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## Relationship of TQM and Business Performance with Mediators of SPC, Lean Production and TPM

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### Abstract

In today's highly competitive market, the demand for quality is the single most critical factor for companies to survive in the ever-expanding global marketplace. The concept of Total Quality Management (TQM) has been developed as a result of intense global competition. Most of the previous works show that TQM has significant relationship with business performance. However, the examining of moderators is less given in previous work, which mediators are known generally as general tools and techniques without specific focus on types of improvement. The purpose of this paper is to propose relationship between TQM practices and business performance with mediators of Statistical Process Control (SPC), Lean Production (LP) and Total Productive Maintenance (TPM) based on extensive review of the literature. Study on TQM, Lean Production, TPM and SPC generally investigate the practices and business performance in isolation. The main contribution of this paper is to identify the relationships among TQM, TPM, SPC and Lean Production practices as a conceptual model. This proposed conceptual model will help the academicians and industry players to have better understanding on the relationship between the practices and step by step implementation to improve business performance. The structural equation modeling (SEM) techniques are used to examine the relationships of the practices.

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## 1. Introduction

The concept of total quality management (TQM) has been developed as a result of intense global competition (Garvin, 1988). Firms that conduct international trade in global competition have put emphasis on TQM philosophy, procedures, tools and techniques. According to Garvin (1988), international competition requires higher levels of quality achievement to meet the customer satisfaction. TQM is a management philosophy that helps manage their organization to improve the effectiveness and performance to achieve world class status for the past two decades (Konecny & Thun, 2011). Research on TQM, Lean production, TPM and SPC investigated the implementation and their impact in isolation. What are the relationships among these four practices with business performance? TQM, Lean production, TPM and SPC have similar goals: continuous improvement, waste reduction and improving performance (Teeravaraprug, Kitiwanwong, & Saetong, 2011). These practices are a comprehensive set of manufacturing improvement practices directed towards improving business performance. Lean production eliminates waste through inventory control and reduction time delay of process (Fullerton & Wempe, 2009). TPM helps maximize equipment performance and prevents break-down (Breja, Banwet, & Iyer, 2011) and TQM aims to maintain and improve product quality and business performance. Furthermore, SPC is a monitoring process to ensure process is under control and stable (Juran, 1998). The proposed hypotheses are shown in Table 1.

Table 1: Hypotheses of relationship between TQM, TPM, Lean Production, SPC and Performance

	TQM	TPM	Lean Production	SPC	Performance
TQM	X	H1	H2	H4	H7
TPM	H3	X	H3	H5	H8
Lean Production	H2	H5	X	H6	H9
SPC	H4	H6	H8	X	H10
Performance	H1	H7	H9	H10	X

## 2. Hypotheses and Literature Review

### H1: Relationship between TQM and Business Performance

There is a strong relationship between TQM and business performance as in previous studies. The benefits of TQM are improved quality, employee participation, teamwork, working relationships, customer satisfaction, employees satisfaction, productivity, communication and market share (Besterfield, 2009). Most previous studies show a positive relationship between TQM practices and business performance (Jun et al., 2006; Bou & Beltrán, 2007; Gunday et al., 2011; Miyagawa & Yoshida, 2010). However, there are also studies that show TQM did not improve the business performance (Corredor & Goñi, 2011; Demirbag et al., 2006). Some of the findings also partially correlated with the business performance (Demirbag et al., 2006; Feng et.al., 2006; Arumugam et al., 2008). Therefore, accordingly, it is proposed that:

*H1: The TQM practices has a direct, positive effect and leads to better Business performance.*

### 2.1 Relationship between TQM and mediators (Lean Production, TPM and SPC)

#### H2: Relationship TQM and Lean Production

Juran (1998) states that TQM is the fundamental pillars for implementing Lean production practices. TQM has become an umbrella for a variety of concepts, methods and production tools. Lean

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