EFFECT OF CHANGE MANAGEMENT ON OPERATIONAL EXCELLENCE IN THE ELECTRICAL AND ELECTRONICS INDUSTRY

OON FOK YEW

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By

OON FOK YEW

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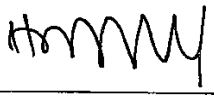
Nama Penyelia/Penyelia-penyelia *(Name of Supervisor/Supervisors)*	:	**Assoc. Prof. Dr. Hartini Bt. Ahmad** 

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ABSTRACT

Although the electrical and electronics (E&E) industry is the leading manufacturing sector in Malaysia, the industry's share of all exports has decreased gradually during the last ten years. To compete in the marketplace, E&E organizations need to focus on making the most effective use of resources in their operations to ensure sustainability of growth. Such growth can be enhanced by having effective management of change (MOC) that employee commitment supports. The present study examines the relationship between six MOC elements (technology, structure, strategy, leadership, human resource & culture) and operational excellence (OPX) and employees' affective commitment to change (ACTC) as a moderating variable. A survey of a sample of E&E manufacturing sector in Malaysia was conducted. Data were analyzed using multiple regression and hierarchical regression. The theoretical framework was guided by resource-based perspective. The analysis found significant, positive relationships between organic structure, operations strategy, transformational leadership style and human resource practices on achievement of OPX. The research had mixed findings, but supported the moderating effect of ACTC on relationship between the MOC and OPX. This study was limited because it was confined solely to the Malaysian E&E industry and suggests that future research could be conducted in other industries. The results of this study could promote a better understanding of the OPX in the E&E industry and its implications for activities concerning operational management and managing change, thus contributing to a wider body of knowledge. Success in change depends upon the proper integration of organic structure, operations strategy, transformational leadership style and human resource practices. Therefore, the recommendation to management is to establish policy, systems and processes by integrating both hard elements (structure & strategy) and soft elements (leadership & human resource) in strategic planning and future directions.

Keywords: Operational Management, Manufacturing Sector, Operational Excellence (OPX), Management of Change (MOC), Affective Commitment to Change (ACTC), Electrical and Electronics (E&E)

ABSTRAK

Elektrik dan elektronik (E&E) adalah sektor pembuatan yang utama di Malaysia tetapi bahagian eksportnya telah menurun secara beransur-ansur dalam tempoh sepuluh tahun yang lalu. Organisasi E&E perlu memberi tumpuan kepada penggunaan sumber yang berkesan dalam operasi mereka bagi memastikan kemampanan perkembangannya. Ia boleh dipertingkatkan lagi dengan pengurusan berkesan dalam perubahan dan sokongan daripada komitmen pekerja. Kajian ini dibentuk untuk mengkaji hubungan antara enam elemen pengurusan perubahan (teknologi, struktur, strategi, kepimpinan, sumber manusia & kebudayaan) dan kecemerlangan operasi dengan komitmen afektif pekerja untuk mengubahnya sebagai moderator. Satu kajian berdasarkan sampel daripada sektor pembuatan E&E di Malaysia telah dijalankan. Data dianalisis menggunakan kaedah regresi berganda dan regresi hierarki. Perspektif teori yang berpandukan rangka kerja teori ini adalah pandangan berasaskan sumber. Analisis ini mendapati bahawa terdapat hubungan positif antara struktur organik, strategi operasi, gaya kepimpinan transformasi dan amalan sumber manusia dalam pencapaian kecemerlangan operasi. Kajian ini juga mendapati yang mana sebahagiannya menyokong kesan moderator oleh komitmen afektif terhadap hubungan antara pengurusan perubahan dan kecemerlangan operasi. Skop kajian ini hanya meliputi industri E&E di Malaysia yang menunjukkan jurang untuk penyelidikan masa hadapan dengan mengesahkan industri lain. Hasil kajian ini adalah untuk memberi pemahaman yang lebih baik mengenai kecemerlangan operasi dalam industri E&E dan implikasinya ke atas aktiviti-aktiviti yang berkaitan dengan operasi pengurusan dan menguruskan perubahan. Kejayaan dalam perubahan bergantung kepada integrasi daripada struktur organik, strategi operasi, gaya kepimpinan transformasi dan amalan sumber manusia. Oleh itu, pengurusan dicadangkan agar mewujudkan dasar, sistem dan proses mengintegrasikan kedua-dua elemen keras (struktur & strategi) dan elemen lembut (kepimpinan & sumber manusia) dalam perancangan strategik dan hala tuju pada masa hadapan.

Kata Kunci: Operasi Pengurusan, Sektor Pembuatan, Kecemerlangan Operasi, Menguruskan Perubahan Organisasi, Afektif Komitmen untuk Menukar

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LIST OF ABBREVIATION

ACTC	=	Affective Commitment to Change
AMT	=	Advanced Manufacturing Technologies
B	=	Beta, Regression Coefficients
BEF	=	Business Excellence Framework
CSR	=	Corporate Social Responsibility
CTC	=	Commitment to Change
DV	=	Dependent Variable
EFA	=	Exploratory Factor Analysis
ERP	=	Enterprise Resource Planning
EFQM	=	European Foundation for Quality Management
FMM	=	Federation of Malaysia Manufacturers
FMT	=	Flexible Manufacturing Technology
ETP	=	Economic Transformation Programme
E&E	=	Electronic and Electronics
HR	=	Human Resource
HRM	=	Human Resource Management
ISO	=	International Standards Organization
IV	=	Independent Variable
JIT	=	Just In Time
KMO	=	Kaiser-Meyer-Olkin
MBNQA	=	Malcolm Baldrige National Quality Award
MPC	=	Malaysia Productivity Corporation
MV	=	Moderating Variable
MNCs	=	Multinational Corporations
MOC	=	Management of Change
NPC	=	National Productivity Corporation
QMS	=	Quality Management Standard
OPX	=	Operational Excellence
PA	=	Productivity Award
PCA	=	Principle Component Analysis
QMEA	=	Quality Management Excellence Award
RBV	=	Resource-based View
ROA	=	Return on Assets

ROE	=	Return on Equity
SME	=	Small Medium Enterprises
SMI	=	Small Medium Industries
TCE	=	Transaction Cost Economic
TBL	=	Triple Bottom Line
TQM	=	Total Quality Management
USA	=	United States of America
VIF	=	Variance Inflation Factor
WCM	=	World Class Manufacturer

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The rapidly changing landscape in the globalized market has put new demands on organizations. In order to stay ahead of competition, companies need to re-invent themselves by injecting new ideas and strategies to achieve business excellence. Excellence can be achieved by meeting or exceeding the expectations of all stakeholders. Furthermore, pursuing excellence keeps companies on the right track to achieve their goals and mission. More important, companies today face incredible pressure to improve continually products quality while simultaneously reducing costs, remaining flexible, meeting short lead-time delivery, and meeting legal, environmental and social requirements. The ability to achieve these goals depends to a large extent upon how well resources are managed against the on-going changing environment (Bayraktar, Jothishankar, Tatoglu, & Wu, 2007; Dunggan, 2011).

To guide organizations on their journey towards excellence, investigations have focused largely on identifying critical variables that might better explain how organizational change can be managed to achieve the best effects (Kanter, Stein, & Jick, 1992; Saka, 2002). To examine such critical variables, this study will provide an insight into understanding the contemporary influential elements that affect business excellence, particularly excellence in operations. The influential elements may serve as pre-conditions for any company before embarking on the management

of organizational change. The elements could be categorized either a ‘soft’ or a ‘hard’ (Peters & Waterman, 1982).

Major organizational change requires a huge investment in time, energy and resources, and numerous change programmes fail to meet the expected performances (Oakland & Tanner, 2007). In determining whether the organizational is ready to accept and adopt the changes, the top management must look into their internal resources, effectiveness and capabilities of the organization, rather than into its complacency in the environment. The stimulus for change comes principally from within, as organizations seek the resources they require while control is directed and comparatively certain (Graetz & Smith, 2010). Thus, managers are used to having direct control of hard elements (e.g. technology, structure, strategy) and indirect control of soft elements (e.g. leadership style, human resource, culture). Additionally, the implementation of change may need commitment from the employee himself. Michela and Burke (2000) pointed out that employee attitudinal commitment such affective commitment to change is associated with employees’ capacity to deal with organizational changes.

How firms achieve and sustain competitive advantages and pursue business excellence is one of the fundamental questions in the field of business performance (Dahlgaard & Dahlgaard-Park, 2006; Lu, Betts, & Croom, 2011). Most organizations that have not reached the excellence levels may not have done so due to management that does not have a profound understanding what it really means to be excellent. One early pioneering company, Xerox, initiated an Operational Excellence program in 90s, defining excellence as being certified with high scores on leadership, people, process, customer, tools and results. Van Assen (2011) described operational

excellence as the design and management of the maximization of operating profit through the continuous operation of an excellent production and/or delivery system that offers customers the right value of products and services. On top of that, operationally excellence companies also deliver a combination of speed, quality, price and ease of purchase that no one else in their market can match.

Most researchers and practitioners like to relate operational excellence with manufacturers. The fact is, manufacturing operation is one prime strategic function in any business. Manufacturing operation whether achieves its competitive position and strategic potential or not solely depends on how it runs its business (Kasul & Motwani, 1995; Yusuff, 2004). Additionally, as manufacturing firms encounter global competition and the pressure to become global, there is a demand for firm's ability to manage its organizational resources with the desire to attain operational excellence at global level.

When reviewing the issues of globalization in the face of fierce competition and technology advancements, Mokhtar and Yusoff (2009) suggested that manufacturing organizations in Malaysia must have the urge to adjust and to change in order to survive the current challenging business environment, especially in the lucrative sector of the country's economy like the electrical and electronics (E&E) industry. In fact, Malaysian E&E industry faces significant challenges in maintaining growth with growing competition from Taiwan, Singapore, China and other Asian countries. Hence, Malaysia E&E's organizations need to have a new set of capabilities to ensure sustainability of growth in a marketplace filled with competitors. Furthermore, taking a closer look at why operational excellence is important in sustaining long-term business is required.

One initiative in the operational excellence movement is to understand and learn from the world-class manufactures. Hayes and Wheelwright (1984) used the term "world class manufacturer" to describe organizations that achieve a global competitive advantage through the use of their manufacturing capabilities and competencies as strategic weapons. For example, the Toyota Production System that has been famous in the manufacturing world since 1950s. When review benchmarking studies in the past, many manufacturers have invested in advanced manufacturing technology (AMT) (Chuang, Yang, & Lin, 2009; Cordero, Walsh, & Kirchhoff, 2008). Voss (1995a) stated that best practices approach which encapsulates the world-class manufacturing and benchmarking philosophy, is based on the assumption of continuous improvement in all areas of the organization will lead to superior performance and capability.

So how does a firm achieve operational excellence through best practices? The basic principle of the best practice philosophy is that competitive benchmarks and business excellence models should drive operational thinking, concepts and techniques (Laugen, Acur, Boer, & Frick, 2005; Voss, 1995b). Models such as Baldrige in the United State and EFQM in Europe have become the foundations for the adoption of best practices. The adoption of the best practices is a popular choice because such practices have been tried and tested and have rendered proven results. Therefore, a firm that can identify best practices can implement and manage them for operational excellence.

In today's highly competitive environment, organizations must strive for enhancing performance excellence in economic and non-economic factors. The professional literature also has suggested that this enhancement should include both financial and

non-financial measures when managers design new performance measurement systems (Gosselin, 2005). Antony and Bhattacharyya (2010) proposed that performance and excellence are consolidated indicators to measure performance. Organizational performance is an indicator, which measures how well a firm achieves its objectives. In most manufacturing performance investigations, the four common variables are used to measure improvement include quality, speed/time, cost and flexibility (Voss, 1995a; Yusuff, 2004; Laugen et al., 2005; Kuruppuarachchi & Perera, 2010), most of which are still used in today's measurement systems (Lu, et al,, 2011).

In accomplishing operational excellence in quality, the ability to achieve high pass yield and offer reliable products has consistently been believe to be a very vital competitive priority. Probably the best-known early pioneer in Continuous Improvement was Deming (1986) who revolutionised the field of quality with respect to how to use quality management as a tool to generate profit instead of seeing it as an expense. Corbett (1998) argued that managers always drive to reduce costs continually, but that some manufacturers are struggling to do so. This is often because raw materials contribute a big portion of production costs and such costs are expected to rise on a year-over-year basis. Speeds of delivery and on-time delivery have always ranked highly as important competitive priorities over the years in Global Manufacturing Futures Surveys (1998). On the other hand, flexibility of operations concentrates on the practices that trim down manufacturing lead-time (Yusuff, 2004). Also, Chuang et al. (2009) pointed out, companies selected 'flexibility' as the most crucial objective for improvement in order to succeed in its competitive strategy. Thus, quality, cost, speeds of delivery, and flexibility are key indicators for measuring excellence utilized in this study.

Besides achieving typical operational priorities, organizations also have a crucial role to play in helping societies become more sustainable and competitive. In recent years, more and more businesses are aligning their activities to the principles of sustainable development. However, researchers and practitioners in the area of manufacturing strategy seem to ignore sustainability as a competitive objective for manufacturing (Shahbazpour & Seidel, 2006) although sustainability has been getting a lot of attention as a business strategy towards increased competitiveness. Therefore, manufacturing firms should adapt themselves to ways of measuring corporate performance consisting of both economic and non-economic measures (Elkington, 1997; Hubbard, 2009; Staughton & Johnston, 2005). Based on the change management perspective, this present study attempts to assess the performance of organizations' sustainability.

In the past organizational change processes, many organizations only have focused their efforts on hard factors. However, Peters and Waterman (1982) argued that most successful companies work diligently on improving soft factors as well. Indeed, soft factors can make or break a change process simply because firms cannot impose hard systems on the organization without considering the effect on people (Kirk, 1995).

To account for all elements, the researcher attempted to integrate both 'hard' and 'soft' elements under the Management of Change (MOC). Based on literature review, three main hard elements (technology, structure and strategy) and three soft elements (leadership, human resource and culture) were identified for use in his current study.

The adoption of change management is quite challenging because gaps in knowledge remain that must be filled up. Particularly, understanding the integration of both hard and soft elements in manufacturing operations to predict Operational Excellence (OPX) is necessary.

Therefore, this study aims to quantify how well the electrical and electronics manufacturers in Malaysia fare with MOC, which is defining as the practices used by, and having significant effect upon the operational excellence of companies. The researcher also will investigate the moderating effect of affective commitment to change (ACTC) in the relationship between MOC and OPX. ACTC is extra effort likely needed to achieve the objectives of the change (Herscovitch & Meyer, 2002).

1.2 Problem Statement

In the 1970s and 1980s, Malaysia's E&E exports increased dramatically. However, E&E's share of Malaysia's exports has decreased gradually during the last 10 years. In fact, E&E's share of Malaysia exports declined from 59 per cent in 2000 to 41 per cent in 2009. Moreover, E&E exports have grown more slowly than any other export growing at 0.4 per cent compared with 7 per cent for overall exports since 2000 (ETP Annual Report, 2011). The E&E industry has faced challenges in maintaining a strong growth trajectory. Therefore, E&E organizations need to focus on making the most effective use of resources in their operations to ensure sustainability of growth. Managers in a firm need to build their own internal competencies to deal with organizational issues, changes, and strategies in pursuing excellence in their operations.

The terms operational excellence conveys the idea that an operation is at the peak of performance. An organization has reached the pinnacle and has set the standard when operational performance is at its best. In reality, operational excellence is not only confined to typical operation performance like cost, time, quality and flexibility metrics but also about how the operating side of the business supports business growth (Dunggan, 2011). For example, building a high performance team for a company to remain competitive and long-term success in both economic and social aspects is required, and business excellence is sustained (Pui-Mun, 2002; Villalonga, 2004). Operational excellence is also the awareness that an operation is a business strategy that forges the business ahead of the competition and returns sustained shareholder value (Dunggan, 2011).

Because sustainability is a contemporary business issue, organizations must find ways to foster environmental compliance while creating economic prosperity. In previous studies, operational performance measured quality, flexibility, speed and cost (Voss, 1995a; Yusuff, 2004; Laugen et al., 2005; Kuruppuarachchi & Perera, 2010) which have focused mainly on economic measures of corporate performance. Studies in the area of social performance are still lacking (Muogboh & Salami, 2009). This includes measurement of employee satisfaction, social performance of suppliers, community relationships, and philanthropic investment (Hubbard, 2009).

The benefit of the model proposed here as a practical operational excellence tool is overcoming the perceived performance gap of implementing management of change (MOC) in sustaining business excellence. This current research aims to fill the gaps by including both economic and non-economic measures (Elkington, 1997; Hubbard, 2009; Staughton & Johnston, 2005) that have an important impact on an

organization's long-term sustainability (Elkington, 1999). Although Hubbard (2009) suggested measuring organizational performance should go beyond the Triple Bottom Line (economic, social & environment) approach, the study did not include measurement of operational priorities. The present study has composited a performance index from two specific performance dimensions: the operational priorities and sustainability. In detail, the dependent variable, operational excellence was measured through quality, flexibility, speed, cost, social and environmental metrics.

An underlying process in maintaining operational excellence is how an organization manages change effectively. Organizational change can be driven by either external force or internal initiative. Traditionally, management of organizational change has been viewed as actions management has taken to fine-tune their internal characteristics to blend better with their external environment (Lawrence, 1990; Goksoy, Ozsoy, & Vayvay, 2012). In fact, the main drivers for change are classified as internal drivers and external drivers. However, the internal drivers have been considered to be a manifestation of external drivers for change (Oakland & Tanner, 2007). For example, if expectations of customers grow higher, then, the firm internally has to achieve better product quality, reduce costs and improve its innovation process. This study provides a holistic, comprehensive approach with respect to the internal environment within the organization that involves change.

Operational management and performance have been an issue in both academia settings and industry for over three decades. The literature on operational excellence (OPX) is growing, but Malaysian manufacturing industry often lacks these discussions. Therefore, this study attempts to create understanding of how Malaysian

electrical and electronics firms manage change pertaining to operational excellence. Indeed, the electrical and electronics (E&E) industry is the leading manufacturing sector in Malaysia, contributing significantly to the country's manufacturing output (26.9 per cent), exports (48.7 per cent) and employment (32.5 per cent) (MIDA, 2012).

The success criteria behind excellence include both hard and soft factors (Peters & Waterman, 1982; Nonaka & Johansson, 1985; Kirk, 1995). They are important in managing change, which allows managers to strike a balance between the 'hard-s' and the 'soft-s' elements of business. However, little agreement exists on what factors most influence an organization in change initiatives (Sirkin, Keenan & Jackson, 2005). In addition, integrating hard and soft elements to predict operational excellence is not well understood either by academics or practitioners. Thus, would be interesting to discover which hard elements (technology, structure, strategy) and soft elements (leadership, human resource, culture) influence the achievement of operational excellence.

Manufacturing technology derives from many sources. For example, advance manufacturing technologies (AMT) including computer-aided design (CAD); computer aided manufacturing (CAM); flexible manufacturing system (FMS) (Roth, Gaimon & Krajewski, 1991); material resource planning (MRP II); enterprise resource planning (ERP) (Mabert & Venkataramanan, 2000; MacDonald, 1994); office automation (OA) (Beaumont, Schroder, & Sohal, 2002); and computer-integrated manufacturing systems (CIM); all of which are focused on doing things better, faster, more efficiency, and more cheaply. But, the field is rather scattered with many articles focusing on either one or a limited set of new technologies, while

the reasons why these technologies are considered best are often not accounted for. Moreover, why these technologies unlike others are regarded as comprehensive by the authors remain unclear. Therefore, having realized that a lack of integrated manufacturing technologies exists in this area, the researcher must compare the various manufacturing technologies deployed among firms. In addition**,** evidence has showed firms that initiate technological change tend to grow more rapidly (Tushman & Anderson, 1986; Peus, Frey, Gerkhardt, Fischer, & Traut-Mattausch, 2009). To the researcher's knowledge, no research examining managing integrated manufacturing technology change to predict operational excellence is extant.

Ashkenas et al. (1995) argued that almost every organization has experimented with some kind of structural changing process. In order to keep in step with environmental changes, organizations must adopt optimum innovative organizational design (structure) that will leads to superior performance. Recent research, Mansoor, Aslam, Barbu, Capusneanu, and Lodhi (2012) have suggested that organic structure works well under dynamic or change environmental condition, especially in the private sector in terms of performance as well as effectiveness where employees are involved in decision-making. In a similar study, they found that organizations gain benefits from implementing a mechanistic structure that operates under more stable conditions like the public sector, which is more centralized and formalized in nature. However, little empirical research has been carried out into the role of change management in organizational structure to predict organizational performance or operational excellence. In the author's opinion, this gap is a serious deficiency because organizational structure is the basic mechanism fundamental to the organization and to members of that organization for making decision and improving performance.

Operations strategy has often been written of as an entity unto itself, apart from the strategy or business mainstream. The monitoring mechanisms include operations strategy construct consisting of four dimensions (quality strategy, cost strategy, flexibility strategy, and delivery strategy) used by Skinner (1974) and Schniederjans and Cao (2009). In this current study, the focus was on change in operations strategy to predict operational excellence in quality, flexibility, time, cost (Brown, Squire, & Lewis, 2010) and sustainability (Hubbard, 2009; Muogboh & Salami, 2009). This study also attempts to contribute insights of sustainability performance when examining the relationship between operations strategy and operational excellence.

Study of change journey at organizations often examines the importance of leadership style. For example, transformation leadership style has been found to be most effective in leading organizational change (Bass, 1985; Boehnke, Bontis, DiStefano & DiStefano, 2003; Burke & Church, 1993). Change management depends upon the leadership enacted, specifically, the leadership style that is concerned primarily with the capabilities required that enact change successfully (Eisenbach, Watson, & Pillai, 1999, Burke & Church, 1993; Idris & Ali, 2008). The majority of the research in leadership paradigms has focussed upon the relationship of leaders to followers (Bass & Avolio, 1994; Burns, 1978; Shin & Zhou, 2003); the success of TQM programs (Waldman, 1993; Ahire & Shaughnessy, 1998; Choi & Behling, 1997); organizational outcomes such team performance (Sauer, 2011; Mannheim & Halamish, 2008); and financial performance (Idris & Ali, 2008). Based upon a literature search, limited research seems to have done on leadership styles and their effects upon operational excellence in manufacturing industry, especially in the Malaysian setting.

The success and future of every organization depends on how well the management handles change, especially with respect to human issues. Kalyani and Sahoo (2011) stated that Human Resources (HR) are an intellectual asset, the sum total of the knowledge, skill and competency that an organization processes and channelizes for sustained organizational excellence. Moreover, Court (2011) suggested the future role of HR functions should include helping the organization to learn how to build a capability to change. HR processionals should play coaching and supporting roles in working alongside their staff and helping them in change programs. To bridge the flaws and gaps in recent literature, this researcher has examined how firms firm managing change in human resource practices such as recruitment and selection, training and development, compensation systems and performance appraisal to sustain operational excellence in broad range of manufacturing firms (Ferguson & Reio Jr., 2009; Gurbuz & Mert, 2011; Kalyani & Sahoo, 2011; Stavrou-Costea, 2004; Dimba, 2010; Khan, 2010).

Changing to a culture of continuous improvement usually requires a paradigm shift. This change requires taking risks, opening up the firm culture, and engendering a greater capacity to learn (Markovic, 2008). You, Coulthard, and Petkovic-Lazarevic (2010) suggested that a link between corporate culture traits such as consistency, mission, involvement, and adaptability and business performance exists. This current study will test whether a link between corporate culture traits and operational excellence is present in Malaysia, with its unique culture and concentrated business environment. This study help fill the gap in the existing literature using the electrical and electronics industry as an exemplar.

Past studies have found that many significant organizational change initiatives fail to meet expectations although people are increasingly aware of the need for change (Burke, 2002; Probst & Raisch, 2005). In addition, one commonly cited cause for the lack of success of organizational change is "resistance to change" (Palmer, Dunford, & Akin, 2009). Because of this resistance, it is unsurprising that change is a phenomenon encouraging strong visceral responses. Employee commitment to change can impact organizational change either positively or negatively (Herscovitch & Meyer, 2002; Fedor, Cardwell, & Herold, 2006; Peus et al., 2009). Thus, a firm cannot afford to ignore its employees' commitment to change which may have an effect upon the operational performance of that organization.

Ford, Ford, and D'Amelio (2008) emphasized that broadening the conversation about resistance to change should include its causes and its possible contributions to effective change management. In contrast, negative employee reactions can be unfavourable for organizations because these organizations are commonly subjected to negative influences, including, for example, employee withdrawal (Armstrong-Stassen, 1994) and poor performance (Weeks, Roberts, Chonko, & Jones, 2004).

Commitment is arguably one of the most vital factors concerned with employee's support for change initiatives (Armenakis, Harris, & Feild, 1999; Herscovitch & Meyer, 2002). Huy (2002) found that the most prevalent factor contributing to failed change projects is a lack of commitment by the people. For instant, strategy implementation may need a commitment from the employee himself. Despite its presumed importance and common identification as an essential element for the effective implementation of organizational change, little empirical evidence exists to support this claim (Herscovitch & Meyer, 2002; Meyer, Srinivas, Lai, &

Topolnytsky, 2007). Hence, the moderating effect of ACTC will be examined in this study. Yet, previous study on MOC has not included the effect of ACTC per se as a factor that is able to moderate operational excellence.

Overall, the literature indicates that firm management of change is vital in ensuring competitive advantage for firms (Kanter, 1985; Kotter, 2007). Moreover, several studies also have discussed the importance of advance manufacturing technology (Cordero et al., 2008; Chuang et al., 2009); organizational structure (Alam, 2011; Farahmand, 2010; Edelman, Brush, & Manolova, 2005; Pleshko, 2006; Mansoor et al., 2012); operations strategy (Skinner, 1969; Chenhall, 2005; Brown et al., 2010); leadership style (Avolio, Bass, & Jung, 1999; Shin & Zhou, 2003; Sauer, 2011; Idris & Ali, 2008); human resource (Kalyani & Sahoo, 2011; Doorewaard & Benschop, 2003; Stavrou-Costea, 2004; Court, 2011; Zink, 2008; Khan, 2010); and organizational culture (Denison, 1990; Ungan, 2007; Markovic, 2008; Gupta, 2011; You et al., 2010) in operational excellence. Effective approaches to organizational change will involve not only one element but also other relevant elements to the entire organization.

The interest of this current research is to find out whether hard elements or soft elements or combinations of them have a significant effect on the achievement of OPX. Moreover, MOC and these six elements (technology, structure, strategy, leadership, human resource and culture) have not been integrated into any research; thus, this study develops new knowledge in the study of operational excellence. In addition, employees' commitment to change is also important (Herscovitch & Meyer, 2002; Peus et al., 2009; Jaros, 2010; Herold, Fedor, & Caldwell 2007; Herold, Fedor, Caldwell, & Liu, 2008) as it influences the success of the change in the relationship

between MOC and OPX. Integrating MOC maturity with associated ACTC efforts in order to remain competitive, is absent in most Operational Excellence initiatives.

1.3 Research Questions

A research question is a fact-oriented, information-gathering question that best states the objective of the research study. The research questions are:

1. What are the effects of MOC hard elements such as technology, structure and strategy on the achievement of OPX?
2. What are the effects of MOC soft elements such as leadership, human resource and culture on the achievement of OPX?
3. Is there any moderating effect of employees' affective commitment to change on the relationship between MOC hard and soft elements and the achievement of OPX?

1.4 Research Objectives

The overall objective of this study is to investigate the effect of management of change on operational excellence moderated by commitment to change. The specific objectives are:

1. To determine the effect of manufacturing technology on the achievement of operational excellence;

2. To determine the effect of organic structure on the achievement of operational excellence;
3. To determine the effect of operations strategy on the achievement of operational excellence;
4. To determine the effect of transformational leadership style on the achievement of operational excellence;
5. To determine the effect of human resource practices on the achievement of operational excellence;
6. To determine the effect of involvement cultural trait on the achievement of operational excellence; and
7. To determine the moderating role of affective commitment to change in the relationship of Management of Change hard elements (technology, structure, strategy) and soft elements (leadership, human resource, culture) on the achievement of operational excellence.

The foremost purpose is to determine the effect of management of change elements on achievement of operational excellence of Malaysian electrical and electronics manufacturers.

1.5 Significance of the Study

Most empirical research on operational excellence has been conducted in developed countries. This study is significant because a need exists to investigate MOC and it effects on the operational performance in manufacturing organizations of developing countries. This is of particularly concern because E&E's share of exports in

Malaysia has gradually declined over the past decade (ETP, 2011; MPC, 2012). As a result, the researcher hopes that the study will benefit to both researchers and practitioners.

1.6 Scope of the Study

The present study was conducted in Malaysia. The scope of respondents was electrical and electronics manufacturing companies who were registered with Federation of Malaysia Manufacturers (FMM). Targeted respondents involved those closely linked to manufacturing operations such as General Managers, Operation Managers, Factory Managers, Production Managers, Engineering Managers, Manufacturing Managers, Planning Managers, Materials Managers, Lean Managers and Project Managers (involved in Change Management or Continuous Improvement programs).

1.7 Definition of Terms

For clarity, the following terms used in the study are conceptually and operationally defined as follows:-

a) Operational Excellence (OPX)

Operational excellence is an integrated management system developed by an organization that drives business sustainability by applying proven practices and procedures. The process involves focusing on synchronized application of

organizational resources in an efficient, effective, and profitable manner towards achieving organizational performance. Ultimately, operational excellence represents best practices in managing organizations by delivering values to customers and other stakeholders. Operational excellence's values lie in quality, cost, speed of delivery, flexibility, environmental performance and social responsibility.

b) Management of Change (MOC)

Management of change is the adoption and implementation of new strategies, leadership, structure, culture, human resources or technology intended to re-align an organization with the changing demands of its business environment, or to capitalize on business opportunities. Gauging levels of change relates to internal organizational factors. The MOC construct in this study consists of hard elements and soft elements. Technology, structure and strategy are defined as hard elements whereas leadership, human resource and culture are identified as soft elements.

c) Manufacturing Technology

Manufacturing technology is defined as micro-electronics-based or computer-controlled equipment used in the design, manufacture or handling of a product, and commonly refers to advanced manufacturing technology. The management of manufacturing technology addresses the effective selection, acquisition and exploitation during the technology adoption period. Operations performance outcomes are determine by a firm’s capability with respect to selection and

acquisition of appropriate technologies as well as exploitation of the acquired technologies.

d) Organic Structure

Organic structure comprised formal rules and procedures that encourage creativity, autonomous work, learning and decentralization of decision-making to the greatest possible extent, which works well in dynamic environmental or change conditions. In contrast, the characteristics of a mechanical structure have a high degree of formalization, stratification and centralization that works better in a stable environment.

e) Operations Strategy

Operations strategy is defined as the perception of how a business unit supports multiple goals in areas of operations namely quality, costs, delivery, flexibility and sustainability. An operations strategy is also perceived as the effective use of operations capability for achieving business excellence. Therefore, to successfully implement change, an organization must have the capability to executive the strategy.

f) Transformational Leadership Style

The transformational style of leadership is perceived as working more effectively with people and the ability to bring about significance organizational change and

create exceptional performance**.** Transformational leadership style may be the most effective leadership style in times of change and also may be of more value in helping leaders to guide organizational change. Transformational leadership style is measured widely in research studies by using the Multifactor Leadership Questionnaire (MLQ), which originated by Bass and Avolio (1990).

g) Human Resource Practices

Human resource practices include recruitment and selection, training and development, performance appraisal, and compensation and benefits that are HR tools an organization uses to achieve excellence.

h) Involvement Cultural Trait

This cultural trait reflects the level of an employee's involvement in the management process. Involvement includes the level of an employee's empowerment in decision-making, team orientation, and capability development the organization has undertaken. Involvement is cultural trait used to measure the company's ability to drive commitment and develop ownership by employees. Involvement or participation allow for change and addresses internal organizational dynamics.

i) Affective Commitment to Change (ACTC)

Affective commitment to change reflects real commitment to organizational change and an increased, likelihood to exhibit constructive behaviors such as better work performance. Affective commitment to change also can be defined as a specific feeling-based attitude towards change.

1.8 Organization of Dissertation

This chapter presented the background of the research, the problem statement, research questions, research objectives, significant of the study, scope and limitations of the study. The next chapter, Chapter 2, contains a discussion of the theories guiding this study. This is followed by an overview of the related studies in operational excellence. This chapter also reviews empirical findings on management of change practices and, commitment to change that have relationships with operational excellence, followed by operational definitions of key variables used in this study. Supported by the literature and the theories discussed, a theoretical framework has been formulated, which are followed by testable hypotheses. Chapter 3 explains the research methodology, including research design, research method, population and sampling, instrumentation, pilot test, source of data, method of data analysis carried out in this study. The chapter also outlines the questionnaire to be used in this research. Chapter 4 presents the results through a discussion of descriptive statistics, multiple regression analysis, and hierarchical regression analysis. Finally, Chapter 5 wraps up the study by summarizing the key findings

according to the research objectives, includes important conclusions, implications and limitations of the study, and provides direction for future research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter starts an extensive review of underpinning theories that may guide the present research and then reviews prior research on operational excellence. Following this discussion, it looks at the evolution of operational excellence ending with a synthesized conclusion based on the meanings of excellence offered by several scholars. Operational excellence in the Malaysian context is also presented in this chapter. In the course of reviewing the literature of management of change practices, seven elements including manufacturing technology, organizational culture, operations strategy, leadership style, human resource, organizational culture, and commitment to change were identified as having a relationship with operational excellence. Next, the theoretical framework and research hypotheses are given. Finally, the chapter presents the main conclusions that can be reached.

2.2 Underpinning Theory

Various theories were examined in the discussion of operational excellence in this study. They include the resource-based view (RBV), transaction cost economics (TCE) and the congruence model. This study will review them because the three are relevant to the research topic.

2.2.1 Resource-based View (RBV)

The resource-based view is one way of viewing the firm form inside out from a strategic perspective. Hamel and Prahalad, in their book *Competing for the Future* (1994), popularized the RBV theory. Basically, the view conceptualises the firm as a bundle of resources and the methods by which a firms utilizes these resources to deliver products and services differentiate one firm from one another. For example, the effective use and management of resources will help a manufacturer improve products quality, reduce operations costs, lead to faster deliver of products to its customers. Therefore, in adopting the resource-based view, a manufacturing firm undergoing change should know what resources the firm has and how these resources can be leveraged in different ways.

The RBV is the dominant theory being used in the empirical literature on internal organizational resources or capabilities and performance (Barney & Arikan, 2001; Ray, Barney, & Muhanna, 2004). The RBV theory emphasizes the use of internal resources and developing capabilities within the firm as sources of competitive advantage. Numerous capabilities and resources upon which competitive advantage may be based reside, entirely in a company's operational function (Coates & McDermott, 2002; Lucas, & Kirillova, 2011). The RBV deals with the competitive environment facing the organization but takes an "inside-out" approach. Its starting point is the organization's internal environment. Thus, an organization's internal capabilities determine the strategic choices it makes in competing in its external environment.

Due to the fact that a multitude of authors with varying backgrounds and research interests have utilized the RBV, a "resources", a key term of this approach has

remained quite vague and broadly defined. Resource-based theorists have argued that the resource-based view is a whole paradigm for understanding competitive advantage in business strategy. Resource-based theorists view the firm as a bundle of resources in the form of both tangible and intangible assets that the firm can exploit. Hence, organizations should focus on developing their resource-bases and capabilities so as to achieve a sustainable competitive advantage. The resource-based perspective views firms with superior systems and structures as being more effective because they have significantly lower costs, higher quality or superior products (Mclvor, 2005). Therefore, this approach focuses on the outcomes that the firm generates from owing a rare specific internal resource.

Ray et al. (2004) pointed out that top-level measures such as financial performance might lead to misleading conclusions with regard to resource-based theory. Alternatively, they suggested using dependent variables formulated at the business process level for future studies of RBV. Related variables can be identified as the capabilities or activities that underpin the delivery of a strategy. Researchers (Venkatraman & Ramanujam, 1986; Brown, Squire, & Blackmon, 2007) also found operational priorities are more relevant than financial goals at the plant-level. Hence, the operational performance indicators instead of financial performance indicators were measured in present research.

Barney (1986) said that a firm's resources included all assets, firm attributes, organizational processes, capabilities, knowledge, information, etc. Which are the more strategically important if resources can be anything internal to the firm? Barney (1991) in his popular checklist identified rare, inimitable, valuable, and non-substitutable as the key features for a resource to be considered strategically

important. In practice, operational management decides how operational capabilities and resources are deployed to assist the business strategy and hence contribute to overall performance (Anderson, Schroeder, & Cleveland, 1991; Brown et al., 2007). In this author's view, organizations that succeed through operational excellence are focused on making the most effective use of resources in their operations.

Gagnon (1999) highlighted three fundamental issues of RBV when he analyzed operations management. First is the manufacturer's active role with respect to strategy. Gagnon argued that crafting continuous innovative strategies would make a firm both strategically and operationally stronger in the face of uncertainty. Second is the demise of trade-offs in hyper-competition. As for trade-offs, operations managers become the guardians, ensuring that key sources of competitive advantage are continuously developed, protected, and leveraged in a dynamic manner. Third is the implementation of world-class practices that would help to build up "strategic options" on a continuous basis.

According to the resource-based view theory, human resources are one of the intangible assets and potential offer a firm advantages in terms of skills, knowledge, reasoning and decision-making abilities. Furthermore, human resources comprise individual attributes such as problem-solving ability and commitment (Grant, 1998). In order to be sustainable, these attributes must not be too amenable to being replicated by competitors. Arthur (1994) indicated that an empowering human resource strategy aimed at fostering employee commitment resulted in less waste, lower employee turnover and higher productivity. Thus, human resources, as viewed from a RBV approach, can produce certain unique and inimitable employee commitment.

In sum, the resource-based view points to intangible resources as the main drivers of the sustainability of performance differences across firms. Assets that are scarce, specialized and difficult to trade, imitate, or appropriate are viewed as intangible (Barney, 2001; Conner, 2002; Ray et al., 2004). The terms variously used for intangible resources could be "core competences", "capabilities", or "knowledge", because different RBV literature has used different terms and a variety of definitions have been offered in reference to these resources (Villalonga, 2004). Besides, employee commitment also consider is an important internal resources, as it provides necessary knowledge and capability when changes arises (Herscovitch & Meyer, 2001). This current study focuses on the managing firm's as determinants of operational excellence, and an effect of employees' commitment to change when an organization managing its internal resources. Therefore, RBV theory can be used to guide this study. Changes in a firm's resources were identified through operational excellence indicators.

2.2.2 Transaction Cost Economics (TCE)

When explaining decisions taken within the boundaries of an organization, Transaction Cost Economics (TCE) has become the predominant theoretical framework. TCE focuses on transactions and the costs that attend completing transactions by one institutional mode over another (Williamson, 1975). Transaction costs comprise the tasks of selecting, negotiating, and observing the actions of potential partners.

According to TCE, economic activity should be arranged in such a way that aligns transaction attributes (uncertainty, asset specificity, and transaction frequency) with a cost-minimising governance structure (hierarchy or market). Attention has been given to transaction costs (real or opportunity costs) of transacting under various governance structures. The mode selected is based on TCE approach, which provides companies with the most efficient (least cost) structures. Brouthers (2002) found that companies choosing other modes pursue less efficient solutions.

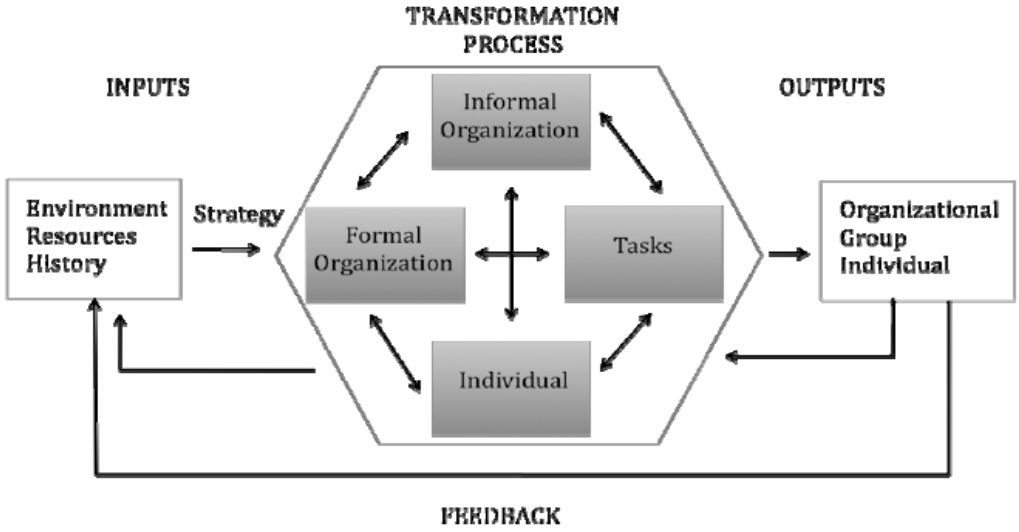
Transaction cost economics adopts a comparative contractual approach to the study solely based on economic organization (Williamson, 1998). TCE framework that focused on economic aspects included cost minimization, and emphasis on opportunity cost. This leads to a limitation of TCE in that it ignores those modes of non-economic aspects such as social relationships. On the other hand, organizations increasingly respond to demands to address sustainability, which includes economic profitability, protecting the environment, and social responsibility (Elkington, 1997; Hubbard, 2009). This study has recognized both environmental and social responsibility as part of the measuring organizational performance in operational excellence that TCE does not capture.

2.2.3 Congruence Model

Nadler and Tushman's (1997) congruence model takes a different approach in looking at the factors influencing the success of the change process. In order to understand fully the organization's performance, the congruence model suggests that the organization is a system that consists of several basic elements (as per Figure 2.1

below). The model viewed an organization as an Open System that draws “inputs” from both internal and external sources, and places them through a “transformation process” and produces “outputs”. In order to achieve higher business performance, various organizations components need to be aligned with others as a whole system. In this model, an organization can use “feedback” for control and correction.

The inputs include the external environment, internal resources and an organization’s history. The organization’s leaders formulate the strategy for initiating changes based on these inputs. The final input is “strategy”. According to Nadler and Tushman, strategy may be the most critical input for some organizations. This is because strategy determines the work to be performed by the organization and it defines the desired organizational outputs. This strategy refers to how the organization matches its resources with the prevailing environment. The organization converts input into output through a transformation process comprising four components which are all interdependent; these are (i) task or the specific work activities, (ii) formal organizational arrangements, informal organization, and individuals or members of the organization. The outputs are the performance of the various sectors of the organization after the changes are implemented (Palmer et al., 2009).



Source: Adapted from Nadler and Tushman (1997)

Figure 2.1
Nadler and Tushman's Congruence Model

The real issue is whether the interaction of these components will produce positive or negative results in some level of performance. So it is vital to be clear about the nature of each component and its role in the organizational system. As an organizing framework, this model acts more like a diagnostic than a measurement tool. In other words, this model is problem-focused rather than solution-focused. It also helps one to understand (and identify) the different interacting forces that affect the effectiveness of an organization.

By applying the congruence model of organization change to the manufacturing firms, the present study could examine the management of change in the framework of the model as well as evaluate the model's applicability. However, the complexity of the external environment and an organization's history are not included in this research. Additionally, the congruence model does not mention either any commitment or resistance to change. Commitments have positive effects on

organizational change programs (Shum, Bove, & Auh, 2008). Conversely, resistances are deeply embedded in change efforts and could be exhibited in the form of both active and passive resistance (Bezboruah, 2008). In fact, this study attempts to reduce the gap between intended and actual outputs that are supported by commitment to change in an organization.

Because the primary objective of this research is to explore how a firm manages its resources in relationship to the operational excellence. This study also attempts to provide a holistic view and an integrative approach in the internal environment, within the organization that involves change. Therefore, RBV is more appropriate compared with TCE and Congruence Model as an underpinning theory to be utilized in this study. This study also integrates the firm's resources like strategy, leadership, technology, human resources, structure and culture to predict output and organizational excellence. As a result, management of change may evolve by introducing a new paradigm in which management fundamentals would actively be integrated within the organization in order to attain the key to operational excellence.

2.3 Operational Excellence (OPX)

Hayes and Wheelwright (1984) first conceived the notion of world-class performance subsequently expended and enriched by others (Flynn, Schroeder, & Flynn, 1999; Voss, 1995) might not be sufficient or no longer be entirely suitable for today's business climate. Apparently, most world-class manufacturing literature is dominated by Japanese practices in automobile industries and volume production.

Therefore, the key characteristics of the world-class manufacturing and the measures developed are somewhat confined to operational excellence (Lu et al., 2011).

Over the last 20 years, both the definition and appropriateness of excellence evaluation have undergone repeated changes (Hermal & Pujal, 2003) According to Hillman (1994), self-assessment of excellence is the process of evaluating an organization against the criteria of the model for continuous improvement in order to highlight what has been achieved and what needs improvement. The European Foundation for Quality Management (EFQM, 1999) defines excellence as an outstanding practice in managing an organization and achieving results.

Operational excellence is focused on providing customers with quality services and products delivered with little inconveniences and minimal difficulty. Management literature is replete with articles and books that discuss efficiency-related topics such as activity-based costing, activity value analysis, benchmarking, cost-benefit analysis, and economies of scale (Matthews, 2005). Organizations need to exert more effort to improve their internal operational capabilities and competencies in order to compete successfully in today's global marketplace.

Antony and Bhattacharyya (2010) defined organizational performance as a yardstick that measures how well managers manage their operations and the value they deliver to stakeholders and to customers. Organizational excellence can also be defined as an outstanding practice in managing organizations and delivery values to stakeholders and to customers. Both definitions reveal an obvious relationship between organizational excellence and organizational performance, which is the gist of the definition the European Foundation for Quality Management has provided (EFQM, 1999). These two definitions prompt managers to aspire for excellence by

reaching a top level of performance through outstanding practices such as best practices.

Schoenberger (1987) suggested manufacturing firms need to adopt WCM (World Class Manufacturer) practices. Through their effective adoption and implementation, WCM practices offer the promise of significant improvement, particularly in the quality of the products, manufacturing cost, capability, new products development, better standing of the organization, and achieving customer satisfaction with the services provided. Although manufacturers have seem to share the common aim of achieving world-class level, Hendry (1998) concluded that just a few manufacturers actually achieving WCM status and many stumble even before getting started in the race.

Yusuff (2004) carried out a study to examine the manufacturing best (know as world-class) practices in electrical and electronics (E&E) firms in Malaysia. Survey data were drawn from a sample data of 350 manufacturing companies from the Federation of Malaysian Manufacturers industry directory. The finding of the study explained that the "best practices" or "world class" implementation among the respondents was acceptable, particularly in management commitment, supplier relationship and development programmes, and internal/external customer service plans and policies. The study also suggested some areas needing improvement including supplier quality, cost of quality, flexible layout, greater operational flexibility and group technology utilization that could be explored in future research.

One main characteristic contributing to the success of an organization is its flexibility, which allows for fast adaption to new challenges. Manufacturing flexibility is not only desired but also required for the survival of organizations that

characterized by short lead times, changing consumer preferences, customization, and high uncertainty. The desirability of manufacturing flexibility stems from its ability to allow organizations to address effectively uncertainty from a wide variety of sources. Even though no predominate definition of manufacturing flexibility exists, many current definitions are similar in that they are concerned with a manufacturing system's capability in addressing this uncertainty for proactive, adaptive, or strategic reasons (Boyle, 2004). In the Global Manufacturing Futures Survey, researchers measured flexibility performance in many ways. Kuruppuarachchi and Perera (2010) considered that flexibility performance included volume flexibility and product mix flexibility.

Laugen et al., (2005) analyzed the relationship between manufacturing best practices and best-performing companies in the 2002 International Manufacturing Strategy Survey (IMSS-III). A review of 474 manufacturers in 14 countries based on the data contained in the IMS-III database. Finding suggested that manufacturing companies should constantly adapt to new requirements of performance such as cost, speed, quality and flexibility for performance improvement. Later, Kuruppuarachchi and Perera (2010) conducted a study to determine the influence of total quality management (TQM) and technology management practices on operations performance. A similar approach is taken in measuring the perceived operations performance of organizations under each performance priority, namely, cost, quality, flexibility and speed. Therefore, the operational measure of excellence is more appropriate to capture performance of the operations system with respect to quality, cost, speed of delivery and flexibility.

Tuanmat and Smith (2011) investigated the relationship among manufacturing technology, competitive environment and organizational strategy affect organizational performance. The data were collected from 182 small and medium manufacturing companies in the Klang Valley, Malaysia. The results revealed that the most participating companies have recognized that changes in advanced manufacturing technology and the competitive business environment of organizations impact strategic behaviour. The analysis showed positive relationships among manufacturing technology, competitive environment and organizational strategy with a positive impact on performance. The findings provided additional insight into how small and medium enterprises implement organization change, particularly in developing countries. Apart from this, future research may explore a specific industry or sector.

Villalonga (2004) examined the positive relationship between a firm's intangible resources and its sustainable competitive advantage. In that study, the persistence of firm-specific profits was used to measure sustainability. The sample for this study involved 1641 US public corporations. As predicted by the RBV of the firm, the findings supported the notion that intangible resources played an important role in sustaining the competitive advantage of a firm. Besides positive impact on competitive advantage, the findings also suggested that intangible resources could lock firms into persistent disadvantages. Thus, future research may consider whether some intangible resources offer a better risk-return trade-off than others, and why some firms greatly benefited from intangible investment while others suffered a detriment.

The emerging of Triple Bottom Line (TBL) in 1997 as a new metric was due to the public opinion that firms should be responsible for more than just creating economic value (Elkington, 1997; Hubbard, 2009). In many corporations, sustainability has its roots in addressing environmental or social issues. Hubbard (2009) also argued that the business reality is those firms are under tremendous pressure to monitor and report more than just their economic performance. As a result, a firm's success should consist of both economic and non-economic measures.

Muogboh and Salami (2009) argued that past research in the area of manufacturing strategy and performance have focused almost exclusively on economic aspects of performance. Those studies have ignored social performance measures, which are fundamental to true economic success and the establishment of sustainable business enterprises. In a recent study, they concluded that manufacturing strategy has a positive relationship with firm performance. Furthermore, economic and social performance measures were found to be correlated. Therefore, firm performance measures both economic and social perspective. The researchers also proposed that future study is necessary to go beyond Nigeria's organizations and cultures.

Incorporating social performance in the manufacturing industry extends the conventional economic measures of performance. This new perspective captures the soft factors, which is important, but often neglected, business concept (Muogboh & Salami, 2009). Indeed, corporate social responsibility (CSR) continues to be an important business concept especially in the borderless world of globalization. Waddock (2005) put it broadly, what are a company's responsibilities to society? Most multinational corporations (MNCs) have developed CSR initiatives into their corporate structure or business model. They are also building the principles of

sustainability into existing goals and targets, and providing education and training opportunities. A possible explanation for this is that more firms are pursuing both economic performance and social performance in order to fulfil stakeholder's expectations. Stakeholder's theory implies that corporations have obligations to individuals and groups both inside and outside of the corporation, including shareholders, employees, customers, and the wider community (Freeman, 1984). In this author's view, social performance should consider examining present research because it is more meaningful for a firm to attain a more comprehensive level of excellence.

Azhashemi and Ho (1999) proposed that the 'impact on society' as one of self-assessment and results criteria in the UK/European model for business excellence. They further explained the impact on society is what the organization has achieved in fulfilling the needs and the hopes of the community at large. Indeed, society expects companies contribute to the overall well being of the society and to other activities or events.

In this study, results from the application of operational excellence are focused on operational performance and organizational sustainable performance. Operational performance reveals the performance of internal operations of a company such as quality improvements, flexibility improvement, delivery improvement, productivity improvement, and costs and waste reduction. The organizational sustainable performance indicator measures in present study are environmental performance and social performance, while the financial measures consist of sales growth, profit growth, return on equity (ROE), return on assets (ROA) and gearing (Hubbard, 2009) were ignored. In fact, many E&E manufacturing firms in Malaysia are owned

by foreign investors and may be listed in the their home countries, thus the respondents may not be privy to the information and data related to financial performance. Although performance can be measured either by operational performance or by financial performance, operational priorities are more relevant than financial goals at the plant level (Venkatraman & Ramanujam, 1986; Brown et al., 2007).

Van Assen (2011) argued that operational excellence is not just a matter of cost reduction and quality improvement, but also being smart about how to handle people and resources. An organization requires solid change management capabilities and strong leadership to become operational excellence. Operational excellence is also very much dependent on employees' empowerment, ownership and a culture of continuous improvement. The introduction and adoption of operational excellence usually confronts a company with the need to change the way in which its employees think and act. Providing leadership for operational excellence comes down to balancing and combining control and individual autonomy and responsibility, and requires a high level of employee commitment. The process confronts a company with the need to change not only a paradigm shift for top managers, but also through all levels in the organization.

In this author's view, operational excellence is not just about efficiency in managing day-to-day operations. Operational excellence is a way to foster continuous improvement. A fact-based understanding of operational performance is required in order to achieve this favourable position. When addressing today's challenges or capitalizing on tomorrow's opportunities, the key operations' executive or manager must be able to define, monitor (use of metrics), and adjust actions aligned with the

operation strategy and objectives and, make changes to the organization's process and performance objectives when necessity.

The key to success in achieving operational excellence starts with the correct definition, one that everyone, at all levels of the operation, can understand and knows how to achieve. In this study, the performance indicators (quality, time, flexibility, cost and sustainability) that have been discussed may be used to measure firm performance in achieving operational excellence. More specifically, the dependent variable, operational excellence was operationalized by measuring quality, flexibility, speed, cost, social and environmental in present study. Moreover, managing people, technology, leadership, strategy, structure, culture and employees' commitment to change are important variables affecting the operational excellence.

2.4 Evolution of Operational Excellence

The concept of organizational excellence as a topic of academic research and debate originates from Peters and Waterman (1982). Peters and Waterman's 1982 best-seller, *In Search of Excellence,* was based on a study of the management practices of a sample of highly successful organizations. In the course of studying these highly successful organizations, Peters and Waterman noticed a number of common characteristics. Later on, they identified a number of the best-run companies that became unsuccessful owing to conservative management practices that did not ensure the continuing success of businesses.

Peters and Waterman (1982) reminded the world that software criteria (style, skills, staff, systems and shared values) are frequently neglected and that more weight is

given to hardware criteria (structure and strategy). Research on excellence (Hermel & Remis-Pujol, 2003; Dahlgaard & Dahlgaard-Park, 2005) pointed out that Peter and Waterman's (1982) soft criteria, which included organizational culture, should be give a higher weight. Thus, the soft factors such as leadership, people and human factor are main criteria from the business excellence model.

The quest for organizational excellence has resulted in diverse paradigms and conceptualisations (Hermel, 1997), and a global perspective is emerging through the integration of various models of quality in excellence (McDonald, Zairi, & Idris, 2002). The Deming Prize created by JUSE in 1951 (Union of Japanese Scientists and Engineers, 2010) was the first globally recognized excellence model. Next was the introduction of the CAE Quality Award in 1984 in Canada (National Quality Institute, 2007). Then, the US Congress created in 1987 the Malcolm Baldrige National Quality Award (MBNQA). In 1988, the Australian Quality Awards was introduced.

The increase in global trade has stimulated the on-going development of business excellence models as for international recognition, and various business models have been embodied in awards. For example, the European Excellence Award (formally known as European Quality Award) based on the European Foundation for Quality Management (EFQM) model, was established in 1991 (EFQM, 1999). Concurrently with Europe, several countries in Asia have evolved their own quality awards during the 1990s, mainly using the EFQM and MBNQA as their reference; for example Malaysia in 1992, India in 1994, Singapore and Japan in 1995, The Philippines in 1997, and Thailand in 2001.

Although the models have differences in structure and scope and are based on different principles, the common goal is try to reach a high performance organization. Researchers have attempted to compare and contrast the awards between MBNQA and the EFQM. An independent board of examiner judges organizations that apply for the MBNQA. Selection of recipients is based on achievement and improvement in seven areas, recognized as the Baldrige Criteria for Performance Excellence. The criteria consists of (i) leadership; (ii) strategic planning; (iii) customer and market focus; (iv) information and analysis (v) human resource focus; (vi) process management; and (vii) business results (MBNQA, 1997).

In contrast, the EFQM Excellence Model comprises nine elements grouped under five enabler criteria including (i) leadership; (ii) policy and strategy; (iii) people; (iv) partnerships and resources; and (v) processes; and four result criteria including (i) customer results; (ii) people results; (iii) key performance results; and (iv) society results. The enablers represent the way in which the organization operates, and the results focus on the achievements directed towards organizational stakeholders (EFQM, 1999). The criterion weights of the enablers and the results in the EFQM excellence model have always been an important part of the model. This is true with most of the other award models as well (Porter & Tanner, 1998). The importance stems from the fact that the award models are used generally to compare an organization with other organizations. Undoubtedly, excellence models are still useful in operations management research.

At the operational level, operation's management has focused on the economic efficiency in the parts of manufacturing. Operational management helps a great deal in efficiency, effectiveness and development. The process of evolution in

manufacturing firms cannot be completed without assessment to optimum performance. Typically, performance is assessed with reference to time, material labour and resource allocation. However, performance is a much broader term than productivity. Cost is a central part of performance, which today involves almost any non-cost objective of competition and manufacturing excellence including dependability, flexibility, quality, speed of delivery and sustainability. On the other hand, productivity is a fairly explicit concept related to the ratio between output and input (Ali, Yousof, Khan, & Masood, 2011).

During the last three decades, both the definitions and sustainability of excellence evaluations have undergone constant change. Hermel and Remis-Pujol (2003) have divided "excellence" into five main stages and defined each excellence stage in details in the literature. The synthesis of the findings is shown in Table 2.1 below.

Table 2.1
Synthesized Conclusions about Excellence

Stage	Synthesized	Time	Explanations
Excellence 1.0	Soft is important	The early 1980s	• Western firms were rapidly losing market share to Japanese competitors. • *The Art of Japanese Management* (Pascale and Athos, 1981) is one of several efforts to analyze those events from a holistic and cultural point of view. The study concluded that: (i) a need existed to account for human factors besides economic ones; and (ii) superior values that can form a guiding vision for organizations were important. At that time, most Western firms were unable to deal with both aspects. • The "7s" model was developed from this and other studies led by McKinsey. Pascale (1992) defines the "7s" model as composed of three hard variables including strategy, structure, and system. Soft components were

			staff, shared values, and style. Skills were the dependent variable. • Peter and Waterman (1982) based their research to produce *In Search of Excellence* on the "7s" model. • The framework of Peters and Waterman was readily accepted and became the virtual management "bible", but was finally deeply criticized. • "Hard is soft". The authors reminded that an organization needed to account for the soft side of the firm in order to obtain hard results. • The first definition of "Excellent firms present the strengths of innovation, the ability to change and leadership that excel through both their values and their actions".
Excellence 2.0	Change	1987	• *Thriving on Chaos* (Peters, 1987) presents an extended analysis of the environment's uncertainty. For example, a change in technology or customers who always their tastes and preferences. • A new type of excellence is required. "Excellent firms do not believe in excellence but only in constant improvement and constant change" (Peters, 1988). • Peters also stresses other concepts such as high added value. • He believes that organizations need two main competencies such as quality and flexibility. • In any event, it is clear that the main focus of this new excellence is change: "Passion for change is the real revolution of chaos management".
Excellence 3.0	Learning	1990	• *The Fifth Discipline* of Peter Senge (1990) can be perceived as further progress in the path of organizational excellence. • The concepts of learning and knowledge existed before but Senge's analysis is at the base of a renewed interest in the concept of the "learning

			organization". • Senge defines the learning organization as "a group of people continually enhancing their capacity to create what that want to create". • According to Senge (1990), the advantage of the learning organizations is that they provide intrinsic motivation for change. • Senge (1999) reminds that the real lesson of the quality movement is the "learning". Senge pointed out Deming's management philosophy essentially create learning organizations. • Quality could be considered to be the foundation of the learning organization, both as building blocks for excellence. Learning as the main base for excellence sustainability.
Excellence 4.0	Excellence models	1990s	• Excellence models are also strongly related to quality. • The Deming Prize in Japan, then the MBNQA in the USA, and finally the EFQM excellence prize in Europe appears. EFQM was developed as a further evolution of the quality movement. • A few models have existed for decades. However, increasing interest in those models can be seen during the 1990s. • Firms use these models to guide their efforts towards becoming "excellent" organizations. • They represent a holistic framework of management practices and help focus organizations on assessment and analytical criteria such as benchmarking and best practices approaches (Goasdoue, 2001). • The lack of an integrated approach and the misalignment of strategic planning, continuous improvement, and the transfer of knowledge could be main causes of failure when trying to implement excellence models

			(Beechner & Hamilton, 1999).
Excellence 5.0	Integrated development	2000s	• Integrated and development approaches seem to respond to the changing management paradigm in broader fashion. For example, how socio-technical or socio-economic schools try to merge different approaches in order to better respond to management and organizational challenges. • Integrative management is composed of normative, strategic, and operational dimensions. Integrative development is composed of activity, structures, and behaviour patterns.

Source: Adapted from Hermel & Remis-Pujol (2003)

Hermel and Remis-Pujol (2003) further explained that the proposed series of excellence stages were only tentative and could certainly be formulated in many different ways. They wished that the different points addressed were at the base of production debate. Operational excellence has moved beyond the realm of the manufacturing industry. Today, it not only encompasses everything from product development to logistics to administrative functions, but it also continues to move further into non-industrial sectors. For example, operational excellence is also the most widely adopted strategy among professional service providers such as banks and insurers (Van Assen, 2011).

This author believes that operational excellence via best practices in business organizations is a naturally forward moving evolution. At present, the term operational excellence is a widely used approach to measure business excellence either by the corporations themselves or by management consultants, academicians,

and government authorities. Furthermore, the very definition of "operational excellence" has been adapted continuously to accommodate the context of rapid changes in the global business environment.

2.5 Operational Excellence in Malaysia

In Malaysia, studies of business or organizational performance are focused mainly on Small and Medium Enterprises (SME) and little research has been done solely in Electrical and Electronics (E&E) manufacturing. Among studies in the Malaysia manufacturing industry are Total Quality Management (TQM) practices (Arumugam, Ooi, & Fong, 2008; Abdullah, Uli, & Tari, 2008; Karia & Asaari, 2006) and best practices (Yusuff, 2004; Anuar & Yusuff, 2011).

Organizational excellence awards have assumed an important role in promoting excellence among organizations. Organizational excellence awards serve as a significant role in promoting excellence in organizational performance in Malaysia. In Malaysia, the Quality Management Excellence Award (QMEA) was first introduced in 1990. This award programme is based on the organizational excellence framework. Later that same year, the Productivity Award (PA) was launched as a niche awards designed to recognized productivity improvements. Another added award recognizing business excellence is The Prime Minister's Award of Malaysia (NPC, 2005). Other niche awards are the Service Excellence, Talent Developer and Operational Excellence (MPC, 2012).

Since 2011, the award programmes have been based on the Business Excellence Framework (BEF) that incorporates the necessary elements to achieve excellence

and serves as a beacon for organizations to enhance their company's performance. Presently, the QMEA is one of the main awards under the Industrial Excellence Awards, administered by the Ministry of International Trade and Industry (MITI). The main purpose of this award is to give due recognition to organizations or companies with an excellent quality management practices especially in their daily operations.

The National Productivity Corporation (NPC), Malaysia launched the Malaysian Benchmarking Services (MBS) in 1997 to encourage and assist local companies in achieving business excellence through benchmarking against world-class performance standards. One main driving force for benchmarking is intense competition, which leads to a search for excellence, especially among competing companies, with the aim of becoming or staying competitive in the market place (Bagchi, 1996). The MBS also provides information on best practices and benchmarks through partnerships and networking. Unfortunately, Lee, Zailani, and Soh (2006) noted that the adoption rate of benchmarking for Malaysia's manufacturing sector lags far behind that of Western countries.

2.6 Change Management

In this turbulent world, 'change is inevitable'. Organizations face the continuous need to change as they fight to stay afloat and compete in an increasingly competitive and globalized economy (Westover, 2010). Either internal or external pressures can trigger changes. Internal pressure could the problem of generating growth whereas external pressures could be finding solutions to overcome market forces. Much time and energy is required to review and study surrounding change

models and to bring about a better understanding of change as it relates to an organization. Because of its exceptional complexity and dynamic nature, organizational change has been a relevant research problem since the establishment in the formation of social sciences.

In the later half of the century, a great desire grew in planning for change and the individuals' role in creating change. Kurt Lewin (1952), categorised change into three phases: unfreezing, changing, and refreezing. His classic study proposed that organizations could be unfrozen, moved and re-frozen, thereby discarding the old view of a unilinear path of change. Burnes (2004) referred to Lewin as one of the early pioneers in group dynamics and pointed out how individuals will typically go along with the group norm without considering the consequences of their actions. Armstrong (2006) further described Lewin's change model, as a methodology for analyzing change, which is called field force analyses. The driving forces are factors propelling change, and the restraining forces are factors acting as barriers to change. In a state of equilibrium, driving and restraining forces interact together as a force field. For change to happen, the force field must be altered by either reducing retraining forces or increasing driving forces.

Tracing the path in the development of change made by management, Elrad II and Tippett (2002) concluded that the 13 of 15 of the underlying change models, ranged from normality through some form of disruption to a re-defined normality. Each of these models of change followed Lewin's pattern of starting and ending in a state of equilibrium, with a temporary period of transaction. In the initial state of normality, a reasonable level of performance can be maintained. In the region of disruption, the performance of an individual or an organization is liable to diminish. A redefined

normality will be in the final stage when the understanding and change expectations by individual or organization are more closely aligned with reality and performance increases. The similarities, differences and symbolic relations of development or change model are presented in Table 2.2 below.

Table 2.2
Summary of Change Models

Date	**Source**	**Initial equilibrium**	**Transition**	**Final equilibrium**
1952	Lewin	Unfreezing	Moving	Refreezing
1961	Harvey et al.	Unilateral dependence	Negative independence	Conditional dependence, positive dependence
1967	Fink	Shock	Defensive retreat	Acknowledgement, adaption, change
1969	Kubler-Ross	Denial	Anger, bargaining, depression	Acceptance
1969	Adams	Dependence	Reaction or rebellion	Coordination and integration
1977	Elgin	Decline	Crisis, muddling through and procrastination, chaos	Back to basics, transformation and revitalization
1982	Lippitt	Shock	Defensive retreat	Acknowledgement, adaption, change
1989	Rashford and Coghian	Denying	Dodging	Doing, sustaining
1990	Perlman and Takacs	Equilibrium, denial	Anger, bargaining, chaos, depression, resignation	Openness, readiness, re-emergence
1994	Reynolds	Denial	Resistance	Commitment, exploration.
1996	Bupp	Shock, denial	Anger, bargaining, grief	Acceptance, exploration, opportunity, accomplishment, creativity
1996	Grant	Shock/ immobilisation, denial/minimisation	Depression/Incompetence	Acceptance, letting go, testing, search for meaning, integration
1996	Mariotti		(1) Confusion (2) Immediate criticism (3) Denial (4) Malicious compliance	

			(5) Sabotage (6) Easy agreement (7) Deflection (8) Silence	
1993	Katzenbach and Smith	Working group	Pseudo-team	High performing team, potential team, real team.
1994	Kegan	Unfreezing	Double-loop unfreezing	Triple-loop unfreezing, and others

Source: Adapted from Elrad II and Tippett (2002)

This author believes that the three-phase analysis of change models, initial equilibrium-transition-final equilibrium, to be followed, whether the best decision is made and the will be accepted by those involved in each phase is still questionable. In this case, hierarchy of management is a pressure given to managers related to how they manage change in an organization. Most past empirical studies have concluded that the majority of change models followed three phases. Managers should understand what organizational factors are critical for change, and the changes that can bring a desired outcome for the organization.

Kotter and Schlesigner (1979) regard that with the increasing demands of competition, growth, changing workforce, government regulations, and technological developments, the majority of companies will find that they must undergo moderate organizational changes within a year and major changes every four to five years. After thirty-two years, this statement is found not only to be still valid, but also more valid than before (Goksoy et al., 2012). Even today, the shorter product life cycles, speed of rapid changes in the markets, higher customer demands and expectations require fundamental changes for an organization's strategy, structure, culture, human resource and other processes in management processes. In

short, most companies are forced to manage organizational change to shore up their operational capabilities.

Kotter (1996) emphasized that major change efforts have assisted some organizations to adapt significantly and improve their competitive standing in competitive markets. In contrast, the downside of change is that in too many situations the improvements have been unsatisfactory and the outcomes have been disastrous for the employees and those in charge. This includes, for example wasted resource, burned-out and frustrated employees. Kotter also states that the biggest error leaders make when trying to change organizations is to plunge headlong without establishing a great enough sense of urgency in fellow managers and employees.

Graetz and Smith (2010) argued that organizational change from the resource perspective mostly focuses on the strategic capability of the organization, rather than on adapting to the environment. Under a rational philosophy, change is internally directed, controlled and certain. Apparently, the only limitation for an organization's success is its management of resources. The stimulus for change (small or large, fast or slow,) comes principally from within, as organizations seek the resources they require, while control is directed and comparatively certain. Organizational performance is a consequence of adaptively between two or more factors such as the use of technology, structure, strategy, style, systems, culture or organization's environment (Pfeffer, 1982). By including a careful consideration of those factors in every new implementation, the desired operational excellence will be realized.

According to Zink (2008), many concepts about change that leads to organizational excellence have put a greater emphasis on employees. Although, this perspective

calls increased participation in the change process, more intensive study should be made to find the best work methods for an organization to be the most productive. In fact, any change programme would revolve around people. Kalyani and Sahoo (2011) proposed that the process, role and function of human resource (HR) must be redefined in the context of change because the dynamics of change have become a central facet of any business. Herscovitch and Meyer (2001) argued that 'commitment' is one of the most important factors involved in employee support for change initiatives. Later, Meyer et al. (2007) concluded that a key to the successful implementation of organizational change is employee commitment.

Change management can be defined as the introduction and management of initiatives designed for renewing an organization's structure, capabilities and direction to serve the ever-changing needs of external and internal customers (Moran & Brightman, 2001; Peus et al., 2009). Because the success and future of every organization depends upon how well managers handle change (Kalyani & Sahoo, 2011; Peus et al., 2009), discussion of research assessing the relationship between management of change and operational excellence is important. Management of change includes planning and realizing changes that concern an organization's critical success factors. These success factors might be due to its policies, competencies and the capability for renewal. A firm's critical success factors that influence organizational change also be identified through the empirical evidence.

Changes vary in an organization. Paton and McCalman (2000) divided the changes (problems) into two categories by using the terms 'hard' and 'soft'. They claimed that hard systems problems can be handled in relative isolation from their organizational context and it is easy to perceive what needed to be done. 'Hard' is

often technically oriented and often has known time scales. In contrast, soft systems problems are larger and concerned with many people, and may have serious implications if not well take care of in an organization. 'Soft' is subjective and at best leads to semi-quantifiable objectives. Past studies have categorized three "hard" S's of strategy, structure, and systems; and the four "soft" S's such as skills, staff, style, and share values (Peters & Waterman, 1982; Nonaka & Johansson, 1985). In this author's view, integration of both 'hard' and 'soft' elements may let organization confront changes effectively regardless of whether changes are proactive or reactive. In fact, the 'hard' and 'soft' elements interact if we view them from a management perspective. Benefits can result from using a combination of both hard and soft elements in operation management (Kirk, 1995). Therefore, all the hard elements and soft elements must be identified from past studies before the integration can take place.

2.6.1 Manufacturing Technology

A successful change management initiative relies on the correct balance between technology and business. Advanced technology is playing a key role in the ability of manufacturing companies to compete as world-class enterprises. Thus, new manufacturing technologies are needed to assist in reducing production time to move products to the market more rapidly and efficiently than competitors (Chuang et al., 2009). Choice of a new manufacturing technology is a key decision-making process for justification and implementation of new manufacturing technology. The choice requires a detailed consideration of various performance measures. Indeed, acquiring

and implementing new technologies is perceived as a high-risk investment and determinant of competition.

Over the past two decades, manufacturers have focused on improving the quality of their processes as a method of achieving operational excellence. Advancements in technology for at least the past twenty years have played an important role in driving the growing number of quality improvement initiatives in manufacturing worldwide. Besides, new and emerging technologies are assisting companies to attain operational excellence. However, Gouvea da Costa and Pinheiro de Lima (2008) argued that the advanced manufacturing technologies (AMT) generate opportunities and not advantages. The advantages can be accomplished through a proper selection and implementation of the technologies.

Dolage and Sade's (2012) assessed the impact of Flexible Manufacturing Technology (FMT) in its adoption on the profitability of the selected manufacturing industry in Malaysia. The types of FMT considered are, namely, Automated Inspections (INS), Robotics (ROB), Computer Numerical Control Machine Tools (CNC), Computer Aided Design (CAD), Numerical Controlled Machine Tools (NC), Automated Storage and Retrieval Systems (ASR), Programmable Logic Controllers (PLC), and Local Area Networks (LAN). The findings suggested that a high level of FMT adoption improves price cost margin (PCM). Therefore, FMT has the potential to bring about impressive cost savings for a manufacturing firm in a long run.

Cordero et al. (2008) investigated the extent to which firms employing competent workers, in addition to adopting advanced manufacturing technologies (AMT) and organization at technologies (which include total quality management and just-in-time techniques) changed manufacturing performance. The data were collected from

89 managers in the micro electro-mechanical systems manufacturing industry with a survey questionnaire. The findings suggested that the moderating effect of competent workers increases both effectiveness and flexibility of manufacturing. In details, the adoption of AMT partially increases both effectiveness and flexibility of manufacturing with the presence of competent workers. Similarly, in the presence of competent workers, the adoption of organization at technologies increases effectiveness, but partially decreases flexibility of manufacturing. The research presents evidence that firms adopting organization at technologies and AMT, and staffing with competent workers alter two broad dimensions of manufacturing performance and their indicators through both additive and synergistic effects. The researchers propose that future research could study additional aspects of manufacturing performance, and use more objective and extensive measures. Generally, manufacturing performance has been categorized in terms of quality, cost/efficiency, delivery/responsiveness, and flexibility that a manufacturing unit must have with the aim of competing (Kristianto, Ajmal, Tenkorang, & Hussain, 2012). Thus, all mentioned indicators are crucial for measuring performance in the manufacturing industry.

The adoption of the ERP technology is truly a global phenomenon, especially in the manufacturing industry. ERP is the industry term used to describe a software package that integrates information flow across business functions and unit boundaries, and even among business partners (Morton & Hu, 2008). Markus and Tanis (2000) found that ERP adoption is a complex task in technology innovation and organizational change management. ERP implementation also can be referred to as an “organization wide revolution” because it brings huge changes to an organization (Hammer & Stanton, 1999; Bingi, Sharma, & Godla, 1999). Benjamin

and Levinson (1993) pointed out that numerous organizations face challenges in implementing AMT projects because they put inadequate emphasis on the management of change brought about by the technology. Conversely, the successful implementation of an ERP system allows for the identification and implementation of the set of tools, procedures, and best practices designed to reach organizational excellence through functional integration (Mabert & Venkataramanan, 2000; MacDonald, 1994).

Most of the literature review has found that manufacturing technologies such as AMT, TQM, JIT, and ERP have had a significant impact on firm performance. However, because manufacturing firms are on-going in adopting advanced technologies or enhancing existing technologies towards operational performance. A lack of integration from the technological viewpoint exists in the change environment. Furthermore, operational priorities and sustainability have not been fully examined in previous studies. Overall, the author views that manufacturing technologies should be incorporated with a change measuring framework in this present study.

In this current study, the adoption of manufacturing technology, which consists of selection, acquisition and exploitation, is based on three out of five technology management assessment indicators in Kuruppuarachchi and Perera's study (2010). This perspective notes that even organizations that are capable in selecting and acquiring new technology, a lack of technology exploitation or enhancement could reduce performance dimensions, especially quality, cost, delivery, flexibility and sustainability. The following hypothesis captures the relationship between manufacturing technology and operational excellence.

H_1: The use of the manufacturing technology will lead to the achievement of operational excellence.

2.6.2 Organizational Structure

Organizational structure exists in various forms. Mintzberg (1989) has written extensively on the importance of organizational structure. Mintzberg described organizational structure as the set of all the ways in which the work is divided into different tasks, achieving coordination. The characteristics of organizational structure are also viewed as important elements influencing the company's innovation and productivity (Germain, 1996). In essence, organizational structure provides the task, responsibility and authority relationships that predetermine the way in which employees work.

Alam (2011) investigated the causal relationships of organizational structure (independent variable), work norms (moderating variable) and performance (dependent variable) in Pakistan. The sample was selected from different organizations such as travel agencies, high schools, and construction companies. The research focused especially on centralization. The finding showed a positive and significant relationship between centralization and performance (efficiency). The study also found a positive and significant relationship between work norms (like time allocation, scheduling and synchronizing) and performance (efficiency). The findings will assist organizations to determining the structure that helps them achieve their expected performance. However, the study was limited to one performance attribute (efficiency), which means that further assessment of other performance

attributes like flexibility and speed might possibly show an association with decentralization rather than centralization.

Organizational change is the process by which companies alter their strategy and structure to improve performance (Farahmand, 2010). Individuals, groups, and units are the mechanisms of the organizational structure. Hence, their actions and effectives will determine the successful implementation of organizational structure. Organizational structure change is not an instantaneous process; large firms often take many years to change from one organizational structure to another. Edelman et al. (2005) proposed that organizational structure can improve a firm's performance by contributing to the development of competitive strategies that aim to satisfy customers' needs better than competitors. For example, if organizational structure has certain uniqueness, the achievement of the intended strategy can be easier, and so with the improvement of performance.

Dalton, Todor, Spendolini, Fielding, and Porter (1980) and Pleshko (2006) found that the relationships between key structural dimensions and performance were not strongly supported. They summarized this relationship as being inconsistent. The four major structural dimensions are centralization, formalization, complexity, and integration, and they seem to have either a positive association or a negative association with performance at other times. Even though the inconsistency of the impact of structural dimensions on performance is known, it is, widely accepted that specific structural forms do indeed influence performance in some way (Miller, 1988). For example, structural form appears to have an influence on profitability.

Meijaard, Brand, and Mosselman (2005) portrayed that some organizational structures performance better in particular sectors and there is no one best way of

organizing. Kosova, Lafontaine, and Perrigot (2010) argued that different types of organizational structures performance equally well. In addition, changing organizations have more chances to increase profit than do stable organizations. On the other hand, Leitao and Franco (2008) provided evidence about the relationship between the structure and performance. In their study, efficient organizational structure positively influenced economic and non-economic performance. Furthermore, organizational change or changes in organizational form have significant influence on service provision and investments (Ciliberto, 2006).

Claver-Cortes, Pertusa-Ortega, and Molina-Azorin (2011) examined organizational structure characteristics and the firm performance mediated by hybrid competitive strategies. Large Spanish firms from different sectors were used as a sample in the study. The results showed that hybrid competitive strategy positively influenced firm performance. Organizational complexity and the existence of formalization influenced hybrid competitive strategy positively, whereas centralization had a negative influence. Organizational structure exerted an indirect influence on performance through a hybrid competitive strategy. From the study, researchers concluded that the organizational design associated with hybrid competitive strategies also seem to be hybrid. They suggested that future organizational design could include a high degree of formalization and complexity of mechanistic structures and a low degree of centralization of organic structures (Burns & Stalker, 1961; Claver-Cortes et al., 2011).

Mansoor et al. (2012) explored the impact of mechanistic structure and organic structure on an organization based on the qualitative research approach. The study basically focused on two dimensions of organizational structure, which were

formalization (or standardization) and centralized decision-making. The analysis showed that organizational performance declined when there was a higher degree of formalization. Formalized demarcation of lines of control can restrict employees' involvement and contributions, thus leading to a decrease in organizational efficiency. Moreover, a high degree of formalization, which can undermine organizational performance, may be caused if today organizations do not use non-routine technologies. However, centralized decision-making expertise showed better results in the public sector under highly stable conditions. The public sector refers to the police, the army, the navy, the teaching profession, and the social sectors. Conversely, decentralized decision-making ability works well in private sector organization, especially when condition are changing at such a rapid pace and fast decisions must be implemented.

Since the seminal work of Burns and Stalker (1961), researchers have believed that an organization's structure can be separated into mechanical and organic structures. The mechanical structures are for predictable and stable environments whereas the organic ones are for dynamic or changing environment. Burns and Stalker (1961) argued that, in changing environments, formalization diminishes organizational adaptability to environmental changes and increases organizational failure rate. By contrast, the organic ideal type emphasizes role flexibility rather than "duties and powers attached to each functional role" or "the breaking down of tasks into specialism" (p.5).

Although it may seem correct to advice manufacturing companies with low formalization to be more adaptable and flexible in dynamic environments, the same advice may not necessarily be appropriate for firms involved in incremental change.

In addition, a lack of role formalization may lead to role ambiguity (Sine, Mitsuhashi, & Kirsch, 2006). Conversely, the formalization of roles and behavior enables organizations to predict, reduce, and control variability because role formalization creates a condition in which "everyone knows exactly what to do" and intimately decreases coordination costs (Mintzberg, 1979; Sine et al., 2006). In changing environments, role ambiguity may also cause confusion about what should be done to adapt to new situation.

Although today ISO 9000 certifies most excellent companies, which substantially increases the amount of formalization and measurement by written rules and procedures, the nature of the process actually has facilitated the decentralization of decision-making authority. Moreover, under increasingly dynamic and competitive pressures, experienced workers who have wider skills, knowledge and work responsibilities would need a higher degree of autonomy and self-regulation. Therefore, decentralization is suggested for these reasons in present study (Martinez-Leon & Martinez-Garcia, 2011).

Classical and contemporary literature provide common characteristics of organizational structure types and reveal several dimensions of organizational structure. The major dimensions that characterize an organization's structure are the formalization of rules and procedures and its degree of centralization in decision-making. Environmental changes may have a direct impact upon organizations as well as their structures. In order to attain better results in that situation, a need exists for an appropriate structure that suits best in changing organization's demand. The choice of an appropriate structure greatly depends upon the conditions in which an organization is operating (Mansoor et al., 2012). For instance, static and change

environments cannot be treated equally. However, little empirical research in assessing change in organizational structure to predict organizational performance or operational excellence exists.

Rather than using the dichotomy Burns and Stalker (1961) proposed, which considers the level of formalization and centralization, this research is focused on formalization and decentralization. This current describes an organic structure as having formal rules and procedures that encourage creativity, learning, autonomous work, and decentralization of decision-making to the greatest extent possible (Daft, 1995; Nahm, Vonderembse, and Koufteros, 2003). Exploring this whether this organic structure has an effect on operational excellence in Malaysian E&E industry will be interesting. Thus, the hypothesis is proposed as follows:

> H_2: The implementation of an organic structure will lead to the achievement of operational excellence.

2.6.3 Operations Strategy

Operations strategy was established as a core topic in operations management by major contributions from Skinner (1969, 1974, 1985), along with Hayes and Wheerlwright (1984), as well as from Hill (2005). More than forty years ago, Skinner (1969) made a seminal contribution to the literature of operations strategy. Since that time, the discussions of the role and purpose of operations strategy have been broad and have included numerous frameworks for identifying key manufacturing decisions. For operations strategy to be useful, that strategy must exhibit consistency among decisions that affect business-level strategy, competitive

priorities, and manufacturing infrastructure (Skinner, 1969; Hayes & Wheelwright, 1984; Hill, 2005). Much of the degree to which operational strategy will be effective relies on the internal consistency of operations strategy, marketing-manufacturing congruence, operations capabilities, and their effects on operational performance.

Skinner (1974) provided important an insight with his concept of the focused factory, linked to how a firm could compete via its internal capabilities. An operations strategy is recognized as an effective use of operations capability for achieving operational goals and business excellence. To successfully implement change, an organization must have the internal capabilities to executive the defined operations strategy. While integrating Skinner with a resource-based view of the firm, Hayes and Pisano (1994) stated that operations strategy was the process of creating the operating environment that the company needed for the future.

Mintzberg (1990) identified key elements of strategy that included content (strategy itself), process (how strategy is formed) and the context (what dimensions surround strategy formation). Most studies that only included the content dimensions of operations strategy when investigating the relationship between operations strategy and performance conceived strategy of competitive priorities. Competitive priorities have been defined as the capabilities that the operations area must have for the firm to compete, in the light of its overall business strategy (Oltra & Flor, 2010). Wheelwright (1978) classified operations priorities in terms of efficiency (which subsequently has been generalised as cost), quality, time delivery, and flexibility.

Operations strategy research has often been contextualised within manufacturing paradigms (Brown & Cousins, 2004; Brown et al., 2010). They summarized that operations of firm were linked to specific modern manufacturing terms, which

included mass customization, flexible specialisation, lean production and lean supply, agile manufacturing, and strategic manufacturing. All the mentioned manufacturing techniques will work with respect to operations strategy to achieve business goals and corporate missions.

With respect to return on sales, Tunalv (1992) found that firms with a formulated operations strategy achieved better business performance than firms without such a strategy. Later, Sun and Hong (2002) investigated the relationships between alignment, business performance and manufacturing performance. Although not linear, they found that alignment has a positive relationship with four subjective measures of business performance. Joshi, Kathuria, and Porth's (2003) study provided interesting views into strategic alignment within the firm and operations performance. Chenhall's (2005) subsequent empirical research further supported the connection between operations strategy and business performance. Hence, past studies provoke interest and potential for future research on the links between operations strategy and firm performance.

Brown et al. (2007) explored the relationship between the process of strategy formulation and operational performance within firms. Nine computer manufacturers from Europe and seven located in the United State were involved in the case study. The study argued that WCM incorporates both strategic operations processes and strategic operations content, whilst low-performing plants do not. By connecting manufacturing strategy process and strategic alignment to WCM practices and performance, this research contributes a new dimension to the study of WCM, commonly to the best practices and practice-performance debates. The performance measures of the study are quality, innovation, inventory, and supplier management.

Therefore, the researchers suggested future research could scrutinize other dimensions of performance such as cost, delivery, flexibility, customisation or variety.

Three years later, Brown et al. (2010) examined the relationship between the content and process of operations strategy within performance of firms in a range of operations parameters. The study assesses two broad groups, strategically fragmented and strategically inclusive. The findings suggested that strategically fragmented firms have lower quality, inventory and supplier performance, with slower new product development processes than strategically inclusive firms. Another finding concluded that the content of strategically fragmented firms is less wider than that of strategically inclusive firms. This study only explored four operational performance parameters, namely innovation, inventory, quality and supplier management. Hence, future research could explore the range of other important operations performance measures including cost, delivery, flexibility, variety or customisation.

A review reveals gaps in the previous literature on specific links between change capability and operations strategy; and the links between these two entities and manufacturing performance measures. To rectify this shortcoming, a new focus was given to change capability in operations strategy to predict operational excellence in quality, time, cost and flexibility (Wheelwright, 1978; Brown et al., 2007; Brown et al., 2010) and sustainability (Muogboh & Salami, 2009). Moreover, the capability of change in operations strategy is based on Skinner's (1969) initial framework. In view of this, this research hypothesizes that:

H_3: A well-defined operations strategy will lead to achievement of operational excellence.

2.6.4 Leadership Style

Change has become a major theme in leadership literature for good reasons because leaders define the context, set the direction and facilitate coherence for their organization (Kanter, 1999). Kanter (1999) also pointed out that passion, conviction, and confidence in others are the most important values a leader can bring to a changing organization. A successful leader of change solely focuses on change. His good business acumen is the driving force behind his efficiency in thinking and acting effectively in business decisions. Therefore, the leadership of an organizational team must ensure that the rank and file embraces operational excellence.

Leadership is the primary criterion of the European Foundation for Quality Management (EFQM) Excellence Model, a model of organizational excellence which is used by 30,000 organizations across Europe (EFQM, 2010). The EFQM Model is in keeping with developments in leadership theory.

Since Bass' seminal book on transformational leadership was published in 1985, a number of researchers have begun studying this particular leadership model, which has emerged as perhaps the most frequently researched topic in leadership of the last two decades (Jung, Yammarino, & Lee, 2009). Avolio and Bass (1991) further developed Bass's (1985) original model into what they described as 'The Full Range of Leadership Model'. This model includes leadership styles of: (1) transformational

leadership, which is based on idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration; (2) transactional leadership, which is based on contingent award, management by exception active, and management by exception passive; (3) laissez-faire or no leadership. Among the leadership styles, transformational leadership ranks as the most effective in this model, followed by transactional leadership and then by laissez-faire (Vigoda-Gadot, 2007). A transformational leader was also perceived as more supportive than transactional leader and laissez-faire leader.

Burke and Church (1993) carried out a study to determine the preferred leadership style use by a change agent while managing change in organizations. The survey was based on responses from 357 organization development or human resource development practitioners on the Change Agent Questionnaire (Burke, 1990). The huge majority of respondents chose the transformational statement rather than the transactional to explain their approach to their consulting work. The research findings also suggested that transformational approach is more effective in managing change, especially when faced with ambiguous situations. Another research finding was that 97 per cent agreed that the future of an organization as state by its leaders is one of the most important aspects of a successful change effort.

Eisenbach et al. (1999) conducted their study by drawing parallels between leadership literature and change literature. The literature of transformational leadership is concerned primarily with the capabilities required of success in enacting change. By displaying the appropriate behaviour at the appropriate stage in the transformation process, transformational leaders can successfully change the status quo in their organizations. Indeed, the practice-related themes that emerged in

this study include leadership qualities and social influence processes that facilitate leaders to enact change successfully. The discussion of this quality is referred to as behavioural integrity, whereby social influence is a good relationship between supervisors and fellow group members that possibly can be used as a vehicle to create a favourable climate for change. Abrhiem's (2013) recent study further addressed the importance of success in enacting change is a crucial issue faced by today's organizational leaders of today (Eisenbach et al., 1999).

Boehnke et al. (2003) examined how leadership works in various national settings. The respondents were senior executives from a global petroleum company. They were first asked to describe exceptional organizational performance examples and then to identify the key leadership behaviors that they explained or accounted for superior outcomes. The main finding was that transformational leadership behavior will universally help leaders work more effectively with people to achieve their needs and create excellence performance. On the other hand, leaders must adapt themselves to those behaviors in order to cope with national differences.

Idris and Ali (2008) explored the relationship between leadership style and organizational performance in Malaysian organizations. A cross-sectional mail survey was conducted by distributing 600 sets of questionnaires to the Chief Executive Officer of companies and yielded 97 responses, which was a response rate of about 15 per cent. The findings showed that best practice management mediated the relationship between transformational leadership and financial performance and that transformational leadership was also significantly related to financial performance. The study emphasised key aspects of future-oriented elements of transformational leadership and internalising best practices as an effective

management approach to nurture organizational change. The ability to weld these approaches in an effort to bring change in the organization is a highly effective means to progress to a world-class standard. Researchers recommended that future studies could include other types of Malaysian companies because the samples were limited to ISO 9000 listed company. In addition, only one item indicator was used to assess the financial stability and profitability of a company. Therefore, more holistic indicators should be used to gauge the performance of the company for future study.

TQM gurus such as Deming, Crosby and Juran have recognised clearly the role of top managers as a key person in effecting quality management in a company. Due to this consensus, almost all models of excellence include leadership either as an enabling driver or a tier-one contributory element (EFQM, 1999; MBNQA, 1997; NPC, 2005; Kanji, 1998). This indicates that the focus of organizational capabilities must hinge on the ability to direct resources on learning a leadership style that could drive performance. Moreover, change ability and adaptation to new business rules demand that organizations acquire critical capabilities. It has been deduced that competent leadership is akin to a stimulant that can trigger the process of change in any organization.

Lo, Ramayah, and Min (2009) investigated leadership styles and organizational commitment of employees in the manufacturing industry. Transformational and transactional leadership styles were selected as the research focus to examine the impact on organizational commitment. Data were collected from 166 Malaysian executives from local manufacturing companies. The findings specified that several dimensions of transformational and transactional leadership have positive

relationships with organizational commitment, but the impact is greater for transactional leadership style.

Battilana et al. (2010) bridges the leadership and organizational change literature by investigating the relationship between leadership competency of managers and the different activities involved in planned organizational change implementation. This study conducted in United Kingdom with the participation of 89 clinical managers. The researchers found that leadership competencies might differentially influence emphasis on three key activities (namely, need for change, support the change, and evaluate the change) involved in planning organizational change. This indicates that when dealing with implementation the role of leadership changes, and change should be considered as a complex multidimensional task. The researchers suggested future research to explore the influence of transformational leadership and charismatic leadership in planned organizational change. They also recommended that measurement instruments, namely, the Multifactor Leadership Questionnaire (MLQ) (Bass & Avolio, 1990; Howell & Avolio, 1993), could be used to measure related leadership dimensions.

Leadership has been recognized as a key factor in organizational success, and this factor has been validated empirically in many fields. However, leadership styles in the context of management of change and its effect on operational excellence in manufacturing industry have not been as widely researched. Management of change depends upon the leadership enacted, particularly the leadership style primarily concerned with the capabilities required to enact change successfully (Eisenbach, et al., 1999, Burke & Church, 1993; Idris & Ali, 2008). Moreover, a transformational style of leadership can produce positive organizational change and create exceptional

performance (Bass, 1985; Boehnke et al., 2003; Burke & Church, 1993). In this present study, the researcher is interested in examining the effect of transformational leadership style on operational excellence. Hence, the researcher offers the following hypothesis:

> H_4: The inclinations towards transformational leadership style will lead to the achievement of operational excellence.

2.6.5 Human Resource

Any programme of change would revolve around people such as changing their mind set and their behavioural and their motivational levels. Although human resource (HR) has always been central to organizations, today it has taken on an even a more vital role in building a firm's competitive edge. HR are the people who are behind every success story. Success essentially depends on "people-embodied know-how" such as knowledge, skills, and abilities imbedded in an organization's members (Kalyani & Sahoo, 2011). The future and success of every organization depends upon how well managers handle change. In other words, both success and growth serve as the means for change management. In fact, HR is an intellectual capital that can include the skills, knowledge and competencies that an organization processes and channelizes for sustained organizational excellence. By using HR strategies and practices as a tool, excellence, which surpasses outstanding achievement, can be achieved.

In discussing the relationship between human resources and operational excellence, quick reference at the relevant Excellence Models might be helpful (Zink, 2008).

This includes, for example, looking at the criteria used in awarding the EFQM, the MBNQA, the Japan Quality Award, or the Australian Business Excellence Framework, which share many aspects in common concerning employee oriented approaches like deployment and HR results. All models (more or less) value human resource fundamentals. Since 1989, HR has played an important role in change in organizational excellence on top of Malcom Baldrige Criteria for Performance Excellence. This is especially true with respect to the criteria giving greater weight to the human resources aspect.

Barney's (1991) resource-based view of an organization proposed that human resources could provide a rare and incomparable source of competitive advantage. He adds that the human resource-based view of the firm provides the opportunity for an organization to obtain and retain sustainable competitive advantage that is largely dependent on the degree of exclusiveness found in the employees' competencies and skills. Because people are seen as resources, which implies that they are seen as sets of competencies, skills, knowledge, and attitudes that are necessary to render positive advantage to an organization (Doorewaard & Benschop, 2003). Although competencies and skills are irreplaceable and genuine, the uniqueness lies in the fact that the higher their contribution to work the greater their achievement in promoting organizational excellence.

Ferguson and Reio Jr. (2009) examined linkages among human resource inputs (employee skills and motivation), human resource practices (training and development; rewards) and organizational outputs included job performance and firm performance. This cross-sectional study comprised 350 business professionals from Mid-western professional organization. The findings indicated that both human

resource inputs and process were related positively to job and firm performance. Continued research is needed to determine a more complete list of factors in human resource practices that influence organizational outcomes.

Technological developments and organizational change have gradually led some employers to realize that success relies on the skills and abilities of their employees which will eventually be translated into considerable and continuous investment in training and development. Stavrou-Costea (2004) highlighted that the top-rated changes for organizational performance Human Resource Management (HRM) are flexibility and efficiency, training and development, and employee relations. Furthermore, the challenges in training practices, in development, in employee relations, in efficiency and in flexibility are related significantly to organizational productivity in most of the Southern European Union group consisting of Spain, Italy, Portugal and Greece. Researchers also suggested that Southern EU firms should employ requisite flexibility, training, development, and employee-relations practices in order to achieve excellent organizational performance. In short, an organizational must confront needs to be addressed with the work of human resources in today's highly competitive environment.

Court (2011) views HR professionals as change agents playing a major role in helping organizations build their capability to change. They act as partners with the business operations team in ensuring that HR strategy and business strategy are aligned. Court also claims that organizations too often have to rely on only one intervention or training. Although training may help develop some skills, the quick application of those skills is crucial. Therefore, HR professionals should broaden the range of approaches at their disposal to create a thoughtful series of interventions

that combine training, with on-the-job coaching supported by appropriate tuning of reward and performance measurement systems.

Gurbuz and Mert (2011) examined HR practices and strategic human resource management (SHRM) to assess the impact of these practices on operational performance, financial and market performance, job satisfaction, and turnover. The HR practices are categorised into two factors, namely, participation and communication, and selection and development. The study used data from Turkey's Top 500 firms-2007. The findings demonstrated that the selection and development practices and SHRM have direct and positive effects on operational, financial and market performance. Moreover, the participation and communication showed a positive correlation with operational performance and job satisfaction. Conversely, selection and development were found to have a negative effect on turnover. The results of this study contributed to the growing empirical evidence that the notion of HR as a competitive advantage for organization is not a theory, but a fact. Based on current results, managers should be aware of the fact that the HR function and effective implementation of some HR practices may bring in higher organizational performance and more satisfied workforce.

Dimba (2010) investigated the direct or indirect relationship between strategic human resource management (SHRM) practices and firm performance. A test sample of 50 large multinational corporations operating in Kenya was chosen in this study. The finding showed that two SHRM practices, compensation system, and training and development, could best predict firm performance. Another finding was that the relationship between SHRM practices and firm performance is indirectly through motivation. However, the relationship between the use of SHRM practices

and firm performance does not hold across the five bundles (namely, training and development; compensation systems; recruitment and hiring; performance appraisal; flexible work arrangements) of what are considered as "high performance work practices". The results showed that the applicability of models of SHRM practices from Western nations in MNC's operation in developing countries is doubtful. Because of this, future studies should focus on more than the five bundles moving towards a broader scope of practices. A broader scope is necessary because it will help multinational corporations avoid practices that conflict with conventional ways of doing things in the host country.

Khan (2010) conducted a study to evaluate the influence of human resource management practices on organizational performance. The respondents were 150 managers from 20 randomly selected Oil and Gas firms in Pakistan. Data collected was through self-reported questionnaire, which measured five HRM practices and subjective measures of organizational performance. The results showed that the five HRM practices, namely, training and development, employee participation, recruitment and selection, compensation and rewards, and performance appraisal had significant positive relationships with firm's performance. This study emphasized the need for an integrated approach toward formulation and implementation of HRM practices and also the importance of these practices to achieving and sustaining superior performance in a changing business. Khan suggested that organizations need to pursue proactively a strategic approach to HRM practices and invest in such practices to realize business excellence in tangible and intangible dimension.

Scant attention has been paid to addressing the impact of managing human resource change on operational excellence. Therefore, further research may help to examine

how firms sustaining organizational excellence are influenced by how a firm manages change with human resource practices. The universal uses of HR practices include recruitment and selection, training and development, performance appraisal, and compensation and benefits could be explored in the present study to predict operational excellence. New knowledge generated from this study could conform with theory building efforts in the HR field, particularly as related to the view of human resource-based view as meaningful organization outcomes and in due course excellence. Therefore, the researcher hypothesizes that effective human resource practices will lead to positive achievement in operational excellence.

H_5: Effectiveness of human resource practices will lead to the achievement of operational excellence.

2.6.6 Organizational Culture

On the one hand, culture refers to shared norms, values and assumptions and on the other hand to the visible expressions of these in the form of behavior**.** Gupta (2011) portrayed organizational culture as an inspiration that may influence individual commitment and performance by setting practices, positive value, and a meaningful work climate. For example, operational excellence is an enterprising culture improves the way in which corporation delivers products and services to its customers.

Indeed, operational excellence requires a deep commitment and a culture of change because an organization can seldom stand still for long. In highly competitive

environments, in which competition means the survival of the fittest, continuous change is vital if an organization is to stay afloat.

Bate (1994) described two basic approaches to culture, and by implication, both are transforming (changing and breaking existing patterns) and strategic conforming (maintaining order and continuity). Citing the subsequent poor performance of many of the so-called 'excellent' companies, Peters and Waterman (1982) pointed to the importance of a strong cohesive culture for success. They further explained that the effective choice of organizational culture and a strategy approach depend upon contextual factors relating to both the internal and the external environment. Hence, context determines culture needs to be maintained or changed but the paradigm and perspective subscribed by the manager or change agent will determine the strategy's adoption. Moreover, Willcoxson and Millett (2000) argued that no definite answers are present for the most appropriate way to maintain or to change an organizational culture for success. If so, is maintenance or change is required in a given context.

Markovic (2008) defined organizational culture as a specific collection of norms and values that people and groups share in an organization and that control the way they interact with one another and with stakeholders outside the organization. He added, there was a call for a new idea of managing organizational change due to the emergence of new challenges and cyber age. According to Fang and Wang (2006), study of the effect of organizational culture on operational practices was neglected in the early years. In a similar study (2006), they found a positive relationship between organizational culture and operations performance such as quality and flexibility.

Studies in different contexts have found that organizations with innovative cultures are successful in implementing change programme. Ungan (2007) found that

innovativeness of organizational culture was significantly associated with the success of implementing manufacturing best practice. Cultures, which are open to new ideas and encourage creativeness, would logically be more successful in implementation. Inspiring every employee to be creative, offering suggestion and making change will promote continuous improvement culture within organization. Importantly, employee involvement and commitment are determinants for successful organizational change (Soumyaja, Kamalanabhan, & Bhattacharyya, 2011; Herold et al., 2007).

You et al. (2010) analysed the influence of corporate cultural traits on business performance in the Australian automobile industry undergoing rapid change. The aim was to identify traits that may enhance business performance and lead to a sustainable competitive advantage. The study used the corporate cultural traits of consistency, mission, involvement, and adaptability, which Denison, Haaland, & Goelzer (2003) developed. A questionnaire was used to survey both manufacturers and retailers in this industry; the survey response rate was 32 per cent. The research findings suggested that a link between corporate culture traits and business performance exits. Compared to other cultural traits, adaptability had the greatest influence over business performance. Future research may focus on both internal and external environmental factors affecting business performance, their measurement and their use to gain a sustainable competitive advantage.

As Denison (1990) stated, the four key traits of organizational culture include involvement, consistency, mission, involvement, and adaptability. These four different aspects of culture can be stressed by different functions. Its consistency and mission either tend or to encourage or promote stability. However, involvement and

adaptability allow for change. Furthermore, consistency and involvement see culture as focusing a viewpoint on the internal dynamics of the organization. Its mission and adaptability see culture as a way of life in addressing the relationship between the organization and its external environment.

The present study embraces change management. As the focus is on internal organization, the involvement trait (Internal Focus) is the best dimension to evaluate its effect upon the desired change within the organization. The fact is an organization with a high level of employee involvement will build up employees' capabilities at all levels and create a sense of responsibility, ownership and loyalty toward their organization. This trait is measured by the three indices, namely, empowerment, team orientation and capability development. Moreover, Denison (1990) found empirical support for the involvement view of culture in which higher levels of employees' participation are correlated with superior organizational performance.

Whilst managing organizational culture has been researched worldwide, little research has been done in the Malaysian context, with its unique culture and concentred business environment. The Malaysian E&E industry is mostly owned by foreign multinationals. Commonly, expatriate managers from the home country manage or head the MNC's operation in the developing countries. According to Patrick, Felicitas, and Albaum (2005), expatriate managers adopt the management style is in accordance with their home country's culture. Denison et al. (2003) also suggested that corporate culture maybe one of the most powerful tools to be used to improve business performance. Rose, Kumar, Abdullah, and Ling (2008) found that national culture was not a barrier for foreign subsidiaries to operate abroad. Discovering to what extent do MNCs managing corporate culture traits, particularly

higher levels of individual involvement or participation to achieve operational excellence as and when they operate in another country with diverse cultural orientations would be interesting. This current paper helps fill this gap in the literature addressing the electrical and electronics industry. This leads to the following hypothesis:

> H_6: Higher levels of individual involvement cultural trait will lead to the achievement of operational excellence.

'Management of change' appears to be a simple enough term. However, no common ontological assumption underlies either the notion of 'managing organizational' or that of 'organizational change'. Drawing lessons from an extensive literature review, this research establishes a link between management of change and operational excellence. In this study, the researcher has identified six critical organizational factors that were incorporated under management of change (MOC) to predict outcomes derived from operational excellence. Thus, this study focuses on the six elements commonly associated with management of change, namely, manufacturing technology, organic structure, operations strategy, transformational leadership style, human resource practices and the involvement cultural trait.

2.6.7 Commitment to Change (CTC)

A specific consideration needs to be given to a firm's employees when discussing organizational change. They comprise organizations and are the vehicles and real

sources for change. Thus, employees are the ones who will either embrace or resist change (Smith, 2005). There is an on-going research in understanding how individual employee's experience (Judge, Thoresen, Pucik, & Welbourne, 1999), and researchers are engaging in exploring the role of employee commitment in organizational change situations (Herscovitch & Meyer, 2002). Judging how employee commitment is similar, different, or related to one another is important. To attain the commitment of the workforce, researchers believe that top executives of the organization must strive to recognize the drivers of CTC and the crucial role they play towards success in the execution of strategic initiatives. Otherwise, unnecessary duplication of effort and redundancy could happen.

According to the previous literature, commitment to change has been found to be empirically and conceptually distinct from organizational commitment (Fedor et al., 2006; Herscovitch & Meyer, 2002; Herold et al., 2008) and to be a better predictor and supporter for change than organizational commitment (Herscovitch & Meyer, 2002; Herold et al., 2008). Specifically, such commitment to a change has been identified as a mental shift that is set towards change (Fedor et al., 2006; Herscovitch & Meyer, 2002). Fedor et al. (2006) also pointed out that past studies on organizational commitment have been related to outcomes such as organizational citizenship behaviours, turnover, absenteeism, tardiness, willing to share knowledge and job performance.

In the context of employee commitment to organizational change, Herscovitch and Meyer (2002) conducted a study on the application of the three-component model of workplace commitment (Meyer & Allen, 1991; Herscovitch & Meyer, 2001). A laboratory simulation study and two cross-sectional survey studies were used to

assess measures and test hypotheses derived from the general model. The findings supported the validity of the three commitments to change scales. In related studies, Herscovitch and Meyer (2002) defined commitment to a change as "a force (mindset) that binds an individual to a course of action deemed necessary for the successful implementation of a change initiative" (p. 475). They stated that this force could reflect: (a) a desire to provide support for the change based on a belief in its inherent benefits (ACTC or affective commitment to the change), (b) a recognition that are costs associated with the failure to provide support for the change (CCTC or continuance commitment to the change), and (c) a sense of obligation to provide support for the change (NCTC or normative commitment to the change). They further explained that these forces could be measured and shown to be distinguishable from another. Indeed, these conceptualizations share the notion of that CTC reflects some kind of attachment to and involvement in the change initiative, which results from awareness of the change.

Herscovitch and Meyer's definitions derive from Meyer and Allen (1987b) who provided a link between employee commitment and organization turnover. They argued that employees who remain are those with high affective commitment because they want to and those with high continuance commitment because they need to while those with high normative commitment because they ought to do so. Even through employees can experience each of these psychological states to varying degrees, the 'net sum' of a person's commitment to the organization reflects each of the separable psychological states. In other words, the strongest one among the three components accordingly reflects the commitment attitude of the employee.

On top of employees' commitment toward a change initiative reflecting as positive change attitude, Herold et al. (2007) suggested that employee should exert willingness, which is a vital prerequisite for successful change implementation. On the individual level, the argument could be made that high commitment towards change initiative is associated with employees' capacity to deal with stressful situations as well as their intention to embrace organizational changes (Michela & Burke, 2000). In this author's view, this is true because not all employees will support change or have an enthusiastic involvement in the entire organization change programme. Moreover, change capacity decreases as employee discontinuously develop their skills and acquire new knowledge for current challenges.

Despite the many negative outcomes related with employee resistance, Ford et al. (2008) claimed that the discussion of resistance in the context of change management has been one-sided. Researchers stress that little attention has been given to the fact that resistance to change can be a resource or potential contributor to effective change. In particular, if 'resistance' is viewed as a contributing factor to the build-up of momentum (e.g., the changes are talked about) and a source of information about redundant, counterproductive, or impractical elements in the design or conduct of the change process, it may actually contribute to the successful implementation of change.

In an organization, employees view the change process differently and often view change as disruptive. A successful change programme requires employees to understand why change is a necessity. Employees must be talked into the change programme. Employees' commitments must be associated with the company's change outcomes. Commitment comes through transition. During the period of

transition, employees will speculate about how change can benefit or possibly harm them. Employees require more information during change process. They also want to know how changes will affect them and how to adapt themselves to the change situations. Besides, if everyone is well informed about the need for change, this information will also help to dispel negative talk. As Bridges and Mitchell (2000) highlighted, change is external, and transition is the internal psychological reorientation of the employee's experience, which allows the change to work.

Following the logic of the above discussions, organizational change will affect all employees either directly or indirectly. Therefore, full commitment of the employees is a key factor for the successful implementation of organizational change. In other words, successful implementation of organization change often requires the agreement and support of the employees (Fedor et al., 2006). Although presumed important, little interest has been paid to the assessment and definition of commitment within a change context, and virtually no empirical evidence exists to substantiate the claims made about its effects (Herscovitch & Meyer, 2002).

A number of moderators have impacted the perception of change, for instant, organizational commitment has been identified as a moderator (Mack, Nelson, & Campbell-Quick, 1998; Sullivan & Bhagat, 1992; Vakola & Nikolaou, 2005). These moderators affect an individual's commitment to coping with the change event. In addition to the main effects of the three components of commitment, Meyer and Allen (1991) also emphasized the importance of studying their moderating or interactive effects.

Although commitment researchers (e.g. Meyer & Allen, 1991; Herscovitch & Meyer, 2002) have identified three types of commitment: affective, normative, and

continuance. This study only focuses on affective commitment that has moderating effect for three reasons.

First, affective commitment best reflects positive attitudes toward and, alignment with, a change effort, also commonly referred to as "buy-in" attitude. Employees who are affectively aligned to an organization are more likely to exhibit constructive behaviors such as better work performance (Shum et al., 2008). Moreover, operational excellence is an activity equivalent to best practices, to the extent that it involves a discretionary effort, which goes beyond the employee's contractual 'obligations' and 'need to' attitude. An extensive literature supports a positive relationship between affective commitment and extra-role behavior (Camelo-Ordaz, Garcia-Cruz, Sousa-Ginel, & Valle-Cabrera, 2011).

Second, affective commitment is the core component of the employees' commitment models among the three dimensions of commitment to change (Herold et al., 2008; Solinger, van Olffen, & Roe, 2008). Authors like Solinger et al. (2008) have even gone to this point of arguing that only affective commitment reflects real commitment to the organization, while normative commitment and continuance commitment only represent attitudes towards specific behaviors, such as turnover. Solinger et al. (2008) further proposed that affective commitment is more relevant when employees are expected to adjust to organizational change and to help organizations to achieve superb performance.

Third, the present study of the management of change has focused widely on recommended strategies for implementing change including transformation, empowerment, training, and participation that are likely to impact on the support for,

and identification with, changes that employees' affective commitment to change has influenced (Herscovitch & Meyer, 2002).

On this basis of such arguments, the researcher expects to see greater effect of affective commitment on the relationship between MOC and OPX. From these reviews, the hypotheses reflecting the moderating influence of ACTC on the relationship between MOC and OPX are as follows:

> H_7: Employees' affective commitment to change will moderate the relationship between the management of change and achievement of operational excellence.

Specially:

> H_{7a}: Employees' affective commitment to change will moderate the relationship between manufacturing technology and achievement of operational excellence.
>
> H_{7b}: Employees' affective commitment to change will moderate the relationship between organic structure and achievement of operational excellence.
>
> H_{7c}: Employees' affective commitment to change will moderate the relationship between operations strategy and achievement of operational excellence.
>
> H_{7d}: Employees' affective commitment to change will moderate the relationship between transformational leadership style and achievement of operational excellence.

H_{7e}: Employees' affective commitment to change will moderate the relationship between human resource practices and achievement of operational excellence.

H_{7f}: Employees' affective commitment to change will moderate the relationship between involvement cultural trait and achievement of operational excellence.

Management of change is the movement that takes an organization away from its present state towards a more desired future state to increase its efficiency and effectiveness. Managing organizational change is one of the most challenging tasks because of the resistance by the employees of the organization to the change effort. Overall, the extensive literature review identified the flaws and gaps. Based on previous studies, this study combines the six elements underlying management of change. They are identified as transformational leadership style, manufacturing technology, human resource practices, organic structure, involvement cultural trait and operations strategy. The moderating effect of employees' affective commitment to change on the relationship between MOC and OPX is also examined in this study.

2.7 Summary of Research Hypotheses

The hypothesis, or thesis statement is an idea or a theory that is expressed as a statement. It is a vital component of a research paper, which provides direction and focus on a research. In particular for this empirical study, several hypotheses were

formulated. In this study, all the hypotheses were derived from the literature under review. Again, the relationships were conjectured from the network of relationships between theoretical framework and research hypotheses as shown in Figure 2.2.

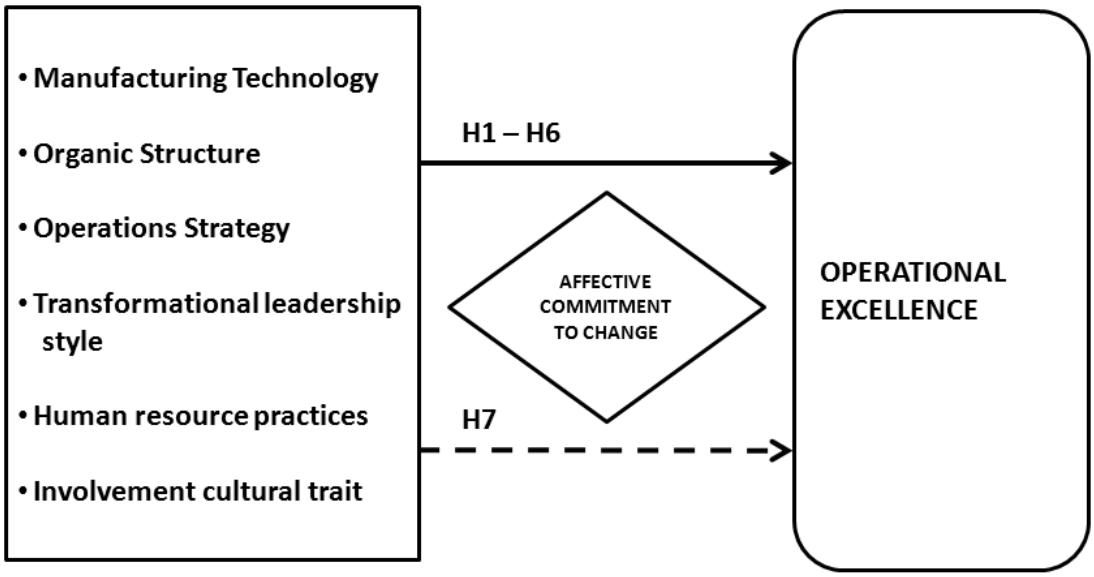


Figure 2.2
Relationships between Theoretical Framework and Research Hypotheses

This study is to investigate the relationship between MOC and OPX moderated by ACTC. Hence, the study aims to address the following research hypothesis shown in Table 2.3 below.

Table 2.3
Summary of Research Hypotheses

Hypothesis	Statement
H_1	The use of the manufacturing technology will lead to the achievement of operational excellence.
H_2	The implementation of an organic structure will lead to the achievement of operational excellence.
H_3	A well-defined operations strategy will lead to achievement of operational excellence.
H_4	The inclinations towards transformational leadership style will lead to the achievement of operational excellence.
H_5	Effectiveness of human resource practices will lead to the achievement

	of operational excellence.
H_6	Higher levels of individual involvement cultural trait will lead to the achievement of operational excellence.
H_7	Employees' affective commitment to change will moderate the relationship between the management of change and achievement of operational excellence.
H_{7a}	Employees' affective commitment to change will moderate the relationship between manufacturing technology and achievement of operational excellence.
H_{7b}	Employees' affective commitment to change will moderate the relationship between organic structure and achievement of operational excellence.
H_{7c}	Employees' affective commitment to change will moderate the relationship between operations strategy and achievement of operational excellence.
H_{7d}	Employees' affective commitment to change will moderate the relationship between transformational leadership style and achievement of operational excellence.
H_{7e}	Employees' affective commitment to change will moderate the relationship between human resource practices and achievement of operational excellence.
H_{7f}	Employees' affective commitment to change will moderate the relationship between involvement cultural trait and achievement of operational excellence.

2.8 Research Framework

A research framework is used in study to outline possible courses of action or to present a suitable approach to an idea or thought. By referring to the empirical review, the present study develops a theoretical framework that incorporates the importance of MOC factors for OPX. The relationship among the various factors discussed in this literature is depicted in a framework as shown by Figure 2.3 below. Based on a synthesis of the literature, this researcher believes that MOC factors are likely to contribute positively to the OPX of the organization only in situations in which the employees are committed to the change in the MOC efforts. In other words, employees who resist change would be reluctant to engage in MOC efforts. Thus, the affective commitment to change of employees may affect the operational

performance of an organization, as far as this research is concerned. Table 2.4 below contains the constructs for measuring each element that constitutes the MOC to predict OPX in the Malaysian E&E industry.

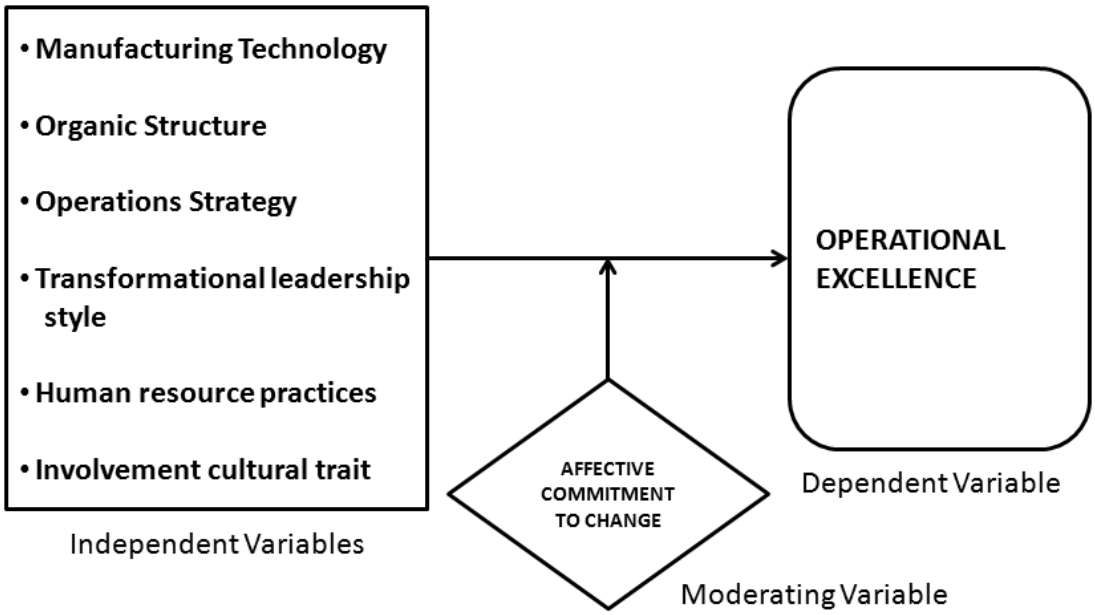


Figure 2.3
Theoretical Framework

Table 2.4
Constructs for Measurements

No	Items	Constructs
1	Quality	Operational excellence
2	Time	
3	Flexibility	
4	Cost	
5	Social responsibility	
6	Environmental	
1	Idealized influence	Transformational leadership style
2	Inspirational motivation	
3	Intellectual stimulation	
4	Individualized consideration	
1	Selection	Manufacturing technology
2	Acquisition	
3	Exploitation	
1	Recruitment and selection	Human resource practices
2	Training and development	

3	Performance appraisal	
4	Compensation systems	
1	Formalization	Organic structure
2	Decentralization	
1	Empowerment	Involvement cultural trait
2	Team orientation	
3	Capability development	
1	Quality strategy	Operations strategy
2	Delivery strategy	
3	Cost strategy	
4	Flexibility strategy	
1	Affective commitment to change	Affective commitment to change

2.9 Summary

This chapter looks at the variables that can create an effect on operational excellence but were under-represented in previous writings. The dimensions covered by operational excellence were not explored fully in previous studies. Many importantly, variables in relationship to operational excellence such as managing people, strategy, technology, leadership, structure and culture have not been identified. Firms cannot ignore their employees' commitment to change because change will bring success to an organization. Thus, this study attempts to integrate these important elements as factors affecting operational excellence.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter commences with a brief description of research design and research method respectively. These two sections form the foundation of the study. It then elaborates the target population, sampling frame, sampling size and unit of analysis used in this research. It also covers the survey instrument to be employed. The reliability and validity of the instrument are provided. Next is a description of the data collection strategy. This is followed by an explanation of the pilot test and the source of data for this study. The method of data analysis is also presented in this chapter. Finally, the data cleaning and screening are discussed before wrapping up the chapter.

3.2 Research Design

The researcher used a research design as a framework that guides them for data collection and compilation so as to answer the hypotheses. A research design depends primarily on the nature of research questions or research purpose, which may be broadly grouped into three types of studies namely, (i) descriptive; (ii) exploratory; and (iii) causal (cause-and-effect). A descriptive study is conducted on the basis of previous understanding of the research problem and does not completely explore the research phenomenon as in the case of exploratory research (Bajpai,

2011). A descriptive study describes what the research problem with an emphasis on what actually exists with respect to current conditions, practices, situations, or any phenomena (Calderon & Gonzales, 2005). An exploratory study is undertaken when ambiguous problems needing exist clarification (Sekaran, 2003). The main goal of causal research is to examine the cause-and-effect relationship between two or more variables (Zikmund, 2003). The nature of the problem in this study determines that it leans more towards a cause-and-effect relationship. Thus, this study utilizes causal studies as it attempt to ascertain the relationship among management of change (MOC), affective commitment to change (ACTC) and operational excellence (OPX). Obviously, it is a correlation study.

A given research design can employ not only one but also a combination or a variety of methods for collecting and analysing data. The quantitative research method and design selected for this study is the most fitting given the purpose and problem statement for the study. This quantitative research study aims to determine the moderating effect of affective commitment to change in the relationship between management of change and operational excellence, based on the views of the Malaysian managers who are attached to Electrical & Electronics Manufacturing Industry.

The time frame of a study commonly refers to two options. One is a longitudinal study that involves surveying the same population over a period of time (Cooper & Schindler, 2006). The second is a cross-sectional study. This type of study employs a cross-sectional survey method, which attempts to describe the phenomena or to establish the reasons for any particular action (Zikmund, 1994), and it involves the collection of information from a sample of a population at only one point of time

(Cooper & Schindler, 2006). A survey type method provides a quick, efficient and accurate means of assessment of information about the population of interest (Zikmund, 2003). Furthermore, a survey technique allows the researcher to gather data from many people who are geographically dispersed and allows the capture of numerous variables under multiple hypotheses test (Neuman, 1997). Moreover, questionnaire survey is inexpensive and widely used. During the data collection period, questionnaires are distributed randomly either through emails or hand-outs to the firms.

The few past studies in operational performance or excellence used cross-sectional studies included those by Antony and Bhattacharyya (2010), Idris and Ali (2008), and Ferguson and Reio Jr. (2009). After considering the objectives of the research and the study setting, this research employed a cross-sectional survey method as it was deemed more appropriate compared to other research methodology.

3.3 Population and Sampling

Because the study is about operational excellence in the Malaysian E&E industry, it is appropriate that managers involved in manufacturing operations are considered. In this context, samples of the population were selected from the FMM-MATRADE Industry Directory Electrical and Electronics Malaysia 2007/08 (FMM, 2008) and Federation of Malaysian Manufacturers (FMM) Industry Directory 2012 of Malaysian Manufacturers (FMM, 2012), which totalled of 1952 companies.

The Electrical and Electronics (E&E) sector was further broken down into four sub-sectors that included (1) consumer electronics (2) electronic components (3)

industrial electronics and (4) electrical. Table 3.1 below gives an idea of the subsectors of the E&E sector in Malaysia.

Table 3.1
Structure of the E&E Industry

Sectors	Sub-Sectors	Examples of Products
Electronics	Consumer electronics	Television, audio visual products included blu-ray disc players/ recorders, mini disc, digital home theatre systems, electronics games consoles and also digital cameras.
	Electronic components	Semi-conductor devices, active/passive components, printed circuits and other components included substrates, media and connectors.
	Industrial electronics	Multi-media and IT (Information Technology) products included computers, computer peripherals, office equipment and telecommunication products.
Electrical	Electrical products	Lightings related products, solar related products, household appliances included, refrigerators, air-conditioners, vacuum cleaners and washing machines.

Source: MIDA Reports (www.mida.com.my accessed on 9th Sept 2012).

In this study, the systematic random sampling method was chosen in order that every component in the population is considered and has an equal chance of being chosen as a subject (Sekaran, 2003). By using the systematic random sampling method, 321 companies were selected to answer the questionnaire for the research. Specifically, only one manager in the manufacturing company who is responsible to the company's operations was requested to answer the questionnaire.

According to Hair, Black, Babin, and Anderson (2010), the researcher commonly would not factor analyze a sample of less than fifty observations, and, if possible, the

sample size should be a hundred or larger. As a general rule in multivariate analysis, the more acceptable sample size would have a 10:1 ratio for a variable to be analyzed. In the present study, there were 8 variables so that the required sample size should be 80 or more.

The sample size of respondents chosen for this study was determined by Krejcie and Morgan's (1970) criterion. The sample size of the this study also compiled with the rule of thumb by Roscoe (1975) who suggested that for most research a sample size of more than thirty and less than five hundred was appropriate. Table 3.2 below illustrated the sample size according to the Krejcje and Morgan. By studying the samples, the researcher was able to illustrate the conclusions that could be generalized to the population of interest.

Table 3.2
Krejcje and Morgan Chart

Number of E&E Manufacturers in FMM Directory

Population	Sample
1900	320
1952	321
2000	322

Number of respondent chosen

Source: Krejcje and Morgan (1970)

3.3.1 Unit of Analysis

Neuman (1997) defined the unit of analysis as the type of unit a researcher uses when measuring the variables. It is used to describe the units themselves and 'what' or 'who' that is being studied. Typically, a unit of analysis in social science research would include individuals, groups and organization. This study attempts to determine

the operational excellence through management of change and employees' commitment to change that involved Malaysia E&E manufacturing companies. Therefore, the unit of analysis is the organization or company with one respondent representing the organization or company. The target respondents are from the managerial level who were identified as those responsible in running the company's operations linked to manufacturing operations. The respondents could include the General Manager, Operation Manager, Factory Manager, Production Manager, Engineering Manager, Manufacturing Manager, Planning Manager, Materials Manager, Lean Manager and Project Manager (involved in Change Management or Continuous Improvement programs).

3.4 Survey Instrumentation

A survey is a research technique in which data are collected from a sample of population through a questionnaire. A questionnaire consists of formalized and pre-specified set of questions designed to obtain responses from potential respondents. Questions in the instrument reflect the research objective under investigation. Structured questionnaires are used widely in field research, in experiments and other data collection activities because they are essential to and most directly associated with survey research (Babbie, 2005).

In line with present study, a set of questions was developed. The questionnaire consists of four sections. Section A and Section B of the questionnaire ascertained the link, if any, between independent variables and the dependent variable. These sections also asked questions concerning the moderating variable effect, the

relationship between independent variables and dependent variable. Section A was a measure of independent variables and moderating variable comprised of 70 questions that were break into 7 sub-sections. Twenty-three questions, which were developed to measure the dependent variable, were presented in Section B. Section C sought information in relationship to participating companies' background information, and Section D solicited information regarding respondents' background including demographical information. Both Section C and Section D comprised 5 and 7 questions respectively. (See Appendix A for details.) Table 3.3 below summarized the survey instrument constructs used for this study.

Table 3.3
Survey Instrument Construct

Section	Title	Number of Items	Authors
A	*(i) Measures of Independent Variables*		
	Manufacturing Technology	12	Kuruppuarachchi & Perera (2010).
	Organizational Structure	8	Nahm et al. (2003); Cruz & Camps (2003).
	Operations Strategy	11	Skinner (1969); Oltra & Flor (2010).
	Transformational Leadership	12	Bass & Avolio (1992).
	Human Resource Practices	12	Snell & Dean (1992); Uen & Chien (2004); Tsui et al. (1997).
	Organizational Culture	9	Denison et al. (2003); You et al. (2010).
	(ii) Measures of Moderating Variable		
	Commitment to Change	6	Herscovitch & Meyer (2002).
B	*(i) Measures of Dependent Variable*		
	Operational Excellence (cost, quality, time, flexibility, social responsibility, and environmental).	23	Laugen et al. (2005); Hubbard (2009); Kuruppuarachchi & Perera (2010).
C	Company Information (company sub-sector, numbers of employees, numbers of years of operation, annual sales turnover, and type of ownership).	5	
D	Demographic Characteristics	7	

	(gender, ethnic group, age, educational, employment, designation, and company name).		

A five-point Likert-point was used for all questions in Section A and Section B. A Likert scale was utilized because it is relatively easy to construct, is adaptability, has intuitive appeal, and usually offers good reliability (Babbie, 1990; Nunnaly, 1978). In addition, Cooper and Schindler (2006) argued that the scale reliability could be improved if the numerical point on the scale increases. However, the selection of a numerical point on the scale must approximate the degree of complexity of the construct. Also, it should provide a full range of response options to the respondents.

In a Likert scale, each respondent was asked to indicate the extent of agreement with each statement on a five-point. The options given in the questionnaires for Section A were "strongly disagree (1)"; "disagree (2)"; "neutral (3)"; "agree (4)"; and finally "strongly agree (5)". For Section B, respondents were requested to rank their answers using 5-point Likert-type interval scale, with values ranging from 1 for "worst in industry"; 2 for "bad in industry"; 3 for "average in industry"; 4 for "good in industry" and 5 for "best in industry". Hence, researcher can solicit answers about the given statement through a set of response keys.

A cover letter from the university (Universiti Utara Malaysia) informing respondents about the purpose of the study and the researcher's expectations was attached in front of the questionnaire. In that letter, confidentiality of the respondents was guaranteed and who were told that only aggregated data would be published. Finally, a closing statement was means to convince the respondents that his or her response

was important and crucial to the success of the study. (Refer to Appendix A for details). A self-addressed envelope, including a stamp was enclosed with each questionnaire to encourage respondents to mail completed questionnaires back to the researcher.

3.5 Pilot Test

According to Neuman (1997), a pilot study is essential because it improves the questionnaires. The purpose of a pilot study is to identify flaws in research design and instrument use, and to supply proxy data for selection of a probability sample (Cooper & Schindler, 2006). The outcomes of the pilot study should discover ambiguities, misunderstandings, and useless items (Wiersma, 1993). Pilot studies collect data from a small sample ranging from 15 to 30 (Malhotra & Peterson, 2006) to serve as a guide for the larger study. Several groups were contacted for an interview session so as to go over the contents of the questionnaires. These included five manufacturers that were chosen to participate in the pilot study in the present research. Those experts were asked to give ideas and critically assess with the survey with the aim of improving the questionnaires. They were asked to answer the questionnaires during a meeting. In a same session, the respondents highlighted any irrelevant questions or ambiguity in the questions. Then, they also were asked about the relevancy of the questions. Actual time taken to answer all questions completely also has been captured.

This pilot run gives an opportunity to discover unforeseen problems of coding, test ambiguous, analysis, misleading questionnaire and administration. Based on

suggestions and comments received, a revised draft of the questionnaire was prepared accordingly before carry out the main empirical survey. For instant, making corrections to some of the wordings and presentation of the questionnaire.

3.6 Reliability and Validity of the Instrument

Before proceeding with the statistical analysis, reliability and validity tests of the instrument were carried out to test the goodness of the measure.

3.6.1 Reliability

Reliability refers to consistency or stability in measurement. Reliability is the tendency of a respondent to respond in a consistent or in a similar manner to an identical or a near identical question. Adversely, inconsistent errors produce a low reliability in the measuring instruments. This research used Cronbach's coefficient alpha, the mostly widely used reliability coefficient to estimate the internal consistencies of items in an instrument (Onwuegbuzie & Daniel, 2002; Sekaran, 2003). According to Nunnally (1995), Cronbach's alpha score above 0.7 is the most widely accepted criteria for a research instrument. An instrument is considered to be more reliable and share a high internal consistency when the value of Cronbach's alpha is closer to "1". Therefore, this researcher used Cronbach's alpha value of 0.7 in this study.

3.6.2 Validity

Validity is the ability of an instrument to measure what is designed to measure. In other words, validity relates to whether the findings represent an actual image of the situation. The majority of the questions in present study were adapted and adopted from previous studies; therefore, face validity was present. Face validity appears on the surface, and then it looks like a valid test to the concept (Sekaran, 2003). Validity was established through content validity and constructs validity. In present research, both content validity and construct validity were employed.

3.6.3 Content Validity

Content validity refers to the degree to which a test measures an intended area, and experts in the field are asked to judge whether the instrument is content valid in accordance with the researched theme. Sekaran (2003) explained that content validity ensures that the measure includes an adequate and representational set of items that tap the concept. This is the point at which a panel of experts can attest to the content validity of instrument. In this study, 5 academicians and 5 managers of E&E companies reviewed the content validity on first draft questionnaire. As a result improvements to make the layout as pleasant as possible based on the feedback to ensure a high response rate.

3.6.4 Construct Validity

Construct validity involves testing the hypothesized constructs, which represent the concept that researchers are trying to measure, and a number of replicated studies demonstrate the validity of the hypothesized constructs. Sekaran (2003) described construct validity as "testifying to how well the results obtained from the use of the measure fit the theories around which the test is designed" (p. 415). Thus, construct validity is achieved if the measure behaves as it is suppose to, and if the expected pattern of inter-correlation with a variety of other factors are present. Construct validity usually can be accessed through convergent validity and discriminant validity. Convergent validity is established when the new measure correlates or converges with other similar concept (Bajpai, 2011). In other words, scores from two different items measuring the same construct are highly correlated. Discriminant validity is established when a new measuring instrument has a low correlation or non-convergence with the measures of a dissimilar concept (Bajpai, 2011). Obviously, discriminant validity differentiates each dimension or variable from the other dimensions in the scale. In this study, construct validity was measured through data reduction (factor analysis) using a principle component method with varimax rotation.

3.7 Data Collection Strategy

According to Babbie (2011), three mailings which include an original distribution and two follow-ups, are considered to be the most efficient. The methodological literature strongly suggested that an effective method increasing return rates in mail

surveys is provided with follow-up mailings. Generally, the longer a potential respondent delays replying, the less likely the potential respondent is to complete the instrument. Therefore, properly timed follow-up mailings provide additional stimuli to respond.

A total of 642 questionnaires were distributed to the respondents at the end of February 2013, and the expectation was that questionnaire would be returned within a month. At the end of March, only usable 61 responses were received. A reminder letter was sent in the middle of April to seek for more responses (see Appendix B). Following this reminder, 29 usable responses were received. One more follow-up was made through e-mails and telephone calls in mid May 2013. A total of 39 usable questionnaires were returned. Thus, the total usable questionnaires received by the cut-off date were 129. Because different timing of responses might be indicative of bias, which can affect estimates, the collected data were split into early and late responses. A comparison of the early and late response groups was performed to assess non-response bias.

During the data collection, the researcher carried out a “drop and collect” technique, which aims to increase the response rate. At that moment, some managers were requested to have the survey questionnaire sent directly to them through electronic mail. To increase the effectiveness of “drop and collect” method, all respondents concerned were contacted directly by phone to notify them of the intended visit. This was followed by personal visit to hand over the questionnaire. Almost everyone involved agreed with the collection date and time.

3.8 Source of Data

The research methodology used in this study was to secure from primary data from a structured questionnaire addressed either to the managers or to any senior management corporate members listed in Federal of Malaysia Manufacturers (FMM, 2008; FMM, 2012). The main objective of the questionnaire was to determine the perceptions of employee at the electrical and electronics manufacturing firms, with respect to the moderating effect on the relationship between management of change and operational excellence. This study used manager's perception to assess company performance (Idris & Ali, 2008). The researcher used several indicators to measure the operations efficiency and sustainability performance of a company.

The present study required very minimal interference by the researcher in the sense that the researcher only administered the questionnaires. Data for the present study were obtained from the Malaysian Electrical & Electronics manufacturing companies in Peninsular Malaysia.

3.9 Method of Data Analysis

Upon completing data collection, preliminary test was conducted to determine the response rate, inter-rater agreement, reliability, and validity of the study construct. Factor analysis and reliability analysis were used to assess the validity and reliability of the independent variables (MOC), dependent variable (OPX) and moderator variable (ACTC). The response rate is computed by calculating the frequency of response and compared to the overall sample. The descriptive statistics namely

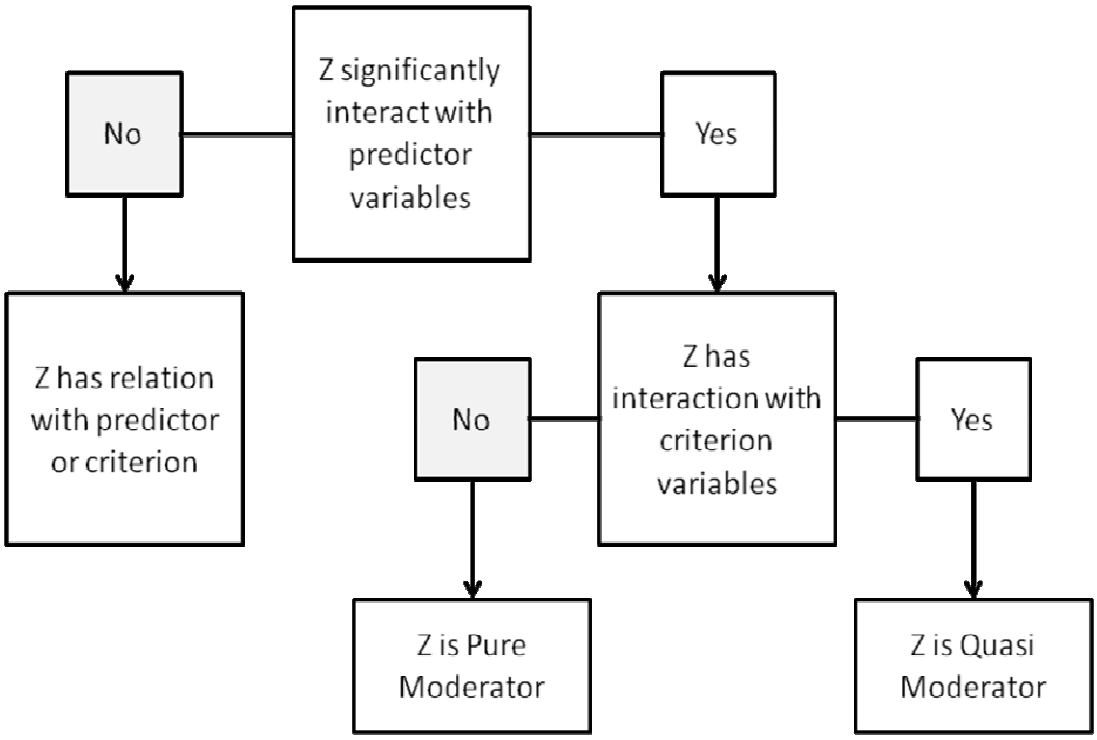
mean, median, standard deviation, frequencies, and percentage were used to describe the main characteristics of the sample.

The researcher proposed using multiple regression to test the significant predictors of operational excellence from management of change soft elements and hard elements. The multiple regression test provides an understanding of how much variance in the dependent variable is explained by the independent variables when theorized to influence simultaneously the former (Sekaran, 2003). Before using multiple regression as a statistical test, several assumptions should be met. The multivariate assumptions that have to be achieved are: (1) assumption of normality; (2) assumption of linearity; (3) assumption of homoscedasticity; (4) and assumption of multicollinearity.

This current research suggested using hierarchical regression to test whether affective commitment to change will moderate the relationships of managing organizational change (manufacturing technology, organic structure, operations strategy, transformational leadership style, human resource practices, and involvement culture trait) to operational excellence. This in line with Zedeck (1971), Cohen and Cohen (1983) and Chaplin's (1991) recommendations the use of hierarchical regression in research concerning detection of moderating effects. In addition, Baron and Kenny (1986) argued that the use of hierarchical regression in detecting moderating effects was the most appropriate test. Thus, hierarchical regression analyses were able to draw conclusions about the ability of affective commitment to change the relationship between management of change and operational excellence.

In order to determine the moderator effect of commitment to change, a number of steps were taken that involved entering sets of predictors into the regression in an order. Following Baron and Kenny (1986), the data were regressed in several steps. In the first step, in which the independent variable was regressed against the dependent variable, the main effects of MOC variables were entered into the equation. In the second step, which followed, the moderating variable was entered to gauge whether the moderator had a significant on the dependent variable. Finally, the third step required the interaction items to be entered to see the additional variance explained. The interaction items can be obtained by multiplying the moderating variable with the variables of MOC.

For the moderator effect to be present, Step 3 must show a significant R square increase with a significant F Change value. Hair et al. (2010) argued that only the change in R square would indicate the presence of a significant moderator. If the variable were a moderator, a multiple line graph would then be drawn to show the effect of the moderator in the relationship between the predictor and criterion variables. Graphically displaying the results is especially useful for models with interaction terms and is commonly used (Kohler & Kreuter, 2005). Additionally, a hierarchical regression test was applied to identify whether such a moderating variable was pure moderator or quasi moderator (Sharma & Gur-Arie, 1981). The steps taken to identify the effect and type of moderators involved in present study are illustrated in Figure 3.1 below.



Source: Adapted from Sharma & Gur-Arie (1981)

Figure 3.1
Framework for Identifying Moderating Variables

Data analysis tools including the Statistical Package for Social Science (SPSS) and Microsoft Excel were used to process the data obtained from this survey. All sections of the responses of the questionnaire were analyzed using frequencies, means, standard deviations, and percentages to estimate different characteristics of the data. Independent T-tests were conducted to determine the differences, if any, between early and the late respondents.

As Sekaran (2003) and Hair et al. (2010) suggested, the data analysis methods chosen were based on the research questions and variables' characteristics. A brief description of the different types of analysis that were carried out in this study is listed below:

1. *Exploratory factor analysis (EFA)* could be described as a statistical technique that is used to reduce data to a smaller set of summary variables and to explore the underlining theoretical structure of the phenomena (Sekaran, 2003). EFA, traditionally, has been used to identify the structure of the relationship between the variable and the respondent. In practice, factor analysis is used as an exploratory technique when the researcher wishes to summarize the structure of the set of variables.
2. *Frequency distribution tables* are structured to generate the results of the demographic characteristics of participants.
3. *A T-Test* is a statistical test that establishes a significant mean difference in a variable between two groups. For example, an independent sample t-test to find out if there are significant differences between the mean scores of early respondents and late respondents.
4. *Correlation analysis* is used to examine the relationship between two continuous variables (by using Pearson r), especially in terms of the strength and direction of the linear relationship between the variables (Pallant, 2001). For example, Pearson's correlation is employed to examine the existence of multicollinearity among the variables.
5. *Multiple regression analysis* is a most popular statistical technique to predict the variance in the dependent variable by regressing the independent variables of the study. The researcher selected multiple regression analysis in present study because it allows researchers to determine the effect of more than one independent variable on the dependent variable.
6. *Hierarchical multiple regression* has been advocated as a more appropriate method to find out whether a quantitative variable has a moderating effect on

the relationship between two other quantitative variables (Baron & Kenny, 1986). In this study, hierarchical multiple regression analysis is utilized to test whether the moderating variable will moderate the relationship of independent variables and dependent variable. To test the interaction effects, basic multiple regression procedure that specify a fixed order of entry for variables are used including, for example, a 3-step hierarchical regression analysis (Cohen & Cohen, 1983).

3.10 Data Cleaning and Screening

Almost all researchers have suggested that some preliminary steps have to be completed before proceeding with the hypotheses testing. This helps to ensure that the data are reasonably good and of assured quality. Data cleaning and screening are the preliminary steps that are necessary to conduct before getting data ready for analysis (Sekaran, 2003). Data cleaning and screening are the processes of ensuring that collected data are clean and ready for conducting further statistical analyses. Data must be screened in order to ensure the data are useful, reliable, and valid for testing causal theory.

In the present study, the returned questionnaires were checked for its completeness and consistency. This includes data that have been entered correctly, checking for missing values, outliers and normality. Outliers are extreme values as compared to the rest of data. The determination of values as "outliers" is subjective. The presence of outliers in the data inflates error rates and creates substantial distortions of parameter and statistic estimates (Zimmerman, 1998). In this study, data were

checked for both univariate (outliers on one variable alone) and multivariate (outliers on a combination of variable) outliers in order to avoid biased results. Univariate outliers can be detected by calculating Z-score whereas multivariate outliers are found by computing a Mahalanobis Distance in SPSS.

3.11 Summary

This chapter has discussed the research methodology used by the researcher in this study. This research is a causal study is cross-sectional. This quantitative research approach utilizes a survey method. A systematic random sampling was chosen from FMM Industry Directory. The E&E manufacturing companies were the respondents to the questionnaires. The survey instrument was tested to ensure its validity and reliability. In order to improve the questionnaires, a panel of experts, a pilot study and the Cronbach's alpha test were used. In this study, the primary data from the survey were gathered and then analyzed using descriptive and inferential statistics. Prior to this, the data were screened or cleaned to ensure that they were error free.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the findings and discussion of this study. It describes the statistical tests and results for the hypotheses of this study. The results are organized into several sections. The first section describes the data screening in which the raw data were checked and corrected before the main analysis was conducted. Data were checked for outliers, assumption of normality, linearity, homoscedasticity and multicollinearity. An analysis of the response rate is presented in the second section. The test results of early and late responses are discussed in the third section. The demographic profile which includes the profile of the respondents and their company are discussed in the fourth section. Section five explains the testing goodness of data, which include the validity and reliability of the data respectively. Section six reports the results of hypotheses testing. Testing of the hypotheses using Pearson correlation, multiple regression and hierarchical regression is covered under individual sub-section. The final section provides the discussion of the findings and the summary of the chapter.

4.2 Data Screening

The primary data for this research was collected through a survey in the form of questionnaires. Prior to statistical analysis, the raw data were screened to ascertain

the accuracy of the input data. Returned questionnaires were checked for their completeness and consistency including missing values and outliers. A total of 129 respondents companies returned their questionnaires of which 2 respondents had left much of the data blank while almost 30 per cent of questionnaires were not answered. The rule of thumb is that is better not to include a survey in the data set if 25 per cent of the items in the questionnaire have been left unanswered (Sekaran, 2003). Therefore, two incomplete mailed questionnaires were discarded and the usable questionnaires were 127 or 39.56 per cent.

Other than this, the missing data among a few respondents was related to the demographic variables for annual sales turnover. This non-random missing value may occur because respondents either do not know or reluctant to disclose the information which they think is confidential. The treatment of those missing data was assigned the midpoint in the scale as the response to that particular item. After the outlier analysis, the usable data set was 121 or 37.7 per cent respondent companies (as presented in Table 4.1).

Table 4.1
Analysis of Usable Data

	No	**%**
Total number of questionnaires distributed	321	100
Non response	192	59.81
Total usable questionnaires	**121**	**37.70**

4.2.1 Missing Values

The raw data were screened by examining the basic statistics of frequency distribution. Descriptive statistics such as mean, standard deviation, minimum and

maximum values of the variables were scrutinised to detect any missing values or errors in the data entry. In this study, the frequency test of SPSS program was used to check for errors in data entry. Table 4.2 below shows that there were zero missing values for the 127 cases. The minimum and maximum values also were within the range of 1 to 5. As a result, the researcher can conclude that the data are clean and without error.

Table 4.2
Missing Value Test

	N	Mean	Std. Deviation	Minimum	Maximum	Missing
Manufacturing technology	127	3.6365	.72288	1.00	4.83	0
Organic structure	127	3.4843	.56101	2.13	4.63	0
Operations strategy	127	3.8275	.53524	1.73	4.73	0
Transformational leadership style	127	3.5577	.70434	1.00	4.75	0
Human resource practices	127	3.6811	.59132	1.42	4.75	0
Involvement cultural trait	127	3.7038	.50004	1.73	4.67	0
Affective commitment to change	127	3.6142	.72183	2.00	5.00	0
Operational excellence	127	3.6946	.53828	2.04	4.65	0

4.2.2 Checking for Outliers

The analysis of outliers is usually performed in three different forms: univariate, bivariate and multivariate. Univariate outliers are extreme values for a single variable. Assessing univariate outliers can be done by checking the standardized scores (Z-scores) for each individual variable, as suggested by Hair et al. (2010) and, Tabachnick and Fiddel (2007). The cut-off is to determine whether an observation is

in fact an outlier or not; however, the cut-off varies according to the scholars. Hair et al. (2010) argued that, depending upon the size of the sample, a standardized score for a variable that exceeded 2.5 (for small sample size) or 4 (for large sample size) should be considered as having outliers. On the other hand, Tabachnick and Fiddle (2007) suggested the cases with standardized scores in excess of 3.29 ($p<0.001$, two tailed test) should be considered to be potential outliers. For the purpose of this study, the cut-off point suggested by Tabachnick and Fiddel (2007) was adopted. Table 4.3 below shows the result of descriptive statistics on maximum and minimum values of standardized score for each variable.

Table 4.3
Standardized Scores for Each Variable (before removed outliers)

Z-Score of Variable	**N**	**Minimum**	**Case >-3.29**	**Maximum**	**Case > 3.29**
Manufacturing technology	127	-3.64718	Case 26 & 1	1.65566	No case
Organic structure	127	-2.42287	Nil	2.03339	No case
Operations strategy	127	-3.96323	Case 44, 26 & 3	1.69409	No case
Transformational leadership style	127	-3.63143	Case 26	1.69274	No case
Human resource practices	127	-3.82947	Case 9	1.80765	No case
Involvement cultural trait	127	-3.95273	Case 9 & 18	1.92554	No case
Affective commitment to change	127	-2.23624	No case	1.91989	No case
Operational excellence	127	-3.06743	No case	1.77889	No case

Referring to Table 4.3 again, there were 6 cases of standardized scores exceeding the cut-off value of 3.29 as Tabachnick and Fiddel (2007) suggested. A negative Z-score implies that original score was lower than the mean. A positive Z-score implies that the original score was higher than the mean. Therefore, 6 cases (1.87% of all responses) were deleted from the data set due to univariate outliers, putting the total

usable responses for further analysis at 121 and constituting an overall 37.7 per cent response rate for usable survey for this study. After the deletions, the new maximum and minimum value of standardized scores were presented in Table 4.4 below.

Table 4.4
Standardized Scores for Each Variable (after removed outliers)

Z-Score of Variable	**N**	**Minimum**	**Maximum**
Manufacturing technology	121	-2.22354	1.96165
Organic structure	121	-2.22831	2.09723
Operations strategy	121	-2.26362	2.11322
Transformational leadership style	121	-2.32219	1.93516
Human resource practices	121	-2.43454	2.05758
Involvement cultural trait	121	-2.32984	2.18285
Affective commitment to change	121	-2.11425	1.92383
Operational excellence	121	-2.44103	1.87625

Because this study has more than two variables, the bivariate methods to detect outliers become inadequate. Therefore, multivariate methods to detect cases with an unusual combination of scores on two or more variables are appropriate for use. They assess the multidimensional position of each observation to some common point. Assessment on multivariate outliers was performed using the Mahalanobis distance at $p > .001$, as suggested by Hair et al. (2010) and Tabachnick and Fiddel (2007). Mahalanobis distance is like a multidimensional version of a univariate z-score. This method provides a way to measure distances of a case from the centroid (multidimensional mean) of a distribution, given the covariance (multidimensional variance) of the distribution. Mahalanobis distance requires that the variables be metric; hence, all the metric independent variables in this study were used.

Mahalanobis distance is evaluated using critical values of chi-square with degrees of freedom equal to the number of explanatory variables in the model. In this case, degree of freedom is 7 and the critical value of chi-square is 24.32 at $p = 0.001$ level.

The 24.32 is a threshold value as indicated in the table of chi-square statistics that is related to the 7 independent variables of this study.

To adjust the number of variables being tested, the Mahalanobis distance (a chi-square statistics) is usually considered unacceptable at the $p < 0.001$ level (Pedhazur, 1997). In this study, a case was a multivariate outlier if the probability associated with its Mahalanobis distance was 0.001 or less, p-value < .001. Moreover, any case with a Mahalanobis distance greater than 24.32 or p-value < .001 was considered a multivariate outlier. In this analysis, no cases were deleted because of multivariate outliers. (See Appendix C for details.) Thus, the final sample comprised 121 respondents.

4.2.3 Assumption of Normality

In multivariate analysis, the most fundamental assumption is that the data in which the analysis is to be tested should not depart significantly from normal distribution or normality (Hair et al., 2010). Multivariate normality is defined as the prerequisite for multivariate analysis in order to make the analysis to be considered valid. In most analysis, data can be verified for normality by using visual checking which includes histogram, stem and leaf plot, normal probability plot (Normal P-P Plot), whisker box-plot, and a de-trended normal plot (Normal Q-Q Plot). Normality can also be assessed by obtaining the values of skewness and kurtosis for each variable (Pallant, 2001). Alternatively, normality can be tests using the Kolmogorov-Smirnov test (K-S) and Shapiro-Wilks (S-W) test. The K-S test and S-W test are designed to test

normality by comparing a data set to a normal distribution with the same mean and standard deviation of the sample.

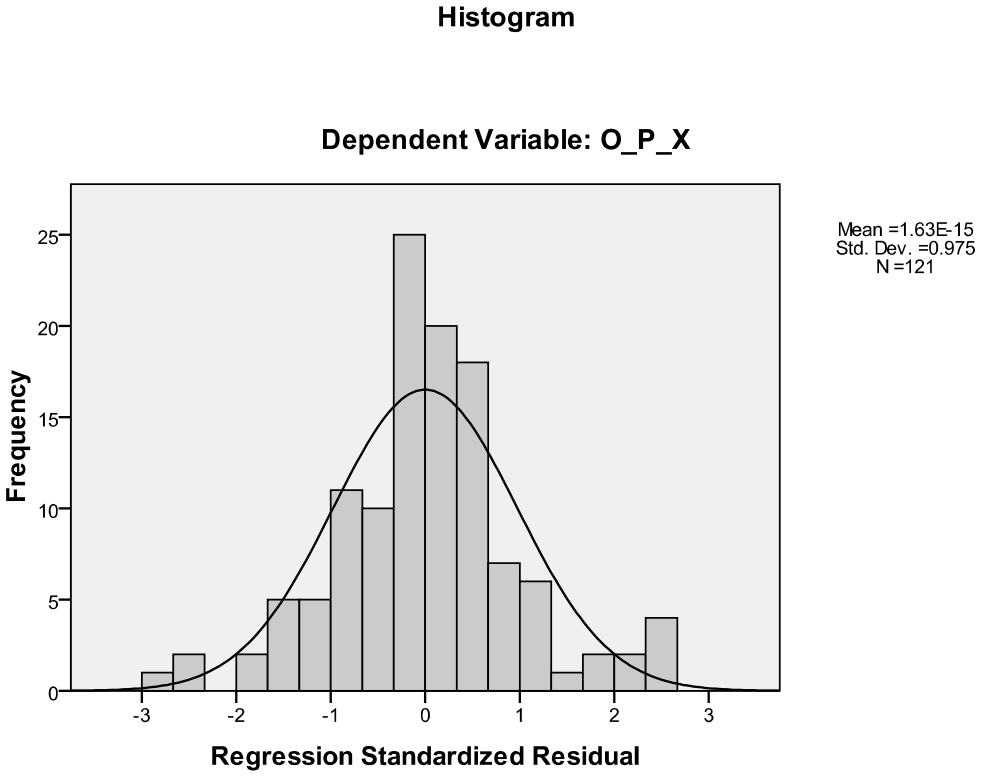
In the present study, all variables were examined for univariate normality using their skewness and kurtosis values. There were no extreme deviations found from univariate normality. As a rule of thumb, values of kurtosis of less than 3 and of skewness less than 8 indicate non-severe violations of the normality assumption (Kine, 2005). In this study, the highest skewness value for a variable was -0.341, which is within a fairly acceptable range. The highest kurtosis value for a variable was -0.695, clearly below the thresholds. More importantly, the requirement of multivariate normality was met which further confirmed that normality in this research was an efficient means of reducing the probability of incurring either Type I or Type II errors and also improving the accuracy of the research.

The statistics of standardized skewness and standardized kurtosis along with Kolmogorov-Smirnov test for goodness of fit, which presented in the Table 4.5 below.

Table 4.5
Statistical Result Assessing Univariate Normality

Variable	**Kolmogorov-Smirnov Z**	**Asymp. Sig. (2 tailed)**	**Skewness Z**	**Kurtosis Z**
Manufacturing technology	.750	.628	-.143	-.695
Organic structure	.646	.798	-.056	.380
Operations strategy	1.039	.230	-.206	-.378
Transformational leadership style	.803	.539	-.314	-.481
Human resource practices	1.005	.265	-.081	-.439
Involvement cultural trait	.856	.456	-.074	-.370
Affective commitment to change	.694	.721	-.058	-.699
Operational excellence	1.005	.265	-.341	-.270

Assessment on multivariate normality is usually performed using residual analysis. This assessment is tested through graphical analysis of the histogram and the normal probability plot of the residuals. The result of the graphical analysis, as shown in Figure 4.1 below, suggested no indication of significant departure from normality for the residuals. Based on the analysis, the assumed can be made that multivariate normality has been achieved, and therefore the variables in question are assumed to be approaching normal.



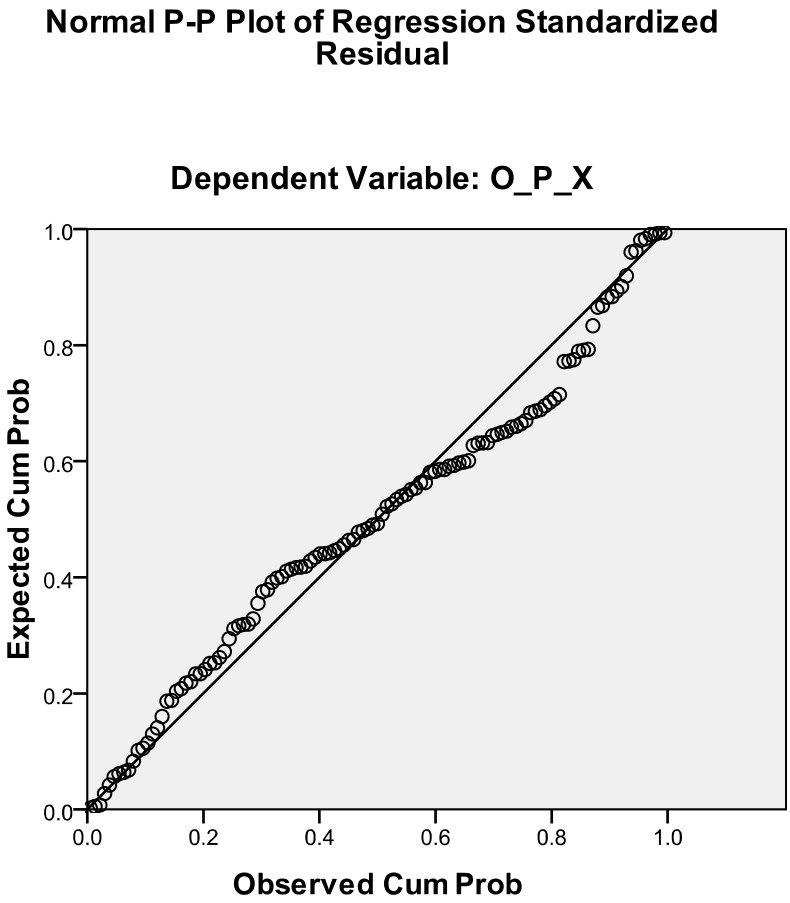


Figure 4.1
Histogram and Normal Probability (P-P) Plot on Residuals

4.2.4 Assumption of Linearity

The assumption of linearity states that is a linear relationship exists between the predictor and the response variable. This assumption is important because Pearson *r* only captures the linear relationship among variables and any significant departure from linearity would be ignored (Tabachnick & Fiddel, 2007). Indeed, there are several ways to examine the assumption of linearity, which includes inspecting the

bivariate scatterplot. In this technique, the shape of the scatterplot should be oval, which means that the variables are distributed normally and are linearly related.

To assess whether the linearity assumption is tenable, it is customary to plot a scatterplot, which is provided in Appendix D. All the seven bivariate scatterplot results revealed insignificant deviation from the assumption of linearity as all showed an oval shape. Thus, the tests have shown that there is linearity between the dependent and independent variables because all the items in the independent variables were adopted from existing theories that have been tested.

4.2.5 Assumption of Homoscedasticity

In regression analysis, homoscedasticity refers to the assumption that the variance of residual is homogeneous across level of predicted values. Homoscedasticity facilitates analysis because most methods are based on the assumption of equal variance. This assumption is also known as the assumption of independence of error. If the dispersion of the residual is unequal across levels of predicted values, then the relationship is said to be heteroscedastic. Homescedasticity is assessed by using graphical analysis through a scatterplot in which the standardized residuals are plotted against the standardized predicted values (Tabachnnick & Fiddel, 2007). The condition of homoscedasticity is said to be met if the plot is scattered across the scatterplot with no distinctive pattern. The result of graphical analysis using scatterplot to assess the assumption of homoscedasticity is depicted in Figure 4.2 below. The data are assumed to have fulfilled the assumption of homoscedasticity

because the plots were almost evenly spread across the predicted values of the dependent variable.

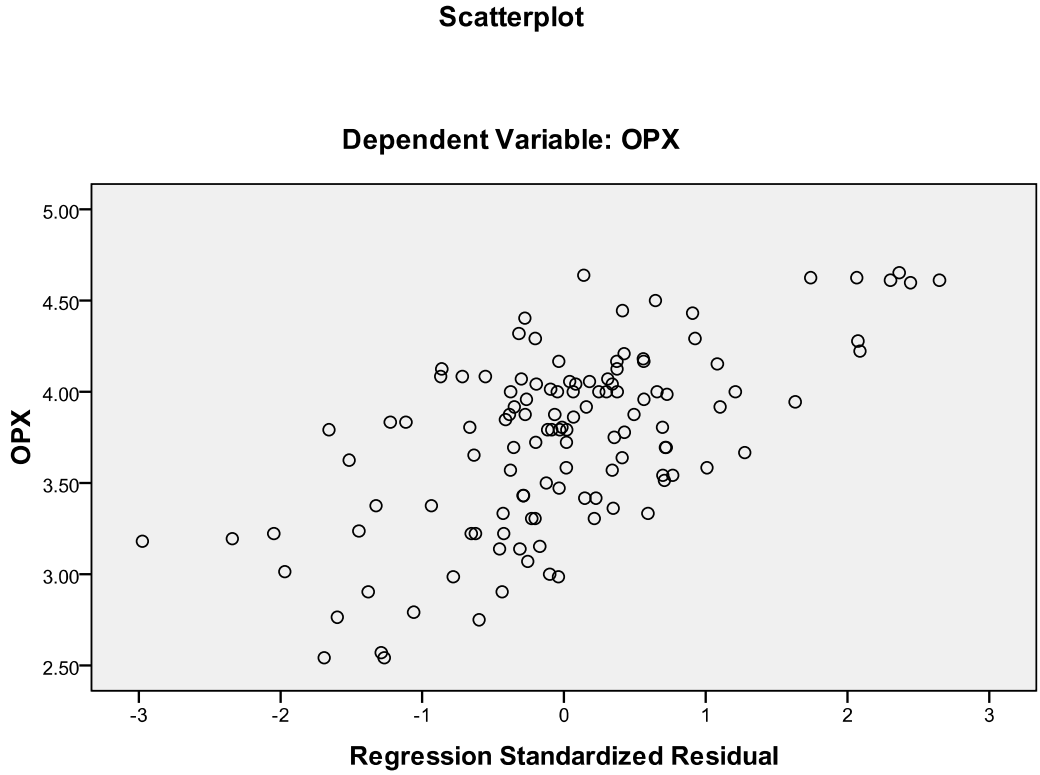


Figure 4.2
Scatterplot Analysis for Testing the Assumption of Homoscedasticity

4.2.6 Assumption of Multicollinearity

Multicollinearlity exists in a predictive model when two or more predictors in the model are correlated to each other, which leads to the inability to analyze the importance of the predictors in the model based on their invalid test statistics. There are several methods available shown in the literature for detection of multicollinearity. One way of detecting multicolinearity is by assessing the tolerance value, defined by the amount of variability of the selected Independent Variable not

explained by the other Independent Variables (Hair et al., 2010). The tolerance value is measured between 0 and 1. A tolerance close to 1 indicates the absence of multicollinearity, but a value close to 0 indicates that multicollinearity may be a threat. While it is largely debated on target values, a tolerance value of .50 or higher is generally considered acceptable (Tabachnick & Fidell, 2007). Some statisticians accept a value as low as .20 before being concerned.

Some researchers have suggested another way of checking the existence of significant multicollinearity by assessing the value of the variance influence factor (VIF). The square root of VIF is the degree to which the standard error has been increased due to multicollinearity (Hair et al., 2010). The value of VIF falls between 1 and infinity; however, closer to 1 indicates the absence of multicollinearity. O'Brien (2007) suggested that a tolerance of less than 0.20 or 0.10 and/or a VIF of 5 or 10 and above indicates a multicollinearity problem. Cohen, Cohen, West, and Aiken (2003) explained that complete elimination of multicollinearity is impossible but the degree of multicollinearity can be reduced by adopting ridge regression, principal components regression.

In this study, both values of tolerance and VIF were assessed through collinearity diagnostics in the SPSS package. The result of collinearity diagnosis presented in Table 4.6 (see Appendix E for details) shows no single variable tolerance value of less than 0.2 or a VIF value of more than 5. Therefore, it is safe to assume that the level of multicollierarity among independent variables in this research is acceptable and no evidence existed of significant multicollinearity among the predictor variables.

Table 4.6
Collinearity Diagnostics among Predictor Variables

Variables	Tolerance	VIF
Manufacturing technology	.423	2.364
Organic structure	.608	1.644
Operations strategy	.526	1.900
Transformational leadership style	.484	2.065
Human resource practices	.487	2.055
Involvement cultural trait	.544	1.838
Affective commitment to change	.715	1.398

4.3 Response Rate

In the present study, the targets respondents were the manufacturing companies from the Electrical and Electronics (E&E) sector. The sampling frame was drawn from the FMM-MATRADE Industry Directory Electrical and Electronics Malaysia 2007/08 (FMM, 2008) and Federation of Malaysian Manufacturers (FMM) Industry Directory 2012 of Malaysian Manufacturers (FMM, 2012). Because the majority response rate of the previous studies was half or less, this researcher decided to double the questionnaire distribution, aiming for a higher response rate. The total number of distributed questionnaires was 642 with a requirement of 321. With the intention of increase the response rate, a personal visit to FMM Offices and E&E factories located in Johor, Selangor, Penang and Kedah was performed. At the final stage, the total questionnaires received were 129, out of which 121 were usable. Therefore, the rate of response was 37.7 per cent from the total number of questionnaires distributed. The rate of response obtained in this study was almost similar to previous research in similar fields. The Table 4.7 below illustrates the respond rate of earlier studies, which were carried out in Malaysia.

Table 4.7
Respond Rate of selected Studies in Malaysia

Authors	Topic studied	Level of analysis	Response rate
Yusuff (2004)	Manufacturing best practices of the electric and electronic firms in Malaysia.	Questionnaire-based survey addresses to top managers from the Federal of Malaysian manufacturers (FMM) industry directory.	Out of the 350 questionnaires sent only 31 (8.9%) completed replies were received.
Abdullah, et al. (2008)	The influence of soft factors on quality improvement and performance.	Structured questionnaires with closed questions were mailed to the selected firms.	A total of 275 firms responded from 350 firms, yielding a response rate of 72.8%.
Idris and Ali (2008)	The impacts of leadership style and best practices on company performances.	Cross-sectional mail survey to the CEOs of company listed in SIRIM ISO9000 directory.	The survey yielded 97 responses (15%) out of 600 firms.
Islam and Karim (2010)	Manufacturing practices and performance.	Questionnaires were distributed to a random sample of top managers across the manufacturing industry.	Respond rate was 14.4% (72 firms out of 500 firms).
Anuar and Yusuff (2011)	Manufacturing best practices in Malaysian small and medium enterprises (SME)	Questionnaires were mailed to the managers of the selected companies.	Based on the total 270 questionnaires distributed, 60 (22.2%) usable questionnaires were identified.
Tuanmat and Smith (2011)	The effects of changes in competition, technology and strategy on organizational performance.	Questionnaires being mailed to respondents.	There was 182 (36.4%) out of 500 companies had replied.

4.4 Test of Early and Late Responses

Delay or a lack of response in gathering the survey data presents some limitations for a study. Thus, a researcher must first address major limitations such as non-response bias to ensure the representativeness of the sample. One common way to test non-response bias is to compare respondents with non-respondents. According to Armstrong and Overton (1977), firms that respond later are theoretically more similar to non-respondents. This argument is the late respondent probably would not have responded if not followed up upon. To rule out that non-response bias is a critical concern for this study, a non-response bias test was carried out with the late respondents being used as proxy for non-respondents.

In this study, test of differences was conducted using an independent sample T-test as to compare any significant differences between early and late respondents. There were 61 early respondents and 60 late respondents. The early respondents were those usable questionnaires, which were received by the cut-off date and without a reminder and the late respondents were those usable questionnaires that were received after the cut-off date and to whom reminder letters were send out. During the analysis, a T-test was conducted for all variables in this study. Results from the T-test are shown in Table 4.8 below. The researcher found no statistically significant differences at the 0.05 level for any of the characteristics of the two groups, early respondents and late respondents. Therefore, the researcher assumes that non-response bias was not a critical concern for this study.

Table 4.8
The T-test Results between Early and Late Respondents

	Response Bias	**N**	**Mean**	**Std. Dev.**	**Std. Error Mean**	**T-value**	**Significance**
Manufacturing technology	Early	61	3.7063	.59329	.07596	-.663	.181
	Late	60	3.7736	.52145	.06732		
Organic structure	Early	61	3.5143	.5525	.07589	-.786	.072
	Late	60	3.5854	.43331	.05594		
Operations strategy	Early	61	3.8823	.40566	.05194	-.309	.608
	Late	60	3.9045	.38621	.04986		
Transformational leadership style	Early	61	3.5574	.57101	.07311	-.612	.142
	Late	60	3.7472	.55255	.07133		
Human resource practices	Early	61	3.7309	.51108	.06544	.652	.880
	Late	60	3.7847	.45393	.05860		
Involvement cultural trait	Early	61	3.7359	.41533	.05318	.084	.880
	Late	60	3.7704	.42464	.05482		
Affective commitment to change	Early	61	3.7596	.66146	.08469	1.744	.558
	Late	60	3.5389	.72898	.09411		
Operational excellence	Early	61	3.6972	.52335	.06701	-.865	.298
	Late	60	3.7741	.45250	.05842		

Note: * Significant at 0.05 level

4.5 Demographic Profile

The data collected from Section C, respondent's company information, and Section D, respondent's profile through survey questionnaire was analyzed in this section.

4.5.1 Profile of the Respondents

For ease of understanding a tabulation of the profiles of the respondents is shown in Table 4.9. In relationship to gender, 71.9 per cent of the respondents were male and 28.1 per cent were female. In terms of ethnic group, 18.2 per cent were Malay, 66.1 per cent were Chinese, 11.6 per cent are Indian and others were 4.1 per cent. In terms of age, 45.5 per cent of the respondents were between 36 and 45 years old, 34.7 per cent were above 46, and 19.8 per cent were between 18 and 35.

The respondents' profile indicated those respondents whose highest education level was secondary or high school (3.3 per cent), certificate, diploma or advanced diploma (14.0 per cent), first degree (40.5 per cent), postgraduate degree (30.6 per cent), and professional (11.6 per cent). Therefore, first degree and postgraduate degree holders contributed more than two-third of the respondents in this study. Most respondents (33.1 per cent) had less than 5 year's tenure of employment with their current companies. In contrast, 31.4 per cent of the respondents had more than 16 years of being attaching to their current companies. Of the remaining respondents 21.5 per cent had between 6 to 10 years and 14.0 per cent had between 11 to 15 years.

Managers answered about half of the questionnaires, while 19.0 per cent of those who answered were a senior executive or senior engineer, 5.8 per cent were a section head and assistant manager respectively, 14.0 per cent were a senior manager, 6.6 per cent were a director, and 4.1 per cent were a professional. Professionals included consultants and advisors. By group, 59 per cent of questionnaires were answered by middle management, 31 per cent by lower management, 6 per cent by top management and 4 per cent by a company's advisors and consultants. The results

inferred that the majority of the E&E manufacturing companies followed the requirements as stated in the cover letter send along with the questionnaire.

Table 4.9
Profile of the Respondents

Characteristics		**Frequency (N = 121)**	**Per cent (Total 100%)**
Gender:	Male	87	71.9
	Female	34	28.1
Ethnic group:	Malay	22	18.2
	Chinese	80	66.1
	Indian	14	11.6
	Others	5	4.1
Age:	Between 18 to 35 years	24	19.8
	Between 36 to 45 years	55	45.5
	Above 46 years	42	34.7
Educational Level:	Secondary / High school	4	3.3
	Certificate / Diploma / Advanced diploma	17	14.0
	First degree	49	40.5
	Postgraduate degree	37	30.6
	Professional	14	11.6
Number of years working in this company:	Less than 5 years	40	33.1
	Between 6 to 10 years	26	21.5
	Between 11 to 15 years	17	14.0
	More than 16 years	38	31.4
Position held:	Senior Executive / Senior Engineer	23	19.0
	Section head	7	5.8
	Assistant Manager	7	5.8
	Manager	54	44.6
	Senior manager	17	14.0
	Director	8	6.6
	Professional	5	4.1

4.5.2 Profile of the Respondent Companies

Most manufacturing companies in the electrical and electronics (E&E) industry that responded to the survey were in the electronic component sector. As presented in Table 4.10, they comprised 43.8 per cent of the number of respondents, followed by those in industrial electronics sector (24.8 per cent), consumer electronics (15.7 per cent) and electrical products (15.7 per cent).

Table 4.10
Respondents in E&E Sub-sector

Sector	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Electronic components	53	43.8	43.8	43.8
Industrial electronics	30	24.8	24.8	68.6
Consumer electronics	19	15.7	15.7	84.3
Electrical products	19	15.7	15.7	100.0
Total	121	100.0	100.0	

In relationship to the number of employees, 5.8 per cent of E&E manufacturing companies employed 50 or fewer people, 11.6 per cent of the firms had employed between 51 and 150 people, 20.7 per cent of the firms employed 151 to 500 people, 25.6 per cent of the firms employed 501 to 1000 people, and 36.1 per cent had more than 1000 employees. This result revealed that the majority of E&E manufacturers manufacturing engaged in large-scale production with labour intensive activities. Table 4.11 below illustrates the break down.

Table 4.11
Number of Employees in the Participating Companies

	Frequency	Per cent	Valid Per cent	Cumulative Per cent
50 or fewer	7	5.8	5.8	5.8
51 - 150	14	11.6	11.6	17.4
151 - 500	25	20.7	20.7	38.0
501 - 1000	31	25.6	25.6	63.6
More than 1000	44	36.4	36.4	100.0
Total	121	100.0	100.0	

Table 4.12 presents the number of years of operation of the participating companies. The majority of the companies have been operating for more than 15years (68.6 per cent), 15.7 per cent have been operating for between 11 to 15 years, 10.7 per cent are have been operating between 5 to 10 years and only 5 per cent have been operating for less than 5years. This longevity could be explained by the fact that the business respondents are quite established organizations perhaps due to the fact that Malaysian E&E industry has had a sterling track record for more than four decades since the establishment of the first semiconductor plant in Penang in 1972 (MIDA, 2012).

Table 4.12
Number of Years of Operation of the Participating Companies

	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Less than 5 years	6	5.0	5.0	5.0
Between 6 to 10 years	13	10.7	10.7	15.7
Between 11 to 15 years	19	15.7	15.7	31.4
More than 15 years	83	68.6	68.6	100.0
Total	121	100.0	100.0	

Company's annual sales turnover (2011) indicated that 65.3 per cent had more than RM50 million and 11.6 per cent had annual sales turnover between RM26 million to RM50 million. Table 4.13 also shows that 18.2 per cent of the annual sales turnovers (2011) for participating companies were between RM10 million to RM25 million, only 5 per cent were less than RM10 million. Indeed, the E&E sector is largest contributor to output, employment, investments and exports of Malaysia (MIDA, 2012).

Table 4.13
Annual Sales Turnover (2011) for the Participating Company

	Frequency	**Per cent**	**Valid Per cent**	**Cumulative Per cent**
Less than RM10 million	6	5.0	5.0	5.0
Between 10 million to RM25 million	22	18.2	18.2	23.1
Between RM26 million to RM50 million	14	11.6	11.6	34.7
More than RM50 million	79	65.3	65.3	100.0
Total	121	100.0	100.0	

Foreign companies that fully owned by foreign investors dominated the respondents with 62 per cent responses. Conversely, companies fully owned by-local ownership was 22.3 per cent. Those companies that have majority foreign ownership and majority local ownership were 9.1 per cent and 5.8 per cent respectively. Only 0.8 per cent of participating companies had equal local-foreign ownership. The result attested to the fact that large numbers of multinational corporations (MNCs) have chosen Malaysia as their base as manufacturing hub. Table 4.14 below confirms that details.

Table 4.14
Types of Ownership

	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Fully local (100%)	27	22.3	22.3	22.3
Fully foreign (100%)	75	62.0	62.0	84.3
Majority local (51 to 99%)	7	5.8	5.8	90.1
Majority foreign (51% to 99%)	11	9.1	9.1	99.2
Equal local-foreign (50% to 50%)	1	.8	.8	100.0
Total	121	100.0	100.0	

4.6 Goodness of Measures

Sekaran (2003) stated that researcher is required to assess the "goodness" of measure developed and also to be reasonably sure that the instruments they use in their research do indeed measure the variables that they are supposed to measure, and measure them accurately. In other words, an instrument developed to measure concepts must be accurately measuring the variable and actually measuring the concept that is to be measured so that the important dimensions and elements are not missed or irrelevant ones need to be excluded.

In this study, goodness of data gathered was measured by testing its reliability and validity. The reliability analysis measures the extent to which a variable or a set of variables is consistently measuring what is intended to measure, whereby validity analysis measures the extent to which a scale or set of measures accurately represent the concept of interest (Hair et al., 2010). Content validity and construct validity are used to access the present study.

4.6.1 Content Validity

Content validity refers to the suitability of the questions for the concept. It ensures that measures are adequate and represent the concept to be tested (Babbie, 1990; Sekaran, 2003). At this stage, a panel of experts was asked to evaluate each question in relationship to the construct that it is intended to measure. Any items that were considered irrelevant or unrepresentative of the construct would be deleted from the final list of questionnaire. This process involved two phases.

In the first phase, the first draft questionnaire was distributed to 5 academicians and 5 managers of E&E companies for comments and suggestions. This was to ensure that the questions posed adequately addresses the objectives of the study. In that discussion, no major errors were found in the questionnaires. The second phase is where the panel of experts contribute during the pilot test. At this phase, twenty experts from five manufacturing companies were asked to critique and provide suggestions about the questionnaires. During the discussion, they were requested to answer the questionnaires. The respondents highlighted any ambiguity in the questions or irrelevant questions. In respect to the construct it intended to measure, the experts were asked about the relevancy of the questions. The majority of the experts responded that the questions were appropriate.

4.6.2 Construct Validity

Factor analysis can be used to establish the construct validity of the question items of each variable (Sekaran, 2003). Thus, this research used factor analysis method to test the construct validity. In this section, the results of factor analysis with establishment

of construct validity for each item or question in this research was explained. Factor analysis comprises two major steps, which include extracting the items and rotating the items. The varimax rotation method is known to give a clearer separation of factors (Hair et al., 2010). In present study, a principle component analysis (PCA) with varimax rotation was used to identify the underlying dimensions of each construct.

Several authors have been discussed criterion for significant loading represented the construct. Kim and Mueller (1978) argued that there should be at least three indicators for each factor. The significance loading also varies according to authors. The loading at ±0.50 is considered more significant as 25 per cent of variance is accounted for by the factor that is deemed appropriate in this study; an item that is less than 0.5 was deleted from the construct, as suggested. In determining the factorability of the dimensions to be acceptable, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy must be more than 0.50 and the Bartlett's test of Sphericity must be significant (Hair et al., 2010). Bartlett's test explained the correlation matrix among the items. A few researchers have suggested that a factor loading cut-off point that is less than 0.5 is unacceptable, 0.5 - 0.59 is miserable, and 0.6 and above is mediocre. Field (2000) proposed 0.5 to 0.7 as mediocre, 0.7 to 0.8 as good and 0.8 to 0.9 as superb. In the present study, a factor loading in the component of 0.50 or higher has been considered to be acceptable as a criterion for the assessment of factor loadings.

The following Table 4.15 shows the results of all variables. The Kaiser-Meyer-Olkin (KMO) measures of sampling adequacy range from 0.692 to 0.911, with a significant Bartletts's test of Sphericity (Sig. = .000). All results showed that factor analysis

could be carried out on the data (Coakes & Steed, 2003; Hair et al., 2010). Moreover, there is a sufficient correlation among the analyzed items when Bartleet's test is significant. Eventually, the exploratory factor analysis (EFA) takes into confirmatory approach to assess the unidimensional construct of this current study (Hair et al., 2010).

Table 4.15
Kaiser-Meyer-Olkin (KMO) and Bartlett's Test Results

		MT	**ORGS**	**OPTS**	**TL**	**HRP**	**ORGC**	**ACTC**	**OPX**
KMO Measure of Sampling Adequacy		.876	.832	.703	.911	.797	.692	.851	.893
Bartletts's Test of Sphericity	Approx. Chi-Square	540.80	303.782	446.015	766.39	556.269	410.166	394.277	1904.040
	Df	66	28	55	66	66	36	15	253
	Sig.	.000	.000	.000	.000	.000	.000	.000	.000

Note: MT=Manufacturing technology; ORGS=Organic structure; ORGC=Involvement cultural trait; TL= Transformational leadership style; HRP= Human resource practices; ACTC=Affective commitment to change; OPX=Operational excellence

The first element was labelled the manufacturing technology. The questions were 12 items adapted from Kuruppuarachchi and Perera (2010), which consist of selection, acquisition, and exploitation. The output in Table 4.16 shows the rotated components of all items tested one factor loading with acceptable loadings of 0.5 and above.

Table 4.16
Rotated Component Matrix of All Questions under Manufacturing Technology (factor loadings below 0.5 were not show)

Item	**Description of Item**	**Factor Loading**
MT_2	We have a good understanding of the life cycle of current technologies.	.802
MT_3	We have a mechanism of benchmarking our technological capabilities with our competitors as well as with international standards.	.810

MT_4	Our top management is willing to accept of technology improvements if necessary.	.616
MT_6	We have our own R&D or Engineering teams to develop our own product/process/information technologies.	.763
MT_7	We use to hire experts for R&D or Engineering teams when it is required to develop new technologies.	.643
MT_8	When new technology is selected, we use to acquire them by a process of technology transfer from vendors.	.813
MT_10	We utilize our technological capabilities to improve operations performance	.532
MT_11	We believe in incremental development rather than radical changes.	.587
MT_12	We maintain well-structured customer-support network using own technology.	.545

Note: Extracted Method: Principle Component Analysis
Rotation Method: Varimax with Kaiser Normalization

The second element was labelled organic structure. All eight items were adapted from early studies, formalization and decentralization (Nahm, et al., 2003; Cruz & Camps, 2003). The output of the analysis did not reduce the total items. Table 4.17 shows the unidimensional tests of all items.

Table 4.17
Rotated Component Matrix of All Questions under Organic Structure (factor loadings below 0.5 were not shown)

Item	Description of Item	Factor Loading
ORGS_1	Our company has written rules and procedures that show how workers can make suggestions for changes.	.721
ORGS_2	Our company has written rules and procedures that define how workers can make changes on their job.	.767
ORGS_3	Our company has written rules and procedures that guide quality improvement efforts.	.729
ORGS_4	Our company has written rules and	.738

	procedures that guide creative problem solving.	
ORGS_5	In our company, blue-collar workers have the freedom to make decisions.	.589
ORGS_6	In our company the decision-making capacity tends to be located at the lowest possible level of the hierarchical order.	.598
ORGS_7	In our company the managers of the operating units have the freedom both to inject strategies and to implement them.	.666
ORGS_8	In our company the workers have the freedom to organize their work in the way they think most appropriate.	.600

Note: Extracted Method: Principle Component Analysis
Rotation Method: Varimax with Kaiser Normalization

The operations strategy is the third element in this study. The construct is based upon Skinner's (1969) early research. The eleven measures items adapted from past research which, consisted of cost strategy, delivery, quality strategy and flexibility strategy. Eventually, the construct was assessed its unidimensionality. All items remained with a factor loading more than 0.5 as shown in Table 4.18.

Table 4.18
Rotated Component Matrix of All Questions under Operations Strategy (factor loadings below 0.5 were not shown)

Item	Description of Item	Factor Loading
OPTS_1	We have the ability to reduce production cost by lowering labour cost.	.728
OPTS_2	We have the ability to reduce production cost by lowering material cost.	.829
OPTS_3	We have the ability to reduce production cost by lowering overhead cost.	.744
OPTS_4	We have the ability to adjust production volume quickly.	.678
OPTS_5	We have the ability to adapt to customer's requirements quickly.	.735
OPTS_6	We have the ability to offer a broad product line.	.789

OPTS_7	We have the ability to provide high-conforming quality design (design adequacy).	.774
OPTS_8	We have the ability to offer consistent quality (without defect).	.655
OPTS_9	We have the ability to improve working conditions and safety measures.	.585
OPTS_10	We have the ability to provide dependable deliveries.	.878
OPTS_11	We have the ability to provide fast deliveries.	.819

Note: Extracted Method: Principle Component Analysis
Rotation Method: Varimax with Kaiser Normalization

The fourth element consists of 12 items of the transformational leadership style construct. The adapted transformational leadership style construct by Bass and Avolio (1992) has suggested MLQ measuring the idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. The result of the rotated component tested with unidimensional is shown in Table 4.19.

Table 4.19
Rotated component Matrix of All Questions under Transformational Leadership Style (factor loadings below 0.5 were not shown)

Item	Description of Item	Factor Loading
TL_1	Our top management makes us feel good to be around them.	.811
TL_2	Our top management conveys in simple words what we could and should do.	.860
TL_3	Our top management enables us to think about old problems in new ways.	.715
TL_4	Our top management stimulates us to develop ourselves.	.679
TL_5	Our top management has complete faith and trust in us.	.660
TL_6	Our top management provides appealing insight about what we can do.	.721
TL_7	Our top management provides us with new ways of looking at problems.	.754
TL_8	Our top management informs us on our	.663

	performance.	
TL_9	Our top management makes us proud to be associated with them.	.804
TL_10	Our top management helps to make our work meaningful.	.739
TL_12	Our top management gives us personal attention to make us feel we are needed.	.746

Note: Extracted Method: Principle Component Analysis
Rotation Method: Varimax with Kaiser Normalization

In the fifth element, 12 items were used to measure human resource practices, which included recruitment and selection, training and development, performance appraisal, and compensation systems (Snell & Dean, 1992; Uen & Chien, 2004; Delery & Doty, 1996; Tsui, Pearce, Porter, & Tripoli, 1997). The unidimensional assessment illustrated factor loadings of more than 0.5, as per Table 4.20.

Table 4.20

Rotated Component Matrix of all Questions under Human Resource Practices (factor loadings below 0.5 were not shown)

Item	Description of Item	Factor Loading
HRP_1	We have extensive employee selection process for a job in our company (e.g. use of tests, interviews, etc.).	.865
HRP_2	We spend a great deal of money to insure that we hire the right person for the job.	.587
HRP_3	Multiple applicants are screened before a position is filled to ensure the best person is selected for the job.	.637
HRP_4	We have an extensive training process for members in our company.	.731
HRP_5	There are different kinds of training programmes available for members of our company.	.767
HRP_6	There is a standard training hours to be fulfilled yearly for the members of our company.	.813
HRP_7	Our company evaluates our performance	.787

	annually.	
HRP_8	Our company evaluates performance is based on job-related criteria.	.864
HRP_9	We can know our performance appraisal results by formal feedback system.	.560
HRP_10	Our company consistently reviews and updates its compensation systems to meet the needs of employees.	.829
HRP_11	Our company's compensation structure is equitable.	.819
HRP_12	Employees are given positive recognition when they produce high quality of work.	.698

Note: Extracted Method: Principle Component Analysis
Rotation Method: Varimax with Kaiser Normalization

The sixth element was labelled the involvement culture trait. Nine measure items, originated by Denison et al. (2003) used. These consisted of empowerment, team orientation and capability development. The results showed there was a unidimensional test and factor loading of more than 0.5 as presented in Table 4.21.

Table 4.21
Rotated Component Matrix of All Questions under Involvement Cultural Trait (factor loadings below 0.5 were not shown)

Item	Description of Item	Factor Loading
ORGS_1	In our company everyone believes that anyone can create a positive impact.	.911
ORGS_2	Employees to achieve superior results by making decisions at the level with information sharing.	.861
ORGS_3	In our company business planning is ongoing by involving everyone in the process to a certain degree.	.766
ORGS_4	Our company's organizational structure is based on teamwork.	.784
ORGS_5	Our company encourages cooperation across the board through teamwork.	.899
ORGS_6	In our company people work like they are	.863

	part of a team.	
ORGS_7	Our company recognizes employees' capability as an important competitive advantage.	.648
ORGS_8	Our company will continue to capitalize on the skills of the employees.	.894
ORGS_9	The "bench strength" (capability of people) is constantly improving.	.837

Note: Extracted Method: Principle Component Analysis
Rotation Method: Varimax with Kaiser Normalization

This study includes another construct, which is affective commitment to change, labelled as seventh element. Affective commitment to change measures items was adapted from Herscovitch and Meyer (2002). It was measured under unidimensional construct. All measures had factor loading of more than 0.5; the details are shown in Table 4.22.

Table 4.22
Rotated Component Matrix of All Questions under Affective Commitment to Change (factor loadings below 0.5 were not shown)

Item	Description of Item	Factor Loading
ACTC_1	We believe in the value of change in our company.	.836
ACTC_2	Change is a good strategy for our company.	.894
ACTC_3	We think that our company management has made a right decision by introducing a change.	.635
ACTC_4	Change serves an important factor in our company.	.722
ACTC_5	With change things would be better for our company.	.848
ACTC_6	Change is vital for our company.	.833

Note: Extracted Method: Principle Component Analysis
Rotation Method: Varimax with Kaiser Normalization

The last element was labelled the operational excellence outcomes. This construct consists of 23 items measuring quality, time, cost, flexibility, environmental and social responsibility (Laugen et al., 2005; Kuruppuarachchi & Perera, 2010; Hubbard, 2009). The output tabulated in Table 4.23 shows unidimensional test was produced with factor loadings of more than 0.5.

Table 4.23
Rotated Component Matrix of All Questions under Operational Excellence (factor loadings below 0.5 were not shown)

Item	Description of Item	Factor Loading
OPXQ_1	Product quality and reliability	.711
OPXQ_2	Manufacturing conformance of quality	.736
OPXQ_3	Customer service and support	.681
OPXT_1	Delivery speed	.650
OPXT_2	Manufacturing lead time	.650
OPXT_3	Procurement lead time	.720
OPXC_2	Inventory turnover	.662
OPXC_3	Capacity utilization	.698
OPXC_4	Overhead cost	.852
OPXF_1	Product customization ability	.507
OPXF_2	Volume flexibility	.693
OPXF_3	Product mix flexibility	.769
OPXS_2	Social performance of suppliers	.685
OPXS_3	Community relationship	.831
OPXS_4	Philanthropic investment / donations	.842
OPXE_1	Key material use per unit / product	.553
OPXE_2	Energy use per unit / product	.831
OPXE_3	Water use per unit / product	.866
OPXE_4	Emission, effluent and waste per unit / product	.818

Note: Extracted Method: Principle Component Analysis
Rotation Method: Varimax with Kaiser Normalization

Overall the result suggests that all the scales used in this study measured the adapted construct distinctively and appropriately. Manufacturing technology, organic

structure, operations strategy, transformational leadership style, human resource practices, involvement cultural trait, affective commitment to change, and operational excellence measures were assessed by their unidimensionalilty with exploratory factor analysis.

4.6.3 Reliability Analysis

Reliability of a measure reveals the extent to which it is without bias (error-free), thus ensuring measurement consistency across time and various items in the instrument. Reliability is a measure indicating the stability and consistency with which the instrument measures the concepts and helps to assess the "goodness" of a measure. Hair et al. (2010) explained the objective of reliability test is to ensure that responses are not too varied across a time period, so that a measurement taken at any point in time is reliable. The closer Cronbach's alpha is to 1, the higher is the internal consistency reliability (Sekaran, 2003). Moreover, a Cronbach's alpha of 0.6 or higher is generally considered to indicate that the internal reliability of a scale is adequate or better (Sekaran, 2003). However, Hair et al. (2010) argued the general agreed upon lower limit for Cronbach's alpha is 0.70, although it may decrease to 0.60 in exploratory research.

Table 4.24 below summarizes the values of alpha for all variables in this study, all of which are well above the 0.7 value. Kline (2005) suggested that a reliability coefficient of around 0.70 was "adequate", values of 0.80 was "very good", and values of around 0.90 could be considered "excellent", depending upon the questions. In this research, scales for independent variables, moderator, and dependent

variables have reliability coefficients ranging from very good to excellent with their values ranging from 0.772 to 0.915. (See Table 4.24 below.) Thus, the scales used in this research could be considered as reliable with Cronbach's alpha values of 0.7 or better (Nunnally ,1978; Kline, 2005; Hair et al., 2010).

Table 4.24
Summary of Cronbach's Alpha for Variables

Reliability Statistics				
Variables Names	**Cronbach's Alpha**	**Cronbach's Alpha Based on Standardized Items**	**N of Items**	**Remarks (P > 0.6)**
Management of change				
Manufacturing technology	.871	.873	12	Favourable
Organic structure	.820	.821	8	Favourable
Operations strategy	.780	.780	11	Favourable
Transformational leadership style	.915	.915	12	Favourable
Human resource practices	.843	.845	12	Favourable
Involvement cultural trait	.772	.771	9	Favourable
Affective commitment to change	.892	.892	6	Favourable
Operational excellence				Favourable
Quality	.866	.866	4	Favourable
Time	.823	.828	3	Favourable
Cost	.782	.780	4	Favourable
Flexibility	.812	.815	4	Favourable
Environmental	.865	.869	4	Favourable
Social	.888	.889	4	Favourable

4.7 Test of the Hypotheses

This section discusses the results of statistical analyses with respect to the proposed hypotheses of Chapter 2, which are tabulated in Table 4.25. First, correlations were conducted to explore the bivariate relationships among variables in the questions. Then, multivariate analysis will focused on the relationship between management of

change elements and operational excellence. Finally, the section ends with a discussion on the statistical results of affective commitment to change as a moderating variable in the relationship between management of change and operational excellence.

Table 4.25
Hypotheses in Relation to the ACTC, MOC and OPX

Hypothesis	**Statement**
H_1	The use of the manufacturing technology will lead to the achievement of operational excellence.
H_2	The implementation of an organic structure will lead to the achievement of operational excellence.
H_3	A well-defined operations strategy will lead to achievement of operational excellence.
H_4	The inclinations towards transformational leadership style will lead to the achievement of operational excellence.
H_5	Effectiveness of human resource practices will lead to the achievement of operational excellence.
H_6	Higher levels of individual involvement cultural trait will lead to the achievement of operational excellence.
H_7	Employees' affective commitment to change will moderate the relationship between the management of change and achievement of operational excellence.
H_{7a}	Employees' affective commitment to change will moderate the relationship between manufacturing technology and achievement of operational excellence.
H_{7b}	Employees' affective commitment to change will moderate the relationship between organic structure and achievement of operational excellence.
H_{7c}	Employees' affective commitment to change will moderate the relationship between operations strategy and achievement of operational excellence.
H_{7d}	Employees' affective commitment to change will moderate the relationship between transformational leadership style and achievement of operational excellence.
H_{7e}	Employees' affective commitment to change will moderate the relationship between human resource practices and achievement of operational excellence.
H_{7f}	Employees' affective commitment to change will moderate the relationship between involvement cultural trait and achievement of operational excellence.

4.7.1 Pearson Correlation Test

Correlation was conducted to explore the bivariate relationships among variables in the questions. This study identities any of the relationships between the independent variables and dependent variable and, independent variables and moderating variable. According to Cohen (1988), Pearson correlation values approximately equal to $r = \pm 0.1$ to ± 0.29 are considered to be weak relationship; $r = \pm 0.30$ to ± 0.49 are considered to be moderate relationship; r is ± 0.50 and above are considered to be a strong relationship. The size of the correlation coefficient value represents the strength of the relationship whereby the positive (+) or negative (-) sign represent the direction of the relationship between two variables. Moreover, the Pearson correlation coefficients value is range from -1.0 to +1.0; a correlation value of 0 presents no relationship between specified two variables.

The analysis of correlation in Table 4.26 below shows that all the bivariate relationships among management of change elements as predictor variables are significant with positive correlation. These results support the argument that management of change elements are paralleled to each other and that action taken for factor might also influence the level of action taken in other types of change, which is explained by the significant correlation between them. Because management of change includes hard elements (technology, structure, strategy) and soft elements (leadership, human resource, culture), and would each also be independent variable in this research, a significant correlation among these predictor variables suggests the existence of multicollinearity among them.

In this study, none of the Pearson r for each bivariate correlation exceeded the cut-off point of 0.9 (Tabachnick & Fiddel, 2007, Hair et al., 2010); therefore, the

multicollinearity among these variables is still considered to be at an acceptable level, as discussed earlier in the section about Multivariate Assumptions. The correlation between operational excellence (dependent variable) and other predictor variables was also positive and significant at a level of 99% ($p < 0.01$). The strength of relationship varies from lowest at 0.456 and to the highest at 0.616, which indicates a medium to large correlation. The Pearson's correlation coefficients in Table 4.26 shows that involvement cultural trait ($r = .456$, $p < 0.01$) has a lowest correlation with operational performance. In contrast, operations strategy ($r = 0.616$, $p < 0.01$) has the largest correlation with operational excellence. These findings support the notion that management of change elements as predictor variables had a positive correlation and a linear relationship with operational excellence. On the other hand, the correlation also further confirmed the validity and reliability of the measurement scales used in this study.

Correlation tests were also conducted on the relationships between the independent variables and the moderating variable. Table 4.26 shows the relationships between the moderating variable and the independent variables. All the management of change elements (independent variables) showed a significant relationship with affective commitment to change (moderating variable) at the 99% confidence interval ($p < 0.01$). The strength of the relationship ranged from lowest at 0.357 to highest at 0.431 indicating a medium to large correlation. The lowest correlation with affective commitment to change was organic structure ($r = .357$, $p < 0.01$) and the largest was transformational leadership style ($r = 0.431$, $p < 0.01$). These statistical results suggested that affective commitment to change has a positive relationship with all six management of change elements.

Table 4.26
Pearson's Correlation Test for Independent Variables, Dependent Variable and Moderating Variable

	Operational excellence	Manufacturing technology	Organic structure	Operations strategy	Transformational leadership style	Human resource practices	Involvement cultural trait	Commitment to change
Operational excellence	1							
Manufacturing technology	.562**	1						
Organic structure	.570**	.472**	1					
Operations strategy	.604**	.616**	.486**	1				
Transformational leadership style	.611**	.596**	.487**	.495**	1			
Human resource practices	.607**	.611**	.532**	.524**	.524**	1		
Involvement cultural trait	.561**	.514**	.471**	.456**	.559**	.587**	1	
Affective commitment to change	.480**	.408**	.357**	.427**	.431**	.417**	.417**	1

Note: * Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed)

The results of the correlation analysis among the independent variables, dependent variable and moderating variable support the hypotheses of the study. However, because the present study investigates the effects of various combinations and interactions among variables, multivariate statistical analysis must be used.

4.7.2 Multiple Regression Analysis

In this study, the multiple regression was performed. According to Hair et al. (2010), multiple regression analysis is applied to analyze the relationship between one dependent variable and several independent variables. More specific, the purpose of performing a multiple regression is to determine the predictive power of the independent variables toward the dependent variable.

Regarding generalizability, Hair et al. (2010) suggested a minimum ratio of 5 observers per independent variable and desired ratio of 15 and 20 observations per independent variable. In this study, a parameter ratio of 121:1 was used which exceeded the suggest ratio. Therefore the sample size in this research is adequate and acceptable. Six different hypotheses were proposed in Chapter 2 to test the relationship between management of change and operational excellence. These hypotheses are shown again in Table 4.27 below.

Table 4.27
Hypotheses in Relation to the MOC and OPX

Hypothesis	Statement
H_1	The use of the manufacturing technology will lead to the achievement of operational excellence.
H_2	The implementation of an organic structure will lead to the achievement of operational excellence.
H_3	A well-defined operations strategy will lead to achievement of operational excellence.
H_4	The inclinations towards transformational leadership style will lead to the achievement of operational excellence.
H_5	Effectiveness of human resource practices will lead to the achievement of operational excellence.
H_6	Higher levels of individual involvement cultural trait will lead to the achievement of operational excellence.

In order to measure the combined effect of the management of change elements with respects to operational excellence, multiple regression was performed on the

variables in question. In Table 4.28 below, results from the multiple regression show that of the six elements of MOC that were proposed to have a significant relationship with OPX, four were statically supported. All four elements, namely, organic structure, operations strategy, transformational leadership style, and human resource practices were found to have a positive and significant ($p < 0.05$) relationship toward operational excellence, with Beta values of .175, .242, .228 and .184 respectively. These statistical results suggested that operations strategy had the strongest effect (most important) on OPX in this research, followed by transformational leadership style, human resource practices and organizational structure. However, manufacturing technology and involvement cultural trait failed to produce significant support for their relationship with OPX.

Table 4.28
Results of Multiple Regression Analysis of MOC and OPX

Variable	**Coefficient**		
	Beta	**T**	**Sig.**
Manufacturing technology	.019	.211	.834
Organic structure	.175	2.244	**.027***
Operations strategy	.242	2.938	**.004***
Transformational leadership style	.228	2.710	**.008***
Human resource practices	.184	2.091	**.039***
Involvement cultural trait	.123	1.499	.137

Note: * Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed)

In the *Model Summary* Table 4.29, the R Square (.576), which explained the MOC (composite independent variables) accounted for 57.6 per cent of the variance (R

squared) in OPX (dependent variable). According to Cohen (1998), R Square is considered to be small size if it falls between the range of 1.0 and 5.9 per cent, moderate if the range falls between 5.9 and 13.8, and considered to be large range if it is above 13.8 per cent. In the result of multiple regression analysis, the R Square, .576 means 57.6 per cent and is considered to be large effect. The same table shows the F-value of 25.836 is significant at the 0.000 level.

Referring to the same table, the df1 (df = degree of freedom) represents the number of independent variables (6), df2 is the number of complete responses for all the variables in the equation (N) minus the number of independent variables (K) minus 1. (N – K – 1) [(121 – 6 – 1) = 114. The Durbin-Watson statistic is used to test for the presence of serial correlation among the residuals (Ott & Longnecker, 2001). The Durbin-Watson for this data set was 1.852, which is within the acceptable range of 1.50 to 2.50, therefore indicating that no autocorrelation problem exists in the data.

In summary, the results explained 57.6 per cent of the variance (R Square) in OPX has been significantly explained by the six independent variables under MOC. In other words, the MOC elements accounts for 57.6 per cent of the variability in OPX.

Table 4.29
Model Summary

					Change Statistics					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin - Watson
1	.759[a]	.576	.554	.32610	.576	25.836	6	114	.000	1.852

Note: a. Predictors: (Constant), Manufacturing technology, organic structure, operations strategy, transformational leadership style, human resource practices, and involvement cultural trait.
b. Dependent Variable: Operational excellence

4.7.3 Hierarchical Regression Analysis

Main hypothesis and six sub-hypotheses were proposed in Chapter 2 to test the moderating effect of affective commitment to change (ACTC) in relationship to management of change (MOC) and operational excellence (OPX). These hypotheses are presented again in the Table 4.30 below.

Table 4.30
Hypotheses in Relation the Effect of ACTC to the MOC and OPX

Hypothesis	Statement
H_7	Employees' affective commitment to change will moderate the relationship between the management of change and achievement of operational excellence.
H_{7a}	Employees' affective commitment to change will moderate the relationship between manufacturing technology and achievement of operational excellence.
H_{7b}	Employees' affective commitment to change will moderate the relationship between organic structure and achievement of operational excellence.
H_{7c}	Employees' affective commitment to change will moderate the relationship between operations strategy and achievement of operational excellence.
H_{7d}	Employees' affective commitment to change will moderate the relationship between transformational leadership style and achievement of operational excellence.
H_{7e}	Employees' affective commitment to change will moderate the relationship between human resource practices and achievement of operational excellence.
H_{7f}	Employees' affective commitment to change will moderate the relationship between involvement cultural trait and achievement of operational excellence.

In this study, hierarchical regression analysis was utilized to test the effects of moderators on OPX. The moderator effect was identified so that the results could add insights into its usefulness with respect to the relationship between each of the MOC elements and OPX. Obviously, the test was used to achieve the final objective

of this study concerning whether the variable is a moderator and whether it interacts with the predictor as a moderator.

Three steps of hierarchical regression analysis were performed. The first step or Model 1 in Table 4.31 indicates the relationship between the six independent variables and dependent variable. The Beta value of organic structure (0.164), operations strategy (.299), transformational leadership style (.198) and human resource practices (0.185) with R square 0.576, which indicated that those independent variables significantly ($p < 0.05$) related to the dependent variable. The data showed that concern for operations strategy has a greater effect on operational excellence rather does than transformational leadership style, human resource practices and organic structure. In this step, these elements explained 57.6 per cent of variance of operational excellence.

The second step showed that the Beta value of organic structure was .159, operations strategy was .274, transformational leadership was .183; all were significant at $p < 0.05$. However, the finding indicated that the add-on moderating variable, affective commitment to change was not significant ($p < 0.05$) with Beta value at .078. In a similar step, the R square was 0.585, which meant that 58.5 per cent of variation could be explained by the model. If these 2 models are compared, Model 2 has greater effect than Model 1. In sum, three independent variables including organic structure, operations strategy and transformational leadership remained positive and were significantly related with operational excellence. However, commitment to change was positive but not significantly related with operational excellence

At the final step or Model 3, when the interaction terms were entered, an increase in R square by another 4.1 per cent was observed. The result also revealed that the

adjusted R square increased from 55.4 per cent under Model 1 to 55.9 per cent in Model 2 and reached 58.1 per cent in Model 3. This shows that more was explained with the additions of moderating variables. There is a significant F change of 1.954 that indicates a moderate effect from the moderating variable in the relationship between the predictors and criterion variables. The interaction term used to compute regression coefficients was the product of scores of the two predictor variables. In this study, two interactions produced a significant relationship interaction. Interaction between operations strategy and affective commitment to change with B was -.238, and interaction between transformational leadership style and affective commitment to change with B was -.181. However, the Beta values in the third step cannot be interpreted as there is bound to be the problem of multicollinearity. Therefore, the researcher plotted line graphs to see the interaction effect.

Relating Model 1 and Model 2 showed that the manufacturing technology has no significant relationship with OPX. In Model 3, the interaction between manufacturing technology and ACTC regressed with OPX showed no significant interaction, where the interaction term is the multiplication of manufacturing technology and ACTC. The Beta value obtained was .011 in this analysis. The result indicates that the ACTC has no moderating effect on the relationship between manufacturing technology and OPX.

In Model 1 and Model 2, the organic structure was positively and significant related to OPX. During Model 3 testing, the interaction between organic structure and ACTC also show a positive relation with OPX but the relationship was insignificant. The Beta value of organic structure was .011 indicating that organic structure is

insignificant related to OPX. Thus, the researcher concluded that the ACTC is not a moderator in the relationship between organic structure and the achievement of OPX.

The operations strategy has positive and significant effect on Model 1 and Model 2. This independent variable was multiplied with ACTC to produce the interaction term before proceeding to hierarchical regression test. This interaction item shows a p value of 0.034 (or < 0.05), and as such, indicates there is a moderation effect. The Beta value recorded at -.238 indicates a negative relationship. Therefore, the ACTC has a moderating effect on the relationship between operations strategy and the achievement of OPX.

When referring to the three Models presented in Table 4.31 below, transformational leadership style was positive and significantly related to OPX in Model 1 and Model 2. The interaction term of transformational leadership style and ACTC were statistically significant to OPX in hierarchical regression, as per Model 3. The Beta value of -.181 appears to show a negative relationship.

Human resource practices were significant to OPX in Model 1 but not significant to OPX in Model 2. In Model 3, the Beta value was .374 and hierarchical regression showed no significant interaction effect on the multiplication of the human resource practices and ACTC to predict OPX.

The involvement cultural trait was not significant in all three Models. The interaction between involvement cultural trait and ACTC produced a Beta value of .001. This indicates that ACTC has no moderating effect upon the relationship between the involvement cultural trait and the achievement of OPX.

From Model 3, it can be concluded the interaction between operations strategy and affective commitment to change, interaction between transformational leadership style and affective commitment to change were statistically significantly related to the achievement of operational excellence. An affective commitment to change is a quasi moderator moderating this relationship. Other interaction terms such as manufacturing technology and affective commitment to change, organic structure and affective commitment to change, human resource practices and affective commitment to change, involvement cultural trait and affective commitment to change were not statistically significant at a 0.05 confidence level related to operational excellence. Hence，manufacturing technology, organic structure, human resource practices and involvement cultural trait are pure moderators in this relationship.

This study also indicates that two out of six interaction items had an effect on the above MOC elements towards the achievement of operation excellence. Thus, the researcher summarized hypotheses H_{7c} and H_{7d} were supported, where $H_{7a,}$ H_{7b}, H_{7e} and H_{7f} were not supported. Overall, H_7 was supported.

Table 4.31
Summary of Hierarchical Regression Analysis

	Model 1	**Model 2**	**Model3**
Variables	**B**	**B**	**B**
Manufacturing technology	.016	.012	-.231
Organic structure	**.164***	**.159***	-.072
Operations strategy	**.299***	**.274***	**.905***
Transformational leadership style	**.198***	**.183***	**.921***
Human resource practices	**.185***	.173	.374

Involvement cultural trait	.144	.126	.001
Affective commitment to change		.078	**1.152***
Manufacturing technology X Affective commitment to change			.011
Organic structure X Affective commitment to change			.011
Operations strategy X Affective commitment to change			**-.238***
Transformational leadership style X Affective commitment to change			**-.181***
Human resource practices X Affective commitment to change			-.078
Involvement cultural trait X Affective commitment to change			.476
R square	.576	.585	.626
Adjusted R square	.554	.559	.581
R square changed	.576	.009	.041
F	25.836	22.772	13.785
F Change	25.836	2.435	1.954
Std. Error of the Estimate	.32610	.32407	.32616
Durbin-Watson	1.800		

Note: B = Beta (Unstandardized Coefficient); * Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed)

A graph was plotted on the relationship between manufacturing technology and the operational excellence with affective commitment to change as the moderator. Figure 4.3 show the slope to predict operational excellence is the same for low ACTC and high ACTC, and the regression lines to predict operational are exactly parallel. Thus, there is no interaction effect. In other words, the low degree or high of employees' affective commitment to change would not affect a firm's use manufacturing technology in achieving operational excellence. As the hierarchical

regression test showed no significant (B = .011, significant at .848), affective commitment to change is classified as a pure moderator.

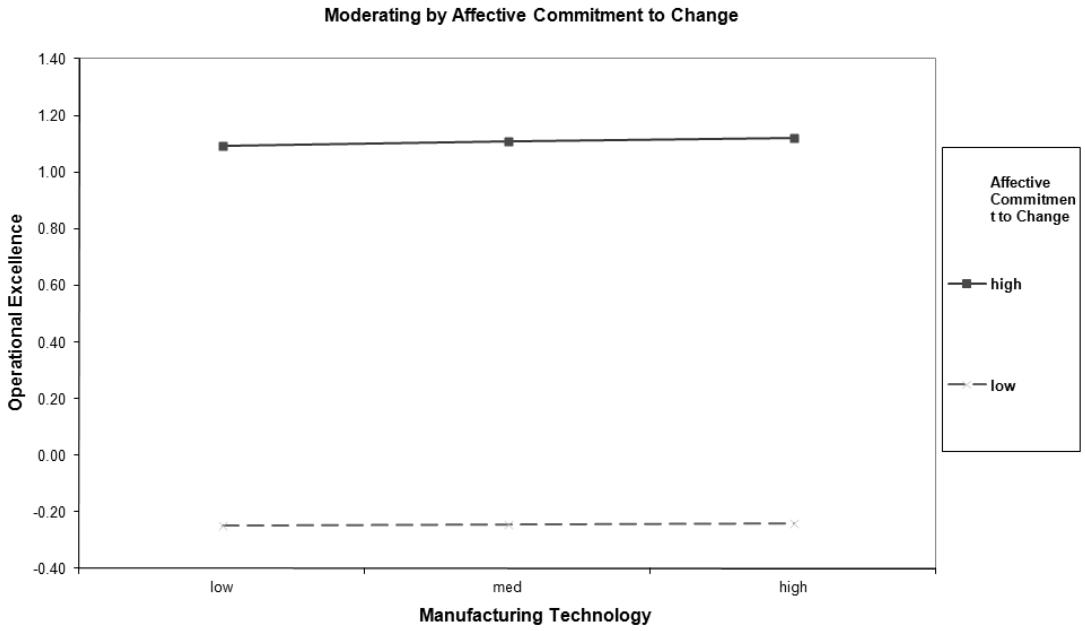


Figure 4.3
The Relationship between Manufacturing Technology and Operational Excellence with Affective Commitment to Change as a Moderator

A plotted graph in Figure 4.4 shows a positive relationship between operational excellence and the organic structure in firms that employees have high affective commitment to change. This indicates high affective commitment to change would work well with organic structure in achieving the operational excellence of the firms. In contrast, firms with employees that have low affective commitment to change will achieve low operational excellence even with an improvement in organic structure. However, the hierarchical regression test showed no significance (B = .011, significant at .900); thus, affective commitment to change is classified as a pure moderator in this relationship.

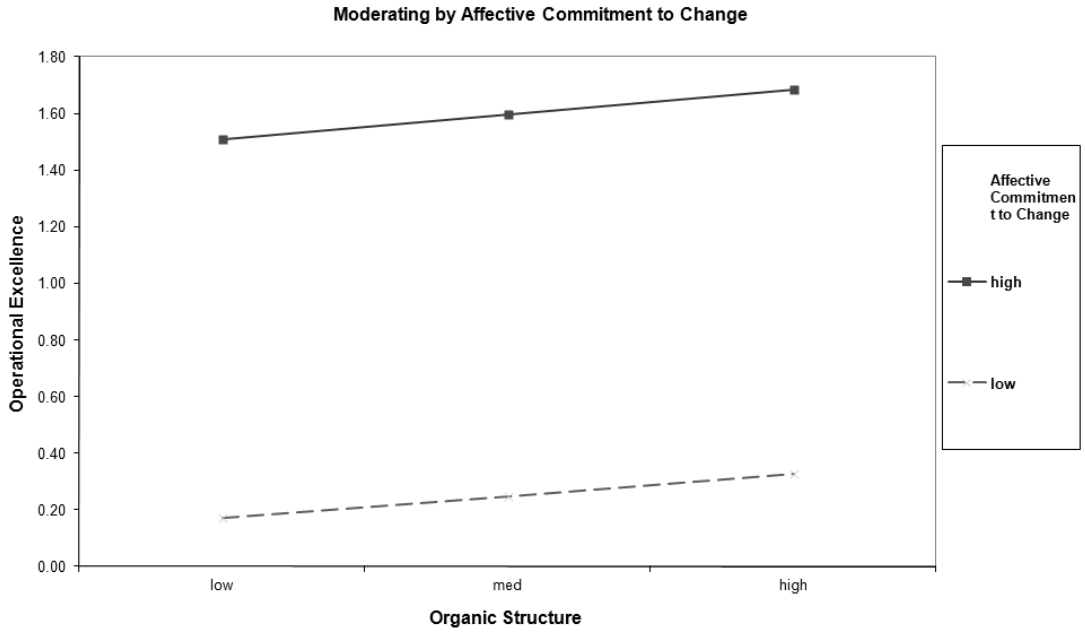


Figure 4.4
The Relationship between Organic Structure and Operational Excellence with Affective Commitment to Change as a Moderator

As show in Figure 4.5, the graph indicate that, with high affective commitment to change, there is slightly positive relationship between operational excellence and operations strategy but a positive linear relationship occurs for firms with low affective commitment to change. Thus, high affective commitment to change does not have much effect in the situation of effective implementing operations strategy in the achieving operational excellence. Conversely, high affective commitment is required in the situation of low operation strategy implementation. When affective commitment is low, the highest level of operations strategy is associated with the highest achievement of operational excellence. The hierarchical regression test was statistically significant (B = -.238, significant at .043) showing that affective commitment to change is classified as a quasi moderator in this relationship.

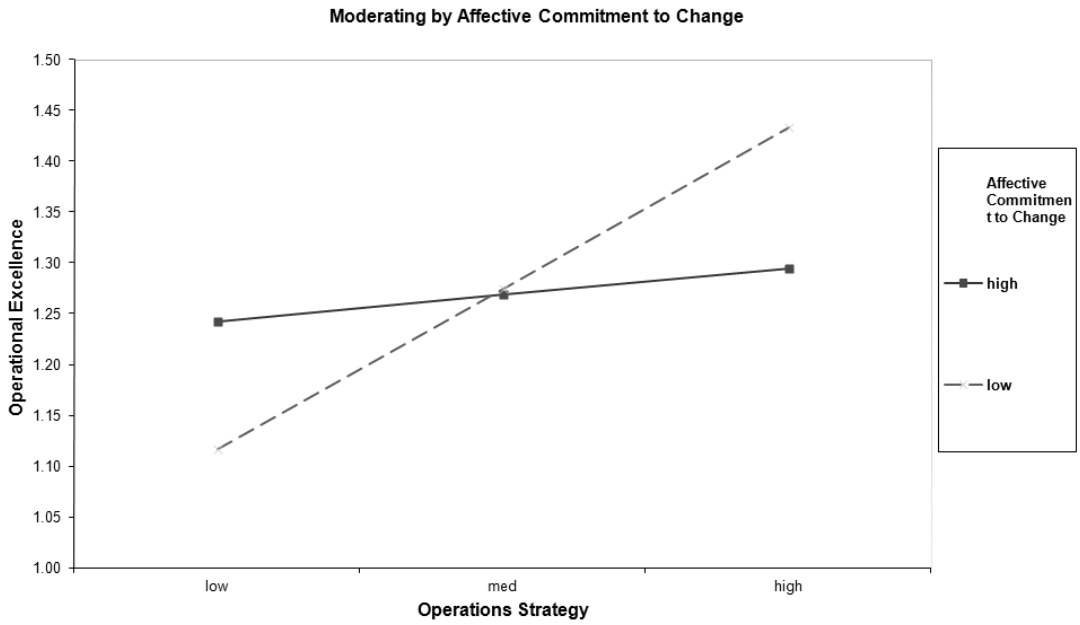


Figure 4.5
The Relationship between Operations Strategy and Operational Excellence with Affective Commitment to Change as a Moderator

The graph in Figure 4.6 shows that a positive relationship exists between operational excellence and transformational leadership style with the presence of affective commitment to change. This relationship indicates that higher employee affective commitment to change would lead to less effect on implementing transformational leadership style to predict operational excellence. However, the relationship between operational excellence and transformational leadership style is positive linear when affective commitment is low. The hierarchical regression test was statistically significant (B = -.181, significant at .034); therefore, affective commitment to change is classified as a quasi moderator.

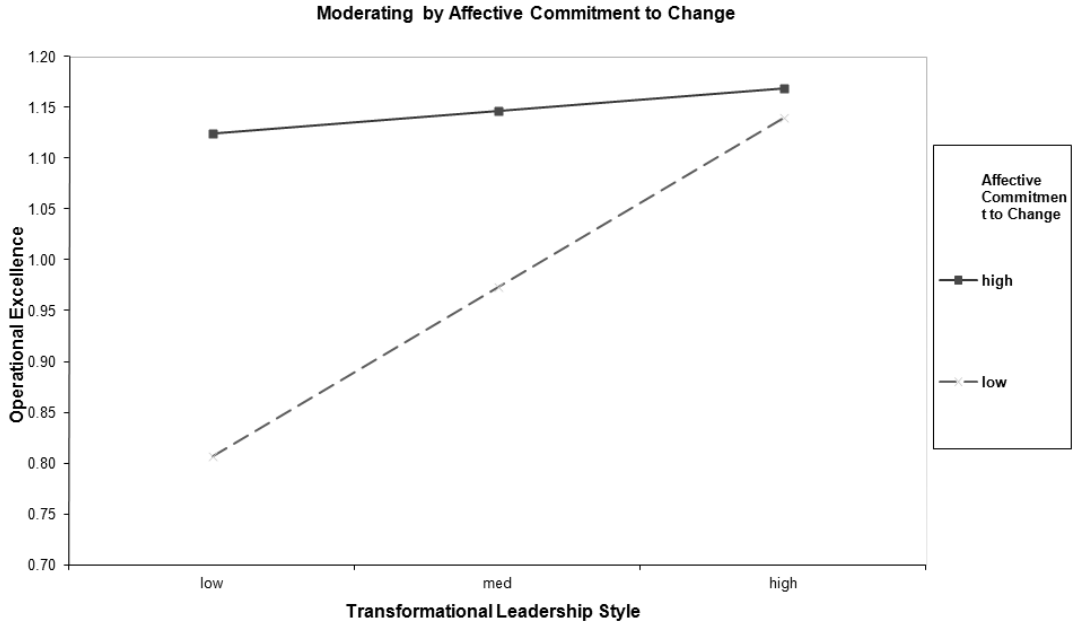


Figure 4.6
The Relationship between Transformational Leadership Style and Operational Excellence with Affective Commitment to Change as a Moderator

The plotted graph for Figure 4.8 shows high affective commitment to change has a slightly positive effect on the relationship between human resource practices and operational excellence. Implementation of human resource practices becomes effective when a high degree of commitment to change is present in the work place. Similarly, a low degree of affective commitment to change would have slightly increased in achieving operational excellence when implementing human resource practices. However, the hierarchical regression test statistically showed no significant (B = -.078, significant at .440); thus, affective commitment to change is classified as a pure moderator in this relationship.

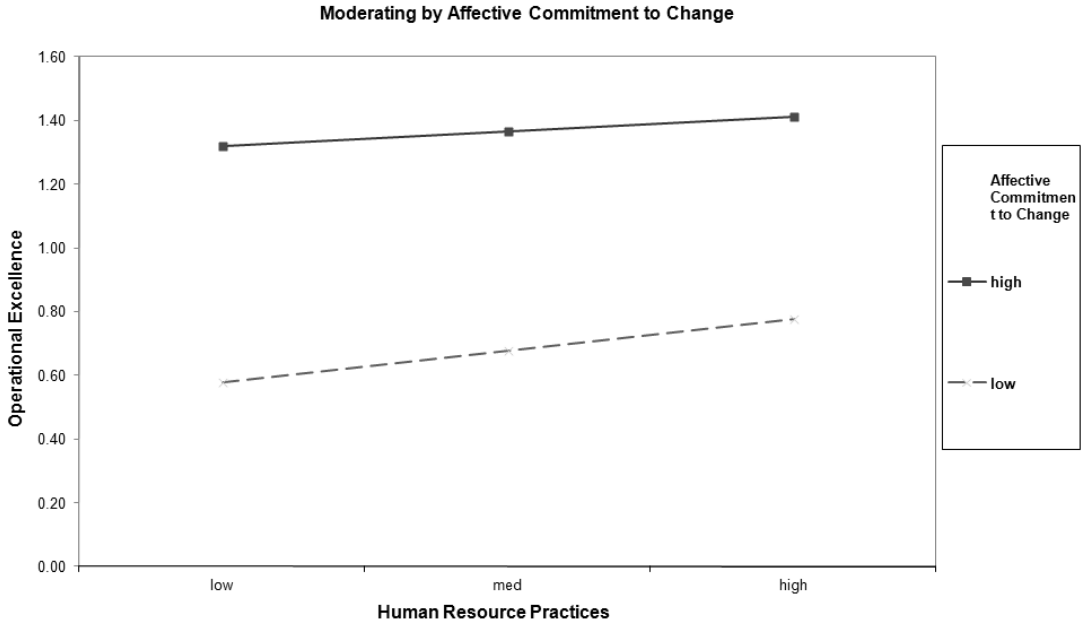


Figure 4.7
The Relationship between Human Resource Practices and Operational Excellence with Affective Commitment to Change as a Moderator

Finally, is affective commitment to change effect a moderator in the relationship between involvement culture trait and the achievement of operational excellence? As shown by plot graph in Figure 4.8, a positive relationship between involvement cultural trait exists with the presence of either low or high commitment to change. Low affective commitment to change will achieved slightly better excellence performance of firms even with the increase of the level of involvement cultural trait. In contrast, high affective commitment to change will lead to achieving a firm's excellence performance even with the presence of low involvement cultural trait. The hierarchical regression test showed no significant (B = .070, significant at .098); thus, affective commitment is classified as a pure moderator.

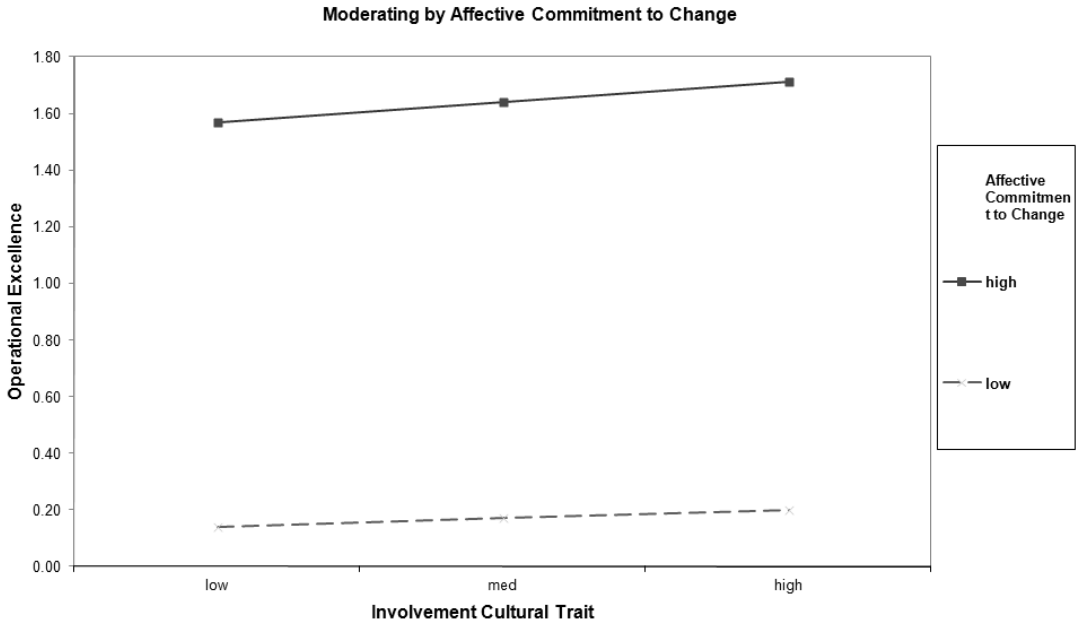


Figure 4.8
The Relationship between Involvement Cultural Trait and Operational Excellence with Affective Commitment to Change as a Moderator

Several proposed hypotheses postulated in Chapter 2 were supported by the statistical analyses presented in this section. In multiple regression analysis, H_2, H_3, H_4 and H_5, which stated that organic structure, operations strategy, transformational leadership style and human resource practices would show a positive and significant relationship with operational excellence, were fully supported. In contrast, H_1 and H_6, which stated that there is a significant relationship between manufacturing technology and operational excellence; involvement cultural trait and operational excellence, were not significant in the multiple regression analysis.

Three steps of hierarchical regression analysis were performed to test the moderating effect. The H_7, which that stated employees' affective commitment to change would moderate the relationship between the management of change and achievement of operational excellence, was supported. In Model 3, they were two interaction terms: (i) the product of operations strategy and affective commitment to change, and (ii)

the product of transformational leadership style and affective commitment to change. These were significantly related to operational excellence at $p < 0.05$. Thus, H_{7c} and H_{7d} were fully supported. Apart from this analysis, the results also showed that affective commitment to change was a quasi moderator.

As a summary of the findings, Table 4.32 summarizes the results of the hypotheses tested in this study.

Table 4.32
Hypotheses Test Results

Hypothesis	Statement	Supported / Not supported
H_1	The use of the manufacturing technology will lead to the achievement of operational excellence.	Not supported
H_2	The implementation of an organic structure will lead to the achievement of operational excellence.	**Supported**
H_3	A well-defined operations strategy will lead to achievement of operational excellence.	
H_4	The inclinations towards transformational leadership style will lead to the achievement of operational excellence.	**Supported**
H_5	Effectiveness of human resource practices will lead to the achievement of operational excellence.	**Supported**
H_6	Higher levels of individual involvement cultural trait will lead to the achievement of operational excellence.	Not supported
H_7	Employees' affective commitment to change will moderate the relationship between the management of change and achievement of operational excellence.	**Supported**
H_{7a}	Employees' affective commitment to change will moderate the relationship between manufacturing technology and achievement of operational excellence.	Not supported
H_{7b}	Employees' affective commitment to change will moderate the relationship between organic structure and achievement of operational excellence.	Not supported
H_{7c}	Employees' affective commitment to change will moderate the relationship between operations strategy and achievement of operational	**Supported**

	excellence.	
H_{7d}	Employees' affective commitment to change will moderate the relationship between transformational leadership style and achievement of operational excellence.	**Supported**
H_{7e}	Employees' affective commitment to change will moderate the relationship between human resource practices and achievement of operational excellence.	Not Supported
H_{7f}	Employees' affective commitment to change will moderate the relationship between involvement cultural trait and achievement of operational excellence.	Not supported

4.8 Discussion

A quick revisit to the research objectives shows that this study was primarily undertaken to provide answers to three research questions, which included: (1) What are the effects of MOC hard elements such as technology, structure and strategy on the achievement of OPX? (2) What are the effects of MOC soft elements such as leadership, human resource and culture on the achievement of OPX? (3) Is there any moderating effect of employees' affective commitment to change on the relationship between MOC hard and soft elements and the achievement of OPX?

In answering the research questions, empirical study was conducted. The research proposed here reflects the empirical results showing the relationships between MOC, ACTC and OPX. In Multiple Regression Analysis, treating all MOC elements composite factors that might influence OPX, this research found that four of six MOC elements were positively and statistically significant with OPX. These MOC elements were organic structure, operations strategy, transformational leadership style and human resource practices. The results from Model 1 (presented in Table 4.31 above) showed that the regression equation with all the predictors was highly

significant. The composite MOC elements contributed 59.5 per cent of the variance of OPX.

With regard to the proposed hypothesis arguing that ACTC as one factor that moderates the relationship between MOC and OPX, this research found support the hypothesis. Two out of six interaction items (moderators) were found to be statistically significant with moderating effect. These two included (1) interaction between operations strategy and ACTC, and (2) interaction between human resource practices and ACTC. The slopes that described the relationship between the interacting effects between each interaction item (moderator) in predicting OPX were significantly varied in different levels as presented in Figure 4.3 to 4.8 above.

The first part of the following section discusses the direct effects of the independent variables that comprise the six MOC elements on the dependent variable (OPX). The second part discusses the moderating effect of ACTC on the relationship between MOC elements and the achievement of OPX.

4.8.1 The Effect of Manufacturing Technology on Achievement of OPX

Even through the relationship between manufacturing technologies, which is the hypothesis, H_1 was not supported and found positively insignificant with OPX, the finding obtained in the present study appears to be consistent with other studies that looked into similar issues of operational performance. Past studies have supported the notion that both continuous improvement techniques and the adoption of manufacturing technology have become a critical success factors for a firm, but empirical and anecdotal evidence has also revealed that many firms are not getting

their expected results from the investment in manufacturing technology or automation (Bessant, 1994; Voss, 1988a; Voss, 1988b; Sim, 2001). These authors have concluded that higher levels of advanced manufacturing technologies (AMT) or automation investment were not associated with higher quality, productivity or flexibility. While the present finding is contrary to the hypothesized positive relationship, it is strongly aligned with the findings in Kuruppuarachchi and Perera (2010) in which they found manufacturing technology had no significant direct relationship on operations performance concurrently with best practices. Arguably, selection, acquisition and exploitation of technology have been found to be some of the lengthiest, expensive, and complex tasks a firm can undertakes. In view of this, manufacturing technology is not considered to a good predictor on operational excellence in this current study.

In multiple regression analysis, H_1 was not supported illustrating that manufacturing technology is not a key factor to achieve OPX. This indicates that manufacturing technology itself cannot improve operational performance. Such technology must be integrated with people, hardware and organizational systems to produce the best results. This has always been the foundation of superior manufacturing performance (Sim, 2001). For example, argument can be made those employees attitudes towards workplace changes, if they are resistance to adopting advanced manufacturing technology, affect a firms' performance (Orr & Sohal, 1999; Ghani & Jayabalan, 2000). To overcome this, workers must be trained in order to attain new and higher level of machine operations and maintenance skills, and must also have a higher level of commitment to the tasks that they perform daily.

Another possible explanation for this research finding could be because the Malaysian E&E industry may not be fully automated. The majority of the responded companies are still labour intensive rather than capital intensive. According to research carried out by Phillips & Henderson (2009), the integration of Malaysia's electronic industry into global production networks depends upon low cost and labour-intensive production. Furthermore, the available pool of relatively cheap and well-trained labour has attracted foreign direct investment (FDI), particularly for labour intensive industries such as the E&E industry (Tsen, 2006). Furthermore, the descriptive analysis revealed that a company work force of between 500 to 1000 employees and above 1,000 employees contributed 25.6 per cent and 36.4 per cent respectively to the total respondents. This high suggests that the Malaysian E&E manufacturing operations depends on humans to operate machine and to achieve high performance. Hence, as this variable is insignificant for E&E manufacturing companies which still have labour-intensive production, this result deserves further analysis in future research.

4.8.2 The Effect of Organic Structure on Achievement of OPX

The result of multiple regression analysis shows the organic structure has a positive and statistically significant relationship with operational excellence. Therefore, H_2 is fully supported. In this study, the organic structure dimensions included both formalization and decentralization as good predictors for the achievement of OPX. This result supported the view of Mansoor et al. (2012), who suggested that an organic structure works well under dynamic or change environment conditions, especially in private sector in terms of performance as well as being effectiveness

where employees are involved in decision-making. In this study, all respondents were from the private sector.

Data analysis revealed that 62 per cent of the E&E manufacturing companies in Malaysia are fully foreign owned. According Shah, Yusaff, Hussain, and Hussain's (2012) recent study, the structure of a multinational company tends to be decentralization rather than centralization because decentralization helps improve local motivation and morale, therefore, increasing the firm's effectiveness. Decentralized decision-making for operating issues can make those more effective and faster (Nahm et al., 2003). This is critical because manufacturing firms require fast decision-making for day-to-day problems. For example, any delay in decision-making may cause a production line to stop longer and losses to be incurred. Another argument is that decentralization facilities spontaneity, experimentation, freedom of speech, and circulation of ideas. These, in turn, will help firm to improve operations efficiency. When decision authority is pushed downward to lower organizational levels, those who are closest to problems and opportunities are allowed to response quickly. Decentralization also enhances organizational commitment through greater involvement. Employee participation ensures that the decision-making process will consider all interests and also promotes programs (such as best practices) success and performance through greater employee acceptance (Akdemir, Erdem, & Polat, 2010). This supports the finding that organic structure produces positive outcomes and is a vital element in predicting operational excellence.

In present study, most E&E manufacturing companies were ISO9000/14000 certified (FMM, 2008; FMM, 2012). Therefore, their organizational structure was well-defined, along with the duties and responsibilities attached to each functional role

per ISO standards requirements. A high degree of formalization tends to produce formal rules and procedures that encourage creativity, autonomous work, learning, and decentralization of decision-making to the greatest extent possible (Daft, 1995; Nahm et al., 2003). In this study, analysis of the results shows that under the management of change environment, the organic ideal type that emphasizes role flexibility influenced OPX. In fact, E&E manufacturers that are likely to confront technological rapid growth and market environment changes; therefore, the more flexible or "organic" their structures tended to be.

This finding also strengthened those of previous researches such as Alam (2011) and Shah et al. (2012) who found that decentralization provided flexibility and was beneficial for organizational performance. This current study focused on decentralization and formalization so its finding will justify the idea that implementation of an organic structure in E&E manufacturing industry will lead to achievement of operational excellence. Thus, the study will help organizations decide about their structure in order to achieve their desired performance.

4.8.3 The Effect of Operations Strategy on Achievement of OPX

Hypothesis H_3 proposed that a well-defined operations strategy would leads to the achievement of operational excellence. The results gathered from the empirical data analysis show that operations strategy positively and significantly affects OPX. This finding is theoretically consistent with others that have empirically shown that operations strategy comprising quality, flexibility, time, cost produce an effective

operations capability for achieving business excellence (Skinner, 1974; Brown et al., 2010).

These current results also support earlier studies by Tunalv (1992), Sun and Hong (2002), Joshi et al. (2003), Chenhall (2005), which said that operations strategy is associated with either operations performance or business performance. One plausible explanation for this positive and statically significant association in this study may be that well-defined operations strategies (quality strategy, cost strategy, flexibility strategy and delivery strategy), Skinner (1974) and Schniederjans and Cao (2009) used these to best to predict operational outcomes in term of quality, flexibility, time, cost (Brown et al., 2010).

Accordingly, the operations strategies studies in this research are directly related to operational performance measures (quality, cost, time, and flexibility) except for environmental and social performance. However, if looked at from the corporate level perspective, the overall aim of an operations strategy is to contribute to the business strategy, and hence the corporate strategy and mission (Waters, 2006). This leads to a series of more immediate aims. None of these are static but continue to evolve over time. For example, if the corporate value is CSR and environmental protection, then the operations strategy has to be designed to achieve that corporate mission. In this study, the result revealed that majority of the E&E manufacturers have aligned, connected and made an internal fit between operations strategy and business performance. So operations managers can build their internal strengths to develop excellence performance.

Another interesting finding from this study is that operations strategy has a significant effect on both economic and non-economic performance. This study not

only validated the fact that operations strategy has a direct and positive relationship with operation priorities, but also concludes that operations strategy is a good predictor on sustainability of performance. The current findings contribute eliminate the performance gap that Muogboh and Salami (2009) pointed out concerning the fact that past manufacturing studies have neglected social performance measures.

4.8.4 The Effect of Transformational Leadership Style on Achievement of OPX

This study also has provided evidence that transformational leadership style has a significant positive effect on OPX when H_4 was supported. That H_4 was accepted is not surprising because strong theoretical and practical support suggest that transformational leadership helps engage change successful. This current research supports previous studies by Burke and Church (1993), Eisenbach et al. (1999), Herold et al. (2008), and Idris and Ali (2008), who suggested that those who manage change better are more likely to exhibit a transformational style in their approach. Based on the aforementioned findings, the conclusion can be that transformational leadership in Malaysian E&E industry is an effective leadership style for change management.

The present study also concurs with the findings of past study by Bass (1985) and Boehnke et al. (2003) who claimed that the transformational leadership style could produce positive organizational change and create exceptional performance. Furthermore, others have found that transformational leadership is directly correlated with better long-term performance (Bass & Riggio, 2006; Cameron, 2008), therefore,

contributing to business sustainability. In other words, this leadership style is good a fit with sustainability of Malaysian E&E manufacturing firms.

In this study, the researcher has validated the four elements of transformational leadership defined by Bass and Avolio (1992), which include (1) idealized influence (attributed), (2) idealized influence (behavior), (3) inspirational motivation, and (4) individualized consideration that have been found to positively predict organizational performance. The empirical finding in this study confirms the hypothesized relationship and is consistent with Elenkov's (2002) study. This finding will let organizational leaders continue to demonstrate their capacity and ability to provide a compelling vision, defining and communicating a high level of performance expectations, acting as role models, and displaying a sense of confidence in followers' ability to achieve the next level of excellence.

This current study adds another point of view to the earlier findings conducted in Malaysia, Idris and Ali (2008) suggested that transformational type of leaders would impact company performance if best practices management were implemented. Under these argument, a transformational leader who promotes the adoption of best practices helps lead the company to superior performance. This finding is consistent with the results from prior studies (Voss, 1995a, Laugen, et al, 2005; Yusuff, 2004; Anuar & Yusuff, 2011), which showed that those companies that adopted best practices showed better operation performance. In this study, the effect of transformational leadership style on achieving operational excellence was supported. In other words, lower and middle management of Malaysian E&E manufacturing companies perceived that their top management used a transformational leadership style in pursuit of excellence.

4.8.5 The Effect of Human Resource Practices on Achievement of OPX

The multiple regression analysis revealed that human resource practices had an effect upon OPX of Malaysian E&E manufacturing companies in this research. Therefore, H_5 was fully supported. This finding is consistent with those of earlier studies by Kalyani and Sahoo (2011), who argued that human resources are an intellectual asset that can be channeled for sustained organizational excellence. This study also support past studies on human resource practices including recruitment and selection, training and development, performance appraisal, and compensation and benefits, that are HR tools used by organization to achieve excellence (Ferguson & Reio Jr., 2009; Gurbuz & Mert, 2011; Kalyani & Sahoo, 2011; Stavrou-Costea, 2004; Dimba, 2010; Khan, 2010).

Moreover, the above findings strongly support Lee and Lee's (2007) empirical findings that suggested human resource management practices including training and development, HR planning, performance appraisal, compensation/incentive, and employee security help organizations improve their business performance such as firm's product quality, flexibility, and employee's productivity. The aforementioned results have also provided the required empirical support that the influence of human resource management practices have demonstrated positive and significant relationships upon organizational performance in the area of research for the past 25 years (Qureshi, Hijazi, & Ramay, 2007). The finding of present study provides empirical evidence again about the role of human resource practices on the achievement of OPX.

As theoretically argued in the extant literature, this study's findings also support RBV theories. RBV theoretically predicts intangible resources as important factors

for firm success (Barney, 2001; Conner, 2002; Ray et al., 2004). Among the intangible resources, human resources are one key determinant of firm success and performance. That is because human capital is seen as set of knowledge, skills and abilities that are required for achieving organization's specific goals (Doorewaard & Benschop, 2003). This research can conclude that Malaysian E&E industry, which has created employment opportunities for more 300,000, has implemented the human resource practices (recruitment & selection, training & development, performance appraisal, compensation systems) in their organization in order to achieve excellent results. Obviously, taking human resources into account remains a crucial factor for E&E organizations in order to match themselves with the on-going environmental changes. Besides, human resource functions also have role as the creator of added value for E&E organizations.

4.8.6 The Effect of Involvement Cultural Trait on Achievement of Operational Excellence

Hypothesis, $H_{6,}$ which speculated a relationship between the involvement cultural trait and OPX, was not statistically significant. This hypothesis was not supported but was found to be positively related to OPX. This result indicates that the involvement cultural trait had no significant effect on achieving OPX. The involvement cultural trait comprises empowerment; team orientation and capability development did not play any major roles in OPX effectiveness. Although impossible to speculate accurately why the above phenomena exist, the anecdotal evidence provides some plausible answers. This finding is similar with past research that showed that different cultural traits were related to different organizational

effectiveness measures (Nasir & Lone, 2008). For example, Denison and Mishra (1995) found that innovation was best predicted by the traits of involvement and adaptability.

This finding is consistent with the studies by You et al. (2010). In this study, they argued that the involvement cultural trait was considered very important by respondents, yet multiple regression demonstrated that it had little to do with explaining changes in business performance. Similarly, the result as obtained in present study in the simple regression analysis indicates that, although the involvement cultural trait is a key enabler, its application has no significant effect on OPX under MOC. This reminded us that other MOC elements were better to predict OPX than cultural trait. This finding also seems to indicate that firms might adopt different cultural traits, depending upon corporate cultures, management philosophies and organizational climates. For example, MNCs with different national origins that have invested heavily in the Malaysian E&E sector would also influence the work culture in the host country.

Another plausible reason for the insignificant relationship between involvement cultural trait and OPX was in the way in which the culture trait was measured. In previous studies by Denison (1990) and You et al. (2010), culture traits were measured on four major aspects which were, namely, involvement, consistency, adaptability, and mission. Rajala, Ruokonen, and Rusimaki's (2012) recent study argued that organizational culture is a complex concept and not easy to capture or define. Every organization reveals a different culture. Some organizations have a "strong" culture and others have a "weak" culture. How is it possible to decide which kind of culture an organization has? This study embraces management of change and

concentrates on internal organization, therefore, only the involvement trait was measured. If more than one cultural trait is used to predict excellence, perhaps these metrics would cover more types of organizational situations. Thus, this result deserves further analysis in future research.

4.8.7 The Moderating Role of ACTC in the Relationship of MOC Elements and Achievement of OPX

H_7 hypothesized a moderating effect of moderator on the relation between interaction (independent variable and moderator) and dependent variable. Interaction effects represent the combined effects of variables on the criterion or dependent measure. The effect of one variable depends on the level of the other variable when an interaction effect is present. In present study, all the six independents were multiplied with ACTC in order to produce new interaction terms. Then all the independent variables, moderator and interaction terms were entered to the line regression step by step. The outcomes from Model 3 (presented in Table 4.31 above) illustrate that the overall regression was statistically significant at 0.05. All MOC elements (composite interaction items) explained 62.6 per cent of the variance in OPX. When the interaction terms were entered, an increase in the prediction from 58.5 per cent to 62.6 per cent was observed. The interaction items together made a unique contribution of 4.1 per cent to the variance of OPX after all independent variables. However, only two interaction items were significant, hence, supporting H_7.

4.8.8 The Moderating Role of ACTC in the Relationship of Manufacturing Technology and Achievement of OPX

The first moderated relationship by affective commitment to change is between manufacturing technology and operational excellence hypothesized as H_{7a}. As indicated in Figure 4.3, the slope of low ACTC and high ACTC lines are parallel and not interacting effects. This means that employees' commitment to change would not affect the relationship between manufacturing technology and achievement on operational excellence. One possible argument for the results obtained is supported by Saberi and Yusuff (2012). Their research finding there were no significant differences between the companies in terms of performance and obstacles despite different levels of AMT usage. The outcomes of the study implied that technology itself did not create a big difference for its users. For example, if the AMT installed in manufacturing firm had programmed fixed output per hour based on machine capacity, an employee's commitment did not played a significant role in outputs such as quality, time, cost, flexibility and waste.

The insignificant relationship between manufacturing technology and OPX is mainly due to Malaysian E&E manufacturing companies that still rely on labour intensive (Phillips & Henderson, 2009; Tsen, 2006), although the researcher believed more companies will move towards capital intensive or fully automation. In the present study, the respondents' data show that 62 per cent of the companies involved used a workforce of more than 500 people. This data justifies the conclusion that the manufacturing systems still depends heavily on a labour work, and process automation is not intensively utilized. Therefore, the interaction item (combined

effect of manufacturing and ACTC) did not play any moderating role in the relationship of manufacturing technology and OPX.

Another plausible explanation is the adoption of new manufacturing technology might be explained, in part, by the fact that employees feel uncertainty about their future with the organization, a loss of control, increased work demands, and fear of failure as they face new job demands. Moreover, Fedor et al. (2006) cited that the majority of the existing literature seems to point out that change tends to be disturbing for employees, particular until the new order is fully normalized. This may be a reason why personal who wanted to offer support for change based on a belief in its inherent benefits (affective commitment to change as suggested by Herscovitch & Meyer, 2002) does not appear in this study. In other words, commitment to the change tended to be low when the change was generally unfavourable for the employee or individual.

4.8.9 The Moderating Role ACTC in the Relationship of Organic Structure and Achievement of OPX

The data analysis of this study does not support hypothesized relationship ($H_{7b)}$ that ACTC will moderate the relationship between organic structure and operational excellence. Figure 4.4 indicates that under the conditions of high ACTC, the effect of perceiving organic structure practices will lead to a high achievement of operational excellence. As a whole, there were positive relationships. Even through the statistically not significant, the positive relationship can be explained further. ACTC is required to achieve operational excellence when an organization has slightly

implemented its organic structure. ACTC also is required for achieving higher operational excellence when an organization has highly implemented its organic structure.

The current finding implies that an organic structure provides the foundation for task allocation, a decentralized decision-making process, and working well under either uncertain or change environment conditions (Lawrence & Dyer, 1983; Mansoor et al., 2012), and a high level of adaptation (Chakravarthy, 1982). Due to the fact that employees with strong affective commitment remain because they a "want to" attitude has effect upon organization that has implemented organic systems.

Daft (1995) and Nahm et al. (2003) stated that an organic structure would decentralize decision-making to the greatest extent possible, written instructions and procedures that guide employees to perform their task in efficient and effective manner. For example, formalization creates a condition in which "everyone knows exactly what to do" (Mintzberg, 1979; Sine et al., 2006). In the light of this argument, formalization is supportive of decentralization, flexibility and empowerment. Hence, it may be possible that affective commitment in the present study could not manifest its effect upon the achievement of OPX with the present of high organic structure. It is also not totally surprising that affective commitment necessarily play a major role in the low organic structure because employees with high affective commitment behavior are likely to perform assigned tasks to the best of their ability and likely to attend work more regularly (Meyer & Allen, 1991).

4.8.10 The Moderating Role of ACTC in the Relationship of Operations Strategy and Achievement of OPX

In the current study, the results obtained from data analysis support the hypothesized relationship (H_{7C}) that employees' ACTC will moderate the relationship between operation strategy and achievement of OPX. This finding is consistent with previous studies in which employee commitment to change is generally seen as the mind-set that binds an individual desire to provide support for the change based on a belief in its inherent benefits (Herscovitch & Meyers, 2002) and best reflects alignment with change (Herold et al., 2008). Thus, it is argued that employees' commitment to change may be an important factor used by management in a course of action of relevance to one or more person (Herscovitch & Meyer, 2001).

The graph in Figure 4.5 showed that both low and high ACTC to change have a positive relationship between operational excellence and operations strategy. This result showed that interaction between ACTC and operation strategy would help achieve higher performance. Past studies by Tunalv (1992), Sun and Hong (2002), Joshi et al. (2003) and Chenhall (2005) suggested that operations strategy is significant with respect to operational performance. In this study, ACTC has played a moderating role between operations strategy and achievement of operational excellence. The result may be explained by the fact that operation strategies are applied directly to tackle operations issues and to achieve better operational performance (Skinner, 1974; Schniederjans & Cao, 2009) while employees' committed to work in operations strategy implementation will assist in achieving better operational performance.

Another plausible explanation is that the majority of manufacturing companies have established the key performance index (KPIs) as operation ratios to achieve excellence in the overall performance. All employees are requested to meet the targets set by the top management. Employees with affective commitment may see them as challenge and "want to" achieve them (Herscovitch & Meyer, 2002). Therefore, ACTC did play a moderating role in this relationship.

4.8.11 The Moderating role of ACTC in the Relationship of Transformational Leadership Style and Achievement of OPX

The relationship between transformational leadership style and OPX moderated by ACTC has been hypothesized in this study as H_{7d}. The results obtained from hierarchical regression analysis showed that ACTC had moderating effect on the relationship. As a positive correlation (as per Figure 4.7), this data means that in practical terms, an inclination towards the transformational leadership style is more likely to have higher affective commitment to change. It is evident that ACTC, which is commonly referred as "buy-in" is most likely to be influenced by leadership style (Herold et al., 2008).

These findings disclosed that transformational leaders who encourage their followers to think creatively and critically could have an influence on their followers' commitment (Bass and Avolio, 1994). Moreover, Burns (1978) noted that transformational leaders focused on traditional needs to fulfill higher levels of human needs such as trust, integrity, delivers true value, actualization, rather than on having merely an eye for exchanging one thing for another. Hence, it logically stands

to reason that in the workplace, a transformational leader has an ability to motivate followers effectively to engage in behaviors known to have positive outcomes for the organization. For example, once employees are motivated towards accomplishment of an end, ACTC will play a moderating role to effect the relationship.

Present finding also consistent with past empirical findings, for example, analysis of affective commitment and normative commitment revealed that three dimensions of transformational leadership, namely, idealized influence, intellectual stimulation, and inspirational motivation significantly predicted affective commitment (Lo et al., 2009). Herold et al. (2008) also suggested that transformational leadership is positively and significantly related to affective change commitment. Hence, the interacting effect between transformational leadership style and ACTC to predict operational excellence was confirmed as a moderating effect in this study.

4.8.12 The Moderating Role of ACTC in the Relationship of Human Resource Practices and Achievement of OPX

In hierarchical regression analysis, the result indicated that ACTC does not significantly moderate the relationship between human resource practices and operational excellence. Therefore, although H_{7e} was not supported, there was a positive correlation. Many studies such as Herscovitch and Meyer (2002), Herold et al. (2008) and Solinger et al. (2008) who claimed that affective commitment can influence organizational change success supported this finding. This result also supported empirical study findings that employee commitment to change could

either positively or negatively affect organizational change (Fedor et al., 2006; Peus et al., 2009).

Based on the multiple line plot shown in Figure 4.7, when affective commitment to change is high, human resource practices have more influence upon operational excellence. When there is a low affective commitment to change, human resource practices have less influence in operational excellence. This finding aligns with the fact that if an organization put more efforts into human resource practices, they also need higher affective commitment of employees to achieve higher OPX.

The findings of the current study also seem to be consistent with previous scholars who found human resources practices (training and development, rewards, employee relations) were positively related to job performance and organizational excellence (Stavrou-Costea, 2004; Ferguson & Reio Jr., 2009). The present findings further validate the application of internal resources to build a firm's capability towards business excellence and also justify RBV theory.

Because employees' affective commitment ('want to') has no moderating effect between human resource practices and operational excellence, the normative commitment because employee 'need to', and continuance commitment because employee feel they 'ought to' do so (suggested by Herscovitch & Meyer, 2002) which were omitted from this study could be further investigated. That is because the mind-sets of the perceived cost of leaving with respect to continuance commitment, and mind-sets of perceived obligation to remain with respect to normative commitment are more aligned with performance appraisal and compensation systems under human resource practices.

4.8.13 The Moderating Role of ACTC in the Relationship of Involvement Cultural Trait and Achievement of OPX

The final moderated relationship (H_{7f}) by ACTC is between the involvement cultural trait and achievement of OPX. The results did not support the role of ACTC as a moderator in the relationship between MOC and OPX in change organization. The construct of involvement cultural trait consisting of staff empowerment, team orientation and capability development which are used to measure the company's ability to drive commitment and develop ownership with employees (Denison et al., 2003) appear to have had no effect in this study. Initially, the high levels of employee involvement in the company's activities did play an important and integrated role in achieving operational performance outcomes. Therefore, ACTC which is recognized as employee' emotional attachment to, identification with, and involvement in the organization (Solinger et al., 2008) could effect this relationship. But the hierarchical regression analysis statically revealed that ACTC did not significantly moderate this relationship.

Figure 4.8 depicted that both low and high ACTC have a positive relationship in between the involvement cultural trait and OPX. High ACTC is required to achieve higher OPX with high involvement of cultural trait. Based on this positive relationship, a reasonable argument could be made that the involvement cultural trait is a company or corporate culture (Denison et al., 2003) that has been embedded in the organization a long time ago, which shapes employee behaviour and involvement, participation in change. Moreover, employees' affective commitment is likely to be required to ensure a willingness to work cooperatively with others and to exert extra effort to achieve the objectives of the change (Herscovitch & Meyer, 2002).

Corporate culture has an indirect influence on employees' decision-making, team orientation, and capability development (Denison et al., 2003; You et al., 2010). Thus, a high level of individual involvement cultural trait did require higher employee's ACTC in achieving better performance.

4.9 Summary

The data were cleaned and screened with a low level of bias. The response rate was normal and acceptable compared with past studies. The majorities of respondents held managerial positions and were related with operations, which was in line with the target respondents. The majority of the responding companies were from electronics sector and fully foreign owned. After the descriptive analysis, factor analysis was performed to validate the unidimensional constructs. The correlations tests to check multicollinearity among the variables and regression tests were conducted to answer the hypothesized questions. Pearson correlation tests were as expected in parallel with previous findings. The multiple regression results revealed that the organic structure, operations strategy, transformational leadership style and human resource practices were statistically significantly and had a positive relationship with the achievement of operational excellence. The quasi moderator, affective commitment to change, affected the relationship between operations strategy and operational excellence, and transformational leadership style and operational excellence. The findings in this study were interesting because they highlighted several stimulating relationship between variables. The next chapter will summarize the key findings according to research objectives, significance of the findings, limitations of the study and recommendation for future research.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 Introduction

This final chapter consists of several sections. First, it starts with a recapitulation of the study in which the objectives and purpose of this study are revisited. Second, it discusses the research contributions and implications. They are categorized into theoretical, methodological and managerial. Third, it presents the limitations of the present study and provides recommendations for future research. The final section of this chapter serves as a parting overview of the entire course of this study by presenting the salient features in its contents.

5.2 Recapitulation of the Study

This study concerns on the relationship among the management of change and operational excellence. It also determined the moderating effect of affective commitment to change on management of change and operational excellence. The outcomes of this study identify variables that are important in explaining the achievement of operations excellence. This study utilized resource-based view as an approach to theory. The unit of analysis for this study was organizational in which one respondent represented one organization. Overall, 121 respondents participated in the survey. Respondents were chosen using systematic random sampling from the Federation of Malaysian Manufacturers (FMM) Industry Directory (FMM, 2008;

FMM, 2012). The selection was based primarily on the Electrical and Electronics manufacturing companies. The approach for primary data collection used in this study was by mail post, electronic mails and a drop in visit. Data were analyzed by using SPSS program and Microsoft Excel worksheet.

The specific objectives of this study were to: (1) determine the effect of manufacturing technology on the achievement of operational excellence, (2) determine the effect of organic structure on the achievement of operational excellence, (3) determine the effect of operations strategy on the achievement of operational excellence, (4) determine the effect of transformational leadership style on the achievement of operational excellence, (5) determine the effect of human resource practices on the achievement of operational excellence, (6) determine the effect of involvement cultural trait on the achievement of operational excellence, and (7) determine the moderating role of affective commitment to change in the relationship of Management of Change hard elements (technology, structure, strategy) and soft elements (leadership, human resource, culture) on achievement of operational excellence.

This study was undertaken to seek answers to three research questions. The questions were: (1) What are the effects of MOC hard elements such as technology, structure and strategy on the achievement of OPX? (2) What are the effects of MOC soft elements such as leadership, human resource and culture on the achievement of OPX? (3) Is there any moderating effect of employees' affective commitment to change on the relationship between MOC hard and soft elements and the achievement of OPX?

Responding to the first research question, this study determined that two out of three MOC hard elements effected on operational excellence of Malaysian E&E manufacturing companies. The results showed that organic structure and operations strategy had an effect on the achievement of operational excellence. The hypotheses were positive and significant and thereby confirmed. Conversely, the manufacturing technology did not affect operational excellence of Malaysian E&E manufacturing companies, and thus this hypothesis was not supported.

Similarly, this study also determined that two out of three MOC soft elements had an effect on the achievement of the company's operational excellence. Transformational leadership style and human resource practices were found to have an effect on the achievement of operational excellence for Malaysian E&E manufacturing companies. The hypotheses were positive and significant and thereby confirmed. In contrast, the analysis showed that the involvement cultural trait has no significant relationship with operational excellence; therefore, the hypothesis was not supported.

With respect to the third research question, one main hypothesis and six sub hypotheses were formulated. The results indicated that only two interaction items (moderators) had a moderating effect on the relationship between MOC and achievement of OPX. Firstly, the affective commitment to change moderated the relationship between operations strategy (hard element) and operational excellence of Malaysian E&E manufacturing companies. Secondly, the affective commitment to change moderated the relationship between transformational leadership style (soft element) and operational excellence of companies. The remaining four interaction items with affective commitment to change, namely, manufacturing technology,

organic structure, human resource practices, and involvement cultural trait had no moderating effect in this study.

5.3 Research Contributions and Implications

This study provided several contributions to theory, methodology and practice. Moreover, this study was among the first studies that examined ACTC as moderating the relationship between the MOC elements and OPX. The findings of this study provide significant insight into manufacturing operations and change management theories.

5.3.1 Theoretical Contributions

The development of theoretical framework and empirical testing of MOC elements on the OPX model, with a strong establishment of the linkages between organic structure, operations strategy, transformational leadership style and human resource practices are major contribution of this research. Compared to past management of change studies, which focused individually or on a limited set of organizational factor, the present study undertakes a different approach by integrating MOC hard and soft elements to predict the operational performance.

This study focuses on both economic and non-economic (Elkington, 1997; Hubbard, 2009; Staughton & Johnston, 2005) factors that have an important effect on firm's long-term sustainability (Elkington, 1999). This integration has developed new knowledge in the study of operational excellence. New knowledge generated from

this study could assist theory-building efforts, particularly in the operation management field and organizational change management. A researcher might use the findings for further research.

Importantly, seven of these research findings have contributed to theory building both in Management of Change and Operational Excellence domains. The result of this study revealed that Malaysian E&E manufactures must pay attention to organic structure, operations strategy, transformational leadership style and human resource practices in pursuing excellence. Therefore, the study adds value to the knowledge of MOC, particularly, because management of change is a complex model.

Also present is originality in terms of the model, which reflects a growing interest in extending operational management paradigms emerging in a developing country context, particularly with respect to insights about MOC and OPX. For example, the literature on Operational Excellence is growing while Malaysian manufacturing industry is often lacking in these discussions.

Furthermore, the present study supports RBV theories. RBV has suggested that organizations should have their own competences according to knowledge resources. These competencies must be rare and unique. Moreover, researchers also have found that many of resources and capabilities upon which competitive advantage is based reside in the operations function (Coates & McDermott, 2002; Lucas & Kirillova, 2011). The argument established in this study was organic structure, operations strategy, transformational leadership style and human resource for an organization could be rare, specified and costly-to-imitate, which a source of sustained operational excellence.

This study expects that the E&E manufacturing companies' ability to achieve a high level of operational excellence in an internal change environment depends upon the firms' internal resources, which are organic structure, operations strategy, transformational leadership style and human resource practices. The moderating factor, employee's affective commitment to change, was also found to moderate the relationship between operations strategy, transformational leadership and operational excellence significantly. Thus, these present findings further validate the application of this study model and justify the underpinning theory when applied to Malaysian E&E industry context.

Firstly, RBV has suggested that firms formalize organic structures and amass resources. Firm that tends to do so will attain better performance levels than those that do not. Secondly, RBV may help operations strategy to better integrate the sources of strategic advantages within a coherent portfolio of optional capabilities towards world practices. In addition, a resource view of the operations strategy is focused on its ability to manage operations well, developing operations excellence (Waters, 2006). Thirdly, RBV may assist operations attain a leadership of excellence, a transformational leadership style that will ensuring a firm's resources, competencies and capabilities are appropriately used as competitive weapons. Fourthly, RBV helps provide clear rules to develop and train human resources and retain talents in a systematic manner. Lastly, the affective commitment to change has little influence on organizational change if internal resources are utilized fully.

5.3.2 Methodological Contributions

Apart from the aforementioned theoretical contributions, this study has contributed significantly to the methodological perspective. For MOC elements, this study has adopted the measurement scales that were conceptualized and empirically tested by a few researchers in measuring the effects of MOC hard and soft elements on operational performance. This study has add-on sustainability performance metrics (non-economic measure) on top of the conventional performance metrics (economic measure) in operational excellence. The researcher computed a composite performance index by averaging scores across the six performance indicators which derive from two specific performance dimensions.

Operations management has been viewed traditionally as measuring important operations performance metrics including quality, time, cost and flexibility. The integration of economic and non-economic measure into operational performance metrics seems to be a rare but emerging direction in the manufacturing field (Muogboh & Salami, 2009). This justifies the fact that more and more manufacturing companies are subscribing to voluntary social and environment standards or certifications such as ISO14000 (Environmental Management System), and ISO26000 (Corporate Social Responsibility) (FMM, 2008; FMM, 2012). Because sustainability is a critical aspects of today's business environment (Hubbard, 2009; Muogboh & Salami, 2009), this methodology can be validated in future research to measure operational excellence or business excellence. Importantly, new measurement methods in this study could fill perceived performance gaps by merging both economic and non-economic measures.

5.3.3 Managerial Implications

The findings of this study address the managerial implications for Malaysia's E&E manufacturing organizations. The study finds several statistically significant relationships with practical applications. E&E manufacturing organizations that are interested in implementing change must be concerned with organic structure, operations strategy, transformational leadership style and human resource practices and affective commitment to change as well as with operational excellence of organization. Management teams and employees play imperative role that would ensure management of change is able to bring about best outcomes for organizations and for the people in them. In addition, the effective management of both hard and soft elements will play an important role in the management of change needed to drive completive new ventures forward towards long-term success, for instance, in achieving world-class manufacturer status.

This research measures the concept of Operational Excellence in a holistic manner. This research considers using both economic measures that includes operational priorities (quality, time, cost and flexibility) as well as sustainability (social and environmental). The result suggests that the key operations managers, while emphasizing the economic performance as their primary focus, also they should incorporate several aspects that support best practices in corporate social performance.

The findings show the importance of organic structure, operations strategy, transformational leadership style, and human resource practices in ensuring that operational excellence is achieved. Management is advised to establish policy,

systems and processes integrating all four elements in their planning and strategic direction.

In contrast, this study reveals that two elements are not significantly related to operational excellence. These include one 'hard', manufacturing technology, and one 'soft', involvement cultural trait. Therefore, E&E manufacturing managers should review the adequacy of technology management policies in terms of selection, acquisition, and exploitation. Furthermore, the involvement cultural trait of firm may need to be either established or enhanced. For example, employee participation and work in a team may not be enough if they do not contribute new ideas or are not hands-on in implementing those ideas into practices at operations level.

Managing organizational change is a most challenging task because of the resistance by people of the organization to the change effort. This study will help operations staff to understand the effect of MOC on OPX in developing countries, specifically in the Malaysian context. Firstly, managers of manufacturing firms may adopt change management to achieve operational excellence objectives of company. For example, they may be able to "discover" potential change management and develop practices, which might move organization performance forward. Secondly, the focus on the five competitive priorities such as quality, delivery, flexibility, cost and sustainability, present effective guidelines for managers should be maintained. Managers may start formulation of manufacturing strategy even as they address the regular demand for products. Thirdly, adoption of change management practices will improve infrastructural decision-making in areas of manufacturing strategy such as benchmarking, best practices, quality practices, and HR policies. Fourthly, the results of this research can assist managers in evaluating their performance and

search for excellence by selecting the appropriate model based on organizational needs. Fifth, managers must try diligently to obtain employee commitment to change for any change programs, in for example, people's commitment to executing new operations strategy to achieve operations priorities and sustainability. As a whole, this study could help practitioners to set directions for their organizations.

5.4 Limitations of the Study and Recommendation for Future Research

The researcher wishes to share a few notable limitations in present study with the hope that they serve as guides or opportunities for interested parties, particularly future researchers who are likely to explore similar contexts in their study. Firstly, this study is a cross-sectional study and was carried out at one point of time. This short period of study may not serve to observe the way in firms operate their businesses. Future research may consider longitudinal study with the possibility of expanding the findings to pre-changes and post changes. Longitudinal studies are believed to provide researchers the ability to test and observe selected parameters over time with the same individuals or set of organizations (Cavana et al., 2001). The benefits of longitudinal study are that it gives chance to study the linkages between complex variables (like change variables) and interactions over time (Bowen & Wiersema, 1999), particularly in a change environment.

Second is the sample frame and sample size of this study. The sample frame was the E&E industry, which indicates that the result cannot be generalized to another industry due to potential differences. The sample size was derived from the FMM directory, which excluded those E&E manufacturing companies that are not

registered to FMM. The respond rate was also limited which inhibited more rigorous testing of the data. Therefore, the findings cannot be generalized to all industries. The limitation suggests that future research could explore others industries. Including for example, local owned Malaysian firms like small-medium enterprise (SME) or small-medium industry (SMI) to add more insight on the usefulness of MOC 'hard' and 'soft' elements. Moreover, future study in the service industry would add richness to this area of interest.

Thirdly, this study had proven the important of few MOC elements in affecting the achievement of operational excellence. Because management of change is a complex model, maybe other important factors have been ignored because only selective dimensions were included in the construct. Further studies could focus on other elements or dimensions, not been included in this study. These could include manufacturing technology (exploitation and protection), organizational culture (consistency, adaptability and mission), continuance commitment, and normative commitment.

Fourth, future study can also investigate the management of change with respect to the external environment. Perhaps this exploration will provide new insights on how firms react to external forces to improve operational performance.

5.5 Conclusion

Change is vital for any organization if it desires to stay active, competitive and dynamic in today's business environment. Without undergoing change, an organization will lose its ability to compete. An organization will face hardship and

their opportunities of long-term survival will decrease without introducing adequate change from time to time (Stadtlander, 2006). Change is hard work and almost always reactive. What can be proactive is how an organization deals with a change situation and how the organization prepares itself to identify and integrate change on an on-going basis.

The literature has noted that organizational change can come from external force and internal initiative. Some authors have argued that organizational change has been viewed conventionally as actions taken by organizations to alter their internal characteristics for a better fit with their external environment. Therefore, managers in a firm need to build its own internal competencies to deal with organization issues, change, and strategizing.

A study to investigate the relationship between MOC elements (hard and soft) and OPX was necessary. The effect of ACTC is also deemed necessary for change in an organization. Success in change depends on proper integration of organic structure, operations strategy, transformational leadership style and human resource practices. Hence, management should establish policy, systems and processes by integrating both hard and soft elements in their strategic planning and future directions.

ACTC only has moderating effect between operations strategy and transformational leadership style and OPX in this study. The result thus suggests that in order for E&E firms to be effective and to benefit from operational excellence, firms must build up their internal abilities and capabilities through organic structure, operations strategy, transformational leadership style and human resource practices.

This study has shown that manufacturing technology and involvement cultural trait have no relationship between MOC and OPX. Nonetheless, it remains necessary to develop appropriate technology and an involvement culture because these help firms to confront organizational change. Not having a significant relationship does not mean that the elements are unimportant. What it does indicate is that some vital dimensions have been excluded from this study. Empirically, this study demonstrated the importance for organizations to focus on employees' commitment to change when engaging in operational excellence. On the other hand, understanding all three components of commitment to change also helps a firm in ensuring that operational excellence is well taken care of. Importantly, employees in the organization should be given the chance to be involved in all aspects of the process of change and be given the opportunity to provide opinions.

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