2006a). The former's innovation performance consisted of 6 items, delineating the perception of employee on the degree of innovation for product design, product quality, distribution, manufacturing processes, new product time-to-market compared to competitors, and whether has the return of investment from R&D been satisfactory. The latter looked into factors of product innovation and process innovation. Product innovation contains items of level of newness of products, use of latest innovative technologies, speed of new product development, number of new products introduced to the market, and number of new market entrants. Process innovation contained items of technological competitiveness of the company, speed of adopting latest technological use into existing processes, novelty of technology in processes, and rate of change in company's processes, techniques and technology. On the rough surface, one could easily spot the high degree of similarities between the innovation performances outlined by these two different studies.

Sadikoglu and Zehir came up with a different style of linking relationships between TQM and innovation performance in year 2010. They had used innovation performance as a partial mediator alongside with employee performance, to predict firm performance. They had not found TQM against innovation performance, but instead, a positive significant relationship. They further stated that TQM has a positive significant correlation with all the employee performance, innovation performance and firm performance. Firm performance had been measured with operating performance, quality performance, and customer satisfaction.

Interestingly, when TQM had been observed alongside organizational learning and innovation performance, it had been discovered that the model fits the observation well. Not only that it had been noticed that TQM has a positive significant influence on organizational learning, they (Hung *et al,* 2011) had found that both TQM and organizational learning has positive influence on innovation performance.

2.7. Types of methodology

2.7.1. Choices of Statistical Analysis for construct validation

Structural Equation Modeling was used to investigate the impact of Organizational learning culture on innovations (Skerlavaj, Song, & Lee, 2010). Structural Equation Modeling was used to examine the structural relationships between TQM factors with organizational performance. Exploratory confirmatory factor analysis was used to test out the constructs of their reliability and validity. (Fotopoulos & Psomas, 2010)

Lai and Cheng (2003) had used descriptive statistics, alpha coefficients and item-total correlation to validate the normality of the data collected. Measurements collected for quality management implementation and quality performance were then subjected to Confirmatory factor analysis (CFA) for evaluation, in which after that ANOVA was used to observed the differences in the implementation of quality management practices in different industries. Alpha reliability threshold for the variables were more than 0.70, and all factors loaded into high item-total correlation has to score higher than 0.60.

Quazi, Jemangin, Low and Chin (1998) had tested out Saraph *et al* (1989) quality management practices measurement, and had reminded the importance of

testing the data on internal consistency, criterion-related validity and construct validity. Their results of construct validity had differed intensely from how Saraph *et al* (1989) had been, resulting in the outcome of 16 factors, in which there are three factors being uni-factorial, and the other 5 multi-factorial.

Principal component factor analysis with Varimax rotation had been used to conduct the factor analysis for items under the factors of quality management practices. For Arumugam, Ooi, & Fong (2008), the exploratory nature of their study had caused them to group together all the items for all factors of TQM practices to explore how many factors could this act successfully derive, similar to Saraph *et al* (1989),

In contradiction to the all-items-grouped-together-for-loadings method prior mentioned, Arumugam *et al* (2009) had conducted factor analysis for each construct (factor) individually to skim out items with low loadings and to ensure the uni-dimensionality of each factor. They used 39 TQM items measures that had been previously used by Davis (1992), Lai *et al* (2002), Spencer & Loomba (2001), Yavas (1995), Yong and Wilkinson (2001) & Baldrige National Quality Program (2002). Baird, Hu and Reeve (2011) had straightaway ran Confirmatory Factor analysis on the factors shortlisted and derived from Kaynak's (2003) study. According to Kaynak (2003), Saraph *et al* (1989) had derived a survey instrument that had been most useful in producing items to measure quality management practices, and that most of the items in her survey had used that basic survey derived from Saraph's as a stepping stone to work on.

Saraph *et al* (1989), at the end of the validity section, had mentioned that each critical factor of the construct was subjected its own construct validation through

an independent factor analysis, where they were each assumed to be a separate construct. The purpose of this process is to ensure the unifactorial (or more often referred to as uni-dimensionality these days) nature of the factors and items developed in their survey tool for quality management practices.

2.7.2. Choices of Sampling design

Lai and Cheng (2003) mapped out "the initiatives and outcomes of quality management implementation across industries" and realized that different industries placed different types of emphasis and effort on quality management. This had led to differing level of implementation, thus resulting in variation of outcomes. Their research pattern, specifically sampling style is written elaborately, allowing a good sneak peak, not to mention that their study purpose is similar to this attempted study.

Lai and Cheng (2003) had grouped up companies that had already embraced quality management practices, stating that they are well aware that this may lead to a positive bias since all respondents would be experienced in quality management practices, but this would help guarantee the statistical validity of the samples. They had sampled at the companies that is ISO certified in Hong Kong, stating the assumption that ISO certified company is practicing quality management within their organization. They had targeted a well-informed informant at each sampled company, with the personnel being responsible for the quality management practices in the company, probably the manager.

Quazi *et al* (1998) had their prospects for sampling shortlisted from the ISO 9000 certified organizations, published by the Singapore Institute of Standards and Industrial Research, including the list of the winners for the National Productivity

Award. Their stated justification for this strategy was that such companies would minimally have a quality system in place, and their executives would be at least knowledgeable about the quality management practices. They had 34 companies' managers willing to respond, giving the result of 33 viable questionnaires.