

**THE CONTRIBUTION OF QUALITY MANAGEMENT PRINCIPLES AND
PRACTICES TO THE ORGANIZATIONAL PERFORMANCE**

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**A thesis submitted in fulfillment of the requirements for the degree of
Master of Business Administration in Advanced Operation Management**

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DECLARATION

I declare that this thesis entitle “The Contribution of Quality Management Principles and Practices to the Organizational Performance” is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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26 JUNE 2013

DEDICATION

To those who always encourage me to be better, to my family I dedicate this work

Abstract of project paper presented to the Senate of Universiti Teknikal Malaysia Melaka in partial fulfillment of the requirements for the degree of Master of Business Administration

“The Contribution of Quality Management Principles and Practices to the Organizational Performance”

By

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JUNE 2013

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In today's competitive environment, Quality Management is the key to an organization's success and survival. The failure of an organization to meet customer requirements and inability of organizations to meet the expectation of the customers through value-added products or services is the concern of all stakeholders in any business organization. Therefore, the main objective of this study is to identify the impact of the principles and practices of Quality Management based on customer satisfaction, continuous improvement and supplier partnership to the organizational performance. This study also examine the types of factor that causes the non-compliance of $Cpk \geq 1.67$ requirements and determine the solution using the quality tools and techniques approach in the carrier tape and reel manufacturing. This study is an action research which conducted in the researcher own organization based on experts opinion through semi-structured interview and focus literature review. Three research questions have developed to achieve the aim of this research. As a result all three dimensions consistently revealed a significant positive effect on the contribution of Quality Management Principles and Practices to the Organizational Performance. The findings provide new evidence regarding the importance of Quality Management Principles and Practices contribution to the Organizational Performance as an integrative mechanism for achieving superior product performance. As a conclusion, the research is recommending the organizations to pay considerable attention to adopt Quality Management Principles and Practices with the Quality Tools and Techniques in the event of problem solving through Six Sigma approach by using DMAIC methodology to boost the effectiveness and enhancing the Organizational Performance. Further implications and limitations of the study has discussed in the research in greater depth for researchers.

Abstract of project paper presented to the Senate of Universiti Teknikal Malaysia Melaka in partial fulfillment of the requirements for the degree of Master of Business Administration

“Sumbangan Prinsip dan Amalan Pengurusan Kualiti bagi Prestasi Organisasi”

Oleh

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Dalam persekitaran yang kompetitif hari ini, pengurusan kualiti adalah kunci kepada kejayaan dan kelangsungan hidup sesebuah organisasi. Kegagalan sesebuah organisasi untuk memenuhi keperluan pelanggan dan ketidakupayaan untuk memenuhi harapan pelanggan melalui produk atau perkhidmatan nilai tambah adalah kebimbangan utama kepada mana-mana organisasi perniagaan. Oleh demikian, objektif utama kajian ini adalah untuk mengenal pasti kesan daripada prinsip-prinsip dan amalan pengurusan kualiti berdasarkan kepuasan pelanggan, penambahbaikan yang berterusan dan perkongsian pembekal kepada prestasi organisasi. Kajian ini juga mengkaji jenis faktor yang menyebabkan ketidakpatuhan “ $Cpk \geq 1.67$ ” dan menentukan penyelesaian dengan menggunakan alat-alat kualiti dan teknik. Kajian ini merupakan kajian penyelidikan tindakan di organisasi penyelidik berdasarkan pendapat daripada pakar-pakar dengan menggunakan kaedah temu bual separa berstruktur dan focus pada kajian kesusasteraan. Dalam kajian ini tiga persoalan telah disediakan untuk mencapai matlamat kajian ini. Hasilnya ketiga-tiga dimensi setara mendedahkan kesan yang positif kepada sumbangan pengurusan kualiti bagi prestasi organisasi. Secara amnya, penemuan bukti baru mengenai kepentingan sumbangan pengurusan kualiti bagi prestasi organisasi sebagai mekanisme bersepadu untuk mencapai prestasi produk yang unggul. Sebagai kesimpulan, penyelidikan ini mencadangkan sesebuah organisasi memberi perhatian yang luas kepada prinsip-prinsip and amalan pengurusan kualiti dengan menggunakan alat kualiti dan teknik dalam penyelesaian sesuatu masalah melalui kaedah “Six Sigma” dengan penggunaan “DMAIC” untuk meningkatkan keberkesanan dan prestasi sesebuah organisasi. Implikasi selanjut dan limitasi kajian telah dibincangkan secara dalam untuk penyelidikan seterusnya.

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A huge bundle of sticks becomes easy to carry when everyone carries a stick along with them. Team work reduces the amount of task each member has to do. Therefore the author would like to wish the following people who had directly and indirectly contributed to make this project paper possible.

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LIST OF ABBREVIATIONS

ISO	International Organization for Standardization
MBNQA	Malcolm Baldrige National Quality Award
EFQM	European Foundations of Quality Management
QMS	Quality Management System
SPC	Statistical Process Control
TQM	Total Quality Management
DMAIC	Define-Measure-Analyze-Improve-Control
OGP	Optical Gauging Product
FMEA	Failure Mode and Effect Analysis
RPN	Risk Priority Number
DOE	Design of Experiment
QFD	Quality Function Deployment
R&D	Research and Development
SGP	Supplier Goal Plan
BRM	Business Review Meetings

CHAPTER 1

INTRODUCTION

1.0 Research Background

The last two decades of the twentieth century have witnessed a new evolution and maturity of quality management practices, mainly in the industrialized world. Quality management practices and paradigms will persist to develop in the twenty-first century (Mohamed *et. al.*, 2006). The quality management practices defined as a “quality techniques” and “behaviours” established within an organization or its sub-units under two conditions. First, these techniques and behaviour are in congruent with criteria established by International Organization for Standardization (ISO) or they are embodied in a framework of a national or an international quality award framework such as those of the Malcolm Baldrige National Quality Award (MBNQA) or the European Foundations of Quality Management (EFQM). Second, these techniques help the organization or its sub-units accomplish a sustainable competitive advantage at both operational and strategic levels which is influence the business performance of an organization or one or more of it sub-units (Mohamed *et. al.*, 2006).

According to Marwan (2011) research, quality is wisdom of fulfill individual’s needs, has become a major differentiating factor among products and among organizations, because quality now is a significant measurement tool for the organization’s performance. Therefore the organizations focus has shifted from the approach of quality control to quality circles, total quality management, continuous improvement, and worker empowerment. A firm that competing for a strategically high quality will lead towards a sustainable competitive advantage and pursue an operational strategy that is able to control

the quality or services and seeks for continuous improvement. In the study conducted by Muhammad & Juan (2011), is clearly mentioned that soft aspect of quality management related to management and people aspects such as leadership, people management, customer focus and supplier relationships and quality planning, while hard aspects of quality management related to tools and system necessary for the implementation of quality management principles such as quality tools and techniques (e.g. FMEA, Six Sigma, SPC, QFD, Ishikawa and etc.), competitive benchmarking, the ISO 9001 standard and process management, measurement and product or service design.

Quality management breakthrough the boundaries of customer's satisfaction since it observed that the customer not only outsiders who buy the organizations product or services but also internal customers who interacts with and serve others in the organization and is unlimited, it is a commitment to never being satisfied, and in quality management language "very good" is not good enough, because quality is a living concept which can always be improved (Marwan, 2011). Quality improvement has to be a driver for the organization which it relates not only to the final product but also need to identify how an organization deals the deliveries, how rapidly it responses to the complaints, how concern the complaint investigate, and the quality management also develops a techniques in order to measure every critical variable in the organizations operations, through comparing the actual results with the planned standards and identify the differences between them, and to trace them to their roots, in order to take the right decision to eliminate their causes and effects (Marwan, 2011).

In the traditional way, the quality of products is evaluated with thought of physical characteristics and features such as their stability and reliability but today many companies have reconsidered the idea of quality. They have found out that the most attractive and

accomplished product would not be taken ideal if it cannot meet customer needs and expectations. In the current situation, paying attention to quality is no longer the responsibility of a small group of people who monitor the performances and take off non-conformance products from the assembly line. Quality management is a philosophical managerial perspective which has increasingly succeeds its place in societies and regards customer needs and innovations along with ways of providing services and improving quality as its principles of work (Azizi *et. al.*, 2010). It is significantly observed in recent years, quality management improving systems have had a fast flowing development since the last two decades, simple inspection activities have been replaced or completed with quality control procedures, the quality assurance has been introduced and they have set out for completion, but now, continuous improvement of quality or total quality management (TQM) has replaced them all presenting patterns and theories establish to the quality improvement of products and systems has become today is belief for organizations (Azizi Jafar *et. al.*, 2010).

In a research conducted by Skaidre *et. al.*, (2009), the concept of total quality management (TQM), relate to the creation of an organizational system that encourage cooperation and learning for facilitating the implementation of process management practices, which, in turn, leads to continuous improvement of processes, products, and services as well as to employee fulfillment, both of which are critical to customer satisfaction, and ultimately, to survival of the company. For that reason, total quality is a description of the culture, attitude and organization of a company that strives to provide customers with products and services that satisfy their needs. The cultures require quality in all aspects of company's operations, with processes being done right the first time and defects and waste having been eradicated from operations. Total quality management

(TQM) is a method by which management and employees can become involved in the continuous improvement of the production of goods and services which is a combination of quality and management tools (Skaidre *et. al.*, 2009).

In the past, manufacturing often depended on production to make the product and quality control to examine the final product and screen out items not meeting specifications. In administrative situations, work is often checked and rechecked in efforts to seize errors. Both cases involve a strategy of detection, which is wasteful, because it allows time and materials to be invested in products or services that are not always usable. It is much effective to avoid waste by not producing unusable output in the first place which is a strategy of prevention (Skaidre *et. al.*, 2009). According to the research performed by Bisgard (2008), quality management provides the framework within modern statistical process control (SPC), quality improvement, and reliability operate which is imbedded within a managerial framework where statistical tools and techniques become fully operational and effective. Besides possessing the necessary technical skills, it is useful for quality professionals to supplement their knowledge base with a basic understanding of the quality management principles.

In the current competitive market most of the organizations continuously look for a new ways to improve organizational performance in order to obtain a competitive advantage in the business. Quality Management (QM) initiatives provide one approach that firms use to improve performance is by the implementation of statistical process control (SPC) in their organization. Yang *et. al.*, (2009) research asserted that many organizations utilizing the principles and philosophy of Total Quality Management (TQM), Continuous Improvement, Six Sigma, etc. to further enhance the quality even though quality improvement (QI) became an important factor for many companies during the mid 1980s.

There are many quality improvement (QI) activities are focus on an administrative concept that implements statistical process control (SPC) tool and techniques but the modern approach has been carefully and professionally followed by many companies which is now well recognized as an effective concept of achieving excellent product and service quality.

Yang *et. al.*, (2009) also highlighted that statistical process control (SPC) is a tool of mistake detection and classification in advance process control. Statistical process control (SPC) is a fundamental part of maintaining and improving quality where fail to implement and manage SPC effectively can significantly block the progress of a company's ability to meet product specifications, limit waste, reduce production costs and generally improve the quality performance. A process is said to be operating in statistical control when the only sources of variation are from common causes. One function of a process control system is to provide a statistical signal when special causes of variation are present, and to refrain from giving false signals when they are not present. This allows appropriate actions to be taken upon those special causes removing them or, if they are beneficial, making them permanent (Besterfield, 2009).

Noteworthy the research conducted by Bart *et. al.*, (2011), statistical process control (SPC) means that a monitoring processes to obtain insights and to identify special cause variation. The term of statistical process monitoring express is a better description because control step in an engineering sense is not part of it. The most important tools in SPC are control charts, first developed back in 1920s by Shewhart who concluded that while every process displays variation, some processes display controlled variation that is normal to the process (*common cause variation*), while others display uncontrolled variation that is not present in the process causal system at all times (*special cause variation*).

According to Chien *et. al.*, (2009) research, process capability analysis has developed an important and well-described tool in applications of statistical process control (SPC) towards continuous improvement of quality and productivity. The actual process performance and the specification limits or tolerance relationship may measure using appropriate process capability indices. The process capability indices consist of C_p , C_a , C_{pk} , C_{pm} , and C_{pmk} have been developed in certain manufacturing industry as capability measures based on different principle, containing process consistency, process departure, process yield, and process loss. It was observed that the three indices C_{pk} , C_{pm} and C_{pmk} provide the similar lower bounds on the process yield in certain recent quality assurance and capability analysis works. The process indices of C_p is considers as the overall process variability proportion to the manufacturing tolerance as a measure of process precision or product consistency whereas C_a is a function of the process mean and the specification limits, referred to as an “accuracy” index, is geared to measure the degree of process targeting relative to the manufacturing tolerance. The C_p and C_{pk} indices are appropriate measures of progress for quality improvement situations when reduction of variability is the guiding factor and process yield is the primary measure of a success. The process capability index C_{pm} , also called the Taguchi index is geared towards measuring the ability of a process to cluster around the target, and reflects the degrees of process targeting. The index C_{pm} incorporates the variation of production items relative to the target value and the specification limits which are preset in a factory.

Base on the above literature review, statistical process control (SPC) plays an important role in the manufacturing industry. Therefore this research will be mainly focus on the non-compliance of $C_{pk} \geq 1.67$ requirement as one of the main subject of the research study among the issues facing towards the manufacturing processes since it is also

a bottleneck that contributes to delay the production and unsatisfactory of customer requirement.

1.1 Problem Statement

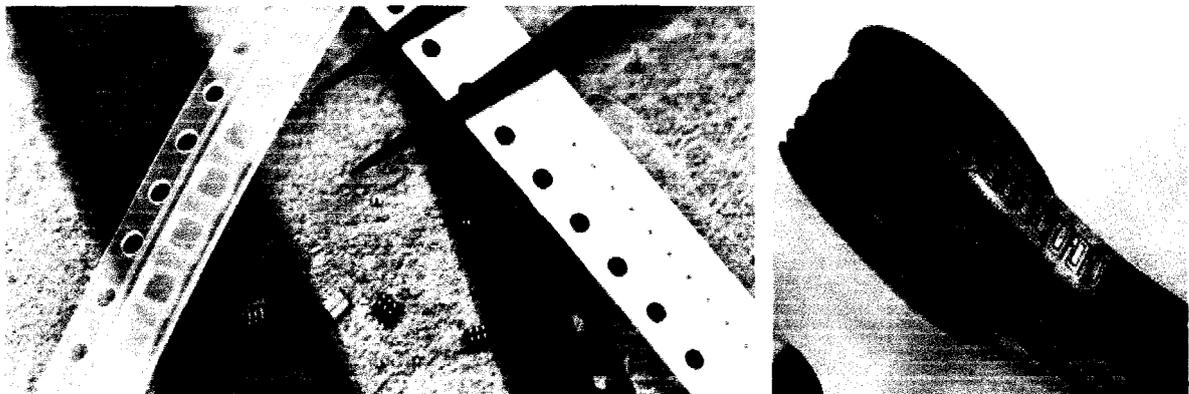
Statistical Process Control (SPC) is a method to understand, monitor and improve production processes over time, reducing process and product variation by the action over the own process (Vileta, 2009). When a process is in a perfect state of statistical control, the process capability indices are widely used to measure the capability of the process to manufacture items within the required tolerance. Most evaluations on process capability indices focus on point estimates, which may result in unreliable assessments of process performance. The index Cpk has been used in various manufacturing industries to provide a quantitative measurement of the performance of the manufacturing (Hung, 2005).

According to the study performed by Novoa *et. al.*, (2009), process capability indexes, and of particular Cpk , provide single value assessments of the ability of a process to comply with specification limits on a quality characteristic. The Cpk by itself does not say anything about whether a process is in statistical control or not. A process may have a large process capability index and not be in statistical control and vice versa. However, the statistic Cpk and the knowledge of its in control distribution can be used to test whether the parameters of process have deviated from its nominal values or not.

In this research, the main subject of concern will focus on the non-compliance of $Cpk \geq 1.67$ requirements which is one of the major issues in complying with customer requirement. The Cpk process capability is monitor and measure for the critical measurement point in the carrier tape and reel manufacturing industry. “Carrier tape and reel” is defined as a process of packing surface mount devices (SMD's) by loading them

into an individual pockets comprising what is known as a pocket tape or carrier tape. The units are sealed in the carrier tape with a cover tape, usually by heat or pressure seal. The carrier tape is coil around a reel for convenient handling and transport then the reel is enclosed in a reel box before it is finally shipped to the customer. Packing units by carrier tape and reel also facilitates automated retrieval and mounting of the components on the application board during customer manufacturing as shown in **Figure 1.1**.

Figure 1.1: The Carrier Tape Sealed with Cover Tape and Coil to Packing Reel



Source: <http://www.cpak.com.sg>

The potential problems may exist in the non-compliance of $C_{pk} \geq 1.67$ requirements mainly on the design of the tooling, measurement system, machinery parameter setting and process capability. Some of these problems happen in relatively short and long time and are usually not able to neglect permanently which have a high complaint receive from the major semiconductor and automotive customer. Somehow these issues are contributing to a big loss in business and lack of customer confident level buying the product which is not complying with the purchasing spec requirement. Based on the problem facing by the organization on the non-compliance of $C_{pk} \geq 1.67$ requirements in the carrier tape and reel manufacturing industry, this study will examine on the factor of causes and identify the impact of the principles and practices of quality management based on customer satisfaction, continuous improvement, and supplier partnership to the

organizational performance. This study also determine the solution for the non-compliance of $Cpk \geq 1.67$ requirements by using the quality tools and techniques approach (e.g. FMEA, DMAIC and Fishbone Diagram analysis tool) thus suggest and recommend solution towards increasing organizational performance. The **Table 1.1** shows the data summary of CPK value that not complying with the dimensional measurement which is retrieved from CPAK quality report from Jan to Dec' 12. The trend chart in **Figure 1.2** is an analysis of CPK value based on the dimensional measurement accumulated for “Ao, Bo, Ko, Po, P1 and P2” which is not complying with the $Cpk \geq 1.67$ requirements except for “W” which is marginally complying with the $Cpk \geq 1.67$ requirements.

Table 1.1: CPK ≥ 1.67 Data Summary

CPK	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
AO	1.32	1.34	1.35	1.30	1.32	1.34	1.36	1.42	1.37	1.39	1.34	1.41
BO	1.24	1.25	1.28	1.30	1.31	1.32	1.32	1.33	1.29	1.35	1.35	1.31
KO	1.18	1.21	1.23	1.19	1.22	1.27	1.23	1.24	1.22	1.19	1.15	1.14
PO	1.32	1.35	1.33	1.36	1.38	1.33	1.35	1.35	1.39	1.36	1.36	1.40
P1	1.45	1.43	1.41	1.43	1.47	1.42	1.45	1.41	1.43	1.51	1.57	1.57
P2	1.56	1.62	1.60	1.61	1.59	1.61	1.58	1.58	1.57	1.57	1.58	1.58
W	1.69	1.76	1.79	1.73	1.72	1.72	1.70	1.72	1.71	1.69	1.70	1.76
Goal	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67

Source: CPAK Quality Report Jan – Dec' 12

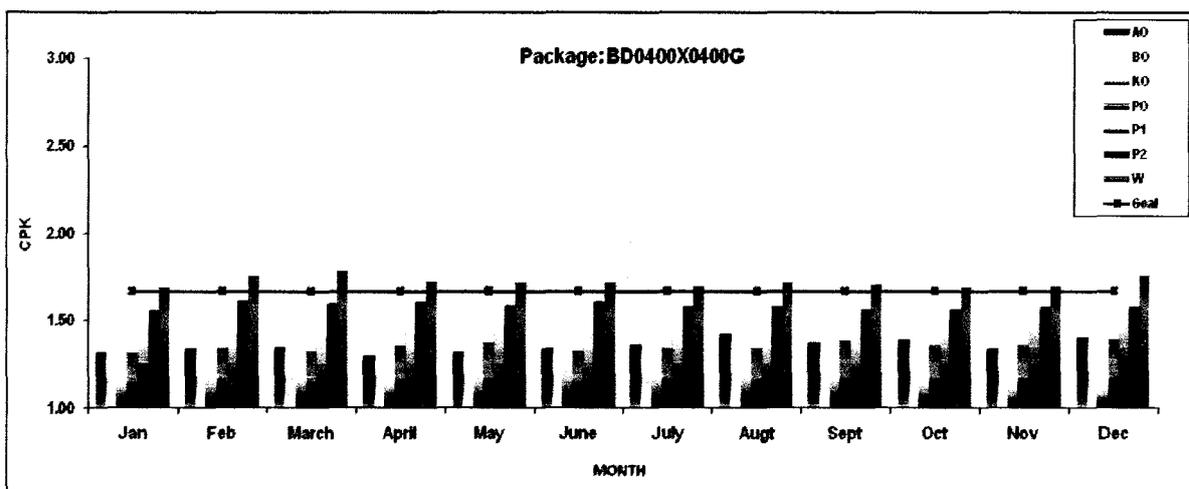


Figure 1.2: The Trend Chart for Non-Compliance of CPK ≥ 1.67 for Carrier Tape

1.2 Purpose of the study

The purpose of this study is to identify the impact of the principles and practices of quality management based on customer satisfaction, continuous improvement, and supplier partnership to the organizational performance. Besides that, it also examines the types of factor that causes the non-compliance of $Cpk \geq 1.67$ requirements in the carrier tape and reel manufacturing, and finally to suggest and recommend the solution towards increasing the organizational performance based on the data analyzed. The non-compliance of $Cpk \geq 1.67$ requirement solutions will be determined by using the quality tools and techniques.

1.3 Research Objectives

The key objectives on this study are:

- a) To identify the impact of the principles and practices of quality management based on customer satisfaction, continuous improvement, and supplier partnership to the organizational performance.
- b) To examine the types of factor that causes the non-compliance of $Cpk \geq 1.67$ requirements in the carrier tape and reel manufacturing.
- c) To determine the solution for the non-compliance of $Cpk \geq 1.67$ requirements using the quality tools and techniques.

1.4 Research Questions

The purpose of this study is to a better understanding and concern with:

- a) What are the impact of the principles and practice of quality management based on customer satisfaction, continuous improvement, and supplier partnership to the organizational performance?
- b) What are the types of factor that causing the non-compliance of $Cpk \geq 1.67$ requirements in carrier tape and reel manufacturing?
- c) How to solve the non-compliance of $Cpk \geq 1.67$ using the quality tools and techniques?

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

Quality Management System (QMS) is a management system coordinating organizational activity in action of pursuing quality and implementation in accordance with ISO 9000, which is the requirement of international standard. The purpose of organization implementing QMS is to arrange all proceeding processes in an organization in order to aim for a better results; therefore its final product would bring the organization desirable profit and completely satisfy consumers needs (Arnoldina, 2011). In order to evaluate the implementation level of quality management system and quality management principles is used European Foundation for Quality Management (EFQM) model, the national quality awards or world class W. E. Deming or Malcolm Baldrige National Quality Award (MBNQA). The analysis of integrated elements of these award models shows that quality management principles are mostly taken into consideration in EFQM model and Malcolm Baldrige, leastwise in W. E. Deming prize requirements. This points to that the implementation of quality management principles was pursued progressively as what been discussed in Arnoldina (2011) research.

The European Foundation for Quality Management (EFQM) model is a practical tool to help organizations to measure the path of excellence; helping to understand the gaps; and then stimulate the solutions which was shown in **Figure 2.1**. Malcolm Baldrige National Quality Award (MBNQA) serve to identify Baldrige Award recipients that will serve as role models for other organizations and to help organizations to assess their